Inverse Domination And Inverse Total Domination In Digraph

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Abstract — *In this paper, we discussed about the various properties like domination in graph , Inverse domination in graph, Inverse total domination in graph, domination in digraph. Domination in graphs has been studied extensively. In contrast, there has been relatively little research involving domination in digraphs. In a digraph D, a vertex v openly (or 1-step) out-dominates every vertex to which v is adjacent and openly in-dominates every vertex from which v is adjacent. Let $D = (V, A)$ be a digraph. A subset S of V is called a dominating set of D if for every vertex v in $V - S$, there exists a vertex u in S such that $(u, v) \in A$. A subset S of V is called a total dominating set of D if S is a dominating set of D and the induced sub digraph $\langle S \rangle$ has no isolated vertices. The inverse domination number g'(G) of G is the order of a smallest inverse dominating set of G. The exact values of g'(G) for some standard graphs and also establish some general results on parameter. The study of inverse total domination in graphs and present some bounds and some exact values for $\gamma_t'(G)$. Also, some relationships between for $\gamma_t'(G)$ and other domination parameters are established. The inverse domination parameters corresponding to domination and total domination in digraphs and establish some results on these parameters. Also we introduce the disjoint domination parameters corresponding to domination and total domination in digraphs.*

Keywords: domination in graph , Inverse domination in graph, Inverse total domination in graph, domination in digraph, total domination in digraphs.

I. INTRODUCTION

The study of domination set in graphs was begun by V.R. Kulli and Janakiram [3]. Learned the applications of domination in graph theory in [3,4,5]. Attained the grap of Inverse domination in graphs in [7]. Acquired the domination number g(G) of G is the order of a smallest dominating set in G. Domination in Digraphs were known in [1,2,9,11,12]. Gain the knowledge of Application of inverse total domination in [6,8,10].

II. PRELIMINARIES

A. Definition

The **dominating graph** $D(G)$ of a graph $G = (V, E)$ is a graph with $V(D(G)) = V(G) \cup S(G)$ where $S(G)$ is the set of all minimal dominating sets of G, with $u, v \in V(D(G))$ adjacent if $u \in V(G)$ and v is a minimal dominating set of G containing u.

B. Definition

The **minimal dominating graph** $MD(G)$ of G is the intersection graph on the minimal dominating sets of vertices in G.

C. Definition

If a graph G is said to be a **vertex minimal dominating graph** $M_vD(G)$ of G if the graph having $V(M_vD(G)) = V(G) \cup S(G)$, where $S(G)$ is the set of all minimal dominating sets of G and two vertices u and v adjacent if they are adjacent in G or $v = D$ is a minimal dominating set containing u.

D. Definition

Let D be a minimum dominating set of G. If $V - D$ contains a dominating set say D', then D' is called an **Inverse Dominating Set** with respect to D.

E. Definition

The inverse domination number $\gamma'(G)$ of G is the order of a smallest inverse dominating set in G.

F. Definition

A set $D \subseteq V$ is a **Total Dominating set** of G if every vertex in V is djecent to some vertex in D.

G. Definition

The **Total Dominating Number** $\gamma_t(G)$ is the minimum cardinality of a total dominating set of G.

H. Definition

Let $D \subseteq V$ be a minimum total dominating Set of G. If $V - D$ contains a total dominating set D' of G, then D' is called an **Inverse Total Dominating Set** with respect to D.

I. Definition

The **Inverse Total Domination Number** $\gamma_t'(G)$ of G is the minimum cardinality of an inverse total dominating set of G.

J. Definition

Let D be a **Digraph** and let v be a vertex of D. The *(open) out-neighborhood* of v is $N^+(v) = \{u \in V(D) \mid (v, u) \in E(D)\}$ and the *(open)* in-neighborhood *of* v is $N^-(v) = \{u \in V(D) \mid (u, v) \in E(D)\}$. For a set S of vertices, the out-neighborhood of S is $N^+(S) = \bigcup_{v \in S} N^+(v)$ and the in-neighborhood of S is $N^-(S) = \bigcup_{v \in S} N^-(v)$.

K. Definition

The **minimum indegree** and **minimum outdegree** of a digraph D are defined, respectively, as $\delta^-(D) = \min_{v \in V(D)}\{|N^-(v)|\}$ and $\delta^+(D) = \min_{v \in (D)}\{|N^+(v)|\}$. The maximum indegree and maximum outdegree of D are defined in $\Delta^-(D)$ and $\Delta^+(D)$.

L. Definition

A vertex v in a digraph D **dominate**s itself and all vertices of $N^+(v)$, while v *openly dominates* only the vertices belonging to $N^+(v)$.

The **domination number** $\gamma(D)$ is the minimum cardinality of a dominating set of D, and the **open domination number** $\rho_1(D)$ is the minimum cardinality of an open dominating set of D. For the digraph D of Figure 6.1, it is straightforward to show that $[u, w]$ is a minimum dominating set of D and $\{u, w, x\}$ is a minimum open dominating set of D. Therefore, $\gamma(D) = 2$ and $\rho_1(D) = 3$.
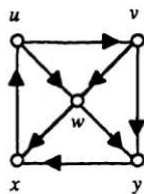

Figure: A Digraph

M. Definition

Two well-known digraphs are the **directed n-cycle** $\overrightarrow{C_n}$ of order n and the directed path P_n of order n. The digraphs C_6 and P_5 are shown in Figure 6.2. It is straightforward to show that $\gamma(\overrightarrow{C_n}) = \left[\frac{n}{2}\right]$, $\gamma(\overrightarrow{P_n}) = \left[\frac{n}{2}\right]$, $\rho_1(\overrightarrow{C_n}) = n$ and $\rho_1(\overrightarrow{P_n})$ is not defined.

III. INVERSE DOMINATION AND INVERSE TOTAL DOMINATION IN DIGRAPHS

Definition : 3.1

Let $D = (V, A)$ be a digraph. Let S be a minimum dominating set in a digraph D. If $V - S$ contains a dominating set S' of D, then S' is called an inverse dominating set with respect to S. The minimum cardinality of an **Inverse Dominating Set Of A Digraph** D is called the inverse domination number of D and is denoted by $\sqrt{-}^1(D)$.

Remark : 3.2

We note that not all digraphs have inverse dominating sets.

Example : 3.3

For the digraph D shown in Figure 1, $S = \{4,5\}$ is a minimum dominating set and $V - S = \{1, 2, 3, 6, 7\}$ is not a dominating set. Thus $V - S$ does not contain a dominating set. Hence the digraph D has no an inverse dominating set.
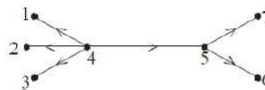

Figure 1

Definition: 3.4

The upper inverse domination number $\lceil^{-1}(D)$. of a digraph D is the maximum cardinality of an inverse dominating set of D.

Example : 3.5

Let D be the digraph as in Figure 2. The minimum dominating sets of D are $\{1, 3\}, \{2, 5\}$ and the corresponding inverse dominating sets are $\{2, 5\}, \{1, 3\}$ respectively. Thus $\gamma(D) = 2$ and $\gamma^{-1}(D) = \lceil^{-1}(D) = 2$. Hence $\gamma(D) = \gamma^{-1}(D)$.
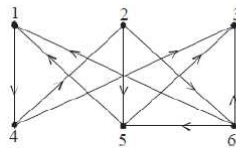

Figure 2

Proposition: 3.6

For any directed cycle C_{2p}, $p \geq 2$, $\sqrt{-1}(C_{2p}) = p$.

A $\sqrt{-1}$ - set is a minimum inverse dominating set of a digraph D.

Proposition: 3.7

If a digraph D has a $\sqrt{-1}$-set, then $\gamma(D) \leq \sqrt{-1}(D)$ and this bound is sharp. (1)

Proof:

Clearly every inverse dominating set of a digraph is a dominating set. Thus (1) holds.
The directed cycles $C_{2p}, p \geq 2$ achieve this bound.

Proposition: 3.8

If a digraph D has a $\sqrt{-1}$-set, then

$\gamma(D) + \sqrt{-1}(D) \leq p$ and this bound is sharp. (2)

Proof

(2) follows from the definition of $\sqrt{-1}(D)$.
The directed cycles $C_{2p}, p \geq 2$ achieve this bound.

Definition: 3.9

Let $D = (V, A)$ be a digraph in which $id(v) + od(v) > 0$ for all $v \in V$. Let S be a minimum total dominating set in a digraph D. If $V - S$ contains a total dominating set S' of D then S' is called an inverse total dominating set with respect to S. The inverse total domination number of D is the minimum cardinality of an inverse total dominating set of D.

Definition: 3.10

The upper inverse total domination number of a digraph D is the maximum cardinality of an inverse total dominating set of D.

Example: 3.11

Let D be a digraph as in Figure 3. The minimum total dominating sets of D are
$\{1, 2, 5\}$ and $\{3, 4, 6\}$ and the corresponding inverse total dominating sets are
$\{3, 4, 6\}$ and $\{1, 2, 5\}$ respectively.
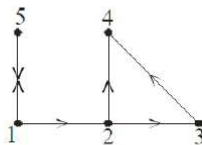Therefore $\gamma_t(D) = \gamma_t^{-1'}(G) = \lceil_t^{-1}(D) = 3$.

Figure 3

A $\gamma_t^{-1'}$-set is a minimum inverse total dominating set of a digraph D. Not all di-graphs without isolated vertices have a total dominating set. We also note that not all digraphs without isolated vertices have an inverse total dominating set. For example, the directed cycle C_4 has a total dominating set, but has no an inverse total dominating set.

Proposition: 3.12

If a digraph D has a -set, then $\gamma_t(D) \leq \gamma_t^{-1'}(D)$ and this bound is sharp. (3)

Proof

Clearly, every inverse total dominating set is a total dominating set. Thus (3) holds. The digraph D of Figure 7.3 achieves this bound.

Proposition: 3.13

If a digraph D has a $\gamma_t^{-1`}$ -set,

then $\gamma_t(D) \leq \gamma_t^{-1`}(D) \leq p$ and this bound is sharp. (4)

Proof

 (4) follows from the definition of .

The digraph D of Figure 7.3 achieves this bound.

Proposition: 3.14

Let S be a γ_t -set of a connected digraph D . If a -set exists in D , then D has at least 4 vertices.

Proof

 Let S be a γ_t -set of D . Since D has no isolated vertices, $\gamma_t(D) = |S| \geq 2$. If a $\gamma_t^{-1`}$ -set exists, then $V - S$ contains a total dominating set with respect to D . Thus $|V - S| \geq 2$. Thus D has at least 4 vertices.

Theorem: 3.15

If a digraph D has a γ_t -set, then $2 \leq \sqrt{-1t}(D) \leq p - 2$.

Proof

By definition, $\gamma_t(D) \geq 2$ and by Proposition 7.4, $\gamma_t(D) \leq \gamma_t^{-1`}(D)$.
Thus $2 \leq \gamma_t^{-1`}(D)$.
By Proposition,
$\gamma_t^{-1`}(D) \leq p - \gamma_t(D) \leq p - 2$, since $2 \leq \gamma_t(D)$.
We establish a Nordhaus-Gaddum type result.

NOTE: 3.16

Let D be a digraph such that both D and have no isolated vertices.
Then

$$4 \leq g_t^{-1`}(D) + g_t^{-1`}(\overline{D}) \leq 2(p - 2),$$
$$4 \leq g_t^{-1`}(D) \cdot g_t^{-1`}(\overline{D}) \leq (p - 2)^2.$$

CONCLUSION

In this paper entitled "**INVERSE DOMINATION AND INVERSE TOTAL DOMINATION IN DIGRAPH**" we make an in-depth study in the domination theory for graph and digraph and its related works. We discussed about the Graph theory, Domination in Graph, Domination in digraph, inverse domination in graph and application of inverse total domination graph theory and history of these graph. We dealt with the basic definitions related to the graph theory We dealt with the definitions, examples and theorems of the inverse domination and inverse total domination in digraph.

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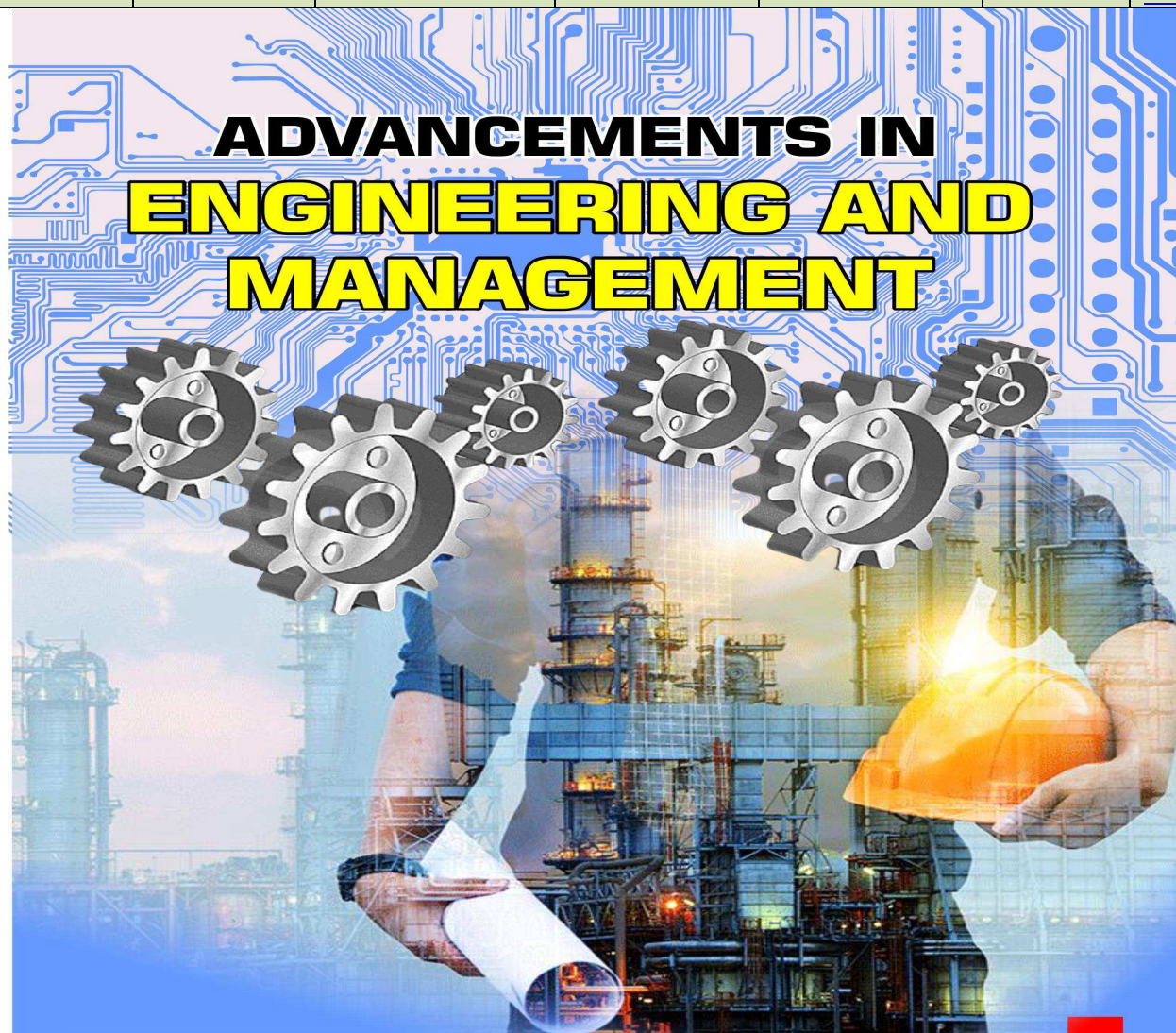
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MANGLAM

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Literature Investigations of Pollutant Removal Using Low Cost Adsorbents

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ABSTRACT

To increasing number of publications on adsorption of toxic pollutants by modified adsorbents shows that to increasing interest in the synthesis of new low-cost adsorbents used in wastewater treatment. The purpose of this review 125 article is to organize the scattered available information on various aspects on a wide range of potentially low-cost adsorbents. The waste materials have some value for the treatment of wastewater. The present review highlights to develop the alternative adsorbents from natural materials, waste materials from industry, agriculture by products etc. Various conventional methods and their advantages and their disadvantages for the removal of pollutants from the wastewater were discussed. In this review, an extensive list of low-cost adsorbents from vast literature has been compiled and their adsorption capacities for the removal of pollutants. It is evident from the literature survey that various low-cost alternative adsorbents have shown good potential for the removal of pollutants.

Keywords: Sorption, heavy metals, dyes, Low-cost adsorbents, Agricultural solid waste, Industrial waste.

Introduction

Heavy metal ions have become an eco-toxicological hazard of prime interest and increasing significance, because of their accumulation in living organisms. Heavy metal pollution is one of the most important environmental problems today.

Heavy metals enter into the body through drinking, eating, inhaling and skin and eye contact. Once in the body they do damage on the cellular level by causing

dangerous free radicals production. The damage that they do is on the cellular level, and can cause cancer and many other diseases.[1] Various industries produce and discharge wastes containing different heavy metals into the environment, such as mining and smelting of metalliferous, surface finishing industry, energy and fuel production, fertilizer and pesticide industry and application, metallurgy, iron and steel, electroplating, electrolysis, electro-osmosis, leatherworking, photography, electric appliance manufacturing, metal surface treating, aerospace and atomic energy installation etc. Thus, metal as a kind of resource is becoming shortage and also brings about serious environmental pollution, threatening human health and ecosystem. Three kinds of heavy metals are of concern, including toxic metals [such as Hg, Cr, Pb, Zn, Cu, Ni, Cd, As, Co, Sn, etc.], precious metals [such as Pd, Pt, Ag, Au, Ru etc.] and radionuclides [such as U, Th, Ra, Am, etc.].[2]

Heavy metals cause serious health effects, including reduced growth and development, cancer, organ damage, nervous system damage, and in extreme cases, death. Exposure to some metals, such as mercury and lead, may also cause development of autoimmunity, in which a person's immune system attacks its own cells. This can lead to joint diseases such as rheumatoid arthritis, and diseases of the kidneys, circulatory system, nervous system, and damaging of the fetal brain. At higher doses, heavy metals can cause irreversible brain damage. Children may receive higher doses of metals from food than adults, since they consume more food for their body weight than adults.[3]

The conventional methods for heavy metal removal from water and wastewater include oxidation, reduction, precipitation, membrane filtration, ion exchange and adsorption. Adsorption on activated carbon has been found to be superior compared to other chemical and physical methods for wastewater treatment in terms of its capability for efficiently adsorbing a broad range of pollutants, fast adsorption kinetics and its simplicity of design.[4]

The adsorption process is generally classified as physicsorption[characteristic of weak Van Der Waals forces] or chemisorption [characteristic of covalent bonding]. It may also occur due to electrostatic attraction. In physical activation process, the processes of carbonization and activation take place in two separate steps. The activating medium mostly commonly used were certain oxidizing gases like steam, carbon dioxide, air etc. This is a high temperature process as compared to that of chemical activation.[5] The raw material which in most of the cases is of cellulosic nature, so the chemical activation, the precursor is impregnated with a dehydrating agent, usually zinc chloride or inorganic acids, prior to carbonization in an inert environment. The chemical activation method is used due to the fact that the chemical activating agents play an important role in the carbonization process,

in which they act as dehydration agents and minimize the formation of tar during carbonization.[6,7] Chemical activation is preferred over physical activation owing to the lower temperatures and shorter time needed for activating material.

Characterization

Physical characteristics namely ash content [%], moisture content [%], pH, surface area, bulk density, specific gravity, porosity [%], Apparent density [g/ml], and pH_{PZC} of the adsorbents used in this study were determined for the adsorbents. X-ray scattering techniques are a family of non-destructive analytical techniques which reveal information about the crystallographic structure, chemical composition, and physical properties. Energy Dispersive X-ray analysis [EDAX] is a widely used technique to analyze the chemical components in a material under SEM. A scanning electron microscope [SEM] is a type of electron microscope that images a sample by scanning it with a high-energy beam of electrons in a raster scan pattern. The electrons interact with the atoms that make up the sample producing signals that contain information about the sample's surface topography, composition, and other properties such as electrical conductivity. The functional groups are analyzed Fourier transform infrared spectroscopy [FT-IR].

Results and Discussion

Heavy Metals-Food Sources-Industrial Sources and Its Toxicity

Heavy metal ions have lethal effects on all forms of life and these enter the food chain through the disposal of wastes in water channels. From among various metal ions like As[II], Cd[II], Cr[IV], Co[II], Cu[II], Fe[III/II], Hg[II], Ni[II], Pb[II] and Zn[II] etc., are at the top on the toxicity list. Due to non-biodegradability, metal ions accumulate and their amounts are increased along the food chain. Hence, their toxic effects are more pronounced at higher trophic levels. Various sources and toxicity and permissible limits of certain metal ions are listed in Table I.

Conventional Processes of Heavy Metal Removal

The conventional processes for removing heavy metals from wastewater include many processes such as chemical precipitation, flotation, ion exchange, electrochemical deposition and adsorption. Listed in Table II.

The removal of toxic metal ions from waste water is an important and widely studied research area. With better awareness of the problems associated with metals and dyes came an increase in research studies related to methods of removal from

Table 1: Heavy metals sources and Toxicity

S.No.	Metal	Food Source	Industrial Source	Toxic Effect	Permissible Level [mg/L]	References
1.	As	Green papaya, rice, tomato, carrot, seafood, Indian mustard, bovine and chicken meat, wine, milk	Agricultural application of various pesticides, herbicides and fertilizers, and industrial effluents from metallurgy, electronics, mining, pharmaceu- ticals, glass processing, ceramic, dye and pesticides manu- facturing, wood preservatives, petroleum refining, and landfill leaching	Chronic health effects commonly include skin, lung, bladder, liver, kidney and prostate cancers, neurological, hematological, renal, respiratory and cardiovascular diseases	0.05	20
2.	Cd	Egg, fish, mushroom, garlic, spinach, wheat, rice, oat, corn, soyabean, peanuts ,mushroom	Metal plating, cadmium-nickel batteries, phosphate fertilizers, mining, pigments, stabilizers, metallurgy, ceramics, photograph, textile printing, lead mining, sewage sludge, alkaline batteries, and electroplating	Lung insufficiency, bone lesions, and hypertension	0.01 & 0.003- WHO	21,22
3.	Co	Fish, nuts, broccoli, spinach,cereals, and oats	Nuclear power plants and industrial waste discharges including mining, metallurgical mining, metallurgical electroplating, paints, pigments and electronic products.	Paralysis, severe diarrhoea, low blood pressure, bone defects and lung irritation.	0.05	23,24

Contd...

S.No.	Metal	Food Source	Industrial Source	Toxic Effect	Permissible Level [mg/L]	References
4.	Cr	Whole grains, Bread, Brown rice, Meat, Broccoli, Mushrooms, Green beans, Brewer's yeast, Chicken, Calves' liver, Cereals, Cheese, Eggs, , Sea food, Corn, Potatoes, Diary products, and Fresh vegetables	Leather tanning, electroplating, metal processing, wood preservatives, paint and pigments, textile, dyeing, steel fabrication and canning industry	cancer in the digestive tract and lungs and may cause epigastric pain, nausea, vomiting, severe diarrhoea, and hemorrhage	0.05	25,26
5.	Cu	Shellfish, whole grains, beans, nuts, potatoes, and organ meats [kidneys, liver] are good sources of copper. Dark leafy greens, dried fruits such as prunes, cocoa, black pepper, and yeast	Industrial activities such as electroplating, mining, power plants and electrical equipment manufacturing	Stomachache, irritation of nose, mouth, eyes and headache	2	27
6.	Fe	Liver, sunflower seeds, nuts, beef, lamb, beans, whole grains, dark leafy greens [spinach], dark chocolate, and tofu	Metallurgical, electroplating, metal finishing industries, tanneries, chemical manufacturing, mine drainage and battery manufacturing	Norexia, oligura, diarrhoea, hypothermia, diphasic shock, metabolic acidosis and even death	0.1 & 0.3-EPA	28,29

Contd...

Contd...

S. No.	Metal	Food Source	Industrial Source	Toxic Effect	Permissible Level [mg/L]	References
7.	Hg	Egg, mushroom, seafood, fish oil	Natural processes [volcanic action, erosion of mercury–containing sediments] and anthropogenic activities [mining operations, tanneries, metal plating facilities]	Neuronal disorders , damage to the cardiovascular system, kidney, bones,	0.01	30,31
8.	Ni	Cereals, carcass meat, poultry, fish , eggs, green vegetables, potatoes, milk, dairy products, nuts, fresh fruits, oils and fats	Mining, electroplating, metal processing, textile and battery manufacturing industry	Damage to lungs, kidneys, gastrointestinal distress, e.g., nausea, vomiting, diarrhea, pulmonary fibrosis, renal edema, and skin dermatitis	0.02	32
9.	Pb	Egg, cocoa powder, rice, wheat, potato, calcium supplement, smoked food, wine, beer, milk, carrot, raisins	Electroplating, paint, pigment, basic steel work, textile industries, metal finishing and electric accumulators' batteries	Impaired blood synthesis, hypertension, severe stomach ache, brain, kidney damage and even can cause miscarriage in pregnant women	0.05	33,34
10.	Zn	Beans, nuts, whole grains, fortified breakfast cereals, and dairy products	Mining, electroplating, petroleum refining, wood preservatives, catalysts, photographic paper, accelerators for rubber vulcanization, ceramics, textiles, fertilizers, pigments and batteries	Anemia, damage to pancreas, lungs, metal fume fever, decreased immune functions, ranging from impaired neuropsychological functions, growth retardation and stunting, impaired reproduction, immune disorders, dermatitis, impaired wound healing, lethargy, loss of appetite and loss of hair	0.08	35-37

Table II: Merits and demerits of different treatment technologies for the sorption of heavy metals from aqueous systems

S. No.	Heavy metals removed by various Technology	Merits	Demerits	References
1.	Membrane Filtration	• Low solid waste generation • Low chemical consumption • Small space requirement • Metal selective method	• Valid at room temperature. At elevated temperature membrane deterioration can be rapid • Various types of polyamide TFM exhibit significant differences in stability at low pH • High initial capital cost • High maintenance and operation costs • Membrane fouling and limited flow rates.	38,39
2.	Flocculation–Flotation	• Metal selective • Low retention times • Removal of small particles	• High initial capital, maintenance and operation cost	40
3.	Ion-Exchange	• Metal selective • Limited pH tolerance • High regeneration capacity	• High initial capital and maintenance cost	41
4.	Coagulation and Precipitation	• Bacterial inactivation capability • Good sludge settling and dewatering characteristics • Process simplicity • Applicable to different metals • Low capital cost	• Much chemical consumption • Large volume sludge • Large volume sludge formation • High sludge disposal and maintenance cost	42
5.	Electrocoagulation	• Good sludge settling and Dewatering characteristics	• Much chemical consumption • Large volume sludge	43
6.	Adsorption	• Wide variety of target pollutants High capacity and fast kinetics • Possibly selective depending on adsorbent	• Performance depends on type of Adsorbent • Needs chemical modification to improve its sorption capacity	44

waste water, for which a number of technologies have been developed over the years. The process of adsorption is considered as one of the most suitable methods of the removal of contaminants from water and a number of low cost adsorbents have been reported for the removal of heavy metals [ions] from aqueous solutions. Organic water pollutants are, Food processing waste, including pathogens, Pesticides, Insecticides and herbicides, a huge range of organ halide and other chemicals, Tree and brush debris from logging operations, Bacteria from sewage or livestock operations, Petroleum hydrocarbons like diesel, gasoline, jet fuels, fuel oils and motor oils and Volatile organic compounds like industrial solvents etc.,. Inorganic water pollutants are, Pre-production industrial raw resin pellets, Heavy metals including acid mine drainage, Chemical waste as industrial by-products, Acidity due to industrial discharges like Sulphur dioxide and Fertilizers in runoff from agriculture including nitrates and phosphates etc.,.

Several types of adsorbents are developed to get enhanced adsorption capacity in inexpensive way. In this invention many researchers have contributed for development of adsorbents from natural sources, industrial wastes, agricultural wastes, food waste etc. Pretreatment methods using different kinds of modifying agents such as base solutions [sodium hydroxide, Potassium hydroxide, calcium oxide,[8] sodium carbonate] mineral and organic acid solutions hydrochloric acid, nitric acid, sulfuric acid, tartaric acid, citric acid, thioglycollic acid], organic compounds [ethylenediamine, formaldehyde, epichlorohydrin, methanol], oxidizing agent [hydrogen peroxide], dye [Reactive Orange 13], etc. for the purpose of removing soluble organic compounds, eliminating colouration of the aqueous solutions and increasing efficiency of metal adsorption have been performed by many researchers.

Comparison of Sorption Performance

Generally, a suitable non-conventional low-cost adsorbent for metals, dye and organic pollutant adsorption should meet several requirements: [i] Efficient for removal of a wide variety of pollutants; [ii] High capacity and rate of adsorption; [iii] High selectivity for different concentrations; and [iv] Tolerant of a wide range of wastewater parameters.

Certain waste products [both agro and industrial], natural materials and biosorbents have been tested and proposed for the removal of various pollutants. Each low-cost adsorbent has its specific physical and chemical characteristics such as porosity, surface area and physical strength, as well as inherent advantages and disadvantages in wastewater treatment. In addition, adsorption capacities of sorbents also vary, depending on the experimental conditions. Therefore,

comparison of sorption performance is difficult to make. However, it is clear from the present literature survey that the low cost adsorbents may have potential as readily available, inexpensive and effective sorbents. They also possess several other advantages that make them excellent materials for environmental purposes, such as high capacity and rate of adsorption, high selectivity for different concentrations, and also rapid kinetics.

Low Cost Adsorbents

Natural materials that are available in large quantities, or certain waste products from industrial or agricultural operations, may have potential as inexpensive sorbents. Due to their low cost, after these materials have been expended, they can be disposed of without expensive regeneration. Most of the low cost sorbents have the limitation of low sorptive capacity and thereby for the same degree of treatment, it generates more solid waste [pollutant laden sorbent after treatment], which poses disposal problems. Therefore, there is need to explore low cost sorbent having high contaminant sorption capacity.

Agricultural Solid Waste, Industrial Waste, Resins, Fly Ash

Utilization of agricultural wastes is of great significance in India, where more than 200 million tons of agricultural residues are generated annually. The utilization of agricultural waste provides additional employments and income to marginal farmers and landless agricultural labourers, especially in developing countries. A number of non-conventional, low cost plant materials [residues], used as adsorbents for removal of pollutants, include fruit waste of Prosopisjuliflora, wood, waste orange peel, banana pith, coir pith, bagasse pith, maize cobs, barley husk, apple pomace, sunflower stalks, coconut shell, sawdust, mango leaves, chitosan, egg shell, and other adsorbents.[8] Reported the adsorption capacity by removal of anionic dye from aqueous solution using groundnut shell activated carbon was 125 mg/g. Eggshell Powder as an adsorbent for removal of Fluoride from Aqueous Solution with sorption capacity 1.09 mg/g at pH 6.0 was reported.[9,10] Watermelon Shell for the Removal of Copper from Aqueous Solutions with sorption capacity 111.1 mg/g at pH 8.0, it follows Langmuir adsorption isotherm and pseudo-second-order kinetic model.[11] Reported yellow passion fruit peel as adsorbent, the maximum adsorption capacity after 50 h of contact time at pH 9.0 and temperature 25°C was 0.0068 mg/g.[12] Reported, banana and orange peel was used for the removal of methyl orange [21.0mg/g] > methylene blue [20.8 mg/g] > Rhodamine B [20.6 mg/g] > Congored [18.2 mg/g] > methyl violet [12.2mg/g] > amido black 10B [6.5 mg/g].[13] Was reported removal of chromium from an

aqueous solution using Neem leaf powder as an adsorbent. The adsorption data fit in both Freundlich and Langmuir isotherms [7.09 mg/g] the adsorption mechanism is described by a pseudo second order kinetics. Holly oak leaf, stem and root The metal uptake capacity of the root for different metals was found to be in the order: Ni>Cd>Pb>Cu>Cr; stem Ni>Pb>Cu>Cd>Cr; and leaf Ni>Cd>Cu>Pb>Cr. The highest amount adsorbed was Ni [root>leaf>stem].[13]

Adsorption with ion exchange resin is one of the popular methods for the removal of heavy metals from the water and wastewater. Ion exchange resins with large surface area and macro porous structure have been successfully used for the preparation of chelating sorbents. The resin beads having different chelating agents sorbed on them show marked selectivity towards a particular metal ion. The potentiality of chelating ion exchange resins for the separation and preconcentration of metal ions have been established.[14,15] Reported the adsorption of behavior of Cd[II] on strong acid cation exchange resin. The maximum adsorption capacity is 355 mg/g fitted with Freundlich sorption isotherm.[16] Reported anion exchange resin for boron removal were investigated in a packed bed column under the optimum operation conditions at pH 8.5.[17] Reported adsorption of chromium [VI] by ethylene diamine-modified cross-linked magnetic chitosan resin. The maximum adsorption capacities obtained from the Langmuir model are 51.813mg/g, 48.780mg/g and 45.872mg/g at 293, 303 and 313 K, respectively.

Fly ash is a by-product producing during the combustion of coal in the electricity generation process. Disposal of fly ash has become an increasing economic and environmental burden. In Australia, fly ash production is around 8 Mt per year while the annual incorporation into cement and concrete accounts for only about 1 Mt. Previously,[17] reported the methylene blue have been removed with the adsorption capacity at 1, 3 and 5M NaOH solution will be 1.2×10^{-5}, 4.2×10^{-5} and 3.5×10^{-5} mol/g at the equilibrium.[18] Reported fly ash is capable of removing fluoride concentration up to 100 ppm. Lower pH helps better fluoride adsorption by column mode.[19] Was reported from aqueous solution by lignite fired fly ash with adsorption capacity 26.954 mg/g and 22.94 mg/g.

The parameter which has been investigated for optimizing the use of adsorbent in waste water treatment, by using various adsorbents and adsorbate concentration, pH of the aqueous solution, Dosage of the adsorbent, Ionic strength, Temperature, Adsorption isotherms, Kinetics of adsorption and the contact time. The pollutant adsorption capacities [mg/g] are compared. Summary of some of the highest adsorption capacities and shown in Table IV. Fig. 1 & Fig. 2 are Compared maximum adsorption capacities [mg/g] for Cu [II] and Ni [II] on several low-cost sorbents.

Table III: Removal of heavy metals, dyes and organic pollutants by various adsorbents – [Physical and Chemical activation]

Pollutant	Precursors	Common activating agent	References
Heavy Metals	Macadamia nutshell	KOH, $ZnCl_2$	44
	Almond Husk	HCl, N_2 and CO_2	45
	Coconut shell and Palm seed	$ZnCl_2$-CO_2	46
	Sulfonated copolymer of styrene and divinylbenzene	H_3PO_4	47
	Chloromethylated and sulfonated copolymer of styrene and divinylbenzene	H_3PO_4	48
	Coconut pith	Pyrolysed with H_3PO_4 and NaOH	49
	Peanut shells	Pyrolysis and steam activation by air oxidation.	50
	Pomegranate peel	H_3PO_4, $ZnCl_2$ and HNO_3	51
	Banana peel	Methanol	52
	Sawdust	Citric acid	53
	Activated sludge	H_2SO_4	54
	Pods of Delonixregia	H_2SO_4	55
	Azadiractaindica bark	H_2SO_4	56
	Hydroxyapatite nanoparticles	-	57
	Iron and silicon oxides	-	58
	Straw pulp	K_2CO_3	59
	Dowex 50x4, 50x2 and Dowex M-4195 resins	-	60
	Coconut shell	$CaCO_3$, KOH, H_3PO_4 and $ZnCl_2$	61
	Animal shell	Oxalic acid and HCl	62
	Coffee residues	$ZnCl_2$, KOH	63
	Mango nuts	$ZnCl_2$	64
	Acanthaceaeleaves	H_2SO_4	65

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Pollutant	Precursors	Common activating agent	References
	Straw pulp	K_2CO_3, KOH	66
	Peanut shell	H_3PO_4	67
	Fly Ash	NaOH and NaOH-Methyl orange	68
	Oil palm empty fruit bunch , bamboo stem, and coconut shells	KOH	69
	Manganese ore tailings	Digestion—oxidation—Co-precipitation	70
	Polyacrylamide grafted rice straw and rice husk	H_3PO_4	71
	Palm kernel shel	KOH	72
	Peels of Banana	-	5
Dyes	RicinuscommunisEpicrab	H_2SO_4	73
	Peel of cucumis sativa	H_2SO_4	74
	Rice straw	Citric acid	75
	Jatropha Husk	Steam, $ZnCl_2$, H_2SO_4,HCl, HNO_3,and H_3PO_4	76
	Neem husk	H_3PO_4, KOH and $ZnCl_2$	77
	Annonasqumosa seed	H_2SO_4	78
	Rice husk	NaOH	79
	Tea Waste	H_2SO_4	80
	Acacia fumosa seed shell	HCl	81
Organic Pollutants	Apricot stone	H_3PO_4	82
	Nano particles of iron oxide	-	83

Table IV: Literature review

Adsorbent	Adsorbate	Adsorption Maximum [mg/g]	Conditions: [Dose[g], pH, Conc[mg/L], Time [mts]	Co-efficient	Isotherm and Kinetic Model	References
Filtrasorb 400	Remazol Reactive Yellow, Remazol Reactive Black and Remazol Reactive Red	714, 278 & 213	pH 5.5, 5.0 and 5.0	R^2	Langmuir, Pseudo-second order	84
Ulothrixzonata	Cu[II]		0.1g, pH 4.5, 50 mg/L, 120 mts	R^2	Langmuir	85
Resins – IRN77 and SKN1,	Co[II]	75.63 & 60.03	150mg/L, pH 5.3, 100mg/, 4hrs	R^2	Freundlich and Langmuir, Pseudo first order	86
Almond husk	Ni[II]	4.89	pH 5.0,5g/L, 50 mts	R^2	Langmuir	87
Thujaorientalis	Cu[II]	19.23	pH 7.7, 50 mg/L, 60 mts	R^2	Langmuir	88
Brown seaweed Sargassumsp	Cu[II]	1.48	pH 5.0, 18.8mg/L, 120 mts	R^2	Langmuir	89
Wheat bran	Cu[II]	51.5	0.5g, pH 5.0, -30 mts	R^2	Langmuir, Pseudo-second order	90
Kaolinite clay	Pb[II], Cu[II], Fe[III], Mn[II] and Zn[II]	-	0.1g, pH 7.0, 10 mg/L, 60 mts	R^2	Freundlich	91
Chitosan	Zn[II]	1.1897	10mg, pH 7.0, 10 mg/L, 6 mts	R^2	Freundlich and Langmuir	92
Aeromonascaviae	Cr[VI]	-	pH 2.5	R^2	Freundlich and Langmuir, Pseudo second order	93
Fontinalisantipyretica	Cd [II], Zn[II]	28.0 & 11.5	2.0, pH 5.0,-,-	R^2	Langmuir	94
Chitosan	Cu[II]	33.44	0.01g, 6.0, 5 mg/L, 50 mts	R^2	Langmuir, Pseudo-second order	95
Chitosan/PVA beads		47.85	0.01g, 6.0, 5 mg/L, 70 mts			

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Adsorbent	Adsorbate	Adsorption Maximum [mg/g]	Conditions: [Dose/g], pH, Conc[mg/L], Time [mts]	Co-efficient	Isotherm and Kinetic Model	References
Coir, Jute, Sawdust and Groundnut shell	Pb[II]	0.127, 0.087, 0.090, & 0.106	90 mts	R^2	Langmuir, Pseudo-second order	96
Husk of tur dal [Cajanuscajan]	Fe [III] and Cr [VI]	66.63 & 96.05	pH 2 and 2.5	R^2	Freundlich and Langmuir	97
Hydrogen peroxide	Pb[II], Zn[II]& Cu[II]	57.63 ,18.9 & 13.9	pH 7.6	-	-	98
Cassia fistula[Golden Shower]	Ni[II]	-	[480 min]	R^2	Pseudo-second order	99
Rosa centifolia	Pb[II], Zn[II]	87.74 & 73.8	0.1g, pH 5.0, 80 mg/L, 160 mts	R^2	Freundlich and Langmuir, Pseudo second order	100
Marine green algae [Ulvalactuca]	Cu[II]	24.5	2g, 5.0 and 50 mg/L	[RMSE] and Chi-square test, R^2	Freundlich and R-P, Pseudo-second order	101
Activated green algae		32.3			Freundlich, Pseudo-second order	
Rhodococcusopacus	Cd [II], Zn[II]	1.5 & 1.3	pH 7.0, 15mg/L, pH 7.0, 5mg/L	R^2	Freundlich, Pseudo-second order	102
Olive cake ash	Cd[II] and Ni[II]	8.38 & 7.32	1g/L, pH 6, -, 2 hrs	R^2	Langmuir, Pseudo-second order	103
Activated carbon	Phenol	0.338	-	R^2	Langmuir	104
bottom ash and deoiled soya	Congo red	2.5 & 15.55	0.05g, 7.05,-,-	R^2	Langmuir, Pseudo-second order	105
Macrofungus[Amanita rubescens]	Pb[II] and Cd[II]	38.4 & 27.3	4g/L, pH 5.0, -, 30 mts	R^2	Langmuir, Pseudo-second order	106

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Adsorbent	Adsorbate	Adsorption Maximum [mg/g]	Conditions: [Dose[g], pH, Conc[mg/L], Time [mts]	Co-efficient	Isotherm and Kinetic Model	References
Algae Marine [Gracilaria]	Ni[II]	2.305	0.6g, pH 5.0, 30 mg/L, 60 mts	R^2	Langmuir, Pseudo-second order	107
Hazel Nut Shell and Hazel Nut Shell ash	Cd[II]	0.039 & 0.0041	0.2mg/L, pH 6, 30mg/, 180 mts	R^2	Freundlich and Langmuir	108
Powdered corn cobs	Cd [II]	-	0.3g, 7.37, 0.2mg/L, 18h	R^2	Pseudo-second order	109
Coconut husk and Teak tree bark.	Cr[VI] and Ni[II]	-	0.2mg, pH 7, 100mg/L, 30 mts	R^2	Freundlich, Pseudo-second order	110
Bael tree leaf	Ni[II]	1.527	20g/L, pH 6.2, -, 30 mts	R^2	Langmuir, Pseudo-second order	111
Spirulinaplatensis	Cu[II]	67.93	pH 5, 300 mts	R^2, RSS, SSE	Langmuir, Pseudo-second order	112
Waste Tea [Camellacinencis]	Ni[II]	1.07	0.2 mg, pH5.0, 10 mg/L., 60 mts	R^2	Langmuir, Pseudo-second order	113
hazelnut, almond and walnut shells	Cu[II], Zn[II]	-	pH 7, 10 mts and pH 8, 10 mts	R^2	Pseudo-second order	114
Cajanus Cajan[L]Milspseed shell	Cr[VI]	45.454	0.5g, pH 2, -, 60 mts	R^2	Freundlich, Pseudo-second order	115
Cassia Siamea, AlbiziaLabbeck, NeriumIndicum, DurautaErecta, and Potato Husk	Cu[II]	-	0.2g, 5.0, -, 50 mts	R^2	Pseudo-second order	116.

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Adsorbent	Adsorbate	Adsorption Maximum [mg/g]	Conditions: [Dose[g], pH, Conc[mg/L], Time [mts]	Co-efficient	Isotherm and Kinetic Model	References
Olive leaves	Pb[II], Cu[II], Cd[II]	119.05, 90.09 & 71.43	0.5g, pH 4.0, 6.0 and 5.0 for Pb[II], Cu[II] and Cd[II].	R^2	Langmuir, Pseudo-second order	117
Grewiaasiatica fruit seed	Pb[II]	21.62	0.2g, pH 8.0, 12 mg/L, 110 mts	R^2, Sum of squares, Mean square, F-Ration, P-Value	Langmuir	118
Hazelnut hull	Fe[III]	13.59	0.6 g, pH 3.0, , 70 mts	R^2	Langmuir	119
Schizosaccharomyces-pombe	Co[II]	-	1.0g/L, pH 5.0, 50mg/L, 30 mts	R^2	Freundlich and Langmuir	120
Acacia niloticaaleaves	Cr[VI]	38.31	0.2g, pH 3, 100 mg/L, 120 mts	R^2	Freundlich, Pseudo-second order	121
Cork waste	Cr[VI]	-	pH 5.6	R^2	BET	122
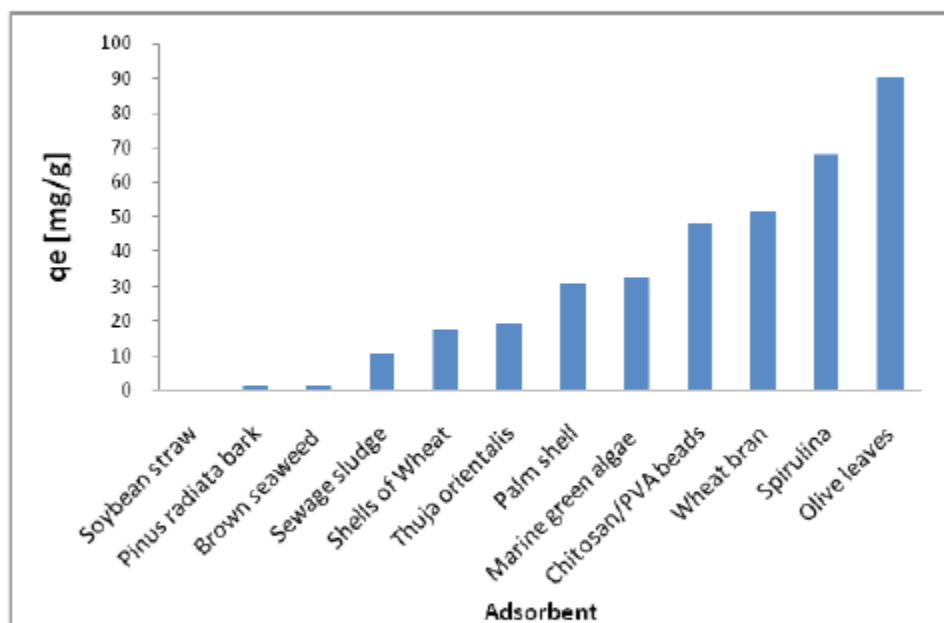
Fig. 1: Compared maximum adsorption capacities [mg/g] for Cu[II]
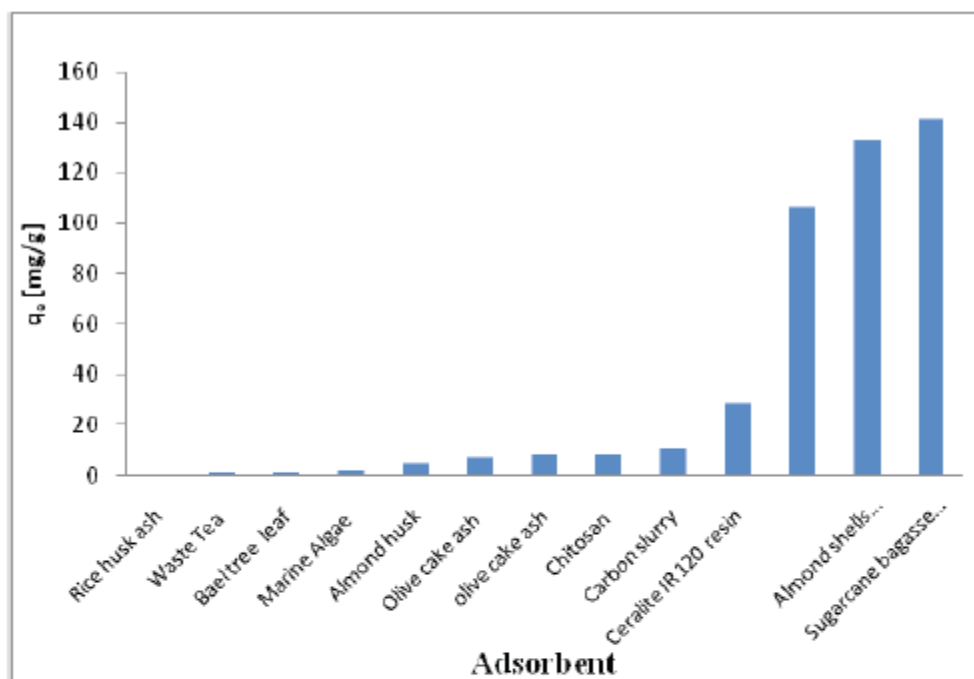
Fig. 2: Compared maximum adsorption capacities [mg/g] for Ni[II]

It is evident that natural materials, waste materials from industry and agriculture and biosorbents are an interesting alternative to replace activated carbons. Several biosorption processes have also been developed, patented and introduced for application in removing contaminants from waters.[123-125]

Conclusion

The low cost adsorbents require simple alkali or/and acid treatment for the removal of lignin before their application and to increase efficiency [both batch mode and column mode]. Chemical modification in general improved the adsorption capacity of adsorbents probably due to higher number of active binding sites after modification, better ion-exchange properties and formation of new functional groups that favours metal uptake. Although chemically modified adsorbents can enhance the adsorption of heavy metal ions, the cost of chemicals used and methods of modification also have to be taken into consideration in order to produce 'low-cost' adsorbents. Undoubtedly low-cost adsorbents offer a lot of promising benefits for commercial purposes in the future.

The adsorption process follows pseudo second order kinetics and a Langmuir isotherm shows that maximum adsorption capacity.

The metals must be recovered and the sorbent regenerated.The adsorbent was characterized; functional group was analyzed by Fourier transform infrared spectroscopy and surface morphology by scanning electron microscope, and energy dispersive X-ray diffraction were analysed.

Acknowledgement

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HOTEL MANAGEMENT SYSTEM

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ABSTRACT:-Hotel management is a (web portal) that helps you manage reservations, bookings, guests and agents. This has been made in a user friendly interface. The user can search for the vacant rooms in the hotel and book for it. Booking can only be done by registered guests or through agents. The rooms will be added or updated by the admin and the same would be available for the guests to book them.

A user is added by the admin, and is given the access for any of the rights that include adding guests and agents, reservation, booking, billing, viewing reports, etc.

Admin module is designed to ensure options of add, edit and delete the contents of the various pages in an easy format. Admin has control over the clients/users accessing the data and if required block users. An admin can view the booking details, transactions and coordinate the activity with the agents. He can track the entire site activity Reservations can also be made by the admin, at the back end, through a phone call or an email. He can also send an SMS to the registered users

Users can either be browsers or registered users. Registered users have privilege to access certain sections of data. There is a standard registration procedure for users/clients. Navigation ensures easy access to the user to all the material being displayed.

I. INTRODUCTION

HOTEL MANAGEMENT SYSTEM is a hotel reservation site script where site users will be able to search room's availability with an online booking reservations system. Site users can also browse hotels, view room inventory, check availability, and book reservations in real-time. Site users enter check in date and check out date then search for availability and rates. After choosing the right room in the wanted hotel – all booking and reservation process is done on the site and an SMS is sent to confirm the booking.

The project, Hotel Management System is a web-based application that allows the hotel manager to handle all hotel activities online. Interactive GUI and the ability to manage various hotel bookings and rooms make this system very flexible and convenient. The hotel manager is a very busy person and does not have the time to sit and manage the entire activities manually on paper. This application gives him the power and flexibility to manage the entire system from a single online system. Hotel management project provides room booking, staff management and other necessary hotel management features. The system allows the manager to post available rooms in the system. Customers can view and book room online. Admin has the power of either approving or disapproving the customer's booking request. Other hotel services can also be viewed by the customers and can book them too. The system is hence useful for both customers and managers to portable manage the hotel activities.

II. OVERVIEW OF THE PROJECT

The mission is to facilitate easy management and administration of a hotel with capabilities to do Booking or reservations of the rooms, Cancellation of the rooms, Cash billing, Room service, Restaurant service, Restaurant Billing, Total Billing, Travels arrangement etc. using the automated hotel management software. One can keep detailed records or info on an unlimited amount of customers. The system lets the user Know which all rooms are available for occupancy at any point of time. This makes the Booking considerably faster. And thus helps the hotel in better management and reduce a lot of paper work as well as manpower.
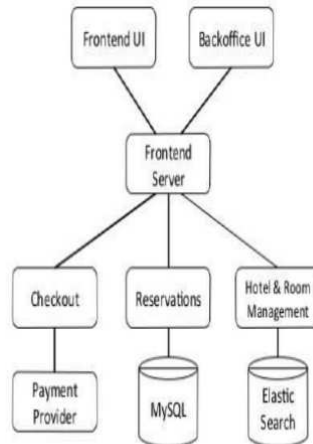
System Architecture

III. MODULES DESCRIPTION

3.1.1 ADMINISTRATOR
Administrator can add / edit and manage administrator accounts.

3.1.2 HOTELS
Administrator can manage hotels that will appear on the site with the hotel name, description, facilities, phone and fax

3.1.3 ROOM TYPES
Administrator can define the type of rooms in the hotels, rooms' prices and upload an image for each room.

3.1.4 HOTEL ROOMS
For each Hotel the administrator can define the rooms available, rooms number, max occupants and remarks on the specific room.

3.1.5 BOOKINGS
All booking and reservations maid on the site are displayed with all booking details: arrival date, departure date, hotel name, room type, number of passengers, price.

3.1.6 AVAILABLE ROOMS
Administrator can also search for room availability from the administrators panel and does not have to go on the site Reports.

3.1.7 BOOKING STATISTICS
Administrator can view statistics of booking on bar charts that show the difference in bookings according to months.

3.1.8 SMS TEMPLATES
Administrators can edit the text on each message.

3.1.9 SITE SETTINGS

Here the administrator can define if to use PayPal on the site and if yes then what will be the pay-pal email address used, the administrator can also define the administrator email address where all reservation emails will be sent to.

IV. SCREEN SHOTS

4.1.1 HOME PAGE
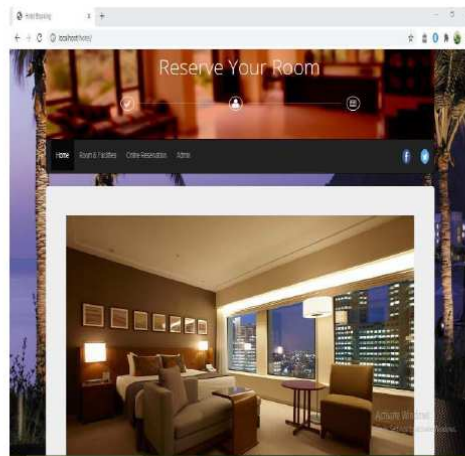
4.1.2 ONLINE RESERVATION
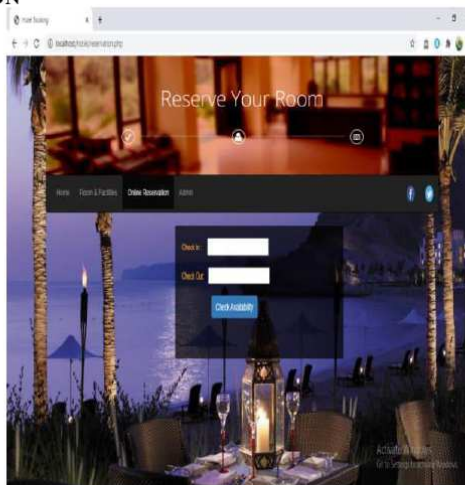
4.1.3 ROOM FACILITIES
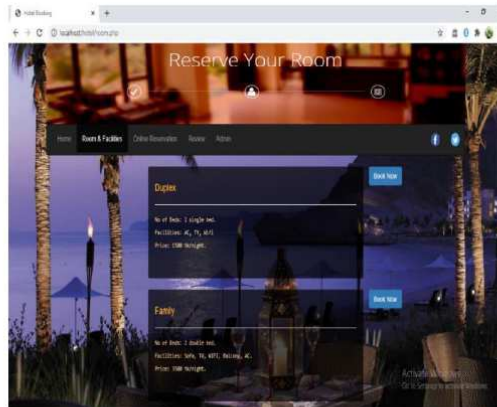
4.1.4 LOG IN
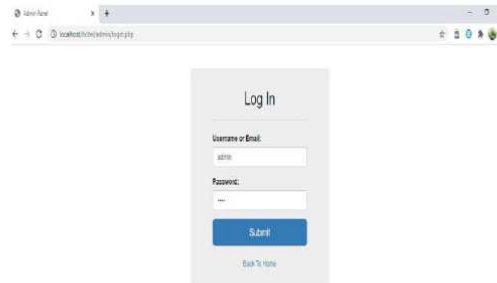
4.1.5 ADD ROOM
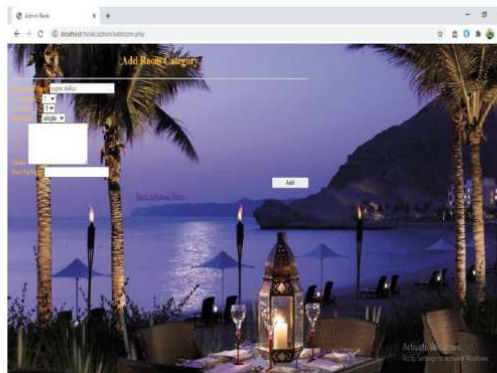
4.1.6 ROOM EDIT
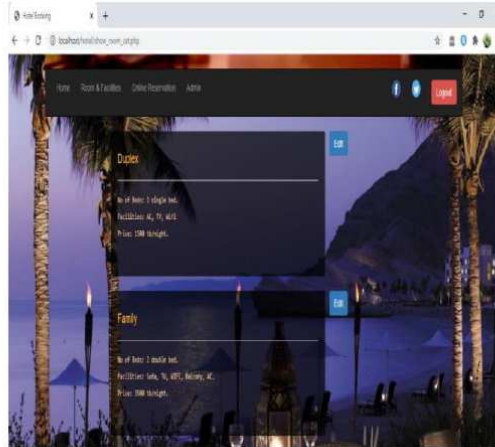
4.1.7 ROOM BOOKING
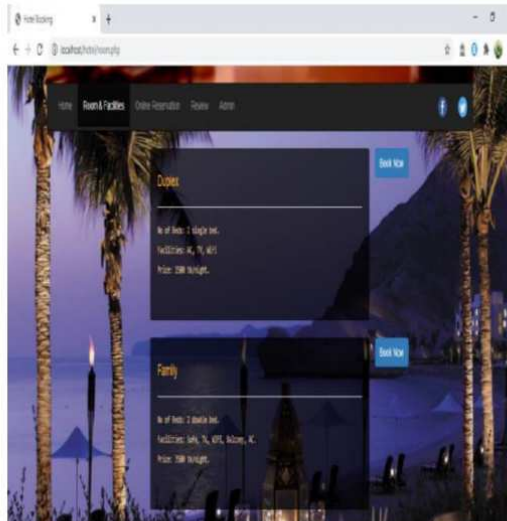
4.1.8 BOOKING DETAILS
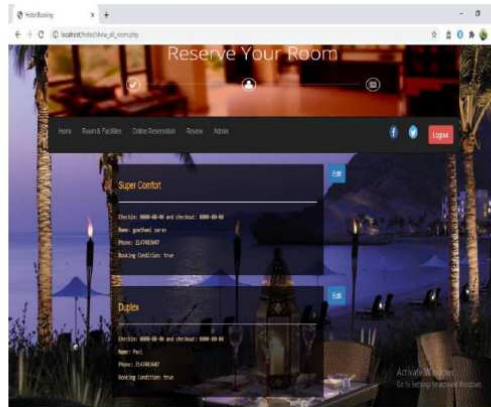
4.1.9 ADD YOUR MANAGER
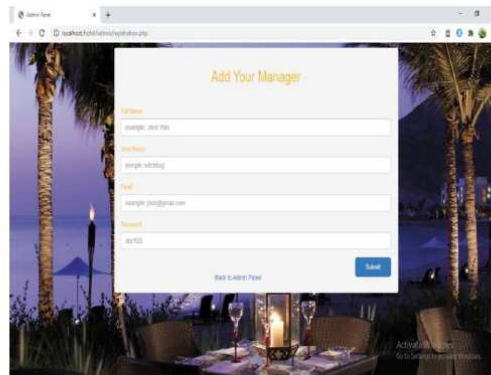
4.1.10 REVIEWS
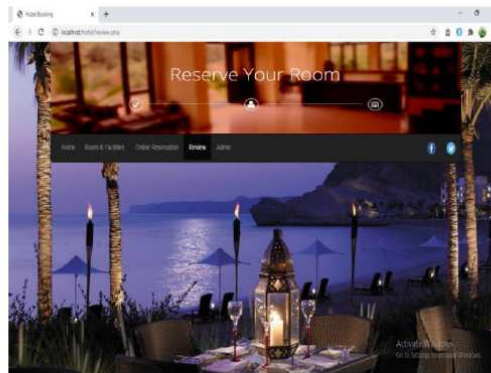
V. CONCLUSIONS

The conclusion of this project is A Hotel management system is a computerized management system. This system keeps the records of hardware assets besides software of this organization. The proposed system will keep a track of Workers, Residents, Accounts and generation of report regarding the present status. This project has GUI based software that will help in storing, updating and retrieving the information through various user-friendly menu-driven modules. The project "Hotel Management System" is aimed to develop to maintain the day-to-day state of admission/Vacation of Residents, List of Workers, payment details etc. Main objective of this project is to provide solution for hotel to manage most there work using computerized process. This software application will help admin to handle customer's information, room allocation details, payment details, billing information.etc. Detailed explanation about modules and design are provided in project documentation. The existing system is a manually maintained system. All the Hotel records are to be maintained for the details of each customer, Fee details, Room Allocation, Attendance etc. All these details are entered and retrieved manually, because of this there are many disadvantages like Time Consuming, updating process, inaccuracy of data. For avoiding this we introduced or proposed a new system in proposed system the computerized version of the existing system. Provides easy and quick access over the data.

VI. FUTURE ENHANCEMENTS

This project can be used in the hotel after adding some more useful modules in the project for which hotel are providing services. Utmost care and back-up procedures must be established to ensure 100% successful implementation of the computerized hotel system. In case of system failure, the organization should be in a position to process the transaction with another organization or if the worst comes to the worst, it should be in a position to complete it manually.

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Mrs. M.Radha, Assistant Professor of Commerce	International Journal of Innovative Research in Science Engineering and Technology	Complaint Management System	International	ISSN: 2319-8753 ISSN: 2320-6710 Volume 10, Issue 3,	March 2021	http://www.ijirset.com/upload/2021/march/95_COMPLAINT_NC.pdf

Complaint Management System

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ABSTRACT:-The Complaint Management system is web based application and it is designed to keep track of complaints registered by the college municipality/lab staffs, so this system need to have distributed platform independent web application. The task of Administrator executives can control all the activities in the system, for creating issue using call registration, assign to service engineer and check the service engineer's performance. In call registration it should be open and assigned to service and engineer can update the call status to close. This System able to show the reports like department wise pending closed calls, open calls, Daily call registration and Engineer performance Report.

I. INTRODUCTION

The main objective of this Complaint Management system is to focus on the issues related to internal system. Complaint Management system is a platform independent application, so this web application can be accessed anywhere in the system. This is also developed for reduces the communication cost between the staffs and to provide the efficient service to their staffs.

The system need to provide the services to the user who is accessing this system from the collected information and this system gathering Call Registration about the issues to provide services. This system which could enhance the day to day activities of the business with efficiency and correctness. Once the call Registered by the staff/user, it should be assigned to service engineers and update the calls as quickly as possible. There are various modules involved in the system.

II. OVERVIEW OF THE PROJECT

The system is Client-server application designed by keeping in view the various activities that are performed at internal complaint management system. Staffs need to register their call registration regarding the issues faced on day-to-day hardware and software issues in this system and also register their clients. This web service is designed to provide the various services to the clients it uses the web server and application server. Server receives the various requests from the client and the server has to respond the client's request.
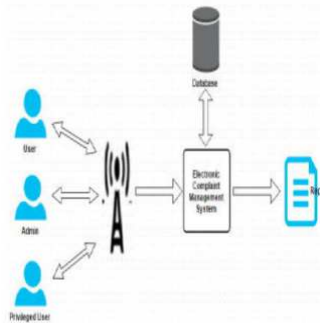
System Architecture

III. MODULES DESCRIPTION

ADMIN (PRINCIPAL)
- First Administrator will login into the site to enter into the site.
- Admin can create category and also manage the category.
- Admin can create Subcategory and also manage the Subcategory.
- Admin can create state and also manage the state.
- Complaint Management Admin can update remark on complaints.
- Mange users.
- Admin can check user logs.
- If the administrator selects complaints he can view the all the complaints from the database those are send by the user.
- If the administrator selects Department Section. In this he can add new department details, View the department details, delete the department details, and modify the department details.
- If the administrator selects the Feedback option he can send the feed back to the users and also he can view the feedback send by the user.
- If the administrator selects the Reports section he can view the different reports like number of student's complaint, about departments, Etc.
- He can also change his password by using change password option.
- After completion of entire work he cans logout from the site.

STUDENT (USER)
- First User enters into the site using login and password. If the user is new for the site it will ask for the registration. After completion of the registration he/she can login into the system.
- The user can perform the operations like (Grievance, Status, Feedback, Change password, Acknowledgement).
- If the user sections the grievance option he can send the grievance to the department based on the complaint wants to send to the department. He can also select the complaint category that is either normal or emergency. If the users not know the complaint type he can select the other option in the category and he was sending. After sending the complaint the complaint will goes to the administrator.
- If the user selects the status option he can view the status of the grievance that he/she was sent previously.
- If the user selects the feedback option he/she can send the feedback to the administrator or department and also he/she can view the feedbacks those are send by the administrator or department.
- If the user selects the acknowledgement option he/she can view the acknowledgement that was send by the administrator.
- The user can change the password by using change password option.
- After completion entire work he/she can sign out from the site by using logout option.

PARENTS
- First parents will login into the site based on the user & password given by the administrator.
- After login into the site he/she can give the feedback like (About campus, about children, about teachers).
- If the parents selects the view grievances option he/she can view the list of grievances those are send by the user. He can view the grievances of that particular department only.
- If the parents are selects the feedback option he/she can give their feedbacks and also view their feedbacks later too. He/she can send the feedback to the user or administrator also.
- Parents can change their password by using change password option.
- After completion of the entire work he/she can logout from the site.

IV. SCREEN SHOTS

4.1.1 HOME PAGE
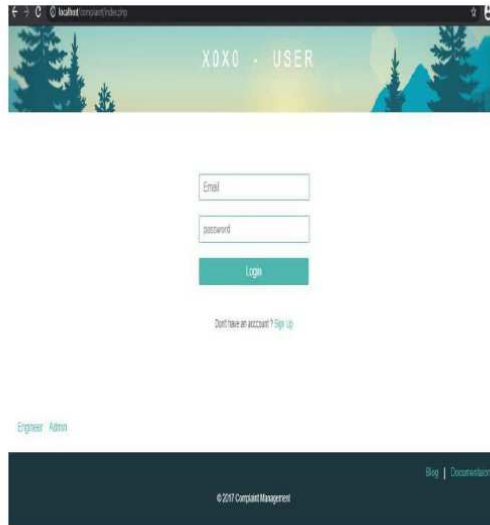
4.1.2 ADMIN LOGIN
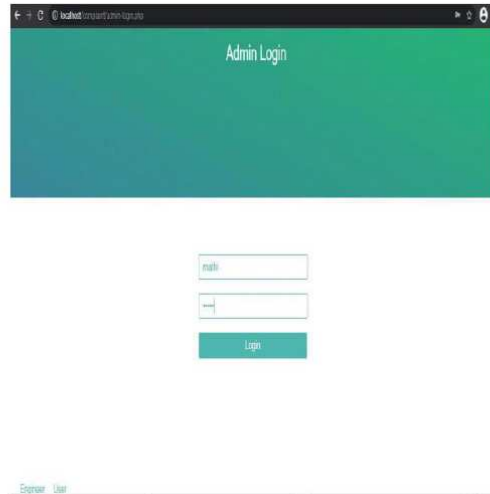
4.1.3 ADMIN PAGE
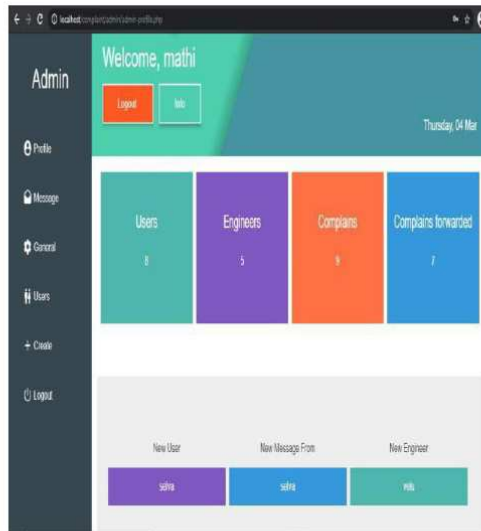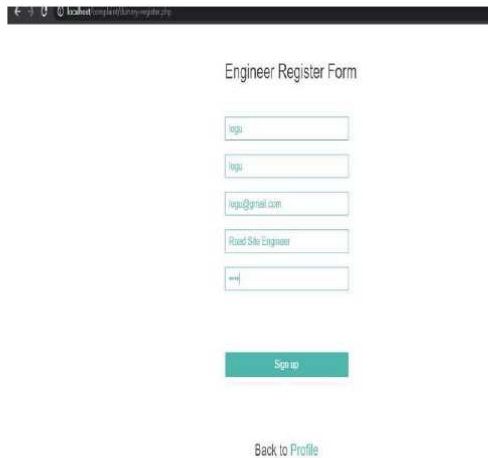

4.1.4 MESSAGES

4.1.5 USER DATA
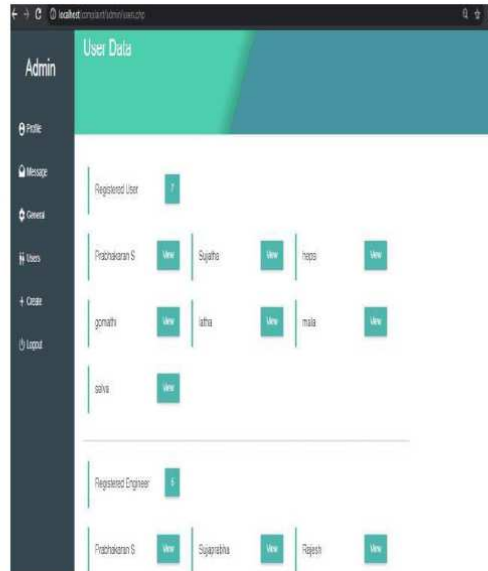
4.1.6 ENGINEER REGISTRATION

V. CONCLUSIONS

The system has the benefits of easy access because it is be developed as a platform independent web application, so the admin can maintain a proper contact with their users, which may be access anywhere. All communications between the student/parent and administrator has done through the online, so this communication cost also is reduced.

VI. FUTURE ENHANCEMENTS

This system is found tested and examined for its successful processing. Future change in the environment or processing can be easily adopted by having simple change in coding. It is very user friendly, cost effective, feature rich and it provides very high level of security. It protects the unauthorized users. Moreover, the system coding is so well designed that new operations can be easily incorporated without much modification. A facility to inform through SMS or Email on landing of the consignment can be added in future.

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Development of an Online Course Portal for a Campus

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ABSTRACT:-This project aims at creating a Courses portal for a campus/organization. This allows registered users of the system to join a course available in the site and access the materials published for the course. People can register themselves as students of a course or Faculty for a course. When a person registers himself as a Faculty, an approval mechanism should be triggered which sends an email to the Administrator for approving the person as a Faculty. There will be an admin approval page where admin can approve the faculty members for the course.

The course home page should contain the title of the course and a brief description. There will be a discussion board for each course where students can interact, an announcement section, which contains the latest announcements, and a course content section which gives the links for the material available for the course. For faculty members there will be an extra link for uploading the course content in a zip file format. The course content should be html pages, which should be uploaded in the zip file format. There should be a mechanism for the faculty members to create a test for the course specifying the test title and a set of multiple-choice questions and duration of time of the test.

I. INTRODUCTION

This project aims at creating a Courses portal for a campus/organization. This allows registered users of the system to join a course available in the site and access the materials published for the course. People can register themselves as students of a course or Faculty for a course.

When a person registers himself as a Faculty, an approval mechanism should be triggered which sends an email to the Administrator for approving the person as a Faculty. There will be an admin approval page where admin can approve the faculty members for the course.

The course home page should contain the title of the course and a brief description. There will be a discussion board for each course where students can interact, an announcement section, which contains the latest announcements, and a course content section which gives the links for the material available for the course. For faculty members there will be an extra link for uploading the course content in a zip file format.

II. OVERVIEW OF THE PROJECT

The course content should be html pages, which should be uploaded in the zip file format. There should be a mechanism for the faculty members to create a test for the course specifying the test title and a set of multiple-choice questions and duration of time of the test.
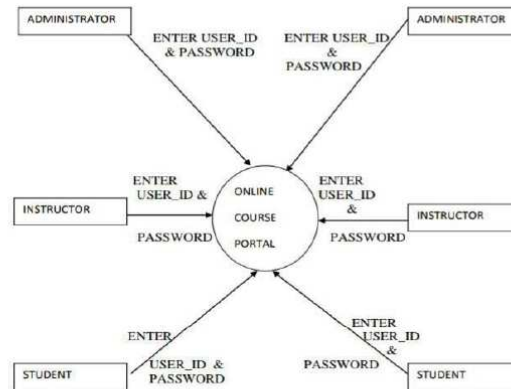
System Architecture

III. MODULES DESCRIPTION

3.1.1 LOGIN MODULE

The purpose of this module is to provide entry to the portal. Based on the type of login, the user is provided with various facilities and functionalities. The main function of this module is to allow the user to use the portal. This module provides two types of login — Admin login and Student login, faculty login.

3.1.2 ADMINISTRATION MODULE

In this module the administrator enters his/her user name and password, which enables access to the administrator page. This page consists of two following sub modules.

Student Addition/Updating/Deletion: Each Student is added, updated or deleted according to his/her department.

Notice/Updates/Result Generation: On the portal, information about notice, attendance and Internal result is generated.

3.1.3 FACULTY MODULE

A faculty member can upload/download the study materials that are beneficial for students in solving their doubts. Faculty member can also enter the marks for each student and thus generate the overall term-work sheet for a particular semester.

3.1.4 STUDENT MODULE

Initially the student has to log into portal by filling up the registration form. Once the student's request is approved by the administrator, the student becomes a part of the portal. Student can download the study material uploaded by the faculty members.

IV. SCREEN SHOTS

4.1.1 HOME PAGE
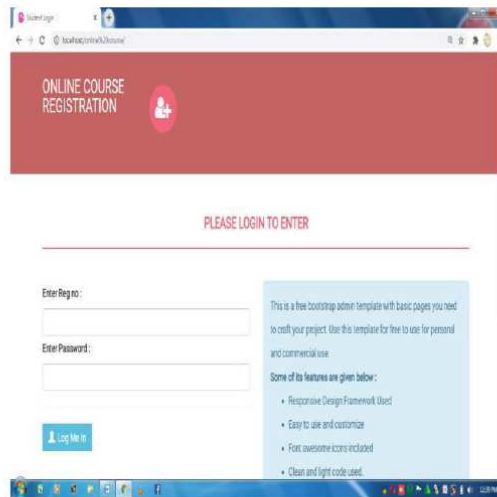
4.1.2 ADMIN
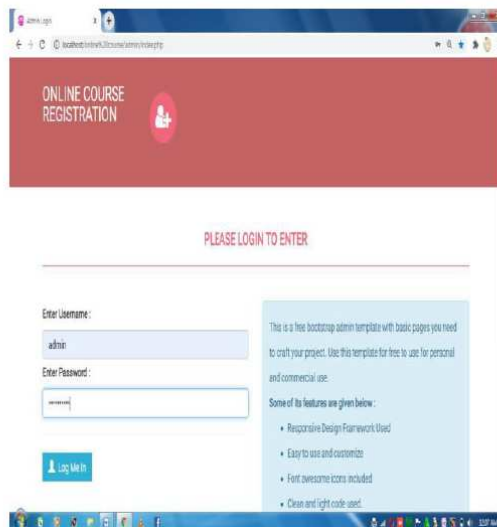
4.1.3 STUDENT LOGIN
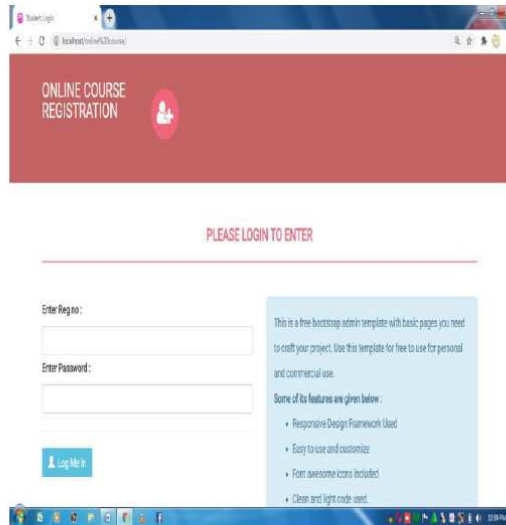
4.1.4 PIN-CODE VERIFICATION
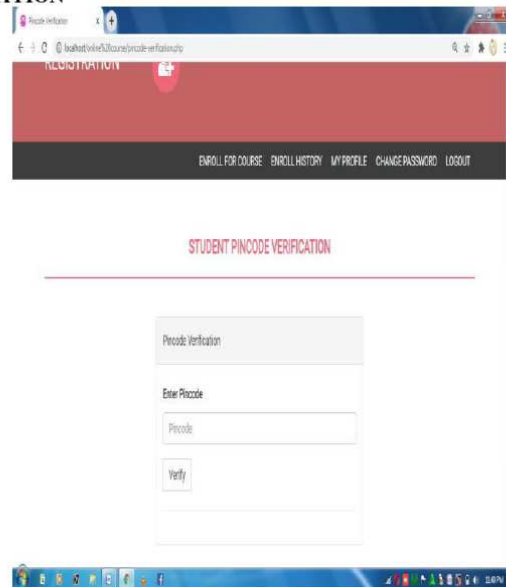
4.1.5 ADMIN LOGIN
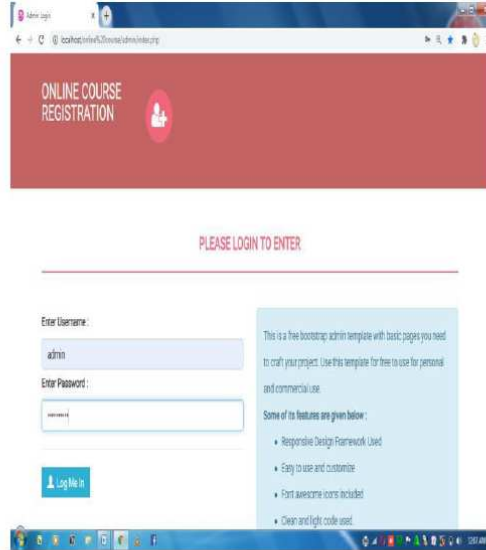
4.1.6 STUDENT REGISTRATION
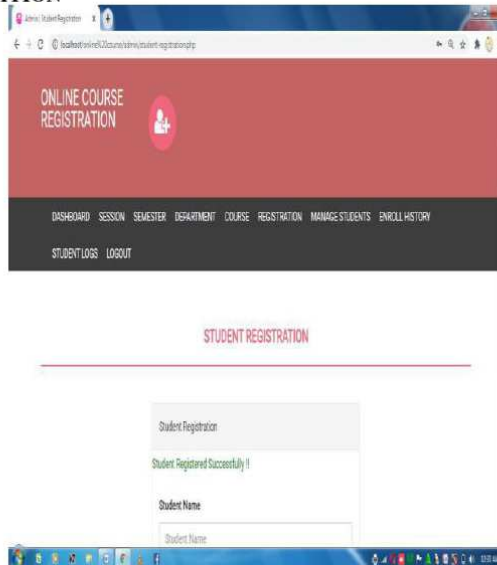
4.1.7 ENROLL HISTORY
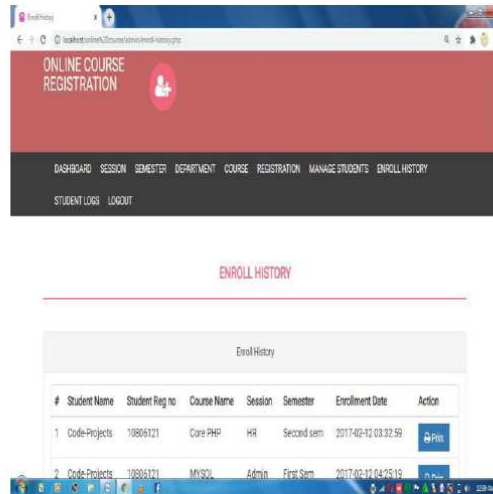
4.1.8 LOGOUT
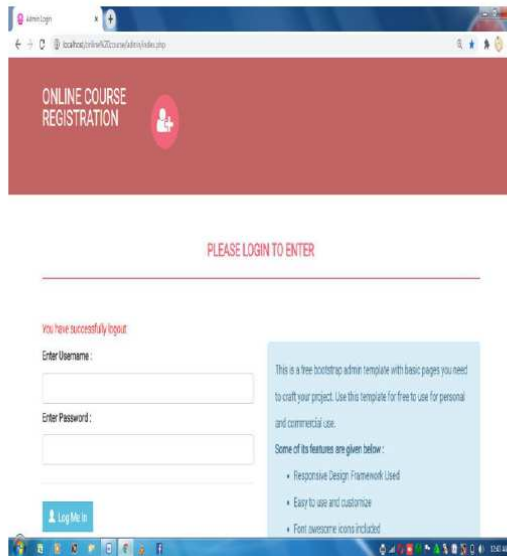
V. CONCLUSIONS

This system, in addition to lessening the work load on the institute, it also fixes any false data about the users that the institution may have. It is a benefit for the users' whose important time and energy is preserved, for the affected educational college's authority whose workload is immensely reduced, whose services are secured from misuse.

VI. FUTURE ENHANCEMENTS

The tremendous popularity of using the social media networking could never have been realized before. In fact, social media have become an important tool of marketing in true sense of customer orientation. But this kind of social networking site which can access only for college campus not from outside the college will make a dramatic change inside the college campus.

- ❖ The scope of Intra-College Communication System is widening and today it offers a strong support to the college campus in providing the much desired touch of concern.
- ❖ The bright future prospect of college networking is also proven with the fact that the technology is integrated in mobile phones as well.
- ❖ The project is developing with the power of interpersonal communication on a globalized outlook.

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E-COMMERCE ONLINE SHOPPING

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ABSTRACT:-In today's fast-changing business environment, it's extremely important to be able to respond to client needs in the most effective and timely manner. If your customers wish to see your business online and have instant access to your products or services. Online Shopping is a lifestyle e-commerce web application, which retails various fashion and lifestyle products (Currently Men's Wear). This project allows viewing various products available enables registered users to purchase desired products instantly using PayPal payment processor (Instant Pay) and also can place order by using Cash on Delivery (Pay Later) option. This project provides an easy access to Administrators and Managers to view orders placed using Pay Later and Instant Pay options. In order to develop an e-commerce website, a number of Technologies must be studied and understood. These include multi-tiered architecture, server and client side scripting techniques, implementation technologies such as ASP.NET, programming language (such as C#) and relational databases. This is a project with the objective to develop a basic website where a consumer is provided with a shopping cart application and also to know about the technologies used to develop such an application. This document will discuss each of the underlying technologies to create and implement an ecommerce website.

I. INTRODUCTION

E-commerce is fast gaining ground as an accepted and used business paradigm. More and more business houses are implementing web sites providing functionality for performing commercial transactions over the web. It is reasonable to say that the process of shopping on the web is becoming commonplace. The objective of this project is to develop a general purpose e-commerce store where product like clothes can be bought from the comfort of home through the Internet. However, for implementation purposes, this paper will deal with an online shopping for clothes. An online store is a virtual store on the Internet where customers can browse the catalog and select products of interest. The selected items may be collected in a shopping cart. At checkout time, the items in the shopping cart will be presented as an order. At that time, more information will be needed to complete the transaction. Usually, the customer will be asked to fill or select a billing address, a shipping address, a shipping option, and payment information such as credit card number. An e-mail notification is sent to the customer as soon as the order is placed.

II. OVERVIEW OF THE PROJECT

The motivation for designing this shopping-cart application came because I love online shopping rather than spending lot of time at physical markets. Further, using the available stores to sell the products, there is also the possibility of designing one's own customized shopping-cart application from scratch because custom-designed platforms are expensive.
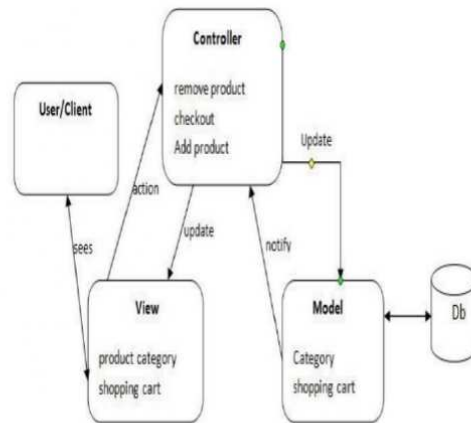
System Architecture

III. MODULES DESCRIPTION

3.1.1 Master Maintenance
This module consists of information about the products and services. This includes two sub modules, Product Master and Price Master.

3.1.2 Product Master
Product Master includes the information about particular product, such as product number, item, name, and category, images of products, description, features and constraints of products.

3.1.3 Price Master
Price Master Deals with the cost of the product discounts applicable for the particular product of a vendor/seller.

3.1.4 Transactions
In this module management of shopping cart is done. This module will add the bought item to the shopping cart, where all items that are to be purchased can be reviewed once again after the item is bought from the cart. Payment will be one on delivery of the items.

3.1.5 Reporting
In this module all reports will be generated. Whenever an item is sold, or customer orders a product, its vendor should be sent an alert via email immediately so that he can ship that item soon. This module has 3 sub modules Stock Reports, Order Reports and Delivery Reports.

3.1.6 Stock Report
This module will produce reports of the quantity of the products available and product status.

3.1.7 Order Report
This module will have the list of products ordered and the customer details who have bought that product which are undelivered.

3.1.8 Delivery Report
This module will generate products list, which are delivered to customers.

3.1.9 House Keeping

This module takes care of data which are alder than a certain period. It will allow the vendor to archive the reports generated or transactions and business history reported by Reporting module.
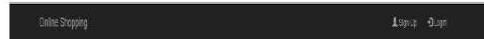
IV. SCREEN SHOTS

4.1.1 HOME PAGE

4.1.2 ADMIN LOGIN

4.1.3 BUYING A PRODUCT

4.1.4 ADD TO CART

4.1.5 CONFIRMING THE ORDER
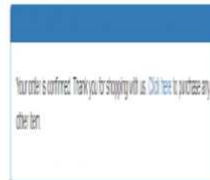
V. CONCLUSIONS

The 'Online Shopping' is designed to provide a web based application that would make searching, viewing and selection of a product easier. The search engine provides an easy and convenient way to search for products where a user can Search for a product interactively and the search engine would refine the products available based on the user's input. The user can then view the complete specification of each product. They can also view the product reviews and also write their own reviews. Use of Ajax components would make the application interactive and prevents annoying post backs. Its drag and drop feature would make it easy to use.

VI. FUTURE ENHANCEMENTS

❖ The current system can be extended to allow the users to create accounts and save products in to wish list.
❖ The users could subscribe for price alerts which would enable them to receive messages when price for products fall below a particular level.
❖ The current system is confined only to the shopping cart process. It can be extended to have an easy to use check out process.
❖ Users can have multiple shipping and billing information saved. During checkout they can use the drag and drop feature to select shipping and billing information.

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Evaluating Retailers in a Smart-Buying Environment using Smart City Infrastructures

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Abstract:-In modern cities, most citizens are interested in buying from e-shops or mostly buy from large shopping brands. This is a challenge for small and medium-sized retailers, who cannot afford to maintain IT infrastructures and skills. The ongoing R&D project SMARTBUY, tries to close this gap by providing a platform for small and medium-sized retailers to become the place where they can easily make their products and promotions visible online for local audiences, along with a mobile application for customers. An important issue in this context is the evaluation of the retailers. In this work, we introduce a new evaluation application for assessing the quality of the retailer services. Customers have the chance to rate the behavior and the offers that the retailers provide to them. This evaluation service is based on the SMARTBUY platform and is developed upon the Organic City Experimentation Platform. The evaluation application is a novel approach to generate knowledge for the retailer shops inside a future city using both data from open city datasets as well as feedback from citizens. Such an application is deemed useful to both customers, to identify retailers with best offers and services, and retailers as an incentive to improve their services.

I. INTRODUCTION

The idea of "Smart- City" is regularly alluded to in scholarly exploration, in writing, and in government reports yet is frequently deciphered conflictingly. A significant part of the advancement has been made in the previous decade, with numerous urban areas around the globe conveying innovations, for example, traffic the board. Be that as it may, while advancements in data the executives are integral to the city's change, no concurred systems can survey the advancement of the city's scaling back corresponding to data the board. In this paper, we survey how data the executives add to city change and recommend a system for partners and city organizers to use in arranging and actualizing city advancements and estimating progress and for analysts to utilize the improvement of their reasonable structures. We likewise consider the decisions looked by those answerable for or engaged with smoothing out the city, regarding plans of action and the centralization or decentralized data the board activities. The majority of the city's smoothing out tasks include the change of existing biological systems, specifically, urban communities, transport, and different other city credits, particularly with the spread of data the executives in the most successive and direct structure, not by the extreme changes, where exercises and players change. As the experience of the city, insight develops, and as innovation advances, more principal possibilities of change are open, with new players arising, existing players changing what they do and when they do and new connections advance among engineers. These advancements will have critical data on the board suggestions.

II. OVERVIEW OF THE PROJECT

In this section, the major features of smart cities and smart buildings are described. The analysis is performed on a literature overview basis. A review of smart building and smart city assessment is also performed.
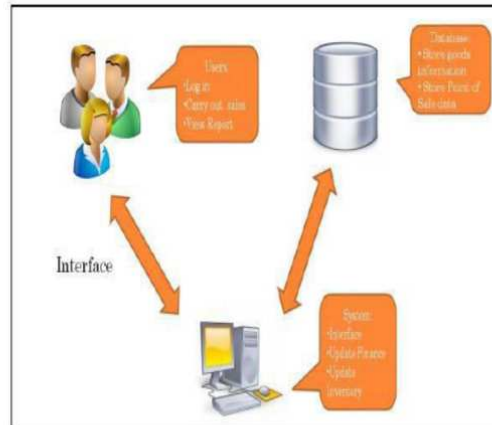
System Architecture

III. MODULES DESCRIPTION

3.1.1. The Evaluation of the Retailers

❖ **Quality of the Service**

➢ Refers to the service-quality delivery of a store and it has a major impact on the consumer's behavior regarding a shop.

❖ **Politeness**

➢ Assesses the kindness and politeness of there tailer to the costumers.

❖ **Value for Money**

➢ Refers to the quantity and quality of the purchased goods that will be exchanged for one monetary unit.

❖ **Discount Policy assesses**

➢ The overall strategy and possible deals that a certain retailer provides to its customers along with the final profit for the customer.

3.1.2. Describing the Retailers

"Location": contains a latitude longitude pair as a Geo Point to describe the retailer's physical location inside the city. The physical location can be used to run spatial queries for retailers near the citizen's location.

"Description": provides a free text description of the products the retailer offers. This description can be used to perform text-based search for limiting the results when citizens search for specific categories of retailers.
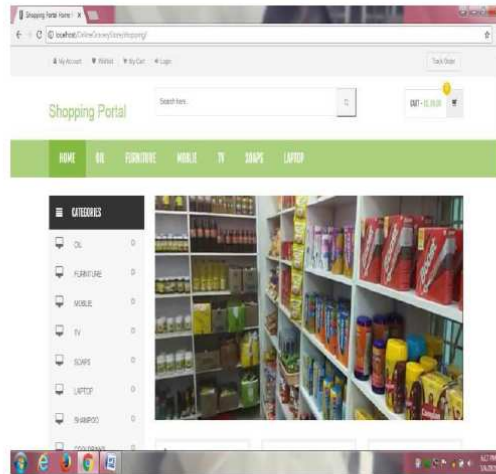
"Name": the name of the retailer's shop that can be used for display and search purposes.

"Contact": various contact methods can be used to allow citizens to contact the retailers directly for information about their shops or products.
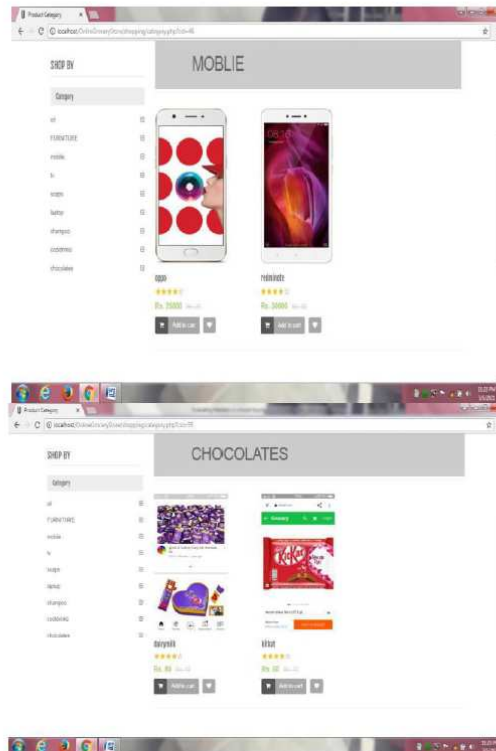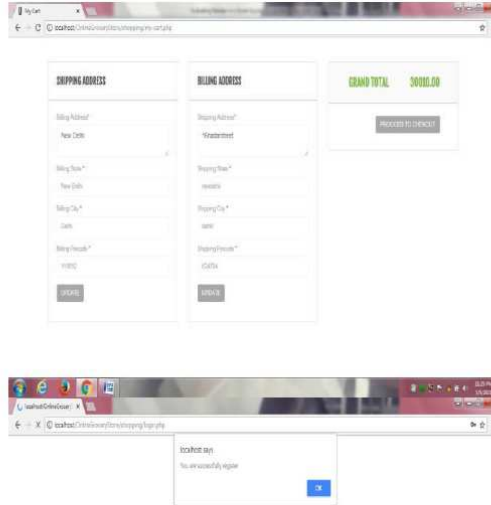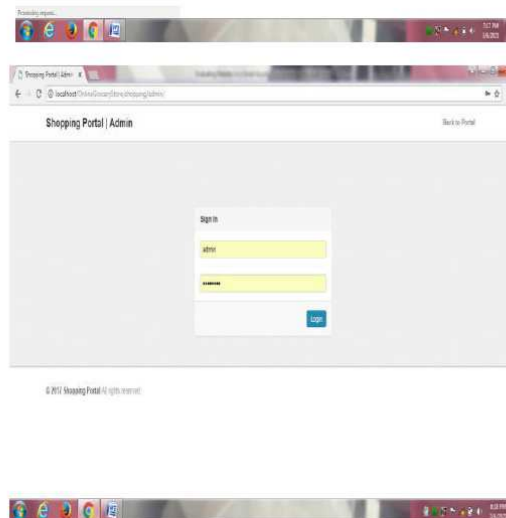
IV. SCREEN SHOTS

4.1.1 HOME PAGE
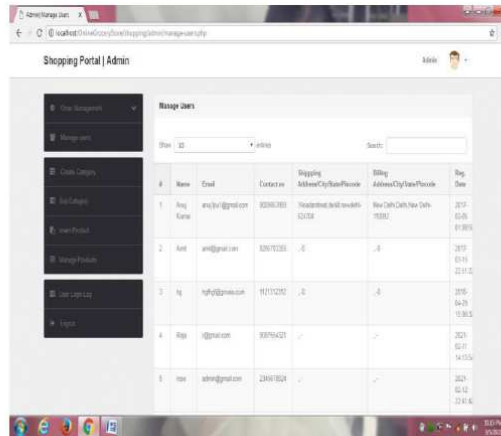

4.1.2 PRODUCTS

4.1.3 ADD CART

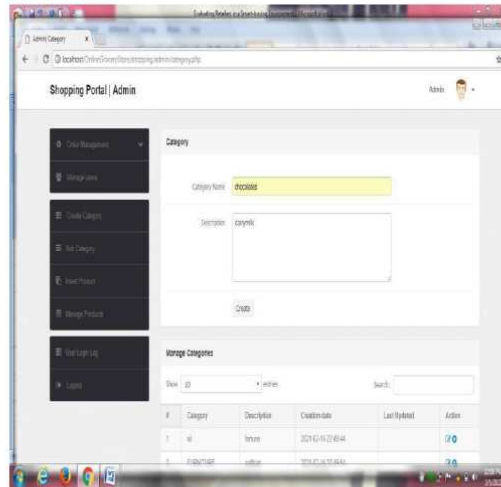**4.1.4 ADMIN LOGIN**

4.1.5 MANAGE USER

4.1.6 ADMINCATEGORY

4.1.7 SUBCATEGORY
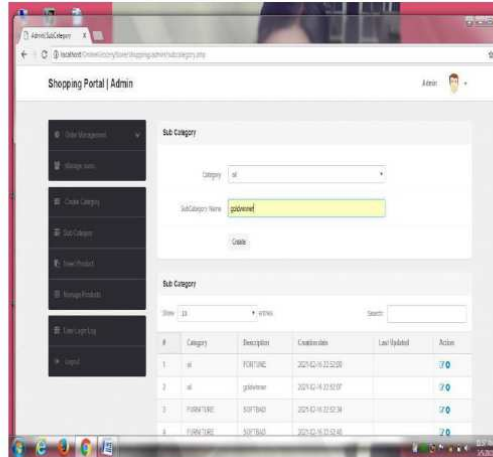
4.1.8 INSERTPRODUTS
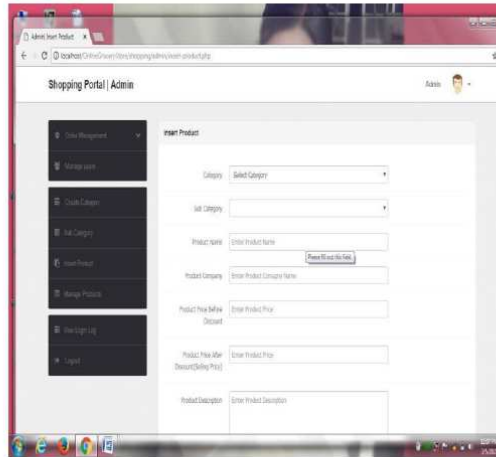
V. CONCLUSIONS

The study indicated that improvements in the initiate of data the executives as applied to Smart-City and their public and private partners could prompt focalized advancements, on openly characterized information stages and perhaps freely claimed, or unique, with the coming of various stages, either open or private, either integral or serious (Schaffers et al. 2011). For this situation, the development of the Smart-City data stage can reflect such data stages in other advanced regions, for example, home shopping, protection, or media. For those engaged with the advancement, improvement, or conveyance of keen urban communities, the suggestions are self-evident; Do not expect that the centralization approach The successive control received by the Government for the methodology of data the executives including numerous player biological systems would work in a way that is better than a more liberal methodology, permitting yet managing. For conceivable biological system stage suppliers, the primary ramifications identify with the need to zero in on the advantages of all player environments, particularly the individuals who remain to profit most

from the smoothing out of the city, regardless of whether they are associations or people, and to guarantee that the cooperation between all individuals from the environment is set up on a fundamental organization, with the acknowledgment that numerous players need to deliver needs from their own advantages, to zero in on the necessities of brilliant end-clients, whether they are residents or associations. Ideally, this article will give a strong establishment to bring this sort of coordinated effort forward.

VI. FUTURE ENHANCEMENTS

Future enhancement: In the system, thus the developers have few future works suggestion for continuation. Firstly, the development of integration between the system with the supplier system of Rahmath Store. By integrating the both systems, Rahmath Store system can directly send the request of inventory order to the supplier when the stock level is low. Thus, Rahmath Store does need to order manually from the supplier which can cause delay in the delivery of the products. By having this integration, Rahmath Store can practices Just-In-Time inventory where the store does not need to hold many stocks which is not a good practice of inventory control. Secondly, the implementation of decision support functions in the system. For examples, data mining techniques or approach can be used to study the pattern of sales made. From the pattern analysis, Rahmath Store can be used it to do marketing strategies to its customer or even stock arrangement management can be done from the result. All this action is believed to boost the sales of the store greater than the current

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Mrs. G.Rathika, Assistant Professor of Commerce	International Journal of Innovative Research in Science Engineering and Technology	Vehicle Sales and Management System in PHP	International	ISSN: 2319-8753 ISSN: 2320-6710 Volume 10, Issue 3,	March 2021	http://www.ijirset.com/upload/2021/march/94_VECHILE%20SALES_NC.pdf

Vehicle Sales and Management System in PHP

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ABSTRACT:-This is a car and car parts store that has listings of various cars along with their features. It also consists of car parts and accessories. This system allows user to buy car and inventory. System allow user to check various car stats including car engine, mileage, tank capacity and other factors. Credit card payment facility available for car parts. Car booking has other methods for booking and registration and even a test drive registration. The visitor who visits the system must register himself by filling up personal details. After registration user can login to the system with his username and password in order to access the system. User can check various car listing and can view each car features. User can also check features of the car as well as inventory parts. User may select the product and can add the product to shopping cart. User can make payment through credit cards by clicking on credit card payment option. User must register himself for the test drive. Car loan and other car booking facilities available in car buying section. This application is a combination of both sales and inventory management of the car and car parts. User can easily purchase car or car parts by using this system user does not have to come manually to shop to purchase the product. He can view the car and car parts in effective Graphical User Interface. User can view features of each product and can compare the products in order to purchase a better product.

I. INTRODUCTION

In the fast changing world, information technology and information management are going to play an important role. We are living in the computer age during past some year .The computer has gaining popularity. Computer revolution found its way into almost every aspect of human life and living. A computer is admirably suited to handle any information and hence is an information processor that is, it can receive data, perform some basic operations on that data and produces results according to a predetermined program. is a web based application in which the whole records of the passenger in the vehicle would be manage the details about different students which have received the books would be kept. The students would be able to know the books availability status on the basis of proper login which would be provided to them. The management would be able to know the whole library status on a single click and customized reports would be generated.

II. OVERVIEW OF THE PROJECT

Today's world is computer world because most of work is doing with the help of computer. Dependency on computer is behind the few reasons. We cannot easily manage to store large number of data or information single handle. If we will be need some information or data in urgency then we cannot manage in manually these works are very difficult if we cannot use computer.
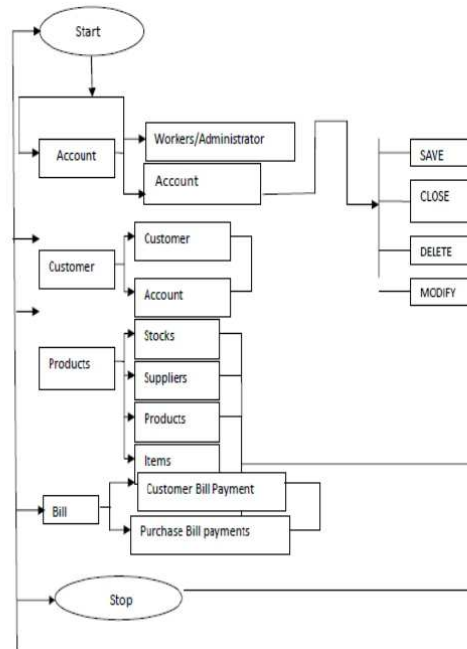
System Architecture

III. MODULES DESCRIPTION

3.1.1 VISITOR REGISTRATION:
> In this module user must register himself by filling some personal details.

3.1.2 ADMIN LOGIN:
> After registration user will get user ID and password through which user can login to access the system.

3.1.3 VISITORS LOGIN:
> After registration user will get user ID and password through which user can login to access the system.

3.1.4 CAR LISTING AND FEATURES:
> User can view list of cars and specification of the car.

3.1.5 CAR PARTS LISTING AND FEATURES:
> User can view list of car parts and specification of the car parts.

3.1.6 TEST DRIVE:
> Visitor must book himself for the test drive by filling registration form.

3.1.7 CAR BUYING SECTION:
> Car Loan and other car booking facilities are available in this module.

IV. SCREEN SHOTS

4.1.1 HOME PAGE
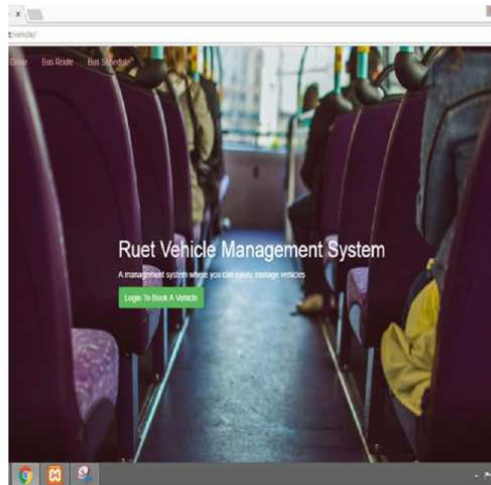
4.1.2 USER LOGIN
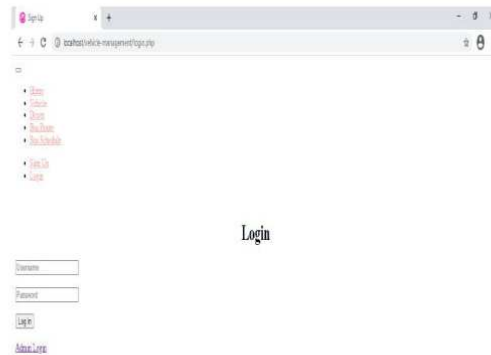
4.1.3 VECHILE LIST
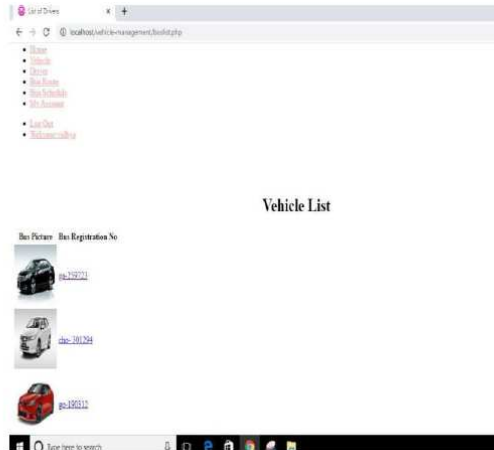
4.1.4 DRIVER LIST
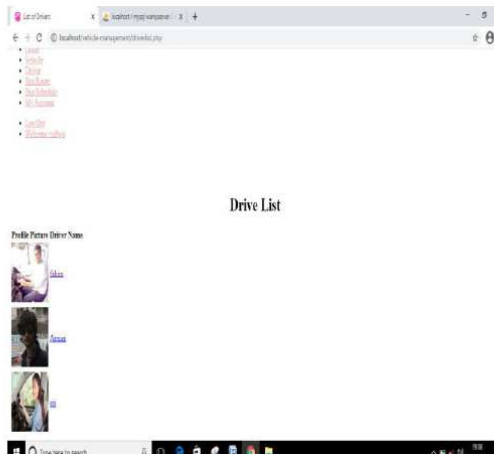
4.1.5 BUS ROUTE
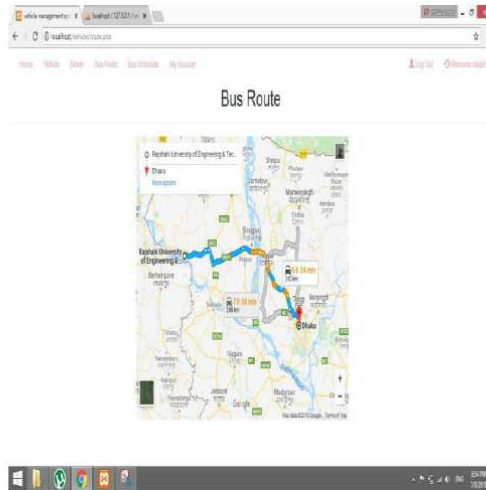
4.1.6 BUS SCHEDULE
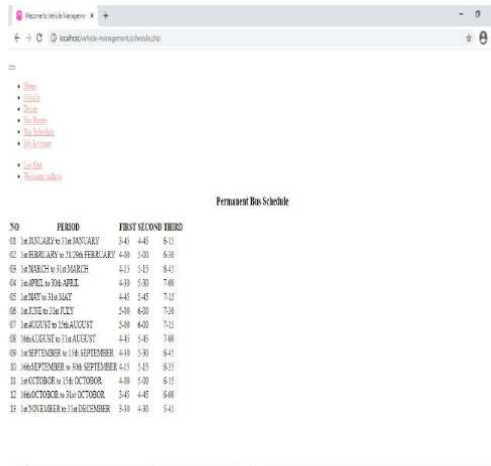
4.1.7 BOOKING

4.1.8 ADMIN LOGIN

4.1.9 ADD DRIVER FORM

4.1.10 ADD VEHICLE FORM

4.1.11 BOOKING LIST

4.1.12 TRIP DETAILS

4.1.13 CONFIRM PAYMENT

4.1.14 CORRESPONDING BILL

V. CONCLUSIONS

In this study, our proposed applications focus on dealing with the user requests and vehicle management in real time. Through the history of activity and record, we can analysis the behavior of vehicles. Thus, the proposed system provides effective and hospitality customized services. Moreover, the golf resources can be optimized at allocation and operation. To enhance the safety and reliability, this study will combine the golf cart with wireless sensor to detect the surrounding environment, tire pressure and golf cart maintenance. Thus the manager can save human power, financial and material resources. After revising the proposed system, we will adopt it on intelligent transportation, logistics, and storage management library.

VI. FUTURE ENHANCEMENTS

In the future, this study will enhance the functions to achieve the environmental protection, nature conservation, public medical and health caring.

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Mrs. G.Rathika, Assistant Professor of Commerce	International Journal of Innovative Research in Science Engineering and Technology	Full Online Telephone and DTH Billing System	International	ISSN: 2319-8753 ISSN: 2320-6710 Volume 10, Issue 3,	March 2021	http://www.ijirset.com/upload/2021/march/90_ONLINE_NC.pdf

Full Online Telephone and DTH Billing System

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ABSTRACT:- Pre-paid Recharging System aims to customize the existing pre-paid system offered by a pre-paid card Agent to the requirements of a Bank, say, ICICI and a Service provider, say, Airtel and integrate it in their existing enterprise system. The system will become the base system and foundation of complete wireless commerce framework. The primary audience is the bank and service providers. Ultimately, all members of the Project Team are the intended audience. The product must be a web-based and work as stand-alone product. In practical, our project makes a customer not to venture outside anywhere from his sitting room for recharging the mobile, that is, from his seat itself, he can able to perform recharge applications through a single message. This facility is what we are providing through our project. The product must be platform independent and it must use link to its home page. This software would satisfy the needs of the clients such, by its security aspects and necessary controls that are adopted by the Programmer and save the messages that has been sent over.

I. INTRODUCTION

PRE-PAID RECHARGING MANAGER is a website in which we record the detail of the Recharges of the distributors. In this, there is a login process for the users. By default all features of the website are disabled. User needs to give valid user id and password. Once the users has logged in successfully, they can use the website. After login to the website the user can access the website, they can add and edit, the various information regarding the Recharges.

First a user is authenticated based upon his/her user Id and Password. If authentication succeeds the user is marked as "logged in" and gets the privilege of inserting, deleting, retrieving or updating records. Data of all the recharges is stored in one centralized database. User can easily use this website without any technical knowledge. But user must have knowledge about the machine and application doesn't need any professional to use the website. User can easily access the data, maintain the record of Recharge.

Mobile is one of the very common devices that people have with them. With passing of years, mobile has become a necessity against luxury. As of today's scenario, almost everyone in the metros does have a mobile. With the increase in popularity of mobile phones, many new mobile handset manufacturers and mobile operators have come up and introduced many attractive schemes and offers. With the easy availability of PRE-PAID RECHARGING, most of the people are attracted towards them as the technology grows at a rapid pace, where we switch from traditional commerce to e-commerce; so does our requirements. To save the valuable time of subscribers, many mobile service providers like Vodafone, Airtel, Idea, etc. have come up with a facility of online recharge.

To ease off the process further, many websites have come up with the idea where one could easily go and get a recharge for any kind of mobile at one place, just at the click of a button.

II. OVERVIEW OF THE PROJECT

Aims:-
- The aim of this website is to make people convenient for recharge their mobile from anywhere.
- It maintains two levels of users:-
  1. Administrator Level
  2. User Level

The Website includes:-
- Easily recharge any number
- Safe payment by card and internet banking.
- Maintain record about user recharge.
- View history of last recharges.

➢ Submit complaint to admin regarding the inconvenience of recharge,

Objectives:-
1. To keep record of all the recharges.
2. To keep records of Sales and Purchase.
3. To keep record of Plans, Companies, Distributors etc.
4. Faster processing of accessing the details.
5. To help user for better management of Recharges.

Scope of the Project:
1. The proposed project is designed using PHP and the backend is My SQL.
2. Ease and comfort in getting information as per requirement.
3. To help user for better management
4. The implementation of project serves both mobile costumers and service providers.
5. It has capacity of recording and storing huge data. It maintains history of past a well as present recharges.
6. The proposed system of online PRE-PAID RECHARGING reduces the paper works. So, it can be considered as economical and easier system of recharge.
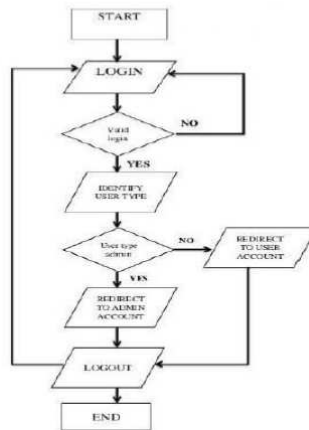
System Architecture

III. MODULES DESCRIPTION

➢ Admin
➢ User

3.1.1 ADMIN
• User Accounts Authentication
• Add Banks
• Add Offers
• DTH Offers
• Add Operators (Mobile)
• Add Operators (DTH)
• Complaints

3.1.2 USER
• Pre-Paid Recharging
• DTH Recharge
• Select Payment Method

- Payment By Credit Card And Debit Card
- Enter Credit/Debit Card Detail
- Enter Transaction Password
- Payment By Internet Banking
- Select Bank
- Bank Account Login
- Bank Transaction Password
- Recharge Successful
- Recharge History (Mobile)
- Recharge History (DTH)
- Complaint

IV. SCREEN SHOTS

4.1.1 HOME PAGE

4.1.2 ABOUT US
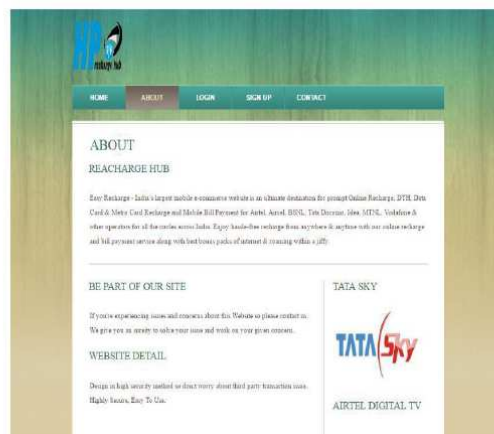
4.1.3 SIGN UP

4.1.4 LOGIN
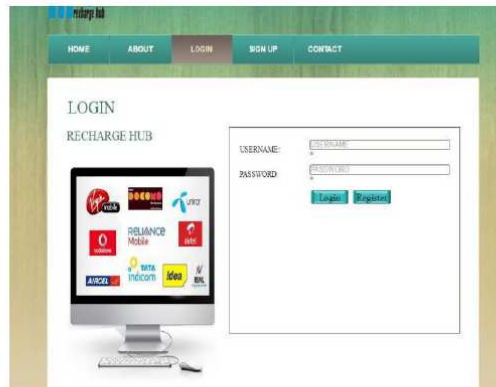
4.1.5 LOGOUT
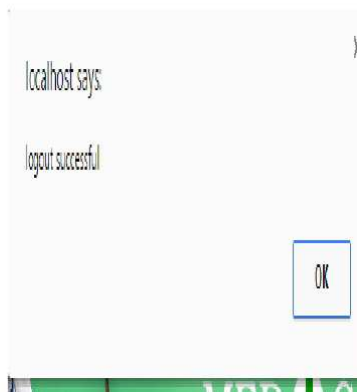
V. CONCLUSIONS

The system is completed and it can help users saving their effort and time, they can recharge their phones balance using this system instead of going to any place to recharge. And we hope that system help users and people in general and we hope that we add new things computer field.

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3. http://www.wtizag.com/
4. http://php.net/quickref.php

Mrs.Usharani Assistant Professor of Commerce	International Journal of Innovative Research in Science Engineering and Technology	Shopping Mall Management System in PHP	International	ISSN: 2319-8753 ISSN: 2320-6710 Volume 10, Issue 3,	March 2021	http://www.ijirset.com/upload/2021/march/93_SHOPPING_NC.pdf

Shopping Mall Management System in PHP

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ABSTRACT:-Extensively accepted problem from major shopping mall owners is to win the customers for their venture. Customers have become more informed with internet and mobile technologies. They prefer to achieve convenient and many times online shopping experience. With an online management site, it becomes easy for mall administrators to manage the mall from remote locations. And also, for shop owners to manage their shop's inventory and check their employee details. Today shopping centers are becoming more complex in terms of its size, type and characteristics and this depicts the challenging role the management team faces. It is important for the owner/developer to establish excellent management teams in order to face the challenges.

If shops are providing an online portal where their customers can enjoy easy shopping from anywhere, the shops won't be losing any more customers to the trending online shops such as flip cart or ebay. Since the application is available in the Smartphone it is easily accessible and always available.

I. INTRODUCTION

This project is a web based shopping system for an existing shop. The project objective is to deliver the online shopping application. Online shopping is the process whereby consumers directly buy goods or services from a seller in real-time, without an intermediary service, over the Internet. It is a form of electronic commerce. This project is an attempt to provide the advantages of online shopping to customers of a real shop. It helps buying the products in the shop anywhere through internet by using an android device. Thus the customer will get the service of online shopping and home delivery from his favorite shop.

Mall management has been identified as an important factor for the success of malls and the retail industry across the world. Till recently, mall management was restricted to facility management by a majority of developers in India, leading to differences in mall management culture. Given the high future supply of malls and increasing competitiveness within the Indian retail market, developers must correctly address these gaps to ensure success. In order to understand mall management, it is mandatory to have an overview of what malls are.

II. OVERVIEW OF THE PROJECT

- ❖ Introduce mall management in retail industry
- ❖ Explain retail scenario in India
- ❖ Enlist the main types of malls
- ❖ Elucidate growth of retail in India
- ❖ Explain mall space supply demand
- ❖ Describe different types of mall management

System Architecture
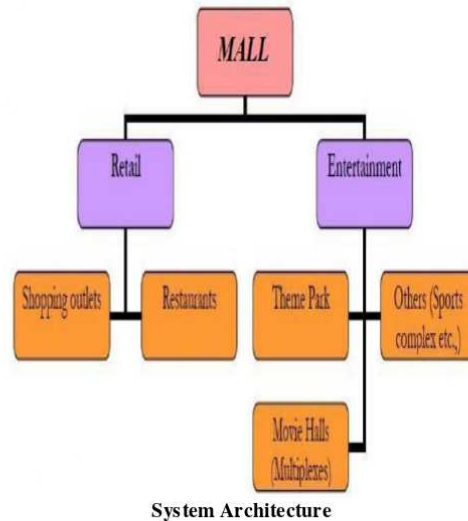
III. MODULES DESCRIPTION

3.1.1 MALL ADMINISTRATOR

The Mall Administrator is the super user and has complete control over all the activities that can be performed. The application notifies the administrator of all shop creation requests, and the administrator can then approve or reject them. The administrator also manages the list of available product categories. The administrator can also view and delete entries in the guestbook.

3.1.2 SHOP OWNER

Any user can submit a shop creation request through the application. When the request is approved by the Mall Administrator, the requester is notified, and from there on is given the role of Shop Owner. The Shop Owner is responsible for setting up the shop and maintaining it. The job involves managing the sub-categories of the items in the shop. Also, the shop owner can add or remove items from his shop. The Shop Owner can view different reports that give details of the sales and orders specific to his shop. The Shop Owner can also decide to close shop and remove it from the mall.

3.1.3 MALL CUSTOMER/GUESTS

A Mall Customer can browse through the shops and choose products to place in a virtual shopping cart. The shopping cart details can be viewed and items can be removed from the cart. To proceed with the purchase, the customer is prompted to login. Also, the customer can modify personal profile information (such as phone number and shipping address) stored by the application. The customer can also view the status of any previous orders, and cancel any order that has not been shipped yet.

3.1.4 EMPLOYEES

❖ Purchase department under a Purchase manager to overlook purchasing activities if warehousing needs arise.
❖ Sales department under a Sales manager who will look after the sale of products and services, the most important activity.
❖ Accounts department under an Accounts manager to look after the accounting activities of the enterprise.

IV. SCREEN SHOTS

4.1.1 HOME PAGE
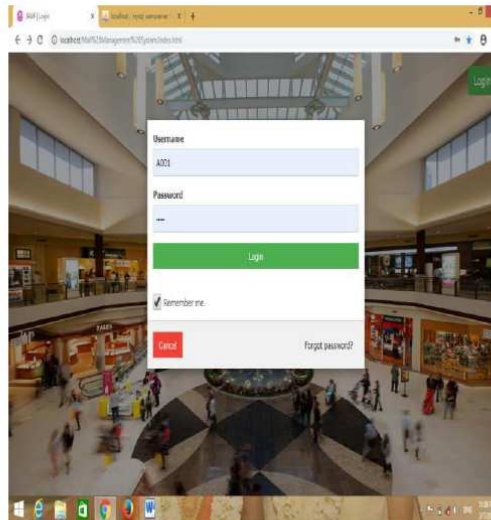
4.1.2 ADD PRODUCT
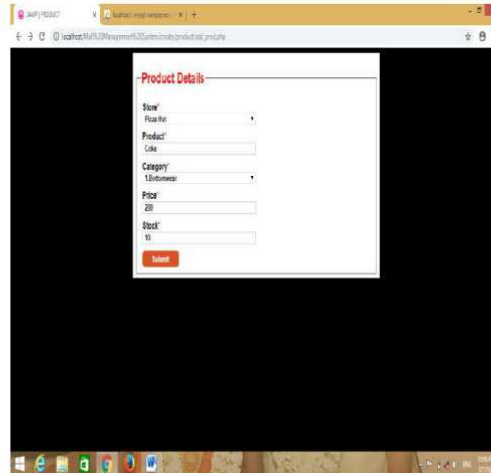
4.1.3 ADD EMPLOYEE DETAILS

4.1.4 VIEWSALE DETAILS

4.1.5 EMPLOYEE

4.1.6 UPDATE

V. CONCLUSIONS

Shopping centers are unique as a real estate format because they typically evolve more rapidly than other properties. They serve many different people, in addition to consumers, retailers and owners. Traditionally, major retail shopping centers have been managed by different in-house management teams, in a traditional fashion. Many are managed on behalf of investors through a combination of centre management teams and managing agents. They generally provide the primary focal point for managing the building asset and retaining relationships within the community and with retailers, with substantive support from consultants and contractors on a centre-by-centre basis. As a result of all this, a confusing range of relationships exist, ranging from retailers' service contracts to centre IT infrastructure, promotions, mechanical, electrical and fabric maintenance, cleaning, lifts and security, and a host of other arrangements. With the suggested solution, the mall can be managed by mall administrators in a more centralized

fashion rather than distributed functioning of different departments. It also allows the store owners at the mall to manage their stores using the system. It allows them to manage the shop's inventory, its employees and other critical functions. The proposed system is an online system and hence mall administrators and shop owners can work from remote locations. The system is available at any time of the day and does not require the administrators and shop owners to be present at the mall. It provides an integrated solution to managing the mall than the use of a number of individual solutions.

VI. FUTURE ENHANCEMENTS

The project enabled us to understand all the design patterns thoroughly. The Iterate, Singleton, Observer are essential design patterns in order to capture the software design of such shopping malls. Various techniques like use case analysis, state machine, CRC, sequence diagram are helpful in prototyping software design. The project can be improved by incorporating the MVC design technique. More of design patterns such as factory patterns can be included in the project.

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Placement Management System in PHP

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ABSTRACT:-The project is aimed at developing an application for the "WEB BASED PLACEMENT MANAGEMENT SYSTEM" of the college. The system is an application that can be accessed and effectively used throughout the organization with proper login enabled. This system can be used as an application for the Placement Officers in the college to manage the student information with regard to placement. Student logging should be able to upload their personal and educational information in the form of a resume. The key feature of this project is that it is one time registration enabled. Our project provides the facility of maintaining the details of the students. It reduces the manual work and consumes less paper work to reduce the time. This project is developed with PHP for frontend and MY SQL for backend. Students logging should be able to upload their information in the form of a CV. Visitors/Company representatives logging in may also access/search any information put up by Students.

I. INTRODUCTION

This project is aimed at developing an online application for the Training and Placement Department of the college. The system is an online application that can be accessed throughout the organization and outside as well with proper login provided. This system can be used as an application for the TPO of the college to manage the student information with regards to placement. Students logging should be able to upload their information in the form of a CV. Visitors/Company representatives logging in may also access/search any information put up by Students.

For the purpose of training and placement of the student in colleges, TPO's have to collect the information and CV's of students and manages them manually and arranges them according to various streams. If any modification is required that is to be also done manually. So, to reduce the job required to manage CV's and the information of various recruiters, a new system is proposed which is processed through computers.

II. OVERVIEW OF THE PROJECT

The project covers a wide scope. The information of all the students can be stored. CV's are categorized according to various streams. Various companies can access the information. Students can maintain their information and can update it. Notifications are sent to students about the companies. Students can access previous information about placement.
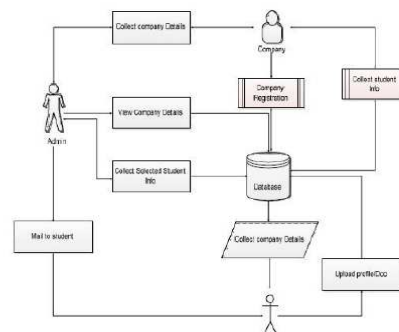
System Architecture

III. MODULES DESCRIPTION

3.1.1 STUDENT MODULE

In this module, creation of student input records about academic career from SSLC, HSC and all semester with facilities to modify the records and viewing changed records. The Student views the company details and verifies particular company details and provides valid details for registration.

3.1.2 COMPANY MODULE

The company enrolls themselves and they register their profile and their will marquee in the main page till their drive and view the student's details and update their details. Login Company, registration, students details view
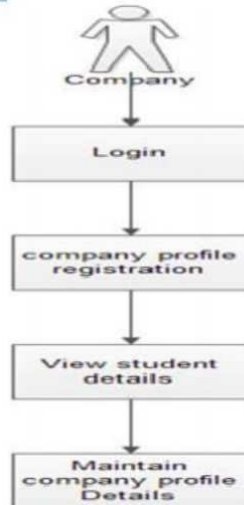
3.1.3 ADMIN MODULE

The admin is the placement officer who views the student's details and company details and posts the selected students list. Sending email to student for complete list of information for particular campus. Indication of hall ticket issued to candidates through mail. Login, View company details, View selected students details, sending mail.
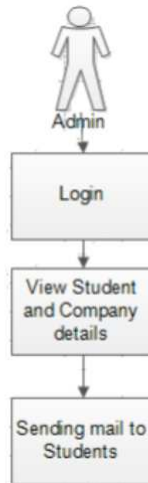
IV. SCREEN SHOTS

4.1.1 HOME PAGE
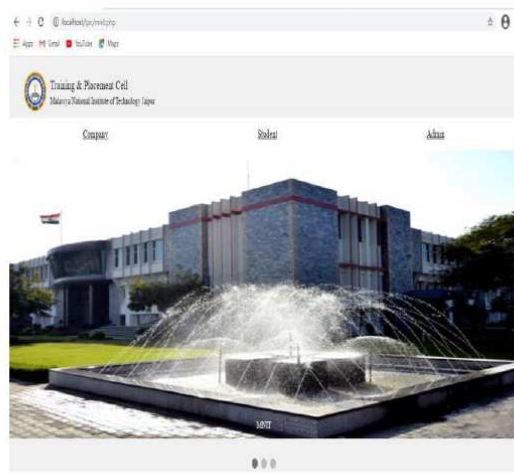
4.1.2 ADMIN LOGIN
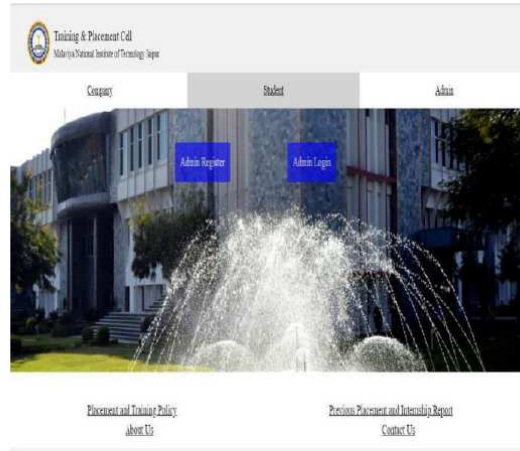
4.1.3 ADMIN PAGE
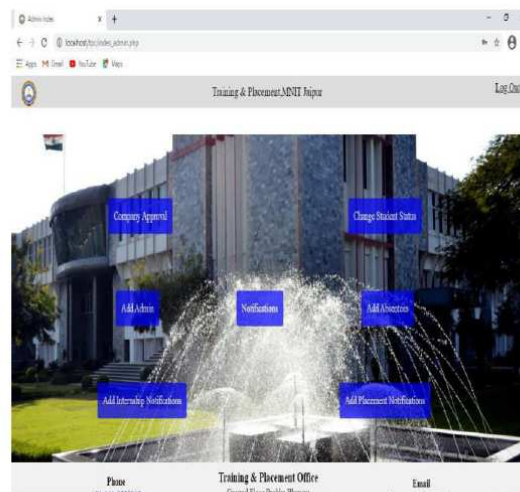
4.1.4 ADMIN NOTIFICATION
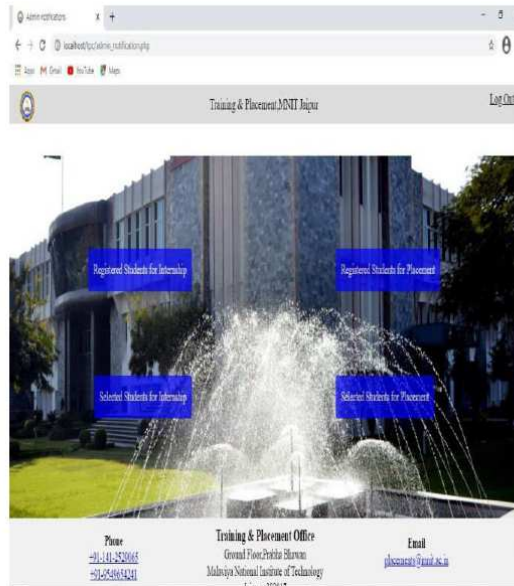
4.1.5 REGISTERED STUDENTS FOR PLACEMENT
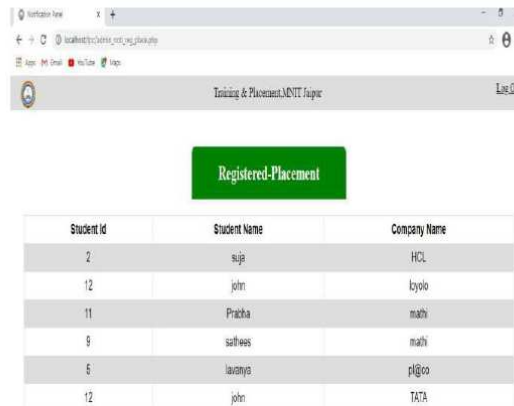
4.1.6 SELECETED STUDENTS FOR PLACEMENT

4.1.7 COMPANY

4.1.8 COMPANY LOGIN

4.1.9 STUDENTS
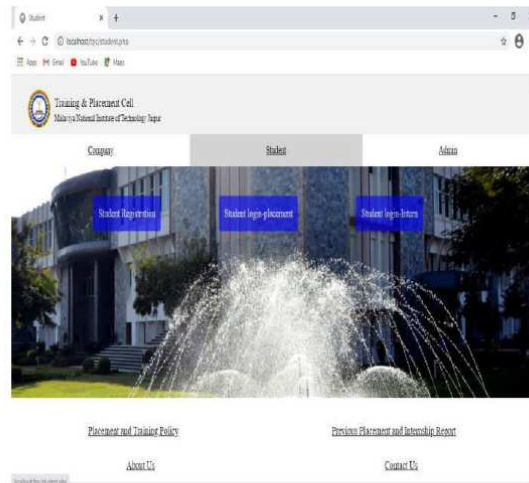
4.1.10 STUDENT LOGIN
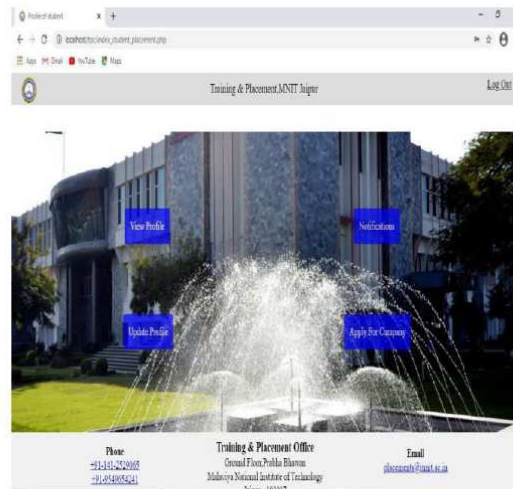
4.1.11 STUDENTS NOTIFIACTION
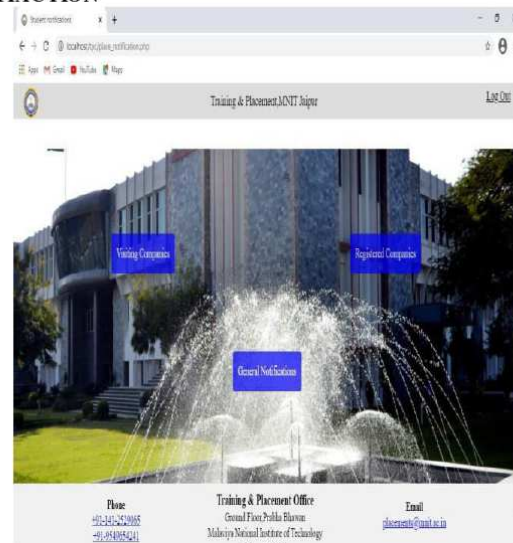
V. CONCLUSIONS

In the existing system maximum work goes manually and it is error prone system, takes time for any changes in the system. The big problem is the searching and updating of the student data and also no any notification method available for giving information to student expect the notice board. The proposed online training and placement management system gives the automation in all the process like registration, updating, searching. It provides the detail

solution to the existing system problem. .In our system admin can check the Student list those eligible according to criteria given by the Company and notify them instantly and update the information anytime successfully. Our system is secure and User-friendly for all of three modules.

VI. FUTURE ENHANCEMENTS

In future online training and placement management system gives the automation in all the process like registration, updating, searching. It provides the detail solution to the existing system problem.

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S. Kasthuri, Assistant Professor of Commerce	International Journal of Innovative Research in Science Engineering and Technology	E – Banking App to Manage Accounts and Transfer	International	ISSN: 2319-8753 ISSN: 2320-6710 Volume 10, Issue 3,	March 2021	http://www.ijirset.com/upload/2021/march/87_E-BANKING_NC.pdf

E-Banking App to Manage Accounts and Transfer

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ABSTRACT:-The project title is "Bank App" the system interface is targeted to the future banking solution for the users who is having multiple bank accounts in banks or who is having so many transactions with the banking system. This interface integrates all bank operations and provides business solutions for both retail and corporate. Bank App system is an innovative web application. The main focus of the application is managing the bank transactions as simple. A person can have bank account in any of the bank. But it's hard to remember the options of every bank's operating system. So we have developed a web application where a person can handle all his bank transactions in a secure manner with the user friendly application.

I. INTRODUCTION

The objective of this application to make the Customers of various Banks can do their account accessibility and transactions using this solution. They need not to interact with various applications or web sites of each bank. The Admin will add new Bank details and can update the existing details of the bank. The Admin will accept/reject the registration of a Customer to use this application. The Bank Admin makes access this site to see the all Customer transactions, account Transfer status, etc. He/she can accept or reject the fund transfer of the Customer. Should able to provide Response for the queries related to the Customers.

The Customers should make request for multiple bank account access to the Administrator. He/she can view the Account related information. The customer should able to transfer the amount from one bank to another bank account using this system by providing the Secondary authentication details. The customer also facilitated to generate report for own bank details for a respective period. The Customer should able to send Queries to the Bank Admin.

II. OVERVIEW OF THE PROJECT

This system enables user friendly for Bank-Customer relationship. Customer can easily maintain the multiple bank accounts. Then bank provide update details about customer.

The project objective is to create an application that uses customer multi banking system. A person can have bank account in any number of banks. But it's hard to remember every bank logins. So we have developed a web application where a person can handle all his bank accounts in a secure manner.

System Architecture
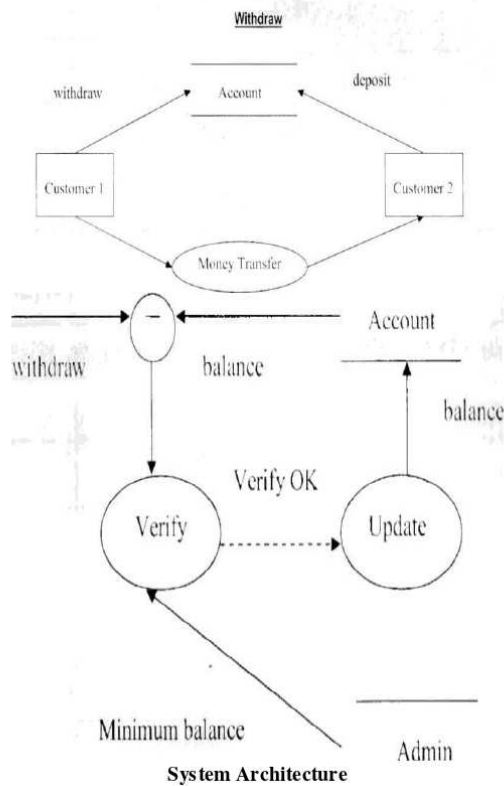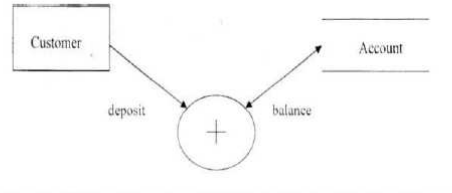
III. MODULES DESCRIPTION

3.1.1. LOGIN PAGE

- Give a good user inter face for all pages. designing is also as important as coding
- Every field in every pages of this app is mandatory. i.e., if any of the field is not filled then a toast message should be displayed saying "PLZ FILL ALL THE FIELDS"
- After logging in , show toast message "SUCCESFULLY LOGEDIN"

- After login go to main page

3.1.2. REGISTER PAGE
- Password should be strong
- At least 8-10 characters should be inserted to create password , else show a warning sign
- We are adding our account details in this page
- Mobile number is used to get OTP
- OTP detection is important
- After submitting, go to OTP detection page

3.1.3. OTP DETECTION
- We can even use a specific OTP for mobile number verification
- After registration , go on to login page for logging in to the account

3.1.4. FORGET PASSWORD
- OTP detection is important in this page
- If any of the field is incorrect, then show a toast message according to that.
- Example : - if account number and mobile number is not matching then show toast message "INVALID ACCOUNT NUMBER AND MOBILE NUMBER"

3.1.5. MAIN PAGE (HOME PAGE)
- Main page will be known as the home page from which the user will be navigating into other subpages of the system.

3.1.6. SLIDE WINDOW
- Slide window allows you to move on to other activities with the additional options.

3.1.7. CHECK BALANCE PAGE
- Here the user can check the balance amount. It shows the details of Account holder name, type of account and the available balance in the account.

3.1.8. A/C STATEMENT PAGE
- Show the last 10 transactions including money transfer and payment made by the user
- Also specify the time and date of the transaction made by the user

3.1.9. MAKE A TRANSFER PAGE
- After transferring show a toast message "SUCCESSFULLY TRANSFERRED "and redirect to home page

3.1.10. MAKE A PAYMENT PAGE
- Network operator field should be a list containing only IDEA, AIRTEL, VODAFONE, and BSNL. The user just has to select one from it.
- The amount has to be decreased from the bank account.
- After recharge show a toast message ,"SUCCESSFULLY RECHARGED "and redirect to home page

3.1.11. MAKE A DEPOSIT USING CHEQUE
- After depositing show a toast message "THE BANK EMPLOYEE WILL EXAMINE THE REQUEST MANUALLY AND ADD THE AMOUNT IN 15 MINUTE"and redirect to home page.
- QR code reader and camera should be invoked

3.1.12. APPLY FOR LOAN PAGE
- After applying, show a toast message "SUCCESSFULLY APPLIED, BANK EMPLOYEE WILL CONTACTYOU FOR FURTHER ENQUIRY "and redirect to home page.
- A user can apply loan for only one time. If a user clicks again on the loan page then show the loan status ie, the details given for applying that loan. And also give a button to cancel the loan.

- This loan purpose field should be a list containing only gold loan and vehicle loan. The user just has to select one from it.

3.1.13. HOME, PROFILE, SETTINGS, LOGOUT, HELPLINE

- When we click home button in slide window redirect the page to home page
- When we click profile button just show the details of the user
- Just add settings button no changes have to happen
- When we click logout button redirect to login page.
- Just add a fancy number as helpline number, phone's dialer should be invoked.

IV. SCREEN SHOTS

4.1.1 ADMIN LOGIN

4.1.2 ADD CUSTOMER

4.1.3 MANAGE CUSTOMER

4.1.4 HOME PAGE

4.1.4 CUSTOMER DETAILS

4.1.5 TRANSACTION

4.1.6 TRANSFER FUNDS

4.1.7 ADD BENEFICIARY

4.1.8 SEND MONEY
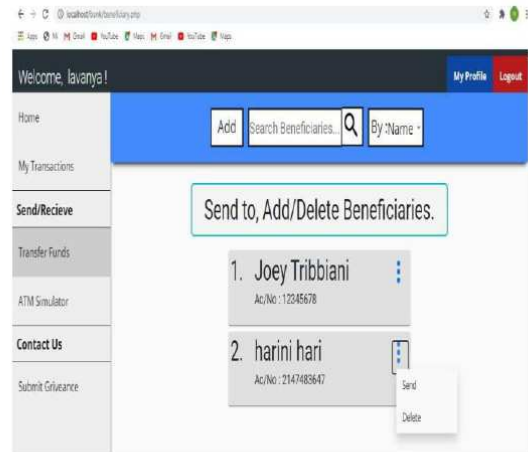
4.1.9 AMOUNT SEND
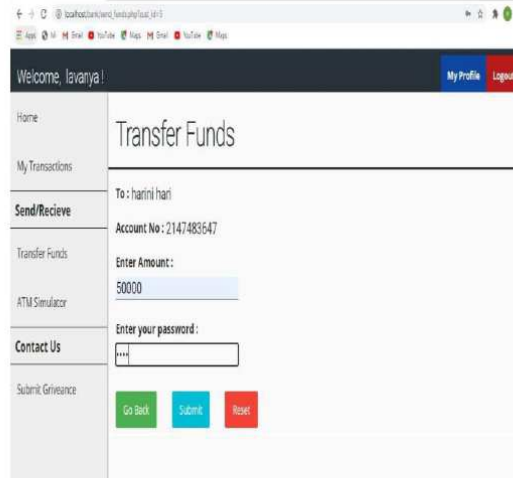
4.1.10 ATM STIMULATOR
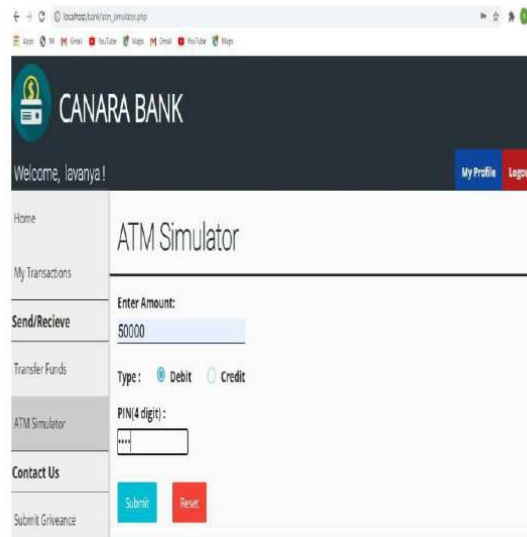
V. CONCLUSIONS

The project can be easily used in the process of decision-making. Different types of reports can be generated which help the management to take correct decision and reduce the time delay which automatically increases the company's work standards as well as the economical state of the company.

This system never decreases the manpower but helps the development of available manpower and optimizes the manpower by which company's standards and capabilities can be scaled to higher dimensions.

VI. FUTURE ENHANCEMENTS

The project has met the standards required to work at Web Site. If the business logic remains same the project can be ported to any Website with minor changes in the working procedure of the project. The project can be used as an availability to develop a project for a different company with different business logic wherein the commonalties in certain areas remain the same at any business level. By using the common features in future development the development time as well as the cost of development can be decreased considerably.

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Asset Tracking and Property Management System

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ABSTRACT:-Real Estate is the business of buying, selling, and renting land, buildings, and offices. Every person wants his house should be best in a location with all facilities. Offices should be near to market and product unit near to raw material and market place. General companies concentrate on its product and infrastructure are bought from Real Estate Company. Due to competition in this industry, every real estate company wants to deliver the best service and makes its customer satisfied. Online Property Management System is software which takes care of everything that a real estate company wants to do. Property Management System is developed for real estate Companies. It is very strong and easy to use that makes quick booking and account handling process. The real estate Property management system is web-based software and you can access it from anywhere. This ensures the service to client 24X7. Clients can view and book their favorite property online just after few clicks. They can also pay the money online and get bills online.

I. INTRODUCTION

Real Estate Script the best solution for your real estate. It gives the big opportunity of being reached by thousands of people-all possible Clients-looking for real estate. No coding knowledge required! It can be managed by a single person with or without technical experience reducing the costs of maintenance.

II. OVERVIEW OF THE PROJECT

1. Administrator:
• In Admin Module Administrator are the user who manages the whole system and all users of this website.
• Admin has the database control.
• Admin has all rights to select, insert, update and delete of all data.
• Admin has also activated and deactivates the user and their properties.

2. Agent/Client:
• In the Client section user can buy or sell Property.
• This system also provides the central login facility. • Buyer can create his profile and add property details.
• Seller can search and sell their property.
• Client can also post his requirement. . Both (Seller/Buyer) are messaging with each other through the email.
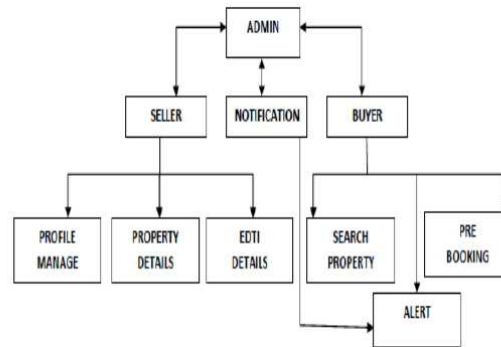
System Architecture

III. MODULES DESCRIPTION

3.1.1 Admin Profile:

Admin profile is profiled which is assigned to a super user having full access to the system. Admin module contains Admin Id, name, address, contact no. Admin can view the property details make changes if required, delete the property details.

Check the payment status, view, and manage the client details. Any issue in client's details or in property details just reports to admin.

3.1.2 Client Profile:

The client profile is for those who want to buy, sell, or rent the property for their uses. Client profile contains Client id, name, address, contact details, etc. Clients can view property. If it is available and the client is willing to buy or rent. They can pay online or offline.

3.1.3 Property Details:

Property details hold the data about the property in property location, total value, owner etc. The property gives an idea about the property which helps the clients to choose the property.

3.1.4 Search Property:

There is a lot of property. Clients may be confused to search their desired property. Clients can search property using property type like residence, offices, faculty, and etc. Property can be searched by property status.

Property can also be searched using property value and much more. If there is some legal problem with the property. Then it would be unavailable to rent or buy.

3.1.5 Availability:

Searched property can be viewed as available or not. The client can book the property only if it is available. Sold property can be hidden from the page. This would decrease the conflict between buyers and seller.

3.1.6 Booking:

Once the property is searched and the client finds desire property. This module helps the client to book the property. This module collects the information and checks the information from the backend. If data is verified then client redirect to the payment page.

3.1.7 Add / update / delete Users:

Only admin can add, update, and delete the client details and others user details. Admin has special permission to do so. User authentication according to his/her role. This module takes care of every profile is our system. No user is

allowed to use our system without a profile. Every profile has to authenticate using system procedure. This would ensure the security of our system.

3.1.8 Add Land Lord Details:
Admin can add details of the landlord to every property. As it would help the clients to reach landlord or owner directly only if owner and client are ready to do so.

IV. SCREEN SHOTS

4.1.1 HOME PAGE

4.1.2 LOGIN PAGE
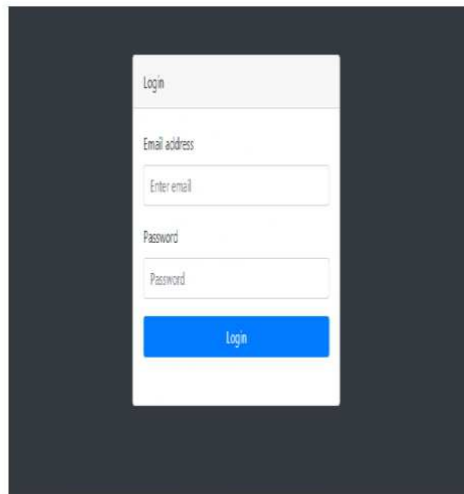
4.1.3 ADMIN PANEL
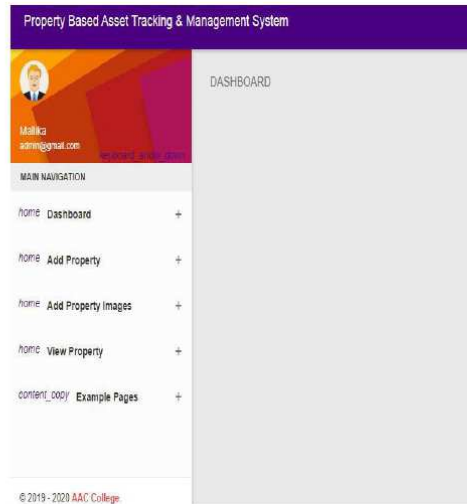
V. CONCLUSIONS

- Finally in Online property management system, we have developed a secure, user-friendly Property Management System. This system is capable of taking care of each work needs to be done in real estate business. The client can login using user id and password.
- This means the unauthorized user cannot enter into the system making it secure. Searching property help to find their desire property fast. Online payment and verification make it more client friend.
- This system would definitely go to reduce labor and make business more profitable and promising to clients.

VI. FUTURE ENHANCEMENTS

As software is used, the admin will recognize additional functions that will provide benefit. Perceptive maintenance extends the software beyond its original.

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| S. Kavitha, Assistant Professor of Computer Science | International Journal of Innovative Research in Computer and Communication Engineering | Kidney Stone Detection using MRI | International | 2320-9801 Volume 9, Issue 3 | March 2021 | http://ijircce.com/admin/main/storage/app/pdf/HE4Rm9GeNZp1AikxnZphZrC6VDYbACpleXQc98R3.Pdf |

Kidney Stone Detection using MRI

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ABSTRACT: Currently, kidney stone and tumor removal can be done without surgery. For this purpose, it is required imaging modalities that able to visualize kidney accurately. In order to improve the accuracy of kidney visualization in a short time, an automatic kidney centroid detection is required. This project developed a software to automatically detect the centroid of human kidney. The software was developed using MATLAB with smoothing filter, texture filter and morphological operators. They were used for image segmentation in order to extract important features. Test result shows the software achieve until 96.43% of accuracy in detecting the centroid. The detected centroid can be used as initial point to create ellipse model, which can be used to detect kidney's contour in further research. This software can be implemented in the most US machine that will be used as segmentation tool to reduce human errors and time. Then texture analysis was performed by calculating the local entropy of the image, continued with the threshold selection, morphological operations, object windowing, determination of seed point and ROI generation. This method was performed to several kidney ultrasound images with different speckle noise reduction techniques and different threshold value selection. Based on the result, it shows that for median filter, threshold value of 0.6 gave the highest TRUE ROIs which were 70%. For Wiener filter, threshold value of 0.8 gave highest TRUE ROIs which were 80% and for Gaussian low-pass filter, threshold value of 0.7 gave highest TRUE ROIs which were 100%. By using the previous methods result, this method has been tested also to more than 200 kidney stone ultrasound images.

I. INTRODUCTION

Nowadays, kidney stone has become a major problem and if not detected at an early stage then it may cause complications and sometimes surgery is also needed to remove the stone. So, to detect the stone and that too precisely paves the way to image processing because through image processing there is a tendency to get the precise results and it is an automatic method of detecting the stone. Doctor generally uses the manual method to detect the stone from the Computed Tomography image but our technique is fully automated so it is advantageous as the time is reduced and with that the chances of error also reduces.

Kidney stone disease is one of the major life threatening ailments persisting worldwide. The stone diseases remain unnoticed in the initial stage, which in turn damages the kidney as they develop. A majority of people are affected by kidney failure due to diabetes mellitus, hypertension, glomerulonephritis, and so forth. Since kidney malfunctioning can be menacing, diagnosis of the problem in the initial stages is advisable. Ultrasound (US) image is one of the currently available methods with noninvasive low cost and widely used imaging techniques for analyzing kidney diseases [1]. Shock wave lithotripsy (SWL), percutaneous nephrolithotomy (PCNL), and relative super saturation (RSS) are the available practices to test urine. The Robertson Risk Factor Algorithms (RRFA) are open and are used for laparoscopic surgery; these algorithms are assigned for concerned [2] special cases. Hyaluronan is a large (>106 Da) linear glycosaminoglycan composed of repeating units of glucuronic acid (GlcUA) and N-acetyl glucosamine (GlcNAc) disaccharides [3]. It has a significant role in a number of processes that can eventually lead to renal stone disease, including urine concentration, uric acid, salt form crystal, crystallization inhibition, crystal retention, magnesium ammonium phosphate, and amino acid.

II. LITERATURE SURVEY

A REVIEW OF SEGMENTATION METHODS IN SHORT AXIS CARDIAC MR IMAGES

This paper is a review of fully and semi-automated methods performing segmentation in short axis images using a cardiac cine MRI sequence. We will review automatic and semi-automatic segmentation methods of cine MR images of the cardiac ventricles, using the short-axis view. The wide variety of image-driven approaches using weak or no prior have been proposed to tackle the ventricle segmentation in cardiac MRI. Almost all of these methods require either minimal or great user intervention. If image based and pixel classification-based approaches offer a limited framework for incorporating strong prior, straightforward extensions of deformable models in this sense have been extensively

studied. In the next section are presented Methods relying on strong prior for heart segmentation. It can be generated by manually segmenting an image or by integrating information from multiple segmented images from different individuals. Strong prior based methods can overcome the previously defined segmentation problems. This paper has been presenting segmentation methods in cardiac MRI. We have proposed a categorization for these methods, highlighting the key role of the type of prior information used during segmentation, and has distinguished three levels of information:

(i)   No information is used, but our study shows that min this case user interaction is required

(ii)   Weak prior, that is, low level information such as geometrical assumptions on the ventricle shape, often combined to low-level user interaction,

(iii)   Strong prior such as statistical models, constructed or learned from a large number of manually segmented images, not requiring user interaction.

Our image segmentation categorization includes on the one hand image-driven and pixel classification based approaches, and deformable models, making use of weak or no prior.

III. PROJECT ANALYSIS

3.1 PROBLEM IDENTIFICATION
- In the scheme does not permit the direct derivation of deformation parameters.
- Detection accuracy is low
- This particularly complex segmentation task, prior knowledge is required.
- Major challenges linked to this segmentation task.

3.2 EXISTING SYSTEM:
- In existing studies suggest neuro imaging may become a valuable tool in the early diagnosis of neurodegenerative diseases by extracting anatomical patterns and revealing hidden relations from structural magnetic resonance (MR) images.
- At analyzing structural brain MR images, a main aim is to find anatomical changes, either local or global, related to functional disturbances.
- In particular, radiologists examine images by looking at distinctively regions and compare them by searching differences.
- The most popular technique has been by far the support vector machine (SVM), which has been applied to classifying individuals with several neurological disorders.
- In this Methods that face the problem of high-dimensionality are the ones that perform image synthesis

3.3 PROPOSED METHOD:
The proposed method is based on a two-phase PSO model that combines bottom-up and top-down approaches to achieve accurate classification of brain MR images as normal controls or probable AD subjects. K-means with PSO based on clustering which is used to classify the problem. In the proposed approach, the pre-defined kernels convert the input image into individual feature saliency maps, whose pso correspond to dimensions of the kmeans space. Most brain lesion segmentation methods based on outlier detection, the proposed method is generic. It does not consider single voxels independently and makes no assumption about shape or intensity profile of the abnormality.

3.4 KIDNEY DATA FLOW DIAGRAM
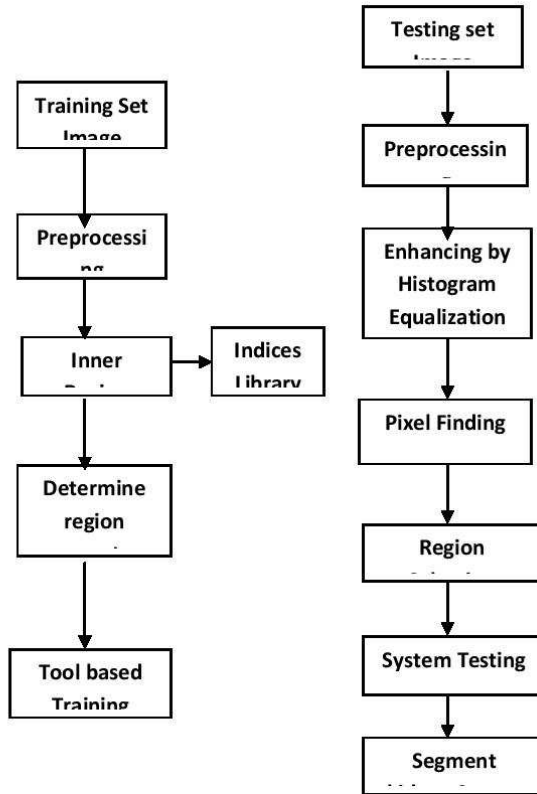
IV. SYSTEM IMPLEMENTATION

Modules

The proposed renal kidney stone segmentation method consists of five major steps namely,

- **(i)** Determining inner region indicators
- **(ii)** Determining the region parameters
- **(iii)** Enhancing the contrast of the image using Histogram Equalization
- **(iv)** Finding most fascinated Pixels by K-means clustering [7] and
- **(v)** Contour based Region selection process

Preprocessing

In this preprocessing phase, principal component analysis with local pixel grouping (LPG-PCA) based image denoising algorithm is used to remove the noise from the US renal calculi images.

Determining Inner Region Indicators

Let D represents the renal calculi image training dataset, which contains renal calculi images D = {I1, I2 ,…In};n = 1…N, where N is the number of the renal calculi images in the given dataset D . To determine the inner region indicators, Then the whole image is divided into L number of blocks and for every block, an index value, firstly, the regions representing kidney are manually marked in the known training data set ultrasound images.

Determine Region Parameter

Using the renal calculi images in D, the calculi and non calculi regions are extracted. The extracted regions from the renal calculi images are R = {r1, r2 ,....rm},m = 1…M, where M Represents the total number of extracted regions. Next we find the centroids values for all the renal part of images in D, that is , where is a centroid value of image I1. Then, we determine the region parameters for the extracted regions from R by utilizing MATLAB function.

The region parameters determined for each region are

(i)   Area
(ii)   Centroid
(iii)   Orientation and
(iv)   Bounding Box.

This region parameter values are given to the ANFIS system for training process. In training process, the normal and calculi area is identified by the threshold values t1 and t2.

Contrast Enhancement using Histogram Equalization

In contrast to the following enhancement process, initially we have converted given ultrasound image tn I into a grayscale image G t' n, as histogram equalization process can be used only on grayscale -images. Histogram equalization make some enhancements to the contrast of the given gray scale ultra sound image. In histogram equalization all pixel values in gray scale image are adjusted to maximum intensity values of the image. The mage that is obtained after the histogram equalization process is denoted as G t' n .

Find Most Fascinated Pixels by K-means clustering

Mostly required pixels are computed from the image G t' n by utilizing the k-means clustering method. K-means clustering is a method of cluster analysis which aims on partition of observations into number of clusters in which each observation belongs to the cluster with the nearest mean. The steps involved in the K-means clustering used in our method are described as following:-

(i)   Partition of the gray scale data points to A arbitrary centroids, one for each cluster.
(ii)   To determine new cluster centroid by calculating the mean values of all the cluster elements.
(iii)   Determining distance between the cluster centroid and the cluster elements and obtain new clusters.
(iv)   Repeat process from step

V. CONCLUSION AND SCOPE FOR FUTURE WORK

To sum up, through power law transformation kidney area is enhanced properly. In the original image the gray level of thoracic cage, vertebral column and lesion part is same. Hence, to separate the anatomical part, preprocessing and segmentation is done. Also, thresholding technique is very simple and accurate to do segmentation.

The ANN is trained with normal kidney image and classified image input for normal or abnormal conditions by considering extracted energy levels from wavelets filters. The developed system is examined for different kidney images from the database and the results are effective in classifying the types of stone successfully with the accuracy of 98.8% [23]. Thus this system can be readily utilized in the hospitals for patients with abnormality in kidney. This work proves that the combination of level set segmentation, lifting scheme wavelet filters, and multilayer perceptron with back propagation means a better approach for the detection of stones in the kidney. In the future work, the system will be designed for real time implementation by placing biomedical sensors in the abdomen region to capture kidney portion. The captured kidney image is subjected to the proposed algorithm to process and detect stone on FPGA using hardware description language (HDL). The identified kidney stone in the image is displayed with colour for easy identification and visibility of stone in monitor.

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S. Kavitha, Assistant Professor of Computer Science	International Journal of Innovative Research in Computer and Communication Engineering	Hybrid Clustering Technique Based Segmentation of Brain Tumour	International	2320-9801 Volume 9, Issue 3	March 2021	http://ijircce.com/admin/main/storage/app/pdf/m0ZBwuSMNuzVraV9ybqQPQFU27Z19sOT7SFN2dZ7.pdf

Hybrid Clustering Technique Based Segmentation of Brain Tumor

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ABSTRACT: Inference of tumor and edema areas from brain magnetic resonance imaging (MRI) data remains challenging owing to the complex structure of brain tumors, blurred boundaries, and external factors such as noise. To alleviate noise sensitivity and improve the stability of segmentation, an effective hybrid clustering algorithm combined with morphological operations is proposed for segmenting brain tumors in this paper. The main contributions of the paper are as follows: firstly, adaptive Wiener filtering is utilized for denoising, and morphological operations are used for removing nonbrain tissue, effectively reducing the method's sensitivity to noise. Secondly, K-means++ clustering is combined with the Gaussian kernel-based fuzzy C-means algorithm to segment images. This clustering not only improves the algorithm's stability, but also reduces the sensitivity of clustering parameters. Finally, the extracted tumor images are postprocessed using morphological operations and median filtering to obtain accurate representations of brain tumors. In addition, the proposed algorithm was compared with other current segmentation algorithms. The results show that the proposed algorithm performs better in terms of accuracy, sensitivity, specificity, and recall.

I. INTRODUCTION

Magnetic Resonance Images (MRI) acquisition provides different sequences like T1- Weighted Images (T1WI), T2-Weighted (T2WI), Proton Density Images (PDI), FluidAttenuated Inversion Recovery (FLAIR) etc. Massive information on tissue structure and pathology can be extracted from these sequences, but each sequence differs in available information content [1]. Slice by slice examination and extraction of small details and abnormalities from these large numbers of sequences is a tedious job in clinical applications. Multispectral data analysis combines the slices of the same brain portion from each sequence to form a single suite so that it helps to analyze the corresponding pixel information as a pixel signature [1]. For example, see the sample slices of T1WI, T2WI and Diffusion Weighted Image (DWI) shown in Figure 1. It is observed that details present in an image vary from slice to slice. In Figure 1, T1WI shows White Matter (WM) information clearly, whereas T2WI contains Gray Matter (GM) and Cerebro Spinal Fluid (CSF) information. DWI fails to distinguish the brain tissues, but pathological information is clearly visible in it.
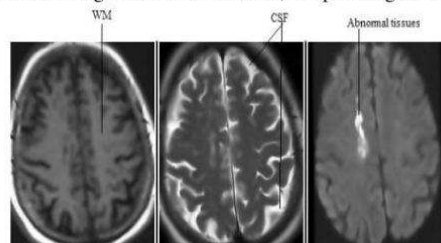
Figure 1. Input Slices of T1WI, T2WI and DWI (from left to right)

Researchers in MRI analysis have been intensively working for last few decades to improve the performance of existing data mining techniques using multispectral approaches. But it remains as a challenge because classification accuracy highly depends upon the input data characteristics and feature analysis methods. Pre-processing, feature extraction and classification are the main steps involved in a typical multispectral analysis system. Preprocessing techniques like image registration, denoising and contrast improvement can contribute much to select the best features

for further analysis. Classification methods in multispectral analysis can be effectively classified into two categories, unsupervised and supervised learning. Unsupervised methods like k-means, Fuzzy C-Means (FCM) and Expectation Maximization (EM) can give satisfactory results for MR image analysis. But radiologists often rely on feedback from previous data and diagnosis to reach at a correct opinion for each case. Supervised learning techniques follow similar strategy, and widely used in computer aided categorization of MRI data. Artificial Neural Networks (ANN) and Support Vector Machines (SVM) are the two widely accepted techniques in supervised MRI classification.

The usual examination workflow is performed by expert neurologists or radiologists, who are able to figure out complex anatomical patterns and subtle changes with clin-ical meaning. The process that an expert follows when examining a particular case involves two different kinds of tasks: those related with image perception, such as visual search or exploration paths, and others associated with cognitive skills, mainly related to diagnostic reasoning and decision making. An expert structures a diagnosis by using contextual knowledge and fusing information from different sources, a process that has been recently under study. At analyzing structural brain MR images, a main aim is to find anatomical changes, either local or global, related to functional disturbances. In particular, radiologists examine im-ages by looking at distinctively regions and compare them by searching difference. In the computational attempt of emu-lating the human vision process—a synchronized collaborative work between the brain and low level visual mechanisms—the concept of visual attention has introduced a generation of tech-niques that are able to transform an image into a hierarchy of relevant regions, known as salient regions. Relevant regions in radiological terms may be defined as those image areas that are visually altered and are entailed with a certain degree of clinical interpretability. Nevertheless, most methods used to compare brains establish local rather than regional (salient) differences. Currently, a morphometric brainanalysis consists of a set of strategies aimed to extract and quantify anatomical differences between groups of subjects. Commonly, this analysis comprises two main processes: first, all images are warped or registered together to a common referenceframe or template, and second, a quantification of the estimated local deformation required to register is computed, producing specific measurements of interest. voxel-based morphometry (VBM) and deforma-tion-based morphometry (DBM) are currently the most used techniques to compare populations. In VBM, local differ-ences, found in brain tissue segmentations, are voxel-by-voxel statistically analyzed, while DBM statistically compares in-formation coming from the deformations fields obtained after registration to the template. With these methods, one-to-one correspondences between subjects are assumed and statistics are computed for the same voxel across all subjects. However, conclusions are limited when the same structure may be par-tially present, or when a single anatomical region may exhibit multiple shapes across the population. On the other hand, some pathologies may affect not only aunique anatomical structure A detailed review of some supervised and unsupervised classification methods in MS lesion segmentation is described.

II. LITERATURE SURVAY

Multispectral approach to brain MRI analysis has shown great advance recently in pathology and tissue analysis. However, poor performance of the feature extraction and classification techniques involved in it discourages radiologists to use it in clinical applications. Transform based feature extraction methods like Independent Component Analysis (ICA) and its variants have contributed a lot in this research field. But these global transforms often fails in extraction of local features like small lesions from clinical cases and noisy data. Feature extraction part of the recently introduced Multiresolution Independent Component Analysis (MICA) algorithm in microarray classification is proposed in this work to resolve this issue. Effectiveness of the algorithm in MRI analysis is demonstrated by training and classification with Support Vector Machines (SVM). Both synthetic and real abnormal data from T1-weighted, T2-weighted, proton density, fluid-attenuated inversion recovery and diffusion weighted MRI sequences are considered for detailed evaluation of the method. Tanimoto index, sensitivity, specificity and accuracy of the classified results are measured and analyzed for brain abnormalities, affected white matter and gray matter tissues in all cases including noisy environment. A detailed comparative study of classification using MICA and ICA is also carried out to confirm the positive effect of the proposed method. MICA based SVM is found to yield very good results in anomaly detection, around 2.5 times improvement in classification accuracy is observed for abnormal data analysis.
  - ➤ the accuracy of the automated method compared to manual segmentations performed by two cardiologists;
  - ➤ the ability of the method to compute reliable characteristics of the LV (ejection fraction and left ventricular mass);
  - ➤ the temporal continuity of the resulting automated segmentation;
  - ➤ the time-efficiency (about 3' to segment a sequence of 25 3D-images on a low-end computer) of the proposed method; and
  - ➤ The robustness of the few parameters whose setting rely mostly on physical and anatomical facts.

III. SYSTEM ANALYSIS

3.1 PROBLEM IDENTIFICATION

- In the scheme does not permit the direct derivation of deformation parameters.
- Detection accuracy is low
- This particularly complex segmentation task, prior knowledge is required.
- Major challenges linked to this segmentation task.

3.2 EXISTING SYSTEM:

In existing studies suggest neuro imaging may become a valuable tool in the early diagnosis of neurodegenerative diseases by extracting anatomical patterns and revealing hidden relations from structural magnetic resonance (MR) images. At analyzing structural brain MR images, a main aim is to find anatomical changes, either local or global, related to functional disturbances. In particular, radiologists examine images by looking at distinctively regions and compare them by searching differences. The most popular technique has been by far the support vector machine (SVM), which has been applied to classifying individuals with several neurological disorders.In this Methods that face the problem of high-dimensionality are the ones that perform image synthesis

3.3 PROPOSED METHOD:

The proposed method is based on a two-phase PSO model that combines bottom-up and top-down approaches to achieve accurate classification of brain MR images as normal controls or probable AD subjects. K-means with PSO based on clustering which is used to classify the problem. In the proposed approach, the pre-defined kernels convert the input image into individual feature saliency maps, whose pso correspond to dimensions of the kmeans space. Most brain lesion segmentation methods based on outlier detection, the proposed method is generic. It does not consider single voxels independently and makes no assumption about shape or intensity profile of the abnormality.

3.4 ARHITECTURE DIAGRAM
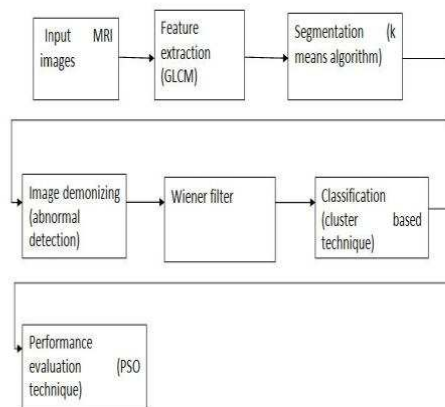
IV. SYSTEM IMPLEMENTATION

4.1 IMAGE SELECTION

MRI sequences for clinical trials are usually acquired with different size and orientation. Registration of the images to form a co-registered multispectral suite is the preliminary step in analysis process. Each pixel vector in a multispectral image forms the spectral signature corresponding to that pixel and a collection of these spectral signatures generate multi signals.

Clinical Image Analysis
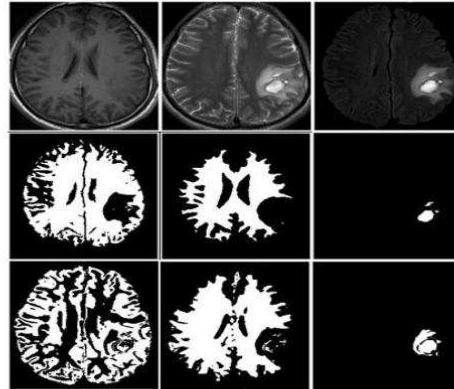
Two sets of clinical data are used in visual and quantitative analysis. The first dataset contains T1WI, T2WI and FLAIR images with specifications as described in total 70 multispectral slice sets were selected for analysis from 20 abnormal cases. Top row shows slices in a sample multispectral image set. T2WI and FLAIR images show lesion surrounded by edema, but that information is not visible in T1WI. Classified results from ICA+SVM and MICA+SVM are given in Figure 5 middle row and last row respectively with GM in the 1st column, WM in the 2nd column and abnormality in the 3rd column.

MICA+SVM results show the lesion and the surrounding edema (Figure last row last column) with a clear description of the separation between lesion and edema in the original image. On observing the affected portion of WM (Figure 2nd column), MICA+SVM results looks better than ICA+SVM results. However, MICA cannot reach the performance of ICA in classification of WM.

4.2 IMAGE DENOISING

Images will often get corrupted in transmission and acquisition due to noise. Therefore we need image restoration to remove the additive noise (mostly Additive White Gaussian Noise) from the image while keeping its original features as much as we can. In here we discuss a Method of Image Denoising using Wiener Filtering and Adaptive Median Filtering. Image Denoising has become a very essential process in Image Restoration. Today several techniques exist such as Wiener Filtering, Gaussian scalar mixture, BM3D (Image denoising, 2010) which is used for image denoising. They have been successfully used in areas such as medical imaging and astronomy.

The goal of the Wiener filter is to filter out noise that has corrupted a signal. It is based on a statistical approach. Typical filters are designed for a desired frequency response. However, the design of the Wiener filter takes a different approach. One is assumed to have knowledge of the spectral properties of the original signal and the noise,

and   one   seeks   the   LTI   filter   whose   output
would come as close to the original signal as possible. Wiener filters are characterized by the following:

1. Assumption: signal and (additive) noise are stationary linear stochastic processes with known spectral characteristics or known autocorrelation and cross-correlation
2. Requirement: the filter must be physically realizable, i.e. causal (this requirement can be dropped, resulting in a non-causal solution)
3. Performance criterion: minimum mean-square error (MMSE) This filter is frequently used in the process of deconvolution; for this application, see Wiener deconvolution.

4.3 KMEANS AND PSO ALGORITHM

The k-means clustering algorithm finds the desired number of distinct clusters and their centroids. A centroid is defined as the point whose coordinates are obtained by computing the average of each of the coordinates (i.e., feature values) of the points of the jobs assigned to the cluster [2]. Formally, the k-means clustering algorithm follows the following steps.

1. Choose a number of desired clusters, k.
2. Choose k starting points to be used as initial estimates of the cluster centroids. These are the initial starting values.
3. Examine each point (i.e., job) in the workload data set and assign it to the cluster whose centroid is nearest to it.
4. When each point is assigned to a cluster, recalculate the new k centroids.
5. Repeat steps 3 and 4 until no point changes its cluster assignment, or until a maximum number of passes through the data set is performed.

Before the clustering algorithm can be applied, actual data samples (i.e., jobs) are collected from observed workloads. The features that describe each data sample in the workload are required *a priori*. The values of these features make up a feature vector $(F_{i1}, F_{i2}, \dots, F_{iM})$, where F_{im} is the value of the mth feature of the ith job. Each job is described by its M features. For example, if job 1 requires 3MB of storage and 20 seconds of CPU time, then (F_{11}, F_{12}) = (3, 20). The feature vector can be thought of as a point in M-dimensional space. Like other clustering algorithms, k-means requires that a distance metric between points be defined [2]. This distance metric is used in step 3 of the algorithm given above. A common distance metric is the Euclidean distance. Given two sample points, p_i and p_j, each described by their feature vectors, $p_i = (F_{i1}, F_{i2}, \dots, F_{iM})$ and $p_j = (F_{j1}, F_{j2}, \dots, F_{jM})$, the distance, d_{ij}, between p_i and p_j is given by:

$$d_{ij} = \sqrt{\sum_{m=1}^{M} \left(F_{im} - F_{jm} \right)^2} \qquad (1)$$

If the different features being used in the feature vector have different relative values and ranges, the distance computation may be distorted since features with large absolute values tend to dominate the computation [2]. To mitigate this, it is common for the feature values to be first scaled in order to minimize distortion. There are several different methods that can be used to scale data. The method used in this paper is z-score scaling. Z-score scaling uses the number of standard deviations away from the mean that the data point resides [5]. The z-score equation is

$$F_{im}^{*} = \frac{F_{im} - \mu_m}{\sigma_m} \qquad (2)$$

where F_{im} is the value of the mth feature of the ith job (i.e., the data point), μ_m is the mean value of the mth feature, and σ_m is the standard deviation of the mth feature. Thus, before the algorithm is applied, the original data set is scaled, using the z-score scaling technique, where the feature mean is subtracted from the feature value and then divided by the standard deviation of that feature (i.e., F_{im} is replaced by its scaled value F_{im}^{*}). This technique has the effect of normalizing the workload features so that no single feature dominates in the clustering algorithm.

The number of clusters to be found, along with the initial starting point values are specified as input parameters to the clustering algorithm. Given the initial starting values, the distance from each (z-scored scaled) sample data point to each initial starting value is found using equation (1). Each data point is then placed in the cluster associated with the nearest starting point. New cluster centroids are calculated after all data points have been assigned to a cluster. Suppose that C_{im} represents the centroid of the mth feature of the ith cluster. Then,

$$C_{im} = \frac{\sum_{j=1}^{n_i} F_{i,jm}^{*}}{n_i} \qquad (3)$$

where $F^{*}_{i,jm}$ is the mth (scaled) feature value of the jth job assigned to the ith cluster and where n_i is the number of data points in cluster i. The new centroid value is calculated for each feature in each cluster. These new cluster centroids are then treated as the new initial starting values and steps 3-4 of the algorithm are repeated. This continues until no data point changes clusters or until a maximum number of passes through the data set is performed.
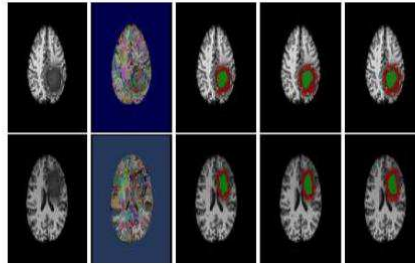
4.5 PARTICLE SWARM OPTIMIZATION (PSO)

As stated before, PSO simulates the behaviors of bird flocking. Suppose the following scenario: a group of birds are randomly searching food in an area. There is only one piece of food in the area being searched. All the birds do not know where the food is. So what's the best strategy to find the food? The effective one is to follow the bird which is nearest to the food.PSO learned from the scenario and used it to solve the optimization problems. In PSO, each single solution is a "bird" in the search space. We call it "particle". All of particles have fitness values which are evaluated by the fitness function to be optimized, and have velocities which direct the flying of the particles. The particles fly through the problem space by following the current optimum particles.

4.6 IMAGE FEATURE EXTRACTION AND IMAGE FEATURE SELECTION

The goal of feature extraction is to locate points in the scene that lie along boundaries. By boundaries we mean sets of pixels that either separate objects from one another or represent changes in the surface geometry of an object. This work considers two basic types of boundaries; step edges and crease edges. Step edges are those edges that represent depth discontinuities, and crease edges are those that represent a crease, or a discontinuity in the surface normal, in a single object. From the range data, steps edges can be identified by the gradient magnitude and crease edges can be located by computing the gradient magnitude of the 3D surface normal. From the amplitude data, object boundaries coincide with high gradient magnitude when objects in color or texture. Crease edges can be located from the gradient magnitude of the amplitude image because of differing angles of incidence of the laser beam. A short overview of our feature extraction methodology is as follows. We begin with some preprocessing to reduce the effects of noise. Given a registered pair of range and amplitude images of a scene from a single pose, we median filter the data to reduce replacement noise (outliers or misfires from the laser) and implement an edge preserving, spatially variant smoothing operator on both the range and amplitude data to reduce additive noise.

4.7 CLASSIFICATION

In the previous section we have shown that the DLD problem can be interpreted as a binary classification problem in which one conditional class probability is known. We now show that this interpretation has far reaching algorithmic consequences. To this end let us assume that we give each sample of our training set T = (x1,...,xn) drawn from Q the label 1. Additionally we generate a second training set T 0 = (x 0 1 ,...,x 0 n 0) from μ and label each sample of it with −1. Merging these labeled sample sets gives a new training set which then can be used by a binary classification algorithm.

V. CONCLUSION AND FUTURE ENHANCEMENT

5.1 CONCLUSION

In recent years, multispectral approach helped MRI analysts a lot to improve the analysis time and accuracy of the clinical trials. However, extraction of very critical features like small lesions is a great challenge in pathology analysis due to lack of efficiency of the existing methods. The proposed multi resolution analysis coupled with ICA is demonstrated as a good choice to resolve this issue. SVM classification is used to investigate and evaluate the performance of the method in abnormality analysis. Experimental results using synthetic and clinical data confirm that

the proposed method performs better than ICA based classifications in lesion/tumor detection. Experiments conducted for noisy synthetic images also support these findings with acceptable results in favor of MICA. Refinements of MICA are under consideration to give equal priority to normal and abnormal tissue classification in future works.

5.2 FUTURE ENHANCEMENT

In this project we detect the affected part on a MR image. we proposed the block-adaptive windows, by which the quality of estimations of image energy distributions is significantly improved. The doubly local Wiener filtering method with block-adaptive windows obtains better denoising performance. And to find the connection between the probabilistic label fusion model and the recently proposed kmeans & pso segmentation method. Another contribution is that label information is incorporated into image registration to improve registration accuracy. Experimental results show that registration refinement improves segmentation accuracy. The method produces reliable clinical indexes which are in good agreement with the manual measurements. It can provide useful information for clinicians in cancer disease diagnosis.

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To Predict the Brightness of Terrain & Cloud Pixels in Remote Sensing Image

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ABSTRACT: Next-generation orbital imaging spectrometers will generate unprecedented data volumes, demanding new methods to optimize storage and communication resources. Here, we demonstrate that onboard analysis can excise cloud-contaminated scenes, reducing data volumes while preserving science return. We calculate optimal cloud-screening parameters in advance, exploiting stable radiometric calibration and foreknowledge of illumination and viewing geometry. Channel thresholds expressed in raw instrument values can be then uploaded to the sensor where they execute in real time at gigabit-per-second (Gb/s) data rates. We present a decision theoretic method for setting these instrument parameters and characterize performance using a continuous three-year image archive from the "classic" Airborne Visible/Infrared Imaging Spectrometer (AVIRIS-C). We then sim- ulate the system onboard the International Space Station, where it provides factor-of-two improvements in data volume with negligi- ble false positives. Finally, we describe a real-time demonstration onboard the AVIRIS Next Generation (AVIRIS-NG) flight plat- form during a recent science campaign. In this blind test, cloud screening is performed without error while keeping pace with instrument data rates.

I. INTRODUCTION

The detection of clouds in satellite imagery has a number of important applications in weather and climate studies. The presence of clouds can alter the energy budget of the Earth-atmosphere system through scattering and absorption of shortwave radiation and the absorption and re-emission of infrared radiation. The scattering and absorption characteristics of clouds vary with the microphysical properties of clouds, hence the cloud type. Thus, detecting the presence of clouds over a region in satellite imagery is important in order to derive atmospheric (e.g., optical depth, phase, temperature, etc.) that give insight into weather and climate processes. For many applications however, clouds are a contaminant whose presence interferes with retrieving atmosphere or surface information. In these cases, the detection of cloud contaminated pixels in satellite imagery is important to isolate cloud-free pixels used to retrieve atmospheric thermodynamic information (e.g., temperature and moisture information, ozone content, and even trace gas concentrations) or surface geophysical parameters (e.g., land and sea surface temperature, vegetation information, etc.) from cloudy ones.

The ability to derive an accurate cloud mask from geostationary and polar orbiting satellite data under a variety of conditions has been a research topic since the launch of the first Earth observing satellite TIROS-1 in 1960. The limited success of some early studies (Coakley and Bretherton 1982, Rossow and Garder 1993, and those discussed by Goodman and Sellers 1988) suggests that the accurate detection of clouds in satellite imagery both during the day and at night is a challenging problem. In more recent work, the probability of detecting clouds has been reported to exceed 90% (Saunders and Kriebel 1988, Merchant et al. 2005, Jedlovec et al. 2008, Reuter et al. 2009) but the performance varies seasonally, regionally, with time of day and retrieval technique. While traditionally both spatial and spectral techniques have been employed to identify cloud contaminated pixels in polar orbiting and geostationary satellite data, sensor spatial resolution, the lack of surface − atmospheric boundary layer temperature contrast, and surface emissivity variations all present performance challenges to a given cloud detection approach. Thus, any one technique may not be best suited for all applications, but may perform quite well in a particular environment (usually the environment in which the algorithm was developed and tested). The key to the success of most of these algorithms lies in the selection of the thresholds for various spectral tests. In more robust algorithms, spatially and temporally varying thresholds, which better capture local atmospheric and surface effects, are used to improve their performance and broaden their application over algorithms with fixed thresholds for cloud tests.

In this chapter, a review of several multispectral cloud detection techniques is presented. Emphasis is placed on techniques which use multispectral approaches applicable to a wide variety of current and future satellite sensors.

The detailed methodology used in several recent and widely used algorithms is highlighted. The performance of two cloud detection approaches is compared for the same observational conditions.

II. LITERATURE SURVEY

We focus on the VSWIR electromagnetic spectrum from 0.4–2.5 μm. Fig. 1 shows an example scene from the "classic" Airborne Visible/Infrared Imaging Spectrometer (AVIRIS-C) with representative spectra of different materials and clouds. There are many studies of cloud detection in these wavelengths,
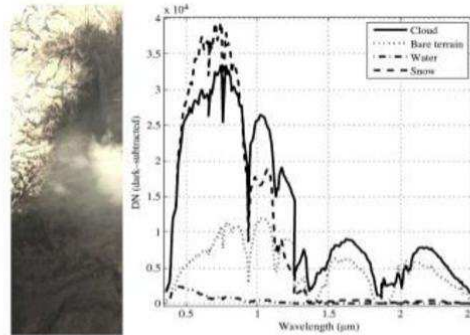
Fig. 1. (Left) AVIRIS-C image f100521t02p05, a challenging scene that contains both clouds and snow. (Right) Spectra from bare terrain, snow, open water, and clouds, in units of dark-subtracted instrument digital numbers (DNs).

and algorithms vary in their assumptions and complexity. "Classical" cloud screening applies threshold tests to spatial and spectral properties of the image. Pixels whose values fall outside valid ranges are marked as cloudy. For example, the MODIS algorithm compares selected visible and near-infrared (VNIR) and near-infrared (NIR) bands to predetermined thresholds and then aggregates the result in different combinations depending on land type. The algorithm uses a combination of 14 wavelengths and over 40 tests. This underscores the intrinsic difficulty of constructing a universal and complete cloud-screening procedure. Even more complex algorithms are possible. Some state-of-the-art cloud-screening techniques estimate the optical path from absorption features such as the oxygen A band, as in Gómez-Chova et al. or Taylor et al. Thermal infrared (IR) channels can add brightness temperature information. Minnis et al. predict clear-sky brightness temperature values using ambient temperature and humidity and then excise pixels outside these intervals. Texture cues can be also used to recognize clouds by their high spatial heterogeneity. Martins et al. demonstrate that a simple spatial analysis, i.e., the standard deviation of VNIR isotropic reflectances in a 3×3 pixel window, reliably discriminates clouds from aerosol plumes over ocean scenes.

B. Algorithm Requirements

Previous systems try to screen all clouds to prevent con-tamination of later retrieval algorithms. In contrast, we aim to reduce the instrument data volume, which leads to distinct requirements. Completeness is not critical since the end user can perform more precise cloud screening later. Our algorithm can be conservative, abstaining from ambiguous classifications to prevent loss of science data. This requires some way to represent classification certainty. The Bayesian probabilistic model of Merchant et al. combines observational data with prior predictions from atmospheric forecasts, leading to true probabilistic predictions. Onboard cloud screening must also satisfy strict computa-tional constraints. The algorithm must process all data collected by the spectrometer before it enters the flight recorder. In many cases, this requires that the algorithm run in instrument hardware such as a field-programmable gate array (FPGA), entailing additional design requirements.
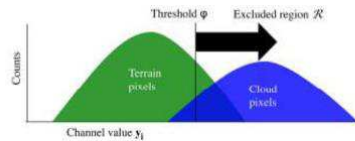
Fig. 2. Thresholds φ define an exclusion region to classify pixels as cloudy thresholds.

A cloud-screening testbed was installed in parallel with the regular AVIRIS-NG data system and operated without error during a recent science campaign.

III. SYSTEM ANALYSIS

3.1 PROBLEM IDENTIFICATION

As mentioned in Section pixel-level data necessarily has fewer dimensions than multi-pixel windows, which can make reliable detection of cloud more difficult. This is exacerbated in RGB when compared to multispectral data, because high albedo terrains (bright urban areas, for example) look the same in RGB as cloud pixels do, when they are be more separable in NIR and TIR bands. Although individual pixels can be misleading over certain terrains, texture often varies greatly between cloud and non-cloud. Therefore, if the system is to perform robustly in high albedo terrains, we need to extract spatial features around each pixel, as well as the individual pixel values themselves, and combine their information content to help distinguish cloud and non-cloud by their texture and surrounding context. Fusion of these different features is vital, because using only high-level features may make it difficult to learn simpler relationships based on colour and brightness. Using an FCN with residual connections in the style of U-net achieves these aims, whilst allowing the entire model to be optimised end-to-end during the training phase.

3.2 EXISTING SYSTEM

In Existing input, CloudFCN(Fully Convolutional Network) takes extended scenes from satellite imagery with arbitrary spatial dimensions. For each given spectral band combination (e.g., RGB) a different instance of the model is needed, however the only alteration made to the design is the number of input channels—no internal parameters are altered. The output of the model has the same spatial size as the input, but can take two distinct formats. When a pixel-by-pixel mask is desired, the final layer uses a softmax activation to classify each pixel as Clear or Cloudy. This is advantageous because it can be easily extended to multi-class problems (e.g., Clear vs. Cloud vs. Cloud Shadow). However, when cloud coverage estimation (as in the percentage of cloud cover over a whole scene) is the desired final product, we output a mask where each pixel has a value between 0 (clear) and 1 (thick cloud), and the cloudiness of a pixel is treated as a regression problem. We then take an average over the whole scene for the cloud coverage estimation. This format allows the model to make estimates for thin cloud as well as thick, and results in more accurate percentages through averaging.

3.3 PROPOSED SYSTEM

The proposed model has several desirable traits, which alleviate the issues that other methods exhibit. First, our design allows for flexible input formats, having no specific spectral requirements, and is able to ingest input images of different sizes. Second, we combine the simplest brightness and colour information with more abstract and complex features from the surrounding areas, creating a complementary set of features that exhibit the strengths of both pixel-level techniques and convolutional ones. Lastly, the output format of the model, and attendant loss function, can be selected based on user needs, increasing the number of possible applications for the method, from cloud coverage estimation (in which a RMSE loss is used) to pixel-wise masking (with a categorical-crossentropy loss).

IV. SYSTEM IMPLEMENTATION

4.1 Lossy Algorithms:

As with lossless algorithms, lossy algorithms also look for repeat pixel values and assign less data to common values. If we take a photo of a sunset over the sea, for example there are going to be groups of pixels with the same colour value, which can be reduced. Lossy algorithms tend to be more complex, as a result they achieve better results for bitmaps and can accommodate for the lose of data. The compressed file is an estimation of the original data.Other advantages of lossy compression is that it can reduce file sizes much more than lossless compression and you can determine how much compression can be applied. For example JPEG is a lossy format and GIF is lossless. With JPEG you can determine how much compression is applied, whereas with GIF you can't, it's set for you. Also JPEG can compress files much more than GIFs - JPEGs can reduce a file to up to 5% of its original size. One of the disadvantages of lossy compression is that if the compressed file keeps being compressed, then the quality will degraded drastically. The diagram alongside illustrates this process.

MERIS/AATSR cloud-screening algorithm is being implemented as an independent module AATSR(Advanced Along Track Scanning Radiometer) and MERIS (Medium Resolution Imaging Spectrometer)
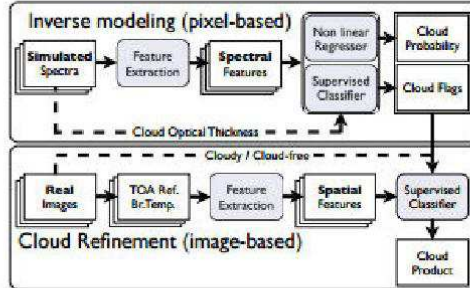
The proposed cloud-screening scheme relies on the extraction of meaningful physical features (e.g. brightness, whiteness, temperature) that are combined with atmospheric absorption features at specific spectral band locations (oxygen and water vapour absorptions). The cloud-screening algorithm should be capable of detecting clouds accurately, but also and very importantly, it provides a cloud probability or cloud contamination index per pixel rather than binary flags. This added value product allows the user to obtain an adjustable cloud mask depending on the further processing stages and final use of the image.

4.2 Color Feature Extraction

Color feature is extracted by Color Histogram and Color Descriptor. The Color histogram specifies the colorpixel distribution in an image. Color histogram uses two types of color space that are RGB, HSV. ColorHistogram (CH), contains occurrences of each color obtained by counting all image pixels having that color. Each pixel is associated to a specific histogram bin only on the basis of its own color, and color similarity across different bins or color dissimilarity in the same bin is not taken into account. Since any pixel in the image can be described by three components in a certain color space (for instance, red, green and blue components in RGB space or hue, saturation and value in HSV space), a histogram, i.e., the distribution of the number of pixels for each quantized bin, can be defined for each component. Color descriptor consists the color expectancy, color variance and color skewness. Color expectancy is the average or mean of intensity in image. Color variance is the square root of the standard deviation. Color skewness is a measure of the asymmetry of the probability distribution of a real valued random variable. Two types of skewness are Positive skewness and Negative skewness.

4.3 Texture Feature Extraction

An image texture is a set of metrics calculated in image processing designed to quantify the perceived textureof an image. Image Texture gives us information about the spatial arrangement of color or intensities in an image or selected region of an image. Texture analysis attempts to quantify intuitive qualities described by terms such as rough, smooth, silky, or bumpy as a function of the spatial variation in pixel intensities. In this sense, thoroughness or bumpiness refers to variations in the intensity values, or gray levels.

4.4 Comparison with Other Target Detection Methods

In order to evaluate the results of the proposed detection approach, three common target detection techniques, including ACE, CEM, and MF, were implemented on the Meteosat multispectral images. The color composite of the visible and near infrared spectral bands (VIS: 0.8, VIS: 0.6, IR: 8.7 μm) is shown in Figure 2.

After introducing the multispectral image in Figure 2 and selecting the ROIs manually (from two specific cloud and no-cloud targets), the three above-mentioned detection algorithms were implemented. For this purpose, the average cloud spectrum based on the selected ROIs in cloudy regions was first produced. The mean cloud signal obtained from the selected cloudy ROIs is shown in Figure 13. This spectrum is used as training spectra, which will be used as input in the detection models. By the way, it should be mentioned that a minimum noise fraction (MNF) transform was also implemented on the raw multispectral image to reduce the spectral noise. Afterwards, the set of detection algorithms were performed respectively on the images. Figure 14 represents the resulting detection outputs from these algorithms in a smaller subset of our study area.
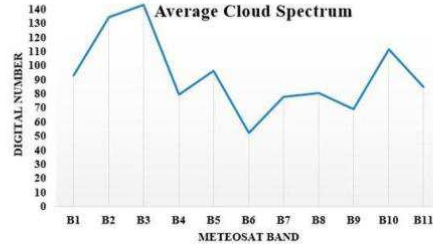
Figure 13. Averaged cloud spectrum obtained from the mean value of the cloud Regions Of Interest (ROI) visually selected on the Meteosat image of the same area.

V. CONCLUSION

This paper has described a novel method for cloud screening onboard spacecraft at Gb/s data rates. We perform the most challenging computations on the ground, exploiting foreknowl- edge of observation geometry and surface type to predict the brightness of terrain pixels and cloud pixels. We calculate optimal thresholds in uncalibrated instrument values that can be uploaded for real-time execution by the flight system. One could always design a more complex cloud classifier to disambiguate the most difficult pixels and consequently achieve a slight improvement in data volume reduction. However, our simple algorithm already achieves better than 90% of the theoretical maximum making it sufficient for many applica- tions and a useful point on the design trade space. At a time when communications and storage subsystems struggle under increasing data rates, the potential for onboard cloud screening has remained relatively unstudied. Mission designers should bear in mind that a few simple design considerations, i.e., the introduction of channel and aggregation thresholds, can enable factor-of-two reductions in data volume.

VI. FUTURE ENHANCEMENT

Future work could seek alternative representations that scale better with dimensionality. A more promising approach would be to incorporate additional domain knowledge into the state vector. One could condition thresholds on very specific land types or on real-time cloud products like the GOES cloud mask. Preprocessing and feature extraction could also improve performance. For example, one could compute spectral derivatives; sums, differences, or ratios of channels; or continuum-relative absorption band depths [47]. Such spectral features could potentially improve results at a low computational cost.

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Text Detection and Recognition from Natural Scene

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ABSTRACT: Many techniques and algorithm have been developed to solve the problem of text extracted from natural scenes. Text extraction is emerging and challenging era in the computer vision. Text which is embedded into the image contains semantic information which is used in many other applications such as information retrieval of complex images, robot navigation, useful for visually impaired persons, street signs, automatic read the sign board and use in so many other applications. Most of the research work in this area has been done only on printed text, a very few research is addressing the LED scene text. Scene text is difficult to extract due to blur image, variations in color, noise problem, complex background, discontinuity, poor lighting conditions, and variation in illumination. LED is which is widely used in displaying the information in boards. Now days LED display that is natural scene is being widely used for displaying announcements, sign boards, banners for displaying information. To extract the text from the LED display is not an easy task, it is very complex due to its discontinuity. So, the aim of this paper to propose a technique to extract the two type of LED text from natural scene image. The first step of the algorithm is preprocessing of the image where the image is converted from RGB to grayscale, noise is removed and the image is converted to binary image, etc. Then the text is localized. After that connected component approach is used for text detection and finally the text has been recognized using template matching with correlation. The experimental results of the proposed method show the detection and recognition rate is 82.87 and 57.6.

I. INTRODUCTION

In electrical engineering and computer science, image processing is any form of signal processing for which the input is an image, such as a photograph or video frame; the output of image processing may be either an image or a set of characteristics or parameters related to the image. Most image-processing techniques involve treating the image as a two-dimensional signal and applying standard signal-processing techniques to it. Image processing usually refers to digital image processing, but optical and analog image processing also are possible. This article is about general techniques that apply to all of them. The acquisition of images (producing the input image in the first place) is referred to as imaging. With the increasing use of digital image capturing devices, such as digital cameras, mobile phones and PDAs, content-based image analysis techniques are receiving intensive attention in recent years. Among all the contents in images, text information has inspired great interests, since it can be easily understood by both human and computer, and finds wide applications such as license plate reading, sign detection and translation, mobile text recognition, content-based web image search. This paper presents a real application to intelligent transportation systems (ITS) of a method to detect and recognize text in images taken from natural scenarios proposed by the same authors. This text reading algorithm has proved to be robust in many kinds of real-world scenarios, including indoor and outdoor places with a wide variety of text appearance due to different writing styles, fonts, colors, sizes, textures and layouts, as well as the presence of geometrical distortions, partial occlusions, and different shooting angles that may cause deformed text.

In this paper, this algorithm is applied, including some modifications and new functionalities, to read the information contained in traffic panels using the images served by Google Street View. The aim of this work is, in the first place, to detect traffic panels and to recognize the information inside them, showing that the text detection and recognition method proposed in [1] can be generalized to other scenarios, which are completely different to those that have been tested, without needing to retrain the system. In the second place, we want to develop an application that enables the creation of up-to-date inventories of traffic panels of regions or countries that facilitate traffic signposting maintenance and driver assistance. In this paper, we focus on traffic panels in the Spanish territory for two main reasons. First, unlike other countries, the coverage of Street View in Spain is near complete; thus, we can create a huge and diverse data set of images. Second, as far as we know, there is not any official database of all the traffic panels in Spain; thus,

there are more possibilities that any government or institution responsible for managing the road network can be interested in having an up-to-date inventory of the traffic panels in Spain with the method here proposed.

The reasons for which these organizations may be interested are various. Having a centralized database of all the traffic panels supposes a rapid and economic way of evaluating and analyzing the potential dangerous situations that may arise due to traffic panels that suffer from a bad visibility or show deteriorated or outdated information. Street-level panoramic image recording services, such as Street View, which have become very popular in the recent years and have reached a huge coverage of the road network, suppose a potential source to rapidly know the state of the vertical signposting of the road network, particularly when the street-level images are updated regularly. Computer vision techniques applied on this kind of images simplify and speed up the creation of traffic signposting inventories, minimizing the human interaction. In addition, these inventories can be useful not only for supporting maintenance but also for developing future driver assistance systems. In general, automatic text read-ing may be helpful to support drivers or autonomous vehicles to find a certain place by simply reading and interpreting street signs, road panels, variable-message signs, or any kind of text present in the scenario, when global positioning systems suffer from lack of coverage, particularly in high-density urban areas.

II. LITERATURE SURVEY

Fast Approximate Energy Minimization via Graph Cuts

In this paper they address the problem of minimizing a large class of energy functions that occur in early vision. The major restriction is that the energy function's smoothness term must only involve pairs of pixels. They propose two algorithms that use graph cuts to compute a local minimum even when very large moves are allowed. The first move they consider is a swap: for a pair of labels, this move exchanges the labels between an arbitrary set of pixels labeled and another arbitrary set labeled. Their first algorithm generates a labeling such that there is no swap move that decreases the energy. The second move they consider is an -expansion: for a label, this move assigns an arbitrary set of pixels the label. Their second algorithm, which requires the smoothness term to be a metric, generates a labeling such that there is no expansion move that decreases the energy.

Moreover, this solution is within a known factor of the global minimum. They experimentally demonstrate the effectiveness of their approach on image restoration, stereo and motion. The major difficulty with energy minimization for early vision lies in the enormous computational costs. Typically these energy functions have many local minima (i.e., they are non-convex). Worse still, the space of possible labeling has dimension jPj, which is many thousands. There have been numerous attempts to design fast algorithms for energy minimization. Simulated annealing was popularized in computer vision, and is widely used since it can optimize an arbitrary energy function.

Unfortunately, minimizing an arbitrary energy function requires exponential time, and as a consequence simulated annealing is very slow. In practice, annealing is inefficient partly because at each step it changes the value of a single pixel. The energy functions that they consider in this paper arise in a variety of different contexts, including the Bayesian labeling of MRF's. The algorithms described in this paper generalize the approach that they originally developed for the case of the Potts model.

In particular, they compute a labeling which is a local minimum even when very large moves are allowed. They begin with an overview of their energy minimization algorithms, which are based on graph cuts. Their first algorithm, is based on -swap moves and works for any semi metric Vfp;qg's. Their second algorithm, described, is based on more interesting –expansion moves but works only for metric Vfp;qg's (i.e., the additional triangle inequality constraint is required). Note that -expansion moves produce a solution within a known factor of the global minimum of E.

III. SYSTEM ANALYSIS

3.1 Existing System

In existing system present a hybrid approach to robustly detect and localize texts in natural scene images by taking advantages of both region-based and CC-based methods. Since local region detection can robustly detect scene texts even in noisy images, they design a text region detector to estimate the probabilities of text position and scale. Although the existing methods have reported promising localization performance, there still remain several problems to solve. For region-based methods, the speed is relatively slow and the performance is sensitive to text alignment orientation. On the other hand, CC-based methods cannot segment text components accurately without prior knowledge

of text position and scale. Here, designing fast and reliable connected component analyzer is difficult since there are many non-text components which are easily confused with texts when analyzed individually.

3.2 Proposed System

In our proposed system has a selective metric-based clustering to extract textual information in real-world images. Hence, our selective metric-based clustering is integrated into a dynamic method suitable for text extraction and character segmentation. This method uses several metrics to merge similar color together for an efficient text-driven segmentation in the RGB color space. However, color information by itself is not sufficient to solve all natural scene issues; hence we complement it with intensity and spatial information obtained using Log–Gabor filters, thus enabling the processing of character segmentation into ndividual components to increase final recognition rates. Our selective metric-based clustering uses mainly color information for text extraction and our system fails for natural scene images having embossed characters. In this case, foreground and background have the same color presenting partial shadows around characters due to the relief but not enough to separate textual foreground from background in a discriminative way as displayed. Gray-level information with the simultaneous use of a priori information on characters could be a solution to handle these cases. Next we propose a new text validation measure M to find the most textual foreground cluster over the two remaining clusters. Based on properties of connected components of each cluster, spatial information is already added at this point to find the main textual cluster. The proposed validation measure, M, is based on the largest regularity of connected components of text compared to those of noise and background. And also we use Log–Gabor filters that present globally high responses to characters. Hence, in order to choose efficiently which clustering distance is better to handle text extraction, we perform an average of pixel values inside each mask. The mask which has the highest average is chosen as the final segmentation.

IV. SYSTEM IMPLEMENTATION

4.1 Implementation of the pre-processing stage

In this module we implement the preprocessing stage of the overall process. At the preprocessing stage, a text region detector is designed to detect text regions in each layer of the image pyramid and project the text confidence and scale information back to the original image, scale-adaptive local binarization is then applied to generate candidate text components. To extract and utilize local text region information, a text region detector is designed to estimate the text confidence and the corresponding scale, based on which candidate text components can be segmented and analyzed accurately. Initially, the original color image is converted into a gray level image. To measure the text confidence for each image patch in a window, no matter it is accepted or rejected. The text scale map is used in local binarization for adaptively segmenting candidate CCs and the confidence map is used later in CCA for component classification. They calculate the radius from the text scale map which is more stable under noisy conditions. After local binarization, because we assume that within each local region, gray-level values of foreground pixels are higher or lower than the average intensity.
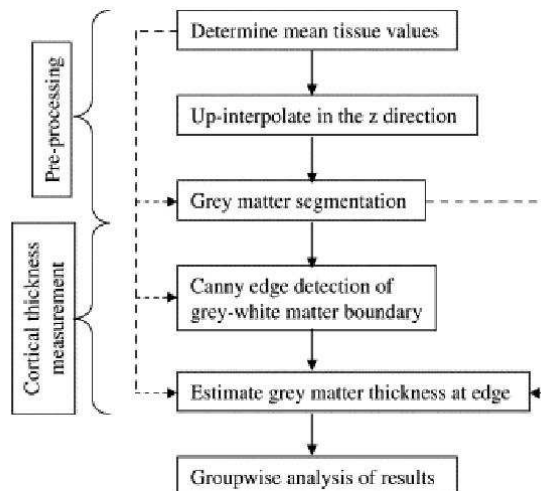
A preprocessor is a program that processes its input data to produce output that is used as input to another program. The output is said to be a preprocessed form of the input data, which is often used by some subsequent programs like compilers. The amount and kind of processing done depends on the nature of the preprocessor; some preprocessors are only capable of performing relatively simple textual substitutions and macro expansions, while others have the power of full-fledged languages.

4.2 Implementation of the connected component analysis stage

In this module we implements the connected component analysis (CCA) stage, a CRF model combining unary component properties and binary contextual component relationships is used to filter out non-text components. Here we propose a conditional random field (CRF) model to assign candidate components as one of the two classes ("text" and "non-text") by considering both unary component properties and binary contextual component relationships. CRF is a probabilistic graphical model which has been widely used in many areas such as natural language processing. Next considering that neighboring text components normally have similar width or height, we build up a component neighborhood graph by defining a component linkage rule. And also we use the CRF model to explore contextual component relationships as well as unary component properties. During the test process, to alleviate the computation overhead of graph inference, some apparent non-text components are first removed by using thresholds on unary component features. The thresholds are set to safely accept almost all text components in the training set.
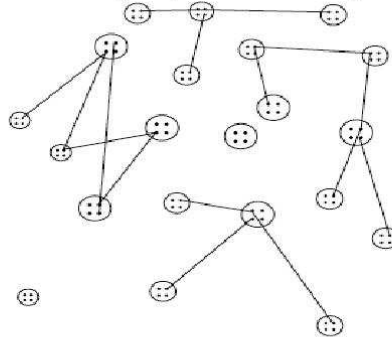
Connected-component labeling is not to be confused with segmentation. Connected-component labeling(stage) is used in computer vision to detect connected regions in binary digital images, although color images and data with higher dimensionality can also be processed. When integrated into an image recognition system or human-computer interaction interface, connected component labeling can operate on a variety of information. Blob extraction is generally performed on the resulting binary image from a thresholding step. Blobs may be counted, filtered, and tracked.

4.3 Implementation of text grouping method

In this module we implements text grouping method. To group text components into text regions are lines and words, we design a learning-based method by clustering neighboring components into a tree with a minimum spanning tree (MST) algorithm and cutting off between-line (word) edges with an energy minimization model. we cluster text components into a tree with MST based on a learned distance metric, which is defined between two components as a linear combination of some features. With the initial component tree built with the MST algorithm, between-line/word edges need to be cut to partition the tree into subtrees, each of which corresponds to a text unit. Finally, text words corresponding to partitioned subtrees can be extracted and the ones containing too small components are removed as noises.
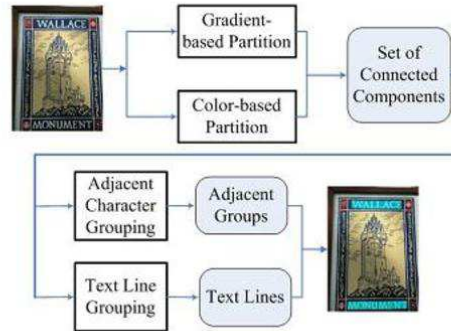
4.4 Implementation of selective metric-based clustering using Log–Gabor filters

In this module we implement the selective metric based clustering using log-Gabor filter. Hence, our selective metric-based clustering is integrated into a dynamic method suitable for text extraction and character segmentation. This method uses several metrics to merge similar color together for an efficient text-driven segmentation in the RGB color space. However, color information by itself is not sufficient to solve all natural scene issues; hence we complement it with intensity and spatial information obtained using Log–Gabor filters, thus enabling the processing of character segmentation into individual components to increase final recognition rates. Our selective metric-based clustering uses mainly color information for text extraction and our system fails for natural scene images having embossed characters. In this case, foreground and background have the same color presenting partial shadows around characters due to the relief but not enough to separate textual foreground from background in a discriminative way as displayed. Gray-level information with the simultaneous use of a priori information on characters could be a solution to handle these cases. Next we propose a new text validation measure M to find the most textual foreground cluster over the two remaining clusters. Based on properties of connected components of each cluster, spatial information is already added at this point to find the main textual cluster. The proposed validation measure, M, is based on the largest regularity of connected components of text compared to those of noise and background. And also we use Log–Gabor filters that present globally high responses to characters. Hence, in order to choose efficiently which clustering distance is better to handle text extraction, we perform an average of pixel values inside each mask. The mask which has the highest average is chosen as the final segmentation.

log-Gabor wavelets increases with the number of orientations (real parts in the left column and imaginary parts in the right column).in which (ρ,θ) are the log-polar coordinates (octave scales), k indexes the scale and p is the orientation, the pair $(\rho k; \theta pk)$ corresponds to the frequency center of the filters, and $(\sigma\rho; \sigma\theta)$ the angular and radial bandwidths.

$$G_{pk} = G(\rho,\theta,p,k) = \exp\left(-\frac{1}{2}\left(\frac{\rho-\rho_k}{\sigma_\rho}\right)^2\right)\exp\left(-\frac{1}{2}\left(\frac{\theta-\theta_{pk}}{\sigma_\theta}\right)^2\right)$$

$$\text{with} \begin{cases} \rho_k = \log_2(n) - k \\ \theta_{pk} = \begin{cases} \frac{\pi}{P}p & \text{if } k \text{ is odd} \\ \frac{\pi}{P}(p+\frac{1}{2}) & \text{if } k \text{ is even} \end{cases} \\ (\sigma_\rho, \sigma_\theta) = 0.996(\sqrt{\frac{2}{3}}, \frac{1}{\sqrt{2}}\frac{\pi}{P}) \end{cases}$$

The main particularity of this novel scheme is the construction of the low-pass and high-pass filters. Such a complete scheme approximates flat frequency response and therefore exact image reconstruction which is obviously beneficial for applications in which inverse transform is demanded, such as texture synthesis, image restoration, image fusion or image compression.

4.5 Performance evaluation

Finally in this module the proposed approaches were illustrated and evaluated to compare the performance of all the approaches. We analyze our proposed scheme in terms of extraction rate, precision rate recall rate and average

speed. Based on the comparison and the results from the experiment show the proposed approach works better than the other existing systems. performance evaluation based on following steps.

1. **Textbox Location:**

$$(\text{Left}(g), \ \text{Top}(g), \ \text{Right}(g) \ \text{and} \ \text{Bottom}(g)).$$

$$L(g) = 12 \quad L^{T}(g) = 2 \quad L^{d}(g) = 1$$
$$L^{s}(g) = 1 \quad HV(g) = 2$$
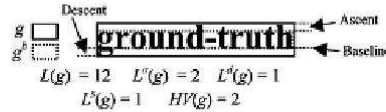
2. **Textbox Height:**

$$\text{Equal to} \ (\text{Bottom}(g) - \text{Top}(g) + 1).$$

3. **Text String:**
    The ASCII string of the text in g(it is not used in our protocol)

4. **Text Length :**

    a. The number of the characters (i.e., the length of the text string) in g .

5. **Skew Angle :**

    a. The skew angle of the text font in . Typically, the greater the skew angle is, the more difficult the textboxes that can be detected.

6. **Color and Texture :**

    a. If the text string in is nonhomochromous or textured, is set to 1; otherwise, it is set to zero. Generally, homochromous text strings are easier to correctly detect.

7. **Background Complexity :**
    a. We extend in each direction for ten pixels and thus form an extended textbox denoted by g^{e} . The background complexity of is g described by

V. CONCLUSION AND FUTURE ENHANCEMENT

5.1 CONCLUSION
This project focuses on implement the selective metric-based clustering uses mainly color information for text extraction and our system fails for natural scene images having embossed characters. In this case, foreground and background have the same color presenting partial shadows around characters due to the relief but not enough to separate textual foreground from background in a discriminative way as displayed. And also we use Log–Gabor filters that present globally high responses to characters. Hence, in order to choose efficiently which clustering distance is better to handle text extraction, we perform an average of pixel values inside each mask. Finally the proposed approaches were illustrated and evaluated to compare the performance of all the approaches.

5.2 FUTURE ENHANCEMENT
In this project we detect the text region using selective metric based clustering, which provides high probability of text detection. Also we used connected component analysis and text grouping and relates the probability of output and came out with an high possibility of text detection. As an future enhancement we are going to implement text extraction and achieve it for mobile application.

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S. Yoga, Assistant Professor of Computer Science	International Journal of Innovative Research in Computer and Communication Engineering	A Smart Phone Image Processing Application for Plant Disease Diagnosis	International	2320-9801 Volume 9, Issue 3	March 2021	http://ijircce.com/admin/main/storage/app/pdf/Nna5nLX6hrb8ZK1TmTgACy79wtyulxJY31Nwmpu8.pdf

A Smart Phone Image Processing Application for Plant Disease Diagnosis

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ABSTRACT: Agricultural productivity is that issue on that Indian Economy extremely depends. this is often the one in all the explanations that malady detection in plants plays a very important role in the agriculture field, as having the malady in plants are quite natural. If correct care isn't taken during this space then it causes serious effects on plants and because of that various product quality, amount or productivity is affected. Detection of disease through some automatic technique is helpful because it reduces an oversized work of watching in huge farms of crops, and at terribly early stage itself it detects the symptoms of diseases means that after they seem on plant leaves. This paper presents a neural network algorithmic program for image segmentation technique used for automatic detection still as the classification of plants and survey on completely different diseases classification techniques that may be used for plant leaf disease detection. Image segmentation, that is a very important facet for malady detection in plant disease, is completed by victimization genetic algorithmic program

I. INTRODUCTION

Image Definition Image is a collection of pixels or dots which are stored in rectangular array. Each individual pixel is having certain kind of color. We can measure the size of the image by counting the no of pixels in that particular image. Different types of images are there such as Black and White and Grey scale images. Both types vary from each other .In black and white image each dot or pixel is either black or white, therefore only one bit is needed per pixel. Whereas Grey scale images uses 8 bits per pixel. For color images things gets slightly difficult. In color images number of bits at every dot termed as the height of image. It is also referred as the bit plane. For bit plane consisting of x, 2x color are possible. Different methods are available to store the color information of image. One of the method is RGB image also termed as true color image. For every pixel red, green and blue component is stored in three dimensional arrays.

Identifying Patterns

In order to detect the same kind of pattern different pattern recognition techniques are used in MATLAB. Using these techniques we recognize the similar kind of the pattern in the problem. When same kind of pattern are detected then these can be used to generate outputs or solve the problems more efficiently. In order to recognize the pattern, we need to train the machine. For this first we need to classify the data .The data is classified using the key features .For classifying the data we have different type of learning modules is there such as supervised learning and unsupervised learning modules .Bothe of these modules are used to identify the patterns. In supervised learning module we train the machine by recognizing the patterns in the data set and then results which are generated are applied to the testing data set. We train the machine over the training dataset and test it over the testing data set. In unsupervised learning module, there are no visible pattern the dataset, so with the help of the some algorithm we try to catch the patterns. Clustering algorithm, classification algorithm such as Markov Model (MM) is there. For recognizing the patterns we identify we have different techniques such as preprocessing, Extraction of features and classification. In preprocessing we try to filter out, smooth the data by normalizing in more ordered way. Filtering such as noise filtering is there. Feature extraction is usually done using the software which collect the information from the data. Sensors are also used for this purpose and the final phase is the classification.

II. LITERATURE SURVEY

Rice Disease detection Pattern Recognition Techniques. The point of this paper is to depict a product model framework for the discovery of malady in rice plant based on different pictures of the rice plants. Pictures of the tainted piece of the rice plant are taken utilizing computerized camera. With the end goal to identify the abandoned piece of the plant different procedures like picture division, picture developing and so forth. By utilizing neural system the tainted piece of the leaf is grouped. Picture preparing and delicate processing procedures are joined on infected plant. Procedures embraced in paper:

- Preparing & design examination strategies of images
- Binary cutoff methods
- Border layout calculation using eight-availability strategy
- Self-organizing map(SOM)

In this examination paper, the diseased part of the rice plant leaf is identified with the help of the self-organizing map. Testing is done using four different images of the crop. Infected region is extracted using neural networks pattern recognition techniques. By utilizing effective example acknowledgment procedures, the framework will have the capacity to do the opportune finding of the field issue and the proposal will assist the ranchers with taking the suitable measure to build the nature of the harvest .It won't just decrease the improvement cost later on yet in addition spare the earth too.

Remote area farmer can also identify the disease in the pomegranate crop as this algorithm gives user option with and without intent. It let the user to upload the image in the system for further processing. This approach is very affective. Also experimental readings shows that the algorithm has eighty two percent accuracy considering average of both case. In almost every case pomegranate disease is identified. Web base approach is also very fast and there is no distortion occur in communication of images in transition of images in this approach. Pixel values remain maintained and cleared. Paper [1] presents classification and detection techniques that can be used for plant leaf disease classification. Here preprocess is done before feature extraction. RGB images are converted into white and then converted into grey level image to extract the image of vein from each leaf. Then basic Morphological functions are applied on the image. Then the image is converted into binary image. After that if binary pixel value is 0 its converted to corresponding RGB image value. Finally by using pearson correlation and Dominating feature set and Naïve Bayesian classifier disease is detected. In paper [20 there are four steps. Out of them the first one is gathering image from several part of the country for training and testing. Second part is applying Gaussian filter is used to remove all the noise and thresholding is done to get the all green color component. K-means clustering is used for segmentation. All RGB images are converted into HSV for extracting feature.

III.SYSTEM DESIGN

3.1 EXISTING SYSTEM

Leaf shape description is that the key downside in leaf identification. Up to now, several form options are extracted to explain the leaf form. however, there's no correct application to classify the leaf once capturing its image and identifying its attributes, however. In plant leaf classification leaf is classed supported its completely different morphological options, a number of the classification techniques used.

3.2 PROPOSED SYSTEM

There are many techniques that are presently being utilized to make computer-based vision systems victimization options of plants extracted from pictures as input parameters to varied classifier systems. during this paper, a method to argument already existing techniques of plant leaves identification system is represented. this paper, a brand new classification model involving neural networks (NN) was utilized to develop a pc primarily based vision system for automatic identification of plant species.

BLOCK DIAGRAM

Digital devices such as digital camera or smartphones are used to take photos of the plant leafs and these images are used to separate out and measure the diseased part area. In order to properly identify the affected region we need image without and impurities so contrast enhancement other image processing techniques are applied on every input image. By enhancing the image using the image processing techniques we get different features of the images which are not visible from the human eye. Above is the flowchart depicting the basic architectural flow.
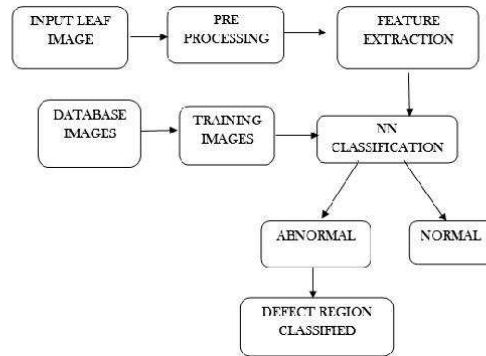
Image acquisition is the first step in the image processing. Any image is taken from the digital devices thereafter image preprocessing and segmentation are done and necessary feature are extracted from image. During classification, with the help classification algorithm different clusters are made. We used k means color based clustering in order to detect and identify the affected area. By selecting the one of the cluster our algorithm uses support vector machine for the prediction of disease.

IV. SYSTEM IMPLEMENTATION

4.1 GENERAL

In this chapter we describe the implementation details of the algorithm and steps in which our algorithm works for the identifying the disease. K means color based clustering algorithm is used in this problem. Below are the steps in which an input image is processed.

- Image acquisition
- Image preprocessing and enhancement
- Image segmentation using k means and Otsu classifier
- Feature extraction

4.2 IMAGE ACQUISITION

Image acquisition means to collect different type of samples for the formation of the input dataset. Dataset images further go through the various steps. In order to provide best solution to any problem it is necessary that dataset cover majority of the different type of inputs. We have covered different plant leaves. Different image formats are taken in our dataset. Any other image excluding dataset can be used in our algorithm provided its size is matching and format is known, out algorithm and its classifier gives the prediction of the disease for that random image.

4.3 IMAGE PREPROCESSING AND ENHANCEMENT

It is the second phase in digital image processing. In this using MATLAB input image noise is reduced, pixel values gets more classified, spot reduction and contrast enhancement is there. The purpose of the image preprocessing and enhancement step is that after preprocessing the image its get easy to separate the infected area. Indirectly the classifier we use works better with preprocessed image without and impurities. Values of the pixels also get adjusted in the preprocessed image. MATLAB provides user number of different filters for the enhancement of the image.

Figure: Image Preprocessing Original Image.

Figure: Preprocessed Image

In figure 4.1 we can see the difference between the two of the images. The first image is the input image and the second one is the preprocessed image in which we enhance the contrast other features of the image using the MATLAB. Preprocessing let the users to reduce the noise in the image and overall quality of the image is improved. The leftover space in the first image is also gets separated in the second preprocessed image. For every different color the contrast gets more enhanced for every pixel value.

4.4 SEGMENTATION:

It means representation of the image in more meaningful and easy to analyse way. In segmentation a digital image is partitioned into multiple segments can defined as super-pixels.

K-means clustering algorithm:

This algorithm is used to cluster/divide the object based on the feature of the leaf in to k number of groups. This is done by using the Euclidean distance metric.

The algorithm of k means
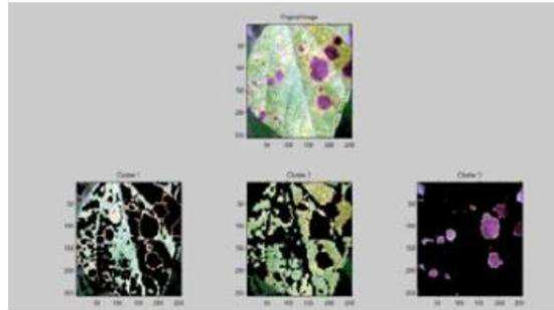
● Initialization: User should select the value of k. k means the number of clusters/groups, i.e. the image is divided in to k number of clusters.

● Every pixel is assigned to its nearest centroid (k).

● The position of centroid is changed by means of data values assigned to the group. The centroid moves to the centre of its assigned points.

Out of these three clusters classification is done for only one cluster which has affected area.

V. RESULTS AND PERFORMANCE ANALYSIS

5.1 GENERAL

The purposed algorithm is made to run for each individual image. In our solution we have covered four different type of diseases which are Alternaria Alternata, Anthracnose, Bacterial blight, Cercospora leaf spot. Given below figures shows the detected disease for input image from a particular disease dataset.

5.2 ALTERNARIA ALTERNATA

Analysis: Plant leaf infected with the alternaria alternate is loaded from database. Contrast enhancement and preprocessing of image is done in the second phase. In image segmentation column one of the cluster is loaded .As the above figure shows the disease classified as Alternaria Alternata .Also area of the affected region in percentage is also shown. To check the accuracy of the our purposed methodology the image is passed through five hundred iteration and every time different clusters is chosen by the algorithm and then accuracy is predicted. The figure shows the accuracy

5.3 ANTHRACNOSE

Analysis: the figure shows the disease classification and prediction of the leaf image infected with anthracnose. Same steps are performed. In this case we can see that disease is classified as the Anthracnose and nearly sixty percentage of area is affected by this disease and the accuracy comes out to be ninety six percentage. Various features which are extracted are also displayed on the right side of the image.

5.4 BACTERIAL BLIGHT

Analysis: In the figure we can see that the diseases identified for the query image comes out to be bacterial blight. Various features both shape color oriented are shown. Preprocessed image and segmented region of interest is shown. In this case disease affected area comes out to be fifteen percentage on the other hand accuracy comes out to be ninety six percentage.

5.5 CERCOSPORA LEAF SPOT

Analysis: disease classified is Cercospora leaf spot and percentage of the area affected is around sixteen percentage and the accuracy comes out to be approximately ninety five percentage.

5.6 HEALTHY LEAF

Analysis: when the query image of healthy leaf is taken then the result is classified as the healthy leaf with no affected region and accuracy of ninety six percentage.

VI. CONCLUSION

This paper gives the executed results on different diseases classification techniques that can be used for plant leaf disease detection and an algorithm for image segmentation technique used for Automatic detection as well as classification of plant leaf diseases has been described later. Banana, beans, jackfruit, lemon, mango, potato, tomato, and sapota are some of those ten species on which proposed algorithm was tested. Therefore, related diseases for these plants were taken for identification. With very less computational efforts the optimum results were obtained, which also shows the efficiency of the proposed algorithm in recognition and classification of the leaf diseases. Another advantage of using this method is that the plant diseases can be identified at an early stage or the initial stage.

VII. FUTURE ENHANCEMENT

Web based image processing techniques can be implemented. In this user is provide with two modes with and without internet. In case of web base processing remote area users can upload image in system and whole image system techniques and classification algorithm will we implemented in the cloud itself. Real time monitoring of the data is there using the cloud platform. To improve recognition rate in classification process Artificial Neural Network, Bayes classifier, Fuzzy Logic, and hybrid algorithms can also be used.

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S. Yoga, Assistant Professor of Computer Science	International Journal of Innovative Research in Computer and Communication Engineering	Real time Vehicle security System through Number Plate and Fingerprint and Recognition	International	2320-9801 Volume 9, Issue 3	March 2021	http://ijircce. com/admin/ main/storage/ app/pdf/jQy2 sIEKm6J9X BqbEpzpfEC aaMKtyNG5 dZEcD2x9.p df

Real Time Vechicle Security System through Number Plate and Fingerprint Recognition

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ABSTACT: The use of vehicle is a must for everyone. In the same way, safeguarding the vehicle against theft is also very essential. Impediment of vehicle theft can be done remotely by an authorized person. A competent automotive security system is implemented using Number plate recognition and Fingerprint Recognition. The NPR (Number Plate Recognition) technique in a system design helps in recognition of number plate of vehicles. This system is based on the image processing technique. The objective is to design an efficient automatic authorized vehicle identification system by using the vehicle number plate and fingerprint recognition. The system is implemented on the entrance of a company parking area for security control. The developed system first captures the vehicle image. Vehicle number plate region is extracted using the image segmentation. Several techniques are used for Number recognition. The system is implemented and simulated in Matlab. There are two types of fingerprint systems: fingerprint verification and identification. We are going to use fingerprint verification system. Fingerprint verification is the process of accepting and rejecting the identity claim of a person using his/her fingerprint. If the fingerprint does not matches the one which is stored in the database means an alert message is sent to the security. This makes security for vehicle from unauthorized user.

I. INTRODUCTION

Image processing is a method to convert an image into digital form and perform some operations on it, in order to get an enhanced image or to extract some useful information from it. In imaging science, image processing is processing of images using mathematical operations by using any form of signal processing for which the input is an image, such as a photograph or video frame. The common steps in image processing are image scanning, storing, enhancing and interpretation. In this modern age there is rapid increase in number of vehicles and so Is the number of vehicle theft attempts, locally and internationally? With the invention of strong stealing techniques, security are in fear of having their vehicles being stolen from common parking area or from outside their home. Thus the protection of vehicles from theft becomes important due to insecure environment. Real time vehicle security system based on computer vision provides a solution to this problem. The proposed vehicle security system performs image processing based real time user authentication using fingerprint as well as number plate recognition techniques. The use of vehicle becomes important everywhere in the world and also preventing it from theft is required. Vehicle manufacturers are attaining the security features of their products by introducing advanced automated technologies to avoid the thefts particularly in case of vehicles.

In the proposed vehicle security system, the objective is to prevent the theft of vehicle using fingerprint

Number Plate Identification:

Number plates are used for identification of vehicles all over the nations. Vehicles are identifying either manually or automatically. Automatic vehicle identification is an image processing technique of identify vehicles by their number plates. Automatic vehicle identification systems are used for the purpose of effective traffic control and security applications such as access control to restricted areas and tracking of wanted vehicles. Number plate recognition (NPR) is easier method for Vehicle identification. NPR system for Indian license plate is difficult compared to the foreign license plate as there is no standard followed for the aspect ratio of license plate.

The identification task is challenging because of the nature of the light. Experimentation of number plate detection has been conducted from many years, it is still a challenging task .Number plate detection system investigates an input image to identify some local patches containing license plates. Since a plate can exist anywhere in an image with various sizes, it is infeasible to check every pixel of the image to locate it. In parking, number plates are used to calculate duration of the parking. When a vehicle enters an input gate, number plate is automatically recognized and

stored in database. In NPR system spectral analysis approach is used were acquiring the image, extract the region of interest, character segmentation using SVM feature extraction techniques.

The advantage of this approach is success full recognition of a moving vehicle[1].It is difficult to detect the boundary of the Number plate from the input car images in outdoors scene due to colour of characters of the number plate and Background of the Number plate the gradients of the original image is adopted to detect candidate number plate regions.[2]. There are also algorithms which are based on a combination of morphological operation, segmentation and Canny edge detector. License plate location algorithm consist of steps like as Edge Detection, Morphological operation like dilation and erosion, Smoothing, segmentation of characters and recognition of plate characters are described.

Fingerprint Introduction

Biometric systems operate on behavioral and physiological biometric data to identify a person. The behavioral biometric parameters are signature, gait, speech and keystroke, these parameters changes with age and environment. However physiological characteristics such as face, fingerprint, palm print, and iris remains unchanged throughout the lifetime of a person.

The biometric system operates as verification mode or identification mode depending on the requirement of an application. The verification mode validates a person's identity by comparing captured biometric data with readymade template. The identification mode recognizes a person's identity by performing matches against multiple fingerprint biometric templates. Fingerprints are widely used in daily life for more than 100 years due to its feasibility, distinctiveness, permanence, accuracy, reliability, and acceptability.

II. LITERATURE SURVEY

Fingerprint-based access control and identification apparatus

This paper concentrates on the authentication based on fingerprint access. Though it serves and helps in many applications, it has shortcomings as other security system based on biometrics. The fingerprint can be easily hacked using scratch or glass cards. By hacking the fingerprint can easily access the system or the owner's properties. If there is any problem or change in biometric, it fails to authenticate. So, we are proposing a paper by overcoming the problems in finger-print authentication. Automatic Number Plate Recognition (ANPR) is an image processing technology which uses number (license) plate to identify the vehicle. The objective is to design an efficient automatic authorized vehicle identification system by using the vehicle number plate. The system is implemented on the entrance for securitycontrol of a highly restricted area like military zones or area around top government offices e.g. Parliament, Supreme Court etc. A PC based number plate recognition system is presented. Digital gray-level images of cars are thresholded using the Niblack algorithm, which was found to outperform all binarization techniques previously used in similar systems. A simple yet highly effective rule-based algorithm detects the position and size of number plates. Characters are segmented from the thresholded plate using blob-colouring, and passed as 15/spl times/15 pixel bitmaps to a neural network based optical character recognition (OCR) system.

Chaotic hash-based fingerprint biometric remote user authentication scheme on mobile devices

This paper presents an efficient and practical chaotic hash-based fingerprint biometric remote user authentication scheme on mobile devices e.g. cell phone and PDA. Our scheme is completely based on the new family of one-way collision free chaotic hash functions, which are much efficient than modular exponentiation-based authentication schemes e.g. RSA. computational costs and efficiency are not suitable for the practical implementation in the real environment. It has more problems in user authentication.

III. EXISTING SYSTEM

3.1. NUMBER PLATE RECOGNITION

The car number plate detection is given briefly in this section. In car number plate was detected in various types. There are seven primary algorithms that the software requires for identifying a license plate:

1. Plate localization – responsible for finding and isolating the plate on the picture.
2. Plate orientation and sizing – compensates for the skew of the plate and adjusts the dimensions to the required size.
3. Normalization – adjusts the brightness and contrast of the image.
4. Character segmentation – finds the individual characters on the plates.
5. Optical character recognition.
6. Syntactical/Geometrical analysis – check characters and positions against country-specific rules.

7. The averaging of the recognized value over multiple fields/images to produce a more reliable or confident result. Especially since any single image may contain a reflected light flare, be partially obscured or other temporary effect.

Steps 2, 3 and 4: The license plate is normalized for brightness and contrast, and then the characters are segmented to be ready for OCR.
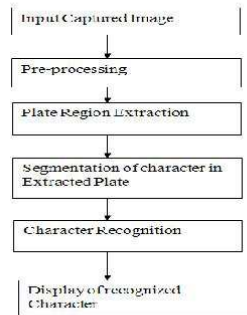
Fig. 3.1 Flowchart showing license plate detection algorithm in MATLAB.

IV. PROPOSED SYSTEM

The step by step process of car plate detection and fingerprint recognition are given below:

IMPLEMENTATION OF LICENSE PLATE DETECTION AND FINGERPRINT RECOGNITION
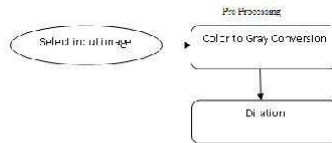
Initial stage, to kept car plate image from the camera. Then this image are given to the preprocessing stage.

The preprocessing stage consists of two methods. It is given below:

4.1Pre-processing Image

To increase the performance of the system preprocessing of the input image is required. This phase involves two steps:

    1.RGB to gray scale conversion
    2.Noise reduction

4.1.1. RGB to gray scale conversion:

Gray scale conversion technique is used to convert the color image captured by the digital camera to the gray scale image. The function used for gray scale conversion is rgb2gray ().

Fig.4.1a. Grayscale

4.1.2. Noise reduction:

The noises in the original image are unavoidable. To eliminate the noises the filter used here is the median filter as shown in fig.6. The vehicle license plate presents the salt and pepper characteristics. To remove such noise the median filter is the best choice. The function used ismedfilt2 ().

Fig.4.1b. Image after applying median filter

4.2. PLATE REGION EXTRACTION AND SEGMENTATION
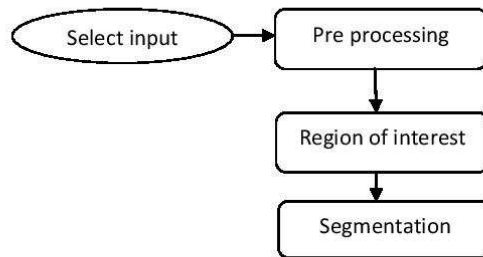
4.2.1. LICENCE PLATE DETECTION

The detection is the most challenging task as the license plate is incorporated in a small region of the whole image and can resist anywhere in the image. Color, rectangular shape and presence of characters are some such features. Given an input image, the main target of the detection is to mark an area with maximum probability of having number plate and validate for true number plate. This phase involves two steps:

    i.   Edge detection
    ii.   Plate extraction

Edge detection:

Canny edge detection method is applied to the preprocessed image which highlights all the edges from the image. The resultant image after applying canny edge detection method is a binary image with edges highlighted. Matlab inbuilt function for this by, Y=edge (x,'canny'); Where: x is the image on which canny method is applied is the edge detected image. The fig.5 shows the image obtained after applying canny edge detection method.

Fig.4.2.a.1. Image after canny edge detection.

PLATE EXTRACTION

In this step, we will extract all the connected components in the image and fill all the holes in the image. A hole is the connected component whichcannot be reached by filling the image with background color. All the holes are filled with white color. The Matlab in-built function used is:

$$y = imfill(x,'holes');$$

 Use the connectivity property to obtain the exact position of the number plate. Matlab has a function regionprops() using which the desired component with the area (say >2000 pixel) can extracted. The function used to extract the plate region is y=regionprops (x,'Area','PixelList')

(a)   (b)
Fig.4.2.a.ii: (a) Filled image   (b)Detected license plate

4.2.2. Character Segmentation
The most important and difficult phase of the plate recognition system is the character segmentation. The character segmentation task is difficult to some extend due to some factors such as noisy image, frame of a plate and illumination variance. The most essential task in computer vision and object recognitions is object segmentation. Usually the objects in the image having the same texture or color are grouped together.

Algorithm is as follows:
    a).Apply morphological operation imerode() and imdilate().
    b).Subtract eroded image from dilated image using function imsubtract().
    c).Fill the holes in the image obtained from step 2.
    d).Use the function bwreopen() to extract the desired component.
    e).Finally use bounding box property of regionprops() function to place bounding boxes on the characters as
        shown in fig.7.

Fig.5.2.b. Segmented characters

4.3. FINGERPRINT REGISTRATION
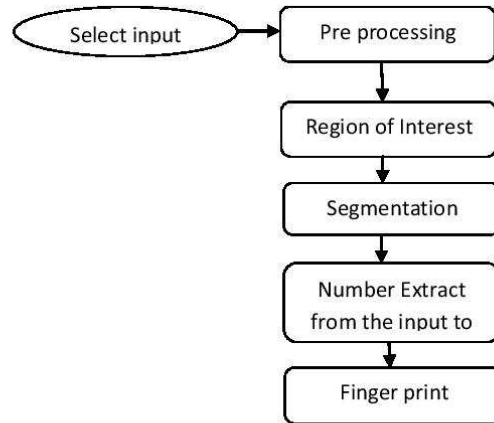
Fig.5.2. Fingerprint registration

After the character segmentation process, the characters are ready to store the database. Then the fingerprint reader asks to a person fingerprint for the registration. If a person give him fingerprint then finally segment characters, which means car numbers and the person fingerprints are stored in database.

Fig.5.3. Fingerprint registration

4.4. VERIFICATION:
The OCR is now used to compare the each individual character against the complete alphanumeric database. The OCR actually uses correlation method to match individual character and finally the number is identified and stored in string format in a variable.
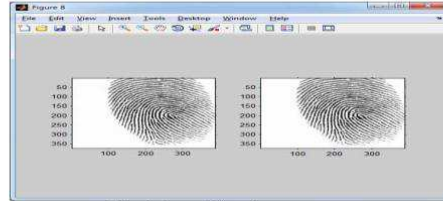
Fig.4.4. verification process

BLOCK DIAGRAM:
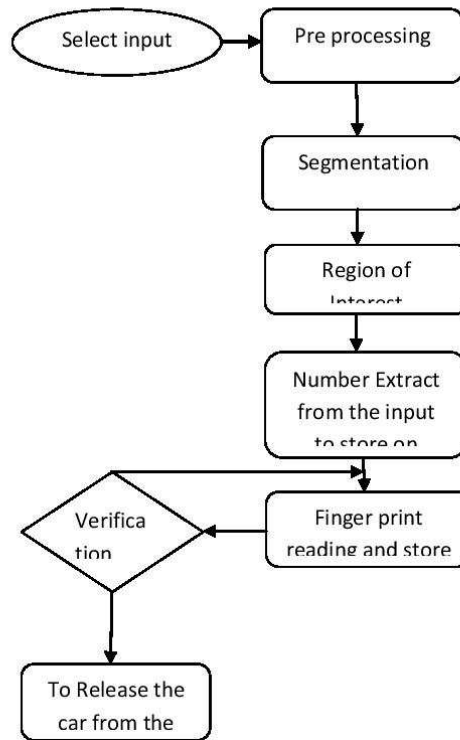
- The string is then compared with the stored database for the vehicle authorization then recognized number plate string is compare with authenticated database file, if the both value is same means it will display the authorized otherwise it will display the unauthorized.
- The resulting data is then used to compare with the records on a database. The system is implemented and simulated in Matlab .Next technique used by us for the vehicle security system is fingerprint recognition.

If the fingerprint does not matches the one which is stored in the database means an alert message is sent to the security. This enables the security to respond it by ringing the alarm which is fixed in the vehicle. This makes security for vehicle from unauthorized user.

4.5. Advantages:

- Vehicle number plate is extracted by using the image segmentation and Optical character recognition technique which is used for the recognizing the character.

- The system use series of image processing techniques for identifying the vehicle from the database stored in the PC.
- The MATLAB results shows that the system robustly detect and recognize the vehicle using license plate against different lightening conditions and can be implemented on the entrance of a highly restricted areas.
- The implementation works quite well and thus there is still room for improvement. The camera used in sensitive to vibration and fast changing targets due to the shutter long time.
- The system can be used on the entrance of restricted area like military zones, area around top government offices e.g. Parliament, Supreme Court etc.
- The system speed and robustness can be increase if high resolution camera is used.
- The OCR methods used in this project for the recognition is sensitive to misalignment and to the sizes, affine transformation can be used to improve the OCR recognition from different angles and size.
- The statistical analysis can also be used to define the probability of detection and recognition of the vehicle number plate

V. CONCLUSION

The task of recognizing some object in an image is none of the most difficult in the field of embedded systems. Car license plate detection is also a very interesting, finding license plate image from vehicle image. This chapter contains the output results of Car License Plate Detection algorithm and provides security for vehicle using fingerprint recognition .

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Plant Identification Using Leaf Images

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ABSTRACT: This paper presents a computer based automatic plant identification system. Out of all available organs of plant, leaf is selected to obtain the features of plant. Five geometrical parameters are calculated using digital image processing techniques. On the basis of these geometrical parameters six basic morphological features are extracted. Vein feature as a derived feature is extracted based on leaf structure. At the first stage leaf images are obtained using digital scanner. Then above mentioned morphological features are extracted which act as input to the classification stage. Recognition accuracy of the proposed algorithm is tested. Accuracy of this algorithm is tested on two different databases and compared. False acceptance ratio and false rejection ratio for both databases is calculated. Total 12 kinds of plants are classified using this algorithm. Dataset consists of 92 images of total 12 plants. This method implements effective algorithm used for plant identification and classification as it is independent of leaf maturity. Proposed method is easy to implement and fast in execution.

I. INTRODUCTION

Plants are important part of our ecosystem. There is huge number of plants existing in nature. Many of them are at the risk of extinction. So it is very necessary to catalogue their identity, features and useful properties. Also there are many medicinal plants which play an important role in Ayurveda. Now a day, whole world is facing various problems like global warming, biodiversity loss, effects of fast urban development, and various environmental damages. Hence there is an urgent need to apply advanced computer vision techniques to obtain the botanical knowledge like plant taxonomy, various features of plant and make this information accessible and useful to different kinds of people like researchers, farmers, botanists, and students [1].

Hence plant identification is the first and important task. There are many plant organs like leaves, flowers, fruits, seeds which can be used for plant identification. In this paper leaves are selected to obtain the features of plant. Because leaf can be easily obtained and scanned and also it consists of more excluding information which is useful for plant classification. These leaf images are sent to computer and then by using image processing tools, leaf features are extracted to identify the plant. Several methods have been introduced for plant identification.

Many of them have selected leaf as characterizing organ. Some of them used shape description method while other deal with colour feature, texture features, vein structure, geometrical features etc. [2]. B.Wang et al. [3] propose shape descriptor method for online plant leaf identification working on mobile platform. They measured the convexity and concavity property of the arches of various levels and obtained the multilevel shape descriptor. S.G.Wu et al. [4] extracted 12 leaf features and orthogonalized them into 5 principal variables using Principal Component Analysis (PCA) and Probabilistic Neural Network (PNN) as a classifier.

To recognize the plant species J. Chaki et al. used Gabor Filter. Convolving Gabor filter with leaf images, real and imaginary parts of resultant signal are obtained [5]. In this paper leaf identification algorithm is implemented by extracting the leaf features. Five geometrical parameters of each leaf image are calculated. Using these geometrical parameters six basic features are obtained. One derived feature which is vein feature is extracted. This paper uses Euclidean classifier to classify the leaf images. Advantage of using Euclidean classifier is that it is fast and easy to implement.

Plants are essential for mankind. In particular, herbs have been used as folk medicines by indigenous people since ancient times. Herbs are usually identified by practitioners based on years of experiences through personal sensory or olfactory sense [1]. Recent advances in analytical technology have significantly assisted in herbal recognition based on scientific data. This eases many people, especially those that are lacking experience in herbal recognition. Laboratory-based testing requires skills in sample treatment and data interpretation, in addition to time consuming procedures [2]. Therefore, a simple and reliable technique for herbal recognition is needed. Computation combined with statistical analysis is likely to be a powerful tool for herbal recognition. This nondestructive technique

shall be the method of choice to rapidly identify herbs, particularly for those who cannot afford to apply expensive analytical instrumentation.

II. LITERATURE SURVEY

Image Processing in Leaf Pattern Recognition

Leaf pattern recognition usually follows the steps as shown in Figure 1. The most challenging part of this study is to extract distinctive features of leaves for plant species recognition. In this case, different classifiers using high performance statistical approaches have been used to perform leaf features extraction and classification. The advancement in computer vision and artificial intelligence have greatly assisted researchers to classify plants through statistical modeling. The pre-processing step consists of image reorientation, cropping, gray scaling, binary thresholding, noise removal, contrast stretching, threshold inversion, and edge recognition.

Image aligning the input image to a standardized position, with the leaf aligned to either the x-axis or y-axis. For leaves that have the greater width: Length ratio, the length is preferably placed in the vertical or upright position [10]. To decrease the amount of computational load that is exerted upon the graphic processing unit, cropping the image is a necessary step to reduce the unnecessary foreground region of the prompt image. Turkoglu and Hanbay [11] suggested that leaf feature extraction could be done by dividing the leaf image into two or four parts, instead of extracting for the whole leaf. The proposed image processing techniques using color, vein, Fourier descriptors (FD), and gray-level co-occurrence matrix (GLCM) methods had proven to achieve 99.1% accuracy using the Flavia leaf dataset. Gray scale conversion of the image into geometrical data is implemented to optimize the contrast and intensity of images.

Later, the thresholding process creates a binary image from the gray scaled image to translate the value of the image to its closest threshold, and therefore having either one of two possible values for each pixel, as presented in Figure 2. Different types of noises, such as grains, and holes, could affect digital images, therefore erosion and dilation are a series of operations implemented in order to remove the background noises. The images are considered homogenous if they do not exhibit substantial differences between one another in terms of contrast stretching. These images, when shown in histogram representation, exhibit very narrow peaks. Inhomogeneity is caused by the lack of uniform lighting upon the image. The image is normalized in order to stretch the narrow range to a more dynamic range. The binary images from the process are inverted during threshold conversion, to convert the background into black. Suzuki algorithm can be utilized to extract the contours of images and further refined by diminishing the contours with small lengths with regards to its largest contour [10]. This process is known as edge recognition.

Ma et al. [12] suggested that their algorithm was better than the conventional back-propagation algorithm in terms of efficiency and accuracy. They analyzed soybean leaf image to evaluate the nitrogen content by introducing median filter in their preprocessing stage. A hazier image is collected to remove grain noise, which could disrupt image processing due to high frequency properties as a result of grey difference [13]. The subsequent step would be emphasizing the leaf edge to obtain a clear image. In this case, the grey linear transformation technique is used to further add the difference in grey saturation between the leaf image and the background, and thus enhance the image by gaining a comparable threshold value of sample image and background to decrease error rate [14]. Since the image background still has an undesired value, the image is binarized to remove the background value completely before the original image is imposed to the processed image [15].
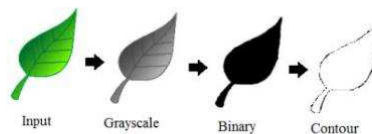
Figure 2. Image pre-processing stage.
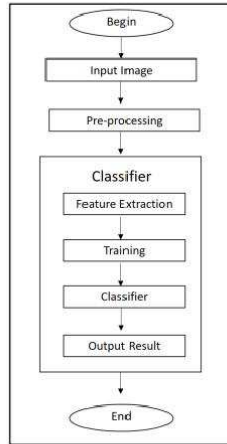
Figure 1. Fundamental of leaf pattern recognition.

III. SYSTEM ANALYSIS

3.1 Existing System

The weight passes between the layers of nodes are established in the early stage, the pre-existing weights will not be manipulated. Nevertheless, new vectors are placed into weight matrices during the training phase which results in real-time viability. During the process of recognizing the leaf pattern, the feature vector of leaf is classified by the network into a particular class since the assigned class is assumed to have the highest probability to be accurate. Classifiers with several features extraction of the leaf images have been shown to yield maximum accuracy output as compared to them individually and all existing methodologies with accuracy of 93.11%

3.2 PROPOSED SYSTEM

The proposed method used 70 samples taken from the Flavia dataset and their geometrical and shape features were extracted and yielded an accuracy of 97.7% which is the highest achievement reported in literature. The results found that the proposed method was able to improve for 11.7% and 4.2% in the scan category and 4.06% and 5.87% for the scan-like category in the average classification score relative to the best results reported in the literature for Image CLEF 2011 and Image CLEF 2012 datasets, respectively. Hence, the multiple classifier system overcame the performance of monolithic methodologies. The computational model was proposed using digital plant images based on biometric features such as shape and vein patterns.

Advantages
- The classifier of SVM also proved to be effective to detect plants in their natural habitat.
- The model could achieve an average accuracy, 97% of leaf identification based on 10 different biometric information extracted from 1907 leaf images of 32 plant species taken from the Flavia dataset.
-

3.3 ARCHITECTURE
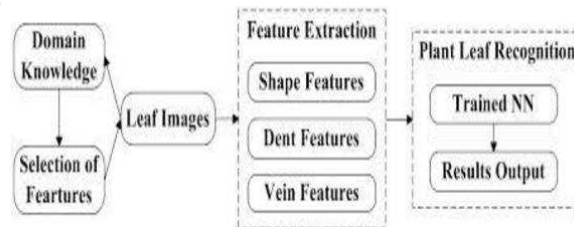
Work Process
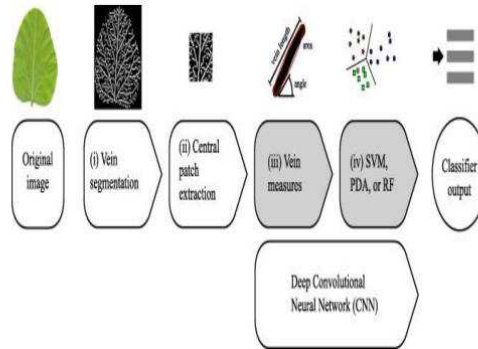
IV. SYSTEM IMPLEMENTATION

4.1 SYSTEM METHODOLOGY

A. Leaf Image Acquisition/ Database selection:
In this paper two database of leaf images are used. One directly obtained from [6]. Other one is created by taking leaves from trees available in college campus. All these leaves are scanned using digital scanner. Back side of leaves are used for scanning. As leaf images are scanned rather photographed, there is no problem of angle of photoing and lighting conditions. The overall flow diagram of proposed work is shown in Figure 1.

B. Preprocessing:
The leaf images obtained in database2 are color images. These RGB images are converted into gray scale. Obtained gray scale images are converted into binary by using appropriate level of thresholding. Median filtering is used to reduce the effect of noise. Leaf contour is obtained by using boundary extraction algorithm. The flow diagram of preprocessing step is shown in Figure 2.

C. Geometrical parameter calculation:
In this technique five basic geometrical parameters are calculated. These are length, width, diameter, area and perimeter of leaf. 1) Length of leaf: It is defined as the distance between two extreme points on the main vein. 2) Width of leaf: It is defined as the length of minor axis of leaf contour. 3) Diameter: The diameter is defined as the longest distance between any two points on the margin of the leaf. [4] 4) Leaf area: Leaf area is calculated as counting the number of pixels having binary value 1 inside the leaf margin. [4] 5) Leaf perimeter: It is obtained by counting the number of pixels contributing margin of leaf.

D. Basic feature extraction:
Using five geometrical parameters which are defined above, six basic morphological features are calculated.
1) Aspect ratio: It is defined as the ratio of length to the width of leaf. It is given as, [4] Aspect Ratio = Length/ Width
2) Form factor:
Form factor is used to obtain the difference between circle and leaf. It is calculated as, [4]
Form Factor = 4 π Area/ Perimeter
3) Rectangularity:
Rectangularity feature is used to obtain the similarity between leaf and rectangle. It is calculated as, [4]
Rectangularity= Length* Width/ Area
4) Narrow factor: It is defined as ratio of diameter to the length. It is given as, [4]
5) Perimeter ratio of diameter: It is given as the ratio of leaf perimeter to its diameter. It is given as, [4]
6) Perimeter ratio of length and width: It is given as the ratio of perimeter of leaf to the sum of its length and width. It is given as, [4]

E. Derived feature extraction:
        One derived feature is extracted named as vein feature. In this feature vein structure of leaf is obtained. Morphological opening is done on input image with disk-shaped structuring element of radius 1,2,3,4 sequentially.

Then final obtained image is subtracted from input image. Here vein structure of leaf is obtained. Total number of white pixels in the vein structure is counted. Vein feature is obtained as the ratio of total number of white pixels in the vein structure to the area of leaf image .Vein feature is given as,

Vein Feature = Number of White Pixels/ Area

In this way total seven features are extracted. These seven features are calculated for all training images and training feature set is created

F. Detection:

In detection step input query image that is test image is classified to appropriate class of tree. First query image is acquired then pre-processed it. Five geometrical parameters for this query image are calculated. Using these parameters six morphological features is obtained. Vein feature is calculated by obtaining vein structure of query image. Test feature set is created using extracted features. Euclidean classifier is used which is very simple to implement and fast as compare to other classifiers. Distance between training feature set and testing feature set is calculated. The tree for which minimum specified distance obtained, query image is classified to that particular tree.

4.2 EXPERIMENTATIONS & RESULTS

Experiments are done on two types of database. One obtained from [6] and other which is created from plants available in college campus. First database contains 32 samples of 6 plants, named as b1 to b6. Each image is saved in a TIFF format. Second database contains 60 samples of 6 plants, named as c1 to c6. Each image is saved in a JPEG format. Training and testing data set of first database are shown below in Figure 1 and Figure 2. And of second database is in figure 3 and figure 4.
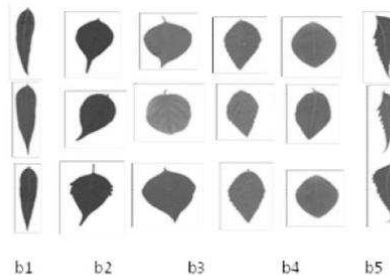
Fig. 3.1 Samples of Dataset1.
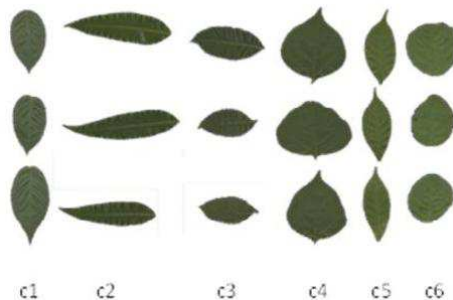
Fig. 3.4 Samples of Dataset2.

G. Analysis:

From first database 2 leaf images per plant and from second database 3 leaf images per plant are used to obtain the accuracy of this algorithm. The accuracy obtained for first database is 78.12 % while for second database it is 85%. Some plants get less accuracy due to inter-species similarity and the intra-species variability and also due to the

simplicity of algorithm. False Acceptance Rate and False Rejection Rate for Database1 and Database2 are as shown in TABLE I and TABLE II respectively. By observing both tables it is cleared that FAR and FRR values of Database2 are less than Database1.

V. CONCLUSION

This paper introduces statistical method approach for plant identification. Proposed method is verified for two databases consisting of total 12 plants. It uses Euclidean classifier for classifying leaf images. This method is easy to implement and fast in execution compared to other methods. Accuracy is moderate. Accuracy can be increased by adding more statistical features and using other advanced classifier. But due to this complexity of algorithm will increase and it will slow down the execution speed. So this method gives the optimum solution in between speed of recognition and accuracy.

VI. FUTURE WORK

Since the essential of the competitive function is to output the index of the maximum value in an array, we plan to let our algorithm output not only the index of maximum value, but also the indices of the second greatest value and the third greatest value. It is based on this consideration that the index of the second greatest value corresponds to the second top matched plant. So does the index of the third greatest value. Sometimes, maybe the correct plant is in the second or the third most possible plant. We are going to provide all these three possible answers to users. Further more, users can choose the correct one they think so that our algorithm can learn from it to improve its accuracy. Other features are also under consideration. Daniel Drucker from Department of Psychology, University of Pennsylvania, suggested us to use Fourier Descriptors so that we can do some mathematical manipulations later. We are also trying to use other features having psychology proof that is useful for human to recognize things like the leaf, such as the surface qualities [30]. Our plant database is under construction. The number of 6 plants that can be classified will be increased.

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Iris Recognition- Image Processing

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ABSTRACT: Biometrics systems have significantly improved person identification and authentication, playing an important role in personal, national, and global security. Iris segmentation algorithms are of great significance in complete iris recognition systems, and directly affect the iris revivification and recognition results. However, the conventional iris segmentation algorithms have poor adaptability and are not sufficiently robust when applied to noisy iris databases captured under unconstrained conditions. In addition, there are currently no large iris databases; thus, their is segmentation algorithms cannot maximize the benefits of convolutional neural networks (CNNs). The main work of this paper is as follows: first, we propose an architecture based on CNNs combined with dense blocks for iris segmentation, referred to as a dense-fully convolution network (DFCN), and adopt some popular optimizer methods, such as batch normalization (BN) and dropout. Second, because the public ground-truth masks of the CASIA-Interval-v4 and IITD iris databases do not include the labeled eyelash regions, we label these regions that occlude the iris regions using the Label me software package. Finally, the promising results of experiments based on the CASIA-Interval-v4, IITD, and UBIRIS.V2 iris databases captured under different conditions reveal that the iris segmentation network proposed in this paper outperforms all of the conventional and most of the CNN-based iris segmentation algorithms with which we compared our algorithm's results in terms of various metrics, including the accuracy, precision, recall, f1 score, and nice1 and nice2 error scores, reflecting the robustness of our proposed network. The results strongly indicate that spoofing detection systems based on convolution networks can be robust to attacks already known and possibly adapted, with little effort, to image-based attacks that are yet to come.

I. INTRODUCTION

Iris texture plays an important role in national defense and security because of its unique, stable, noncontact and anticounterfeiting characteristics. A complete iris recognition system usually consists of the following steps: initially, iris images are obtained by an imaging device. Then, the iris regions of the eye images are located by iris segmentation algorithms. Next, iris features are extracted by feature extraction algorithms. Finally, the extracted iris features are used for iris verification or recognition. As shown in FIGURE 1,with the exception of the iris regions, the iris images consist of not only the iris regions but also other regions, i.e., pupil, eyelid, eyelashes and sclera [1]. The non-iris regions degrade the iris segmentation performance. Iris segmentation algorithms are designed to eliminate the effects of the no iris regions and accurately segment the iris regions from The associate editor coordinating the review of this manuscript and approving it for publication was Genny Tortora. the eye images. Iris segmentation algorithms are of great significance in iris recognition systems. The accuracy and robustness of the algorithms directly affect the subsequentiris extraction, verification and recognition stages [2]. Underideal conditions—i.e., the iris regions are not occluded by the eyelids or eyelashes, the iris images are clear, and users are absolutely cooperative; thus, most existing iris segmentation algorithms can accurately segment the iris regions. However, under non ideal conditions, it is still challenging to design robust iris segmentation algorithms that accurately segment the iris regions despite the effects of eyelids, eyelashes, light, and user cooperation.
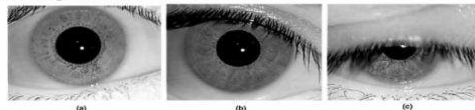
FIGURE 1. Samples of iris images under ideal and nonideal conditions. (a) Ideal iris images. (b) Iris images slightly occluded.(c) Iris images severely occluded

Deep Learning
In this paper, we do not focus on custom-tailored solutions. Instead, inspired by the recent success of Deep Learningin several vision tasks, and by the ability of the technique to leverage data, we focus on two general-purpose approaches

to build image-based anti-spoofing systems with convolutional networks for several attack types in three biometric modalities, namely iris, face, and fingerprint. The first technique that we explore is hyperparameter optimization of network architectures that we henceforth call architecture optimization, while the second lies at the core of convolutional networks and consists of learning filter weights via the well-known back-propagation algorithm, hereinafter referred to as filter optimization. Fig. 1 illustrates how such techniques are used. The archi-tecture optimization (AO) approach is presented on the left and is highlighted in blue while the filter optimization (FO) approach is presented on the right and is highlighted in red.

II. LITERATURE SURVEY

The first three of such benchmarks consist of spoofing attempts for iris recognition systems, Biosec, Warsa, and MobBIOfake. Replay-Attack and 3DMAD are the benchmarks considered for faces, while Biometrika, CrossMatch, Italdata, and Swipe are the fingerprint benchmarks here considered, all them recently used in the 2013 Fingerprint Liveness Detection Competition (LivDet'13). Results outperform state-of-the-art counterparts in eight of the nine cases and observe a balance in terms of performance between AO and FO, with one performing better than the other depending on the sample size and problem difficulty. In some cases, we also show that when both approaches are combined, we can obtain performance levels that neither one can obtain by itself.

Moreover, by observing the behaviour of AO and FO, we take advantage of domain knowledge to propose a single new convolutional architecture that push performance in five problems even further, sometimes by a large margin, as in CrossMatch (68.80%v.98.23%). The experimental results strongly indicate that convolutional networks can be readily used for robust spoofing detection. Indeed, we believe that data-driven solutions based on deep representations might be a valuable direction to this field of research, allowing the construction of systems with little effort even to image-based attack types yet to come. We organized the remainder of this work into five sections. Section II presents previous anti-spoofing systems for the three biometric modalities covered in this paper, while Section III presents the considered benchmarks. Section IV describes the methodology adopted for architecture optimization (AO) and filter optimization (FO) while Section V presents experiments, results, and comparisons with state-of-the-art methods. Finally, Section VI concludes the paper and discusses some possible future directions.

A Survey Based on Fingerprint, Face and Iris Biometric Recognition System, Image Quality Assessment and Fake Biometric

This paper introduce three biometric techniques which are face recognition, fingerprint recognition, and iris recognition (Multi Biometric System) and also introduce the attacks on that system and by using Image Quality Assessment For Liveness Detection how to protect the system from fake biometrics.

Advantages

Hardware-based schemes generally present a higher fake detection rate, at the same time software-based techniques are in general less expensive (like no extra device is needed), and less intrusive since their implementation is clear to the user.

Disadvantages

Fingerprints have been used from long time for identifying individuals.

III. IRIS SYSTEM IMPLEMENTATION

3.1 Acquiring the Picture

Beginning with a 320x280 pixel photograph of the eye taken from 4 cenimeters away using a near infrared camera. The near infrared spectrum emphasizes the texture patterns of the iris making the measurements taken during iris recognition more precise. All images tested in this program were taken from the Chinese Academy of Sciences Institute of Automation (CASIA) iris database.
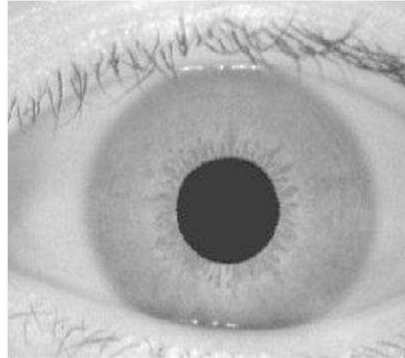
Figure 1: Near-infrared image of eye from CASIA Database

3.2 Edge Detection

Since the picture was acquired using an infrared camera the pupil is a very distinct black circle. The pupil is in fact so black relative to everything else in the picture a simple edge detection should be able to find its outside edge very easily. Furthermore, the thresholding on the edge detection can be set very high as to ignore smaller less contrasting edges while still being able to retrieve the entire perimeter of the pupil.

The best edge detection algorithm for outlining the pupil is canny edge detection. This algorithm uses horizontal and vertical gradients in order to deduce edges in the image. After running the canny edge detection on the image a circle is clearly present along the pupil boundary.
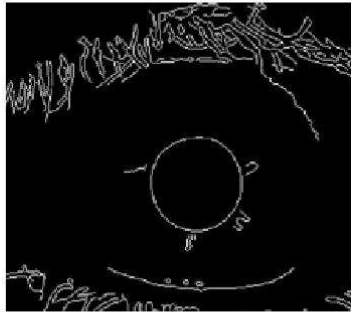
Figure 2: Canny edge detected image of the eye

3.3 Image Clean Up

A variety of other filters can be used in order decrease the extraneous data found in the edge detection stage. The first step in cleaning up the image is to dilate all the edge detected lines. By increasing the size of the lines nearby edge detected components are likely to coalesce into a larger line segment. In this way complete edges not fully linked by the edge detector can form. Thus the dilation will give us a higher probability that the perimeter of the pupil is a complete circle.

Knowing that the pupil is well defined more filters can be used without fear of throwing out that important information. Assuming the image is centered a filter can be used to fill in the circle defined by the pupil's perimeter. In this way we clearly define the entire area of the pupil. After this, a filter which simply throws out sections of connected pixels with an area below a threshold can be used effectively to throw out smaller disconnected parts of the image the edge detector found. Finally, any holes in the pupil caused by reflections or other distortions can be filled, by looking for sections of blank pixels with an area below a threshold. After this processing we achieve a picture that highlights the pupil area while being fairly clean of extraneous data.
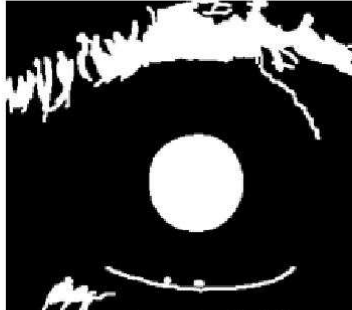
Figure 3: Image after final filters

3.4 Pupil Information Extraction

Having pre-processed the image sufficiently the extraction of the pupil center and radius can begin. By computing the euclidean distance from any non-zero point to the nearest zero valued point an overall spectrum can be found. This spectrum shows the largest filled circle that can be formed within a set of pixels. Since the pupil is the largest filled circle in the image the overall intensity of this spectrum will peak in it.
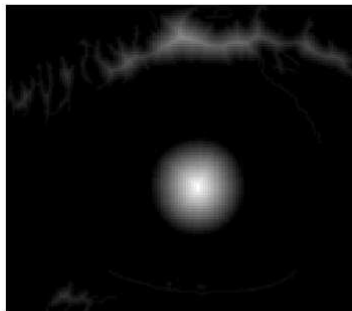
Figure 4: Image after computing minimal euclidean distance to non-white pixel

In the pupil circle the exact center will have the highest value. This is due to the simple fact that the center is the one point inside the circle that is farthest from the edges of the circle. Thus the maximum value must correspond to the pupil center, and furthermore the value at that maximum (distance from that point to nearest non-zero) must be equal to the pupil radius.
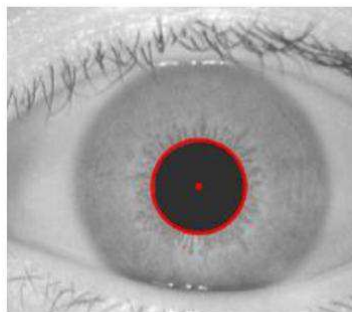
Figure 5: The original image of the eye with the pupil center and perimeter, found with the algorithm, highlighted

3.5 Iris Recognition: Detecting the Iris

3.5.1 Iris Detection
With the information on the pupil discovered the location of the iris can now begin. It is important to note that the pupil and iris are not concentric. Consequently, the pupil information does not help directly determine the same parameters for the iris. However, the pupil information does give a good starting point, the pupil center.
Most modern iris detection algorithms use random circles to determine the iris parameters. Having a starting point at the pupil, these algorithms guess potential iris centers and radii. They then integrate over the circumference in order to determine if it is on the border of the iris. While this is highly accurate the process can consume a lot of time. This module explains an alternate approach which is much more lightweight but with higher error rates.

3.5.2 Iris Radius Approximation

The first step in finding the actual iris radius is to find an approximation of the iris radius. This approximation can then be fine tuned to find the actual iris parameters. In order to find this approximation a single edge of the iris must be found. Knowing that eyes are most likely to be distorted in the top and bottom parts due to eyelashes and eyelids, the best choice for finding an unobstructed edge is along the horizontal line through the pupil center.
Having decided on where to attempt to detect the iris edge, the question of how to do it arises. It seems obvious that some type of edge detection should be used. It happens that for any edge detection it is a good idea to blur the image to subtract any noise prior to running the algorithm, but too much blurring can dilate the boundaries of an edge, or make it very difficult to detect. Consequently, a special smoothing filter such as the median filter should be used on the original image. This type of eliminates sparse noise while preserving image boundaries. The image may need to have its contrast increased after the median filter.
Now that the image is prepped the edge detection can be done. Since there is such a noticeable rising edge in luminescence at the edge of the iris, filtering with a haar wavelet should act as a simple edge detector. The area of interest is not just the single horizontal line through the iris, but the portion of that line to the left of the pupil. This is so that the rising luminescence from the transition from iris to white is the only major step.
The iris should represent the steepest luminence change in the area of interest. Consequently, this area of the image should correspond to the highest valued componenet of the the output from the filter. By finding this maximal value the edge of the iris to the right of the pupil should be found. It should be noted that since the iris may not be concentric with the pupil the distance from the pupil center to this edge may not correspond to the iris' radius.
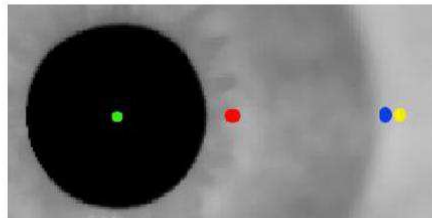
Figure 3: The green point is the pupil center found using the pupil detection techniques of part 1. The red point indicates the starting point of the area of interest. The blue point is the approximate radius found. The yellow point is the padded radius for use in finding the actual iris parameters.

3.6 Iris Translation
Having acquired an approximate radius, a small pad of this value should produce a circle centered on the pupil which contains the entire iris. Furthermore, with the perimeter of the pupil known, an annulus may be formed which should have the majority of it's area filled by the iris. This annulus can then be unrolled into cartestian coordinates through a straight discretized transformation. (r --> y, θ --> x) The details of this procedure are described in Step 3.
If the iris is perfectly centered on the pupil, the unrolled image should have a perfectly straight line along its top. However, if the iris is off center even a little this line will be wavy. The line represents the overall distance the iris is at from the pupil center. It is this line which will help to determine the iris' center and radius. Consequently, an edge detection algorith m must be run on the strip in order to determine the line's exact location. Once again canny edge detection is used. However, before the edge detection can be run the image should undergo some simple pre-processing to increase the contrast of the line. This will allow for a higher thresholding on the edge detection to eliminate extraneous data.

Figure 4(a): The unrolled iris before and after edge detection

Figure 4(b): The unrolled iris before and after edge detection

3.7 Iris Information Extraction

In order to extrapolate the iris' center and radius, two chords of the actual iris through the pupil must be found. This can be easily accomplished with the information gained in the previous step. By examing points with x values on the strip offset by half of the length of the strip a chord of the iris is formed through the pupil center. It is important to pick the vectors for these chords so they are both maximally independent of each other, while also being far from areas where eyelids or eyelashes may interfere.
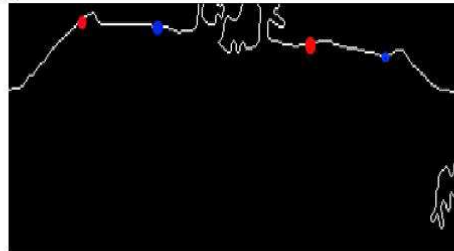
Figure 5(a): The points selected on the strip to form the chords of the iris through the pupil
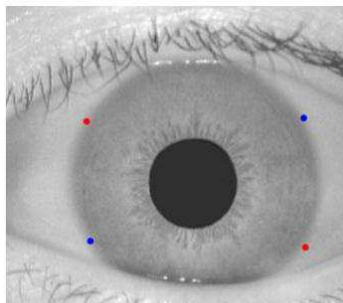
Figure 5(b): The points selected on the strip to form the chords of the iris through the pupil

IV. CONCLUSION

Iris segmentation algorithms play an important role in iris recognition systems and directly affect the accuracy of iris verifification and recognition. We proposed an iris segmentation architecture based on CNNs combined with denseblocks, referred to as DFCN. The encoder of DFCN consists of dense blocks, and the decoder of DFCN obtains the output prediction masks via transpose convolution. To evaluate the performance of DFCN, we adopted three public iris databases captured under different conditions, namely, CASIA-Interval-V4, IITD and UBIRIS.v2, with thecorresponding ground-truth masks. Moreover, we labeledthe eyelash regions occluding the iris regions of theCASIA-Interval-V4 and IITD iris databases using theLabelme software package, which is also used for trainingand testing. To reflflect the superiority of DFCN in terns of many aspects, we adopted a variety of metrics used forevaluating the iris segmentation algorithms, i.e., the accuracy, precision, recall, f1 score, and nice1 and nice2 error scores. In addition, we compared some conventional and CNN-based iris segmentation algorithms. The results of the experiments reveal that the iris segmentation architecture proposed inthis paper outperforms most of the other algorithms, which demonstrates its superiority and robustness. Nevertheless, the performance of DFCN on the public ground-truth masksis better than that on our labeled ground-truth masks; this fifinding is related to the adopted public iris databases andthe method of labeling. Thus, more attention is needed inthe future for the design of more robust iris segmentation algorithms for iris databases under nonideal conditions andfor more effective ways of labeling.

V. FUTURE WORK

For future work, we intend to evaluate such datasets using the proposed approaches here and also consider other biometric modalities such as palm, vein, and gait. As evident from the results, it is possible to create, relatively easily, an algorithm to detect and recognize irises to a calculated degree of confidence. In addition, after a little research , it i s clear that more sophisticated algorithms exist that give zero false acceptance--something many other authentication techniques simply cannot deliver. One specific algorithm patented by Dr. Daugman, is currently the most accepted and widely used in iris code recognition systems. This embodiment of the algorithm uses robust algorithms in each part of the implementation (pupil and iris detection, masking, Gabor correlation), and has experimentally proven to be extremely accurate. In the largest deployment of iris recognition systems, this algorithm does 3.8 billion comparisons a day in the United Arab Emirates (story here).

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Comments on Steganograpy using Reversible Texture Synthesis

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ABSTRACT: Internet is gaining more and more popular now a days, so there is need to provide security for everything on internet. One of the most important concepts where we need to provide higher security is in communication between sender and receiver. Due to security threats the requirement of the secure transmission of the data is also increased the reason for developing the Data Hiding is the easy access of images, documents confidential data by the hackers who always monitor the system. Data hiding is the process of secretly embedding information inside a source without changing its content and meaning there is numerous techniques which hides the data. This paper aims to implement data hiding in compressed video. Like data hiding in images and raw video which operates on the images themselves in the spatial or transformed domain which are vulnerable to steganalysis. The sender first uses the stenographic application for encrypting the secret message. For this encryption, the sender uses text document in which the data is written and the image as a carrier file in which the secret message or text document to be hidden. The sender sends the carrier file and text document to the encryption phase for data embedding, in which the text document is embedded into the image file. In encryption phase, the data is embedded into carrier file which was protected with the password now the carrier file acts as an input for the decryption phase. The image in which data is hidden i.e. the carrier file is sent to the receiver using a transmission medium. E.g. Web or e-mail. The receiver receives the carrier file and places the image in the decryption phase. Now the carrier file acts as an input for the decryption phase. The image in which data is hidden the carrier image is sent to the receiver using a transmission medium. E.g. Web or e-mail. The receiver receives the carrier file and places the image in the decryption phase.

I. INTRODUCTION

1.1 INTRODUCTION TO IMAGE PROCESSING

In imaging science, image processing is any form of signal processing for which the input is an image, such as a photograph or video frame; the output of image processing may be either an image or a set of characteristics or parameters related to the image. Most image-processing techniques involve treating the image as a two-dimensional signal and applying standard signal-processing techniques to it.

Image processing usually refers to digital image processing, but optical and analog image processing also are possible. This article is about general techniques that apply to all of them. The acquisition of images (producing the input image in the first place) is referred to as imaging.

Closely related to image processing are computer graphics and computer vision. In computer graphics, images are manually made from physical models of objects, environments, and lighting, instead of being acquired (via imaging devices such as cameras) from natural scenes, as in most animated movies. Computer vision, on the other hand, is often considered high-level image processing out of which a machine/computer/software intends to decipher the physical contents of an image or a sequence of images (e.g., videos or 3D full-body magnetic resonance scans).

In modern sciences and technologies, images also gain much broader scopes due to the ever growing importance of scientific visualization (of often large-scale complex scientific/experimental data). Examples include microarray data in genetic research, or real-time multi-asset portfolio trading in finance.

1.2 DATA HIDING

In first we have addressed a few fundamental issues of data hiding in image and video. We have proposed general solutions, including how to embed multiple bits, how to handle uneven embedding capacity, and how to allow the number of reliably extractable bits to be adaptable to the actual noise condition. Here apply the solutions to specific design problems and present details of embedding data in image and video. In Section II, we embed data in images at two levels, each of which is designed for different robustness. This approach al-lows for graceful decaying of extractable information as noise gets stronger. In extend the multilevel embed-ding to video, for which difficulty arises

because the embedding capacity varies from region to region within a frame as well afro frame to frame. We embed control information to facilitate the extraction of the user data payload and to combat such distortions as frame jitter. The designs presented in this paper can be used as building blocks for such applications as copy control, access con-

trol, robust annotation, and content-based authentication. Comprehensive protection from malicious attacks that make watermarks undetectable would require both technical and business approaches, such as a well-determined business and pricing model. Our design objective here focuses on surviving common processing in transcoding and scalable/progressive transmission, such as compression with different ratio and frame rate conversion for video.

II. LITERATURE SURVEY

Data hiding in H.264 encoded video sequences

The widespread of the Internet and World Wide Web has changed the way digital data is handled. The easy access of images, musical documents and movies has modified the development of data hiding, by placing emphasis on copyright protection, content-based authentication, tamper proofing, annotation and covert communication. Data hiding deals with the ability of embedding data into a digital cover with a minimum amount of perceivable degradation, i.e., the embedded data is invisible or inaudible to a human observer. Data hiding consists of two sets of data, namely the cover medium and the embedding data, which is called the message. The digital medium or the message can be text, audio, picture or video depending on the size of the message and the capacity of the cover. Early video data hiding approaches were proposing still image watermarking techniques extended to video by hiding the message in each frame independently. Methods such as spread spectrum are used where the basic idea is t o distribute the message over a wide range of frequencies of the host data. Transform domain is generally preferred for hiding data since, for the same robustness as for the spatial domain, the result is more pleasant to the Human Visual System (HVS). For this purpose the DFT (Discrete Fourier Transform), the DCT (Discrete Cosine Transform), and the DWT (Discrete Wavelet Transform) domains are usually recent video data hiding techniques are focused on the characteristics generated by video compressing standards. Motion vector based schemes have been proposed for MPEG algorithms. Motion vectors are calculated by the video encoder in order to remove the temporal redundancies between frames. In these methods the original motion vector is replaced by another locally optimal motion vector t o embed data. Only few data hiding algorithms considering the properties of H.264 standard have recently appeared in the open literature. In subset of the 4 × 4 DCT coefficients are modified in order to achieve a robust watermarking algorithm for H.264. In [9] the blind algorithm for copyright protection is based on the intra prediction mode of the H.264 video coding standard. In some skipped macro blocks are used to embed data. The well established H.264/AVC video coding standard has various motion-compensation units in sizes of 1 6 × 16, 16 × 8, 8 × 16, 8 × 8, and sub8 × 8 [11]. For sub8 × 8, there are further four sub-partitions of sub8 × 8, sub8 × 4, sub4 × 8, and sub4 × 4. In this paper we propose a new data hiding scheme, which takes advantage of the different block sizes used by the H.264 encoder during the inter prediction, in order to hide the desirable data. The message can be extracted directly from the encoded stream without knowing the original host video. This method is best suited for content-based authentication and covert communication applications. Embedding takes place during the encoding process and utilizes the advanced inter prediction features of the H.264 encoder. Its main advantage is that it is a blind scheme and its affect on video quality or coding efficiency is almost negligible. It is highly configurable, thus it may result in high data capacities. Finally, it can be easily extended, resulting in better robustness, better data security and higher embedding capacity.

ADVANTAGES
- Does not actually affect the PSNR of the inter frames.
- To perform the best possible inter prediction during its normal operation.

DISADVANTAGES
- The frame period is too small and the algorithm repeats the message very often.

III. SYSTEM DESCRIPTION

3.1 EXISTING SYSTEM

There are many researches that have been proposed for hiding the data into digital videos. Most of those schemes uses the attributes of motion vectors like amplitude, phase angle etc. This paper deals with hiding data in compressed video where motion vectors are used to encode and reconstruct both the forward predictive (P -) frame and bidirectional (B -) frames in the compressed video. The subsets of motion vectors are chosen based their associated macro block prediction error. Pertinent features will be collected from the motion in between the frames as in the form of the vectors in association with macro blocks and depending on the motion message is going to be hidden. To achieve the robustness a adaptive threshold is searched and low predictive error level is retained. Secret message bits are hidden in least significant bit of both components of candidate motion vector. The evaluation will be based on two criteria: minimum distortion to reconstructed video and minimum overhead on compressed video size.

3.2 PROPOSED SYSTEM

This paper aims to explain the data hiding concept in motion vector of compressed video. In this data hiding in motion vector is done by stenography Technique, data is compressed in different frames of video. The process starts with Mailing system such as sending and receiving secret data. In that hiding data in natural sequence of multiple groups of pictures. The RSA algorithm is used for encryption of message in video and use edge detection mechanism for selecting pixel, Data is encoded as a region where motion estimation is allowed to generate motion vector. The sender first uses the stenographic application for encrypting the secret message. For this encryption, the sender uses text document in which the data is written and the image as a carrier file in which the secret message or text document to be hidden. The sender sends the carrier image and text document to the encryption phase for data embedding, in which the text document is embedded into the image file. In encryption phase, the data is embedded into carrier file which was protected. The decryption phase decrypts the original text document using the least significant bit decoding and decrypts the original message. The performance analysis shows that the algorithm ensures better security against attackers.

ADVANTAGES

- Improve the classification accuracy because the extraction of features can be restricted to the subset of pixels contained in the OOI of the images.
- Automatic segmentation of OOIs in low DOF images to improve search quality

3.3 ARCHITECTURE:
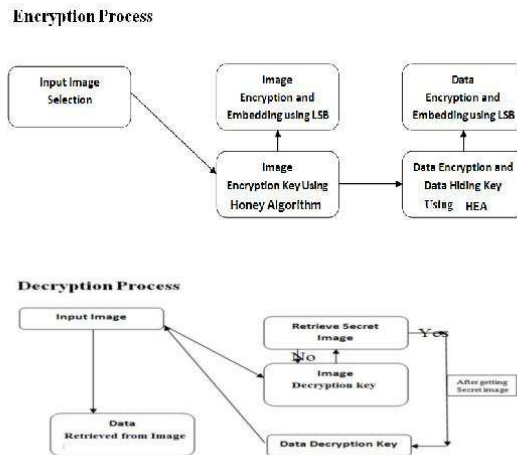
IV. SYSTEM IMPLEMENTATION

4.1 Input image
First to process the input image using pre processing technique for reduce noise of image. Preprocessing is the key step and the starting point for image analysis, due to the wide diversity of resolution, image format, sampling models, and illumination techniques that are used during acquisition. In our framework, preprocessed images are then subject to analysis under different models, which are going to be evaluated in parallel in a multiagent system for identifying the security.

4.2 Encryption of image
In our proposed system, first of all we select a true color image of size 512 x 512 for to it as a cover image and a secret message which will be embedded in the cover image. Image encryption can be used to watermark digital images for copyright purposes and to make your personal images safe from prying eyes. For images that are stored on laptops, smart phones, or in the cloud, encryption gives you an extra layer of security to help keep your images private. Special software is needed to encrypt images and is readily available as freeware, shareware, and for sale on the Internet for all major operating systems.

Images are encrypted for many reasons, including identifying the creator of an image, protecting copyright information, deterring piracy, and blocking images from being viewed by users who shouldn't have access to them. By encrypting images, you can send them through email or over the Internet without worrying about your images are being viewed by people that you don't want to see them. Encrypting images on your home computer will also give you a measure of security in case a hacker gains access to your hard drive, and encrypting the images on your laptop or Smartphone will likewise make your images safer if your computer or laptop are lost or stolen.

Steganography is a way of hiding messages within an image, text, or even in video, but it is not a true encryption process. With digital images, a second picture may be hidden inside a first by selectively replacing some of the binary data that represent each pixel's color and intensity with opposite values. One common steganographic method, called the least significant bit method, changes the unit values of the binary image data so ones become zeros and zeros become ones. Only a portion of the binary image data needs to be changed to hide another picture. Steganography may be used to add digital watermarks to images to help protect copyrighted material from theft, but it can also be used to hide stolen data or sensitive information.

4.3 Transmission
In that module the encrypted or cover image will be transmit to the receiver side. RSA encryption/decryption The test image Cameraman sized 256 *256 was used as the original cover in the experiment. Then, we embedded data into the encrypted image by using LSB method. The encrypted image with message is the encrypted file by public key. The extracted information that was decrypted by the private key. The test demonstrate that it is impossible to get the original information when input the wrong key which provides the protection to the hidden information.

4.4 Performance Comparison
We performed several experiments to evaluate the performance of the proposed coding scheme for data hiding and encryption, decryption methods. We analyzed the former under encryption and decryption of images, extract the data. Also, we tested the proposed code for expression recognition with rsa algorithm.

V. EXPERIMENTAL RESULTS AND DISCUSSION

The objective of the work have been implemented an image steganography technique using encryption and decryption method with RSA algorithm to improve the security of the data hiding technique. This technique is a combination of one steganographic technique and one cryptographic technique which enhances the security of data and data hiding technique. Our implemented encryption and decryption method technique on images is used to hide information in the RGB pixels value of the cover image in the form of 3, 3, and 2 bit order and positions to hide the data bits have been calculated by hash function. The use of RSA algorithm has made our technique more secure for open channel. RSA algorithm has been used with encryption and decryption method so that the original text will be embedded into cover image in the form of cipher text. The decryption method technique has been applied to true color images and which gives satisfactory results. The performance of the encryption and decryption method technique has been evaluated and graphically represented on the basis of two measures are – Mean Square Error (MSE) and Peak Signal to Noise Ratio (PSNR) and obtained values are much better than existing techniques. The technique called "A Secure Steganography Based on RSA Algorithm and encryption and decryption method Technique" has been implemented on MATLAB tool by analyzing four color images of size 512 x 512 tiff format as selected to hide a fixed size of secret data. In this

process stego-image is generated using decryption method and RSA encryption which carried out to enhance the security of hidden data.

VI. CONCLUSION AND FUTURE WORK

CONCLUSION

In this paper we are providing high security for data by using Data Hiding in Motion Vector of Compressed video. The two types of security provided are through by using steganography as well as e-mail system. By compression large amount of data are transmitted. The above technique is providing protection for data from hackers. So this is different technique as compared to older methods. By using above technique the robustness is increased and there is no loss of data, and more reliable system

VII. FUTURE WORK

In the future, we will propose digital video sometimes needs to be stored and processed in an encrypted format to maintain security and privacy. For the purpose of content notation and/or tampering detection, it is necessary to perform data hiding in these encrypted videos. In this way, data hiding in encrypted domain without decryption preserves the confidentiality of the content. In addition, it is more efficient without decryption followed by data hiding and re-encryption. In this paper, a novel scheme of data hiding directly in the encrypted version of H.264/AVC video stream is proposed, which includes the following three parts, i.e., H.264/AVC video encryption, data embedding, and data extraction. By analyzing the property of H.264/AVC codec, the code words of intraprediction modes, the code words of motion vector differences, and the code words of residual coefficients are encrypted with stream ciphers. Then, a data hider may embed additional data in the encrypted domain by using codeword substitution technique, without knowing the original video content. In order to adapt to different application scenarios, data extraction can be done either in the encrypted domain or in the decrypted domain. Furthermore, video file size is strictly preserved even after encryption and data embedding. Experimental results have demonstrated the feasibility and efficiency of the proposed scheme.

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P. Alaguthai, Assistant Professor of Computer Science	International Journal of Innovative Research in Computer and Communication Engineering	Implementing Novel Cryptography Technique in Image Encryption and Secure Data Hiding	International	2320-9801 Volume 9, Issue 3	March 2021	http://ijircce.com/admin/main/storage/app/pdf/6CSLP1hKdF5tCsE5hfOcC26zhT49ROpdmYa4WjhJ.pdf

Implementing Novel Cryptography Technique in Image Encryption and Secure Data Hiding

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ABSTRACT:Reversible data hiding technique in encrypted secret image and hiding the original image. The pixels of the image and a special encryption scheme are designed to encrypt the estimating errors. Without the encryption key, one cannot get access to the original image. The data hiding key only, it can embed in or extract from the encrypted image additional data without knowledge about the original image. The data extraction and image recovery are free of errors for all images. Experiments demonstrate the feasibility and efficiency of the proposed method. A bench- mark encryption algorithm (e.g. AES) is applied to the rest pixels of the image and a special encryption scheme is designed to encrypt the estimating errors. Without the encryption key, one cannot get access to the original image. However, provided with the data hiding key only, he can embed in or extract from the encrypted image additional data without knowledge about the original image. Moreover, the data extraction and image recovery are free of errors for all images. Experiments demonstrate the feasibility and efficiency of the proposed method, especially in aspect of embedding rate versus Peak Signal-to-Noise Ratio (PSNR). And also used LSB the least significant bit (lsb) is the bit position in a binary integer giving the units value, that is, determining whether the number is even or odd. The lsb is sometimes referred to as the right-most bit, due to the convention in positional notation of writing less significant digit further to the right.

1. INTRODUCTION

Reversible data hiding (RDH) has the capability to erase the distortion introduced by embedding step after cover restoration. It is an important property that can be applied to many scenarios, such as medical imagery, military imagery and law for entices. For this reason, RDH becomes a hot research topic and is extensively studied over the years. Until now, many RDH techniques have been proposed based on three fundamental strategies: lossless compression- appending scheme [difference expansion (DE) and histogram shift (HS)]. Some recent arts combined the three strategies to residuals of the image such as prediction errors (PE) to achieve better performance. Almost all state- of- the-art RDH algorithms consist of two steps. Generates a host sequence with small entropy, i.e., the host has a sharp histogram which usually can be realized by using PE combined with the sorting technique or pixel selection. The second step reversibly embeds the message in the host sequence by modifying its histogram with methods like HS and DE. On the other hand, some robust RDH methods have also been proposed. Least significant bit (LSB) technique has been proposed. HLSB technique where the secret information is embedded in the LSB of the cover frame. Hash function is used to select the position of insertion in LSB bits. In this technique has been used mean square error (MSE).

Its h help to error required in original image. The proposed technique is compared with existing LSB based secret message and the results are found to be encouraging. Level of information increased and LSB maintain the separate key. We can easily clear the secret image, so we can get in original image. Reversible data hiding in images is a technique that hides data in digital images for secret communication. It is a technique to hide additional message into cover media with a reversible manner so that the original cover content can be perfectly restored after extraction of the hidden message. In this paper has been used image encrypted and decrypted method. Encryption is an effective and popular means of privacy protection. In order to securely share a secret image with other person, a content owner may encrypt the image before transmission. "Selective encryption". Secure multimedia distribution one part the data is encrypted.

There are two levels of security for digital image encryption: low level and high-level security encryption. In low-level security encryption, the encrypted image has degraded visual quality compared to that of the original one, but the content of the image is still visible and understandable to the viewers. In the high-level security case, the content is completely scrambled and the image just looks like random noise.

The content owner encrypts the signs of host discrete cosine transform (DCT) coefficients. Different fingerprints are generated at the receiver side by decrypting only a subset of the coefficients with different decryption keys. The intra-prediction mode, motion vector differences and DCT coefficients' signs are encrypted, while watermarking process proceed son the DCT coefficients' amplitudes adaptively. a commutative watermarking and encryption system is presented based on a layered scheme and a key dependent transform domain. However, the data embedding is not reversible with the above-mentioned techniques. This paper proposes a novel RDH method in encrypted spatial images based on estimation technique.

A large portion of pixels are utilized to estimate the rest before encryption, and then encrypted with a standard encryption algorithm. After that we encrypt the estimating errors with a special encryption scheme. By concatenating encrypted estimating errors and the large group of encrypted pixels, the ultimate version of encrypted image is formulated. The additional data can be embedded in the encrypted image by modifying the estimating errors. In general, the excellent performance can be achieved in three different prospects. The proposed method is completely reversible. The extraction and decryption steps are independent, which are more natural and applicable.

II. LITERATURE REVIEW

2.1 DATA HIDING IN ENCRYPTED IMAGES USING DCT

Reversible data hiding in images is a technique that hides data in digital images for secret communication. It is a technique to hide additional message into cover media with a reversible manner so that the original cover content can be perfectly restored after extraction of the hidden message. In this paper has been used image encrypted and decrypted method. Encryption is an effective and popular means of privacy protection. In order to securely share a secret image with other person, a content owner may encrypt the image before transmission. "Selective encryption". Secure multimedia distribution one part the data is encrypted. There are two levels of security for digital image encryption: low level and high-level security encryption. In low-level security encryption, the encrypted image has degraded visual quality compared to that of the original one, but the content of the image is still visible and understandable to the viewers. In the high-level security case, the content is completely scrambled and the image just looks like random noise.

Encryption
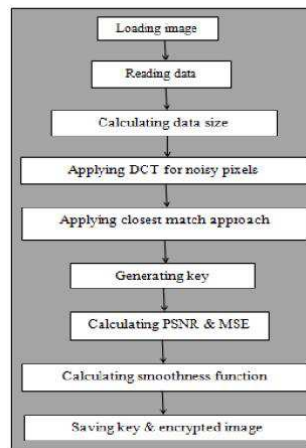
Fig 2.1 Block diagram for Encryption
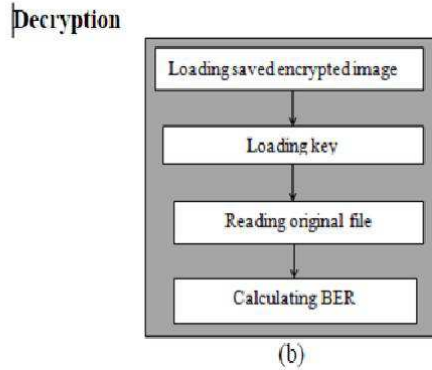
Fig 2.2 Block diagram for decryption

III. SYSTEM ANALYSIS

3.1 EXISTING SYSTEM:

In the existing system reversible data hiding technique the image is encrypted by using the without encryption key and the data to hide is embedded in to the image by using the data hiding. At the receiver side he first need to extract the image using the encrypted image in order to extract the data and after that he'll use data extraction process to extract the embedded data. It is a serial process and is not a separable process. The PSNR values of marked decrypted image are much higher than those previous method can achieve under given embedding rates. The extraction and decryption steps are independent, which are more natural and applicable

3.2 Proposed Scheme:

The proposed scheme is made up of image encryption, data embedding and data extraction/image-recovery phases. The content owner encrypts the original uncompressed image using an encryption key to produce an encrypted image. Then, the data-hider compresses the least significant bits (LSB) of the encrypted image using a data-hiding key to create a sparse space to accommodate the additional data. At the receiver side, the data embedded in the created space can be easily retrieved from the encrypted image containing additional data according to the data-hiding key. Since the data embedding only affects the LSB, a decryption with the encryption key can result in an image similar to the original version. When using both of the encryption and data-hiding keys, the embedded additional data can be successfully   extracted   and the original image can be perfectly recovered by exploiting the spatial correlation in natural image.
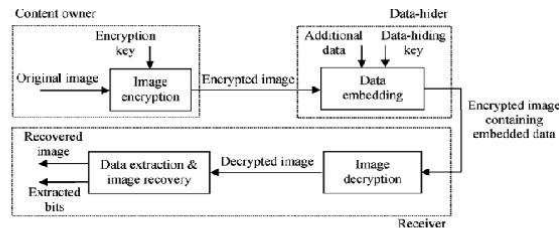
In this paper, hash based least significant bit (LSB) technique has been proposed. HLSB technique where the secret information is embedded in the LSB of the cover frame. Hash function is used to select the position of insertion in LSB bits. In this a technique has been used, mean square error (MSE).

3.3 ARCHITECTURE:
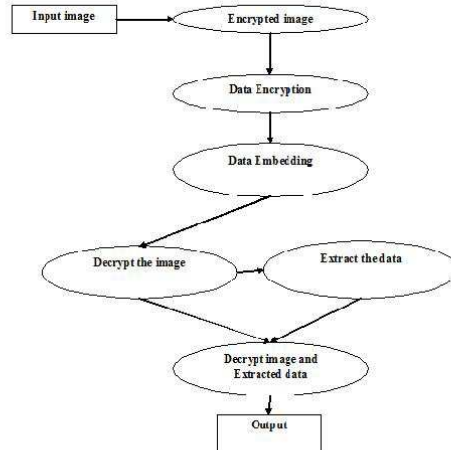
IV. SYSTEM IMPLEMENTATION

4.1 Image Encryption:

Assume each pixel with gray value of the original image is falling into [0, 255] represented by 8 bits.

1   Denote the gray value as $p_{i,j}$, where (i , j) indicates the pixel position, and bits of a pixel as $b_{i,i,0}$, $b_{i,i,1}$,..., $b_{i,i,7}$

$$b_{i,j,k} = \left\lfloor \frac{p_{i,j}}{2^k} \right\rfloor \bmod 2 \quad k=0,1,...,7 \quad \text{and} \quad p_{i,j} = \sum_{u=0}^{7} b_{i,j,k} \cdot 2^k$$

2   exclusive-or results of the original bits and pseudo-random bits $r_{i,i,k}$, determined by an encryption $B_{i,i,k}$, concatenated orderly as the encrypted data

$$B_{i,j,k} = b_{i,j,k} \oplus r_{i,j,k}$$
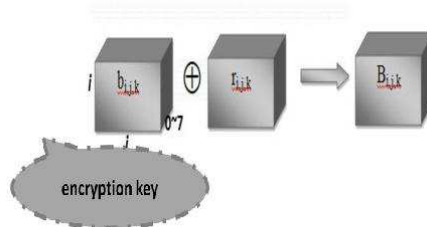
4.2 Data Encryption

Here we are implementing data encryption method for secure data transmission. In Existing Algorithm have many drawbacks like key value is limited, because here we are using DES Algorithm.

4.2.1Data Encryption Standard (DES) is also known as Data Encryption Algorithm (DEA). DEA takes 64 bits of plain text and 56 bits of key to produce 64 bits cipher text block. The DES algorithm always functions on blocks of equal size and uses the permutations and substitutions in algorithm.

4.2.2 Triple DES:

Triple DES is an extension to the DES algorithm. Triple DES uses the same approach for encryption as DES. 3DES takes three 64 bit keys which has a total length of 192 bits. We can give more than one key that is two or three keys for encryption as well as for decryption such that the security will be stronger.

4.3 Embedding Process

1. segment the encrypted image into non overlapping blocks sized by $s \times s$
   - $B_{i,j,k}$, satisfying
     - $(m-1) \cdot s + 1 \leq i \leq m \cdot s$
     - $(n-1) \cdot s + 1 \leq j \leq n \cdot s$
     - $0 \leq k \leq 7$
   - pseudo-randomly divide the s^2 pixels into two sets S_0 and S_1
     - probability that a pixel belongs to S_0 or S_1 is ½
2. check the additional bit to be embedded is 0 or 1

   - 0 , flip the 3 LSB of each encrypted pixel in S_0
   - 1 , flip the 3 encrypted LSB of pixels in S_1

$$B'_{i,j,k} = \overline{B_{i,j,k}} \quad (i,j) \in S_0, S_1 \text{ and } k = 0, 1, 2$$
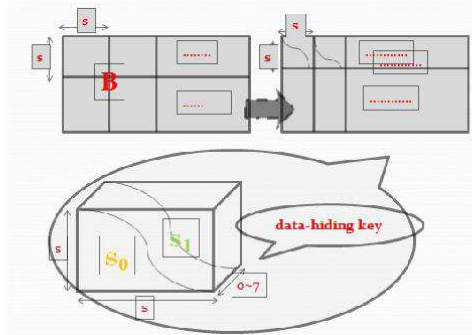
4.4 Data revealing and Image recovery

1. Generate $r_{i,j,k}$ (by encryption key)
2. Calculates the exclusive-or of the received data and $r_{i,j,k}$
   - decrpted bits as $b'_{i,j,k}$

$$b'_{i,j,k} = r_{i,j,k} \oplus B'_{i,j,k} = r_{i,j,k} \oplus \overline{B_{i,j,k}} = r_{i,j,k} \oplus \overline{b_{i,j,k} \oplus r_{i,j,k}} = \overline{b_{i,j,k}} \quad k = 0, 1, 2$$

   - the original five most significant bits (MSB) are retrieved
3. The three decrypted LSB must be different from the original LSB, in this case

   - segment the decrypted image into blocks with the data-hiding key
   - divide the pixels in each block into two sets .
4. Concatenate the extracted bits and collect the recovered blocks
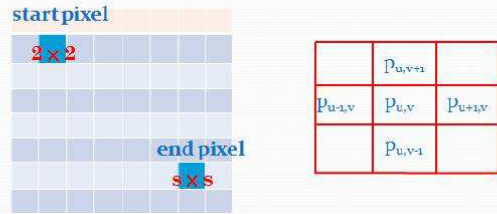
$$f = \sum_{u=2}^{s-1} \sum_{v=2}^{s-1} | p_{u,v} - \frac{p_{u-1,v} + p_{u,v-1} + p_{u+1,v} + p_{u,v+1}}{4}$$

4.4.1 The average energy of errors between the decrypted and original gray values is

- The sum of decimal values of three decrypted LSB and three original LSB must be seven.

$$E_A = \frac{1}{8} \cdot \sum_{u=0}^{7} [u - (7-u)]^2 = 21$$

4.5 Deriving PSNR and MSE value from the image

4.5.1 PEAK SIGNAL-TO-NOISE RATIO (PSNR)

The term peak signal-to-noise ratio (PSNR) is an expression for the ratio between the maximum possible value (power) of a signal and the power of distorting noise that affects the quality of its representation. Because many signals have a very wide dynamic range, (ratio between the largest and smallest possible values of a changeable quantity) the PSNR is usually expressed in terms of the logarithmic decibel scale.

4.5.1 PSNR and MSE Calculation

For the following implementation, let us assume we are dealing with a standard 2D array of data or matrix. The dimensions of the correct image matrix and the dimensions of the degraded image matrix must be identical. The mathematical representation of the PSNR is as follows:

$$PSNR = 20 \log_{10} \left(\frac{MAX_f}{\sqrt{MSE}} \right)$$

Figure 1 - Peak Signal-to-Noise Equation

where the MSE (Mean Squared Error) is:

$$MSE = \frac{1}{mn} \sum_{0}^{m-1} \sum_{0}^{n-1} \| f(i,j) - g(i,j) \|^2$$

Figure 2 - Mean Squared Error Equation

This can also be represented in a text based format as:

MSE = (1/(m*n))*sum(sum((f-g).^2))

PSNR = 20*log(max(max(f)))/((MSE)^0.5)

Legend:

f represents the matrix data of our original image

g represents the matrix data of our degraded image in question

m represents the numbers of rows of pixels of the images and i represents the index of that row

n represents the number of columns of pixels of the image and j represents the index of that column
MAX_f is the maximum signal value that exists in our original "known to be good" image

V. CONCLUSION

In this paper, a new method is proposed to map secret data to the gray-levels of the carrier image by utilising the concepts of transposition, bitxoring, bits shuffling, secret key, and cryptography with high imperceptibility and security. An average PSNR of 58dB, RMSE with 0.6673, and NCC with 0.9917 is achieved using the proposed method which are better than the existing method in the literature with PSNR=40, MSE=0.8115. The proposed method improved the security as well as the quality of stego images and provided promising results in terms of high PSNR, and less histogram changeability as compared to existing methods. The distinguishing properties of the proposed algorithm include transposition, bitxoring, and bits shuffling, adding multiple security levels to the proposed method. These different security levels create multiple barriers in the way of an attacker. Therefore, it is difficult for a malicious user to extract the actual secret data.

VI. FUTURE ENHANCEMENT

The main objective of this study is to provide an overall idea about the popular as well as emerging data hiding techniques in spatial and transform domains. This study deals with both reversible and non-reversible data hiding methods. Also, this study briefly discusses some common steganalytic techniques and concludes with an idea of the future scope of Secure data transmission. The wide range of these techniques will provide a good overview about current trends in transform domain steganography to the researchers who are interested in steganography.

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Content Based Image Retrieval Based on Color and Texture Features

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ABSTRACT: In this paper, the algorithm for a novel image retrieval scheme to retrieve images is presented. We address the unique algorithm to extract the colour pixel features by the HSV colour space and the texture features of Mpeg-7 Edge Histogram Descriptor .The proposed scheme transfers each image to a quantized colour code using the regulations of the properties in compliance with HSV model and subsequently using the quantized colour code along with the texture feature of Edge Histogram Descriptor to compare the images of database. We succeed in transferring the image retrieval problem to quantized code comparison. Experimenting on two public datasets, the results show that the proposed methods can achieve up to 43.5% relative improvement in MAP compared to the existing methods. We will use lab feature extraction for to detect the color and to identify the texture using multi dimensional texture analysis then the edge orientation histogram is used for shape detection. We propose two orthogonal methods named attribute-enhanced sparse coding and attribute-embedded inverted indexing. Attribute-enhanced sparse coding exploits the global structure of feature space and uses several important human attributes combined with low-level features to construct semantic code words in the offline stage.

I. INTERODUCTION

MANY former schemes have been developed to improve the retrieval accuracy in the content-based image retrieval (CBIR) system. One type of them is to employ image features derived from the compressed data stream. As opposite to the classical approach that extracts an image descriptor from the original image, this retrieval scheme directly generates image features from the compressed stream without first performing the decoding process. This type of retrieval aims to reduce the time computation for feature extraction/generation since most of the multimedia images are already converted to compressed domain before they are recorded in any storage devices. In the image features are directly con-structed from the typical block truncation coding (BTC) or halftoning-based BTC compressed data stream without performing the decoding procedure. These image retrieval schemes involve two phases, indexing and searching, to retrieve a set of similar images from the database. The indexing phase extracts the image features from all of the images in the database which is later stored in database as feature vector. In the searching phase, the retrieval system derives the image features from an image submitted by a user (as query image), which are later utilized for performing similarity matching on the feature vectors stored in the data-base. The image retrieval system finally returns a set of images to the user with a specific similarity criterion, such as color similarity and texture similarity. The concept of the BTC [1] is to look for a simple set of representative vectors to replace the original images.

Specifically, the BTC compresses an image into a new domain by dividing the original image into multiple non overlapped image blocks, and each block is then represented with two extreme quantizers (i.e., high and low mean values) and bitmap image. Two subimages constructed by the two quantizers and the corresponding bitmap image are produced at the end of BTC encoding stage, which are later transmitted into the decoder module through the transmitter. To generate the bitmap image, the BTC scheme performs thresholding opera-tion using the mean value of eachimage block such that a pixel value greater than the mean value is regarded as 1 (white pixel) and vice versa. The traditional BTC method does not improve the image quality or compression ratio compared with JPEG or JPEG 2000. However, the BTC schemes achieves much lower computational complexity compared with that of these techniques. Some attempts have been addressed to improve the BTC reconstructed image quality and compression ratio, and also to reduce the time computation.

II. LITERATURE SURVAY

EFFICIENT FACE IMAGE RETRIEVAL THROUGH DCT FEATURES

This paper proposes a new simple method of DCT feature extraction that utilize to accelerate the speed and decrease storage needed in image retrieving process by the aim of direct content access and extraction from JPEG compressed domain. Our method extracts the average of some DCT block coefficients. This method needs only a vector of six coefficients per block over the whole image blocks In our retrieval system, for simplicity, an image of both query and database are normalized and resized from the original database based on the cantered position of the eyes, the normalized image equally divided into non overlapping 8X8 block pixel Therefore, each of which are associated with a feature vector derived directly from discrete cosine transform DCT. Users can select any query as the main theme of the query image. The retrieval images is the relevance between a query image and any database image, the relevance similarity is ranked according to the closest similar measures computed by the Euclidean distance. The experimental results show that our approach is easy to identify main objects and reduce the influence of background in the image, and thus improve the performance of image retrieval. A **discrete cosine transform** (**DCT**) expresses a finite sequence of data points in terms of a sum of cosine functions oscillating at different frequencies. The use of cosine rather than sine functions is critical in these applications: for compression, it turns out that cosine functions are much more efficient (as described below, fewer functions are needed to approximate a typical signal), whereas for differential equations the cosines express a particular choice of boundary conditions. In particular, a DCT is a Fourier-related transform similar to the discrete Fourier transform (DFT), but using only real numbers. DCTs are equivalent to DFTs of roughly twice the length, operating on real data with even symmetry (since the Fourier transform of a real and even function is real and even), where in some variants the input and/or output data are shifted by half a sample. There are eight standard DCT variants, of which four are common. The most common variant of discrete cosine transform is the type-II DCT, which is often called simply "the DCT",[1][2] its inverse, the type-III DCT, is correspondingly often called simply "the inverse DCT" or "the IDCT". Two related transforms are the discrete sine transforms (DST), which is equivalent to a DFT of real and odd functions, and the modified discrete cosines transform (MDCT), which is based on a DCT of overlapping data.

JPEG: Discrete cosine transform

The DCT is used in JPEG image compression, MJPEG, MPEG, DV, Daala, and Theora video compression. There, the two-dimensional DCT-II of $N \times N$ blocks is computed and the results are quantized and entropy coded. In this case, N are typically 8 and the DCT-II formula is applied to each row and column of the block. The result is an 8×8 transform coefficient array in which the $(0, 0)$ element (top-left) is the DC (zero-frequency) component and entries with increasing vertical and horizontal index values represent higher vertical and horizontal spatial frequencies.

Content based image retrieval (CBIR)

This paper proposed to Content based image retrieval (CBIR) is a hot topic research in the last decade. A number of image features based on color, texture, and shape attributes in various domains have been reported in the literature.
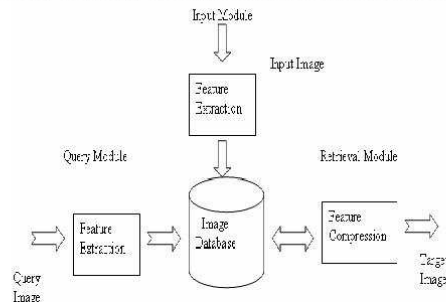
CBIR system can be classified as two phases: indexing and searching. In the indexing phase, each image of the database is represented by a set of attribute features color, texture and shape. In searching phase, when the user selects a query image, a query vector feature is computed. Using similarity distance measure well know Euclidian distance, the query vector compared to the feature vectors in the feature database and retrieve to the user the images that most close or similar to the query image. In the input module, the feature vector is extracted from input image. It is then stored along with its input image in the image database. On the other hand, when a query image enters the query module, it extracts the feature vector of the query image. In the retrieval module, the extracted feature vector is

compared to the feature vectors stored in the image database. As a result of query, the similar images are retrieved according to their closest matching scores. Finally, the target image will be obtained from the retrieved images.

III. SYSTEM ANALYSIS

3.1 EXISTING SYSTEM
A large portion of photos shared by users on the Internet are various images. Some of these images are tagged with names, but many of them are not tagged properly. Existing systems ignore strong, content-specific geometric constraints among different visual words in a image. In this method cannot retrieve the large scale content based image. The reason of choosing the extreme values to represent an image block is to generate a dithered result (bit pattern illusion) to reduce the annoying blocking effect or false contour inherently existing in BTC images. These features are typically high dimensional and global, thus not suitable for quantization and inverted indexing. In other words, using such global features in a retrieval system requires essentially a linear scan of the whole database in order to process a query, which is prohibitive for a web scale image database.

3.2 PROPOSED SYSTEM
The proposed image retrieval system extracts the image features from all images in the database using the proposed CHF and BHF EDBTC features. The proposed method outperforms the former existing CBIR methods under Corel 1000 and Corel 10 000 databases. We propose the EDBTC exploits the dithering property of the error diffusion to overcome the false contour problem normally occurred in BTC compression. We conducted an extensive set of experiments, in which encouraging results were obtained. Attribute-embedded inverted indexing locally considers image content of the designated query image in a binary signature and provides efficient retrieval in the online stage. There are two features employed in the proposed method to characterize the image content, namely, CHF and bit histogram feature.

3.3 ARCHITECTURE:
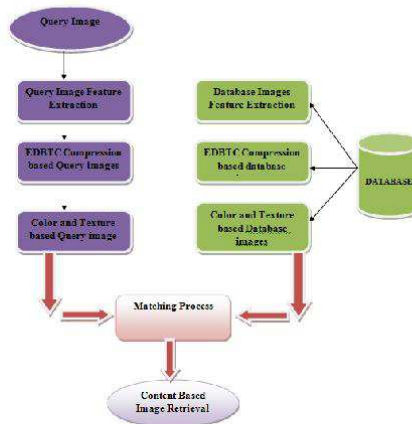
IV. SYSTEM IMPLEMENTATION

4.1. QUERY IMAGE SEARCH:
To select the query image from the data base. In that query image, no need to consider that image format and size. It will be help to support all type of image format. Finally that query image find out the extract result given it.

4. 2. EDBTC COMPRESSION BASED SEARCH:
This section presents a review of the EDBTC with its extension to color image compression. The EDBTC com-presses an image in an effective way by incorporating the error diffusion kernel to generate a bitmap image. Simultaneously, it produces two extreme quantizers, namely, minimum and maximum quantizers. The EDBTC scheme offers a great advantage in its low computational complexity in the bitmap image and two extreme quantizers generation. In addition, EDBTC scheme produces better image quality compared with the classical BTC approaches.

The detail explanation and com-parison between EDBTC and BTC-based image compression can be found. BTC and EDBTC have the same characteristic in which the bitmap image and the two extreme values are produced at the end of the encoding stage. In BTC scheme, the two quantizers and its image bitmap are produced by computing the first moment, second moment, and variance value causing a high computational burden.
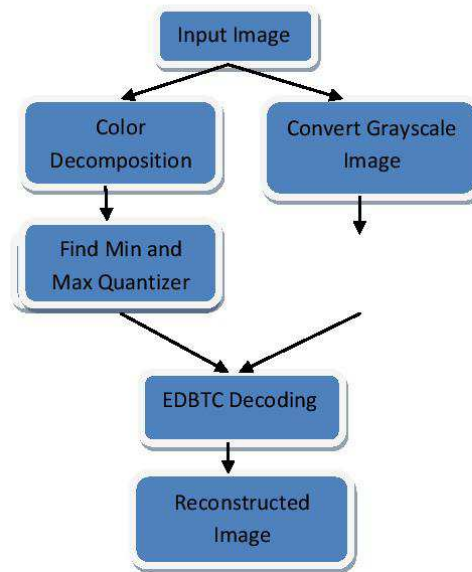
4.3. COLOR BASED IMAGE SEARCH

Several methods for retrieving images on the basis of color similarity have been described in the literature, but most are variations on the same basic idea. Each image added to the collection is analyzed to compute a color histogram which shows the proportion of pixels of each color within the image. The color histogram for each image is then stored in the database. At search time, the user can either specify the desired proportion of each color (75% olive green and 25% red, for example), or submit an example image from which a color histogram is calculated. Either way, the matching process then retrieves those images whose color histograms match those of the query most closely

- ➢ Problems with color variances
  - ● Surface Orientation
  - ● Camera Viewpoint
  - ● Position of Illumination
  - ● Intensity of the Light]
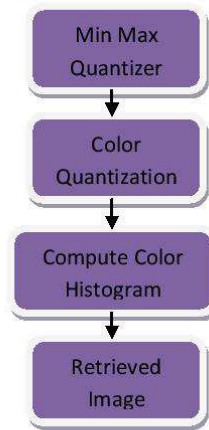
4.4 COLOR HISTOGRAMS

The color histograms are used to represent the color distribution in an image. Mainly, the color histogram approach counts the number of occurrences of each unique color on a sample image. Since an image is composed of pixels and each pixel has a color, the color histogram of an image can be computed easily by visiting every pixel once. By examining the color histogram of an image, the colors existing on the image can be identified with their corresponding areas as the number of pixels. Histogram search characterizes an image by its color distribution, or histogram. Many histogram distances have been used to define the similarity of two color histogram representations.

4.5 TEXTURE BASED IMAGE SEARCH

The ability to retrieve images on the basis of texture similarity may not seem very useful. But the ability to match on texture similarity can often be useful in distinguishing between areas of images with similar color (such as sky and sea, or leaves and grass). A variety of techniques has been used for measuring texture similarity; the best-established rely on comparing values of what are known as second order statistics calculated from query and stored images. Essentially, these calculate the relative brightness of selected pairs of pixels from each image. From these it is possible to calculate measures of image texture such as the degree of contrast, coarseness, directionality and regularity, or periodicity, directionality and randomness.

4.6 SHAPE BASED RETRIEVAL

The ability to retrieve by shape is perhaps the most obvious requirement at the primitive level. Unlike texture, shape is a fairly well-defined concept – and there is considerable evidence that natural objects are primarily recognized by their shape. A number of features characteristic of object shape (but independent of size or orientation) are computed for every object identified within each stored image. Queries are then answered by computing the same set of features for the query image, and retrieving those stored images whose features most closely match those of the query. Two main types of shape feature are commonly used – global features such as aspect ratio, circularity and moment invariants and local features such as sets of consecutive boundary segments. Alternative methods proposed for shape matching have included elastic deformation of templates, comparison of directional histograms of edges extracted from the image, and shocks, skeletal representations of object shape that can be compared using graph matching techniques. Queries to shape retrieval systems are formulated either by identifying an example image to act as the query, or as a user-drawn sketch.

Shape matching of three-dimensional objects is a more challenging task – particularly where only a single 2-D view of the object in question is available. While no general solution to this problem is possible, some useful inroads have been made into the problem of identifying at least some instances of a given object from different viewpoints. One approach has been to build up a set of plausible 3-D models from the available 2-D image, and match them with other models in the database. Another is to generate a series of alternative 2-D views of each database object, each of which is matched with the query image. Related research issues in this area include defining 3-D shape similarity measures, and providing a means for users to formulate 3-D shape queries.

V. CONCLUSION

In this paper, a CBIR method has been proposed which uses the combination of dominant color, GLCM texture and canny edge detection for shape. A total of 39 features covering color, texture and shape proved that the proposed method yielded higher average precision and average recall. In addition the proposed method almost always showed performance gain of average retrieval time over the other methods. As further studies, the proposed retrieval method is to be evaluated for more various databases.

VI. FUTURE WORK

Database for image retrieval generally contains high dimensional and contiguous value data. Finding an index structure which allows efficient searching of an image database is still a problem under research. Index structures for text retrieval are not useful for image retrieval application. Thus we need to come up with an efficient indexing scheme to yield fast search of image database.

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P. Rasukkanu, Assistant Professor of Computer Science	International Journal of Innovative Research in Computer and Communication Engineering	Object based Segmentation using KFCM Technique for Shadow Detection and Removal from Satellite Image	International	2320-9801 Volume 9, Issue 3	March 2021	http://ijircce.com/admin/main/storage/app/pdf/7jRug5iGtq7BCdUj8pUALp5Oxk2BsAyxiC4ZOZXe.pdf

Object based Segmentation using KFCM Technique for Shadow Detection and Removal from Satellite Image

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ABSTRACT: Remote sensing image segmentation is the basis of image pattern recognition. It is significant for the application and analysis of remote sensing images. Clustering analysis as a non-supervised learning method is widely used in the segmentation of remote sensing images. It has made good results in the segmentation of low-resolution and moderate-resolution remote sensing images. As the improvement of image resolution, however, they have problems in the segmentation of high-resolution remote sensing images. In this paper we propose a KFCM based high-resolution remote sensing image segmentation algorithm. Furthermore, some dark objects which could be mistaken for shadows are ruled out according to object properties and spatial relationship between objects. For shadow removal, inner–outer outline profile line (IOOPL) matching is used. First, the IOOPLs are obtained with respect to the boundary lines of shadows. Shadow removal is then performed according to the homogeneous sections attained through IOOPL similarity matching. Experiments show that the new method can accurately detect shadows from urban high-resolution remote sensing images and can effectively restore shadows with a rate of over 85% .The segmentation experiments show that the result of this algorithm is better than the existing methods and is close to the results of artificial extraction.

I. INTRODUCTION

1.1 INTRODUCTION TO REMOTE SENSING

Remote sensing is the acquisition of information about an object or phenomenon without making physical contact with the object and thus in contrast to in situ observation. In modern usage, the term generally refers to the use of aerial sensor technologies to detect and classify objects on Earth (both on the surface, and in the atmosphere and oceans) by means of propagated signals (e.g. electromagnetic radiation). It may be split into active remote sensing (when a signal is first emitted from aircraft or satellites) or passive (e.g. sunlight) when information is merely recorded. Passive sensors gather natural radiation that is emitted or reflected by the object or surrounding areas. Reflected sunlight is the most common source of radiation measured by passive sensors. Examples of passive remote sensors include film photography, infrared, charge-coupled devices, and radiometers. Active collection, on the other hand, emits energy in order to scan objects and areas whereupon a sensor then detects and measures the radiation that is reflected or backscattered from the target. RADAR and LiDAR are examples of active remote sensing where the time delay between emission and return is measured, establishing the location, speed and direction of an object.

Illustration of Remote Sensing

Remote sensing makes it possible to collect data on dangerous or inaccessible areas. Remote sensing applications include monitoring deforestation in areas such as the Amazon Basin, glacial features in Arctic and Antarctic regions, and depth sounding of coastal and ocean depths. Military collection during the Cold War made use of stand-off collection of data about dangerous border areas. Remote sensing also replaces costly and slow data collection on the ground, ensuring in the process that areas or objects are not disturbed.

Orbital platforms collect and transmit data from different parts of the electromagnetic spectrum, which in conjunction with larger scale aerial or ground-based sensing and analysis, provides researchers with enough information to monitor trends such as El Niño and other natural long and short term phenomena. Other uses include different areas of the earth sciences such as natural resource management, agricultural fields such as land usage and conservation, and national security and overhead, ground-based and stand-off collection on border areas.

Data acquisition techniques

The basis for multispectral collection and analysis is that of examined areas or objects that reflect or emit radiation that stand out from surrounding areas. For a summary of major remote sensing satellite systems see the overview table.

Applications of remote sensing data

Conventional radar is mostly associated with aerial traffic control, early warning, and certain large scale meteorological data. Doppler radar is used by local law enforcements' monitoring of speed limits and in enhanced meteorological collection such as wind speed and direction within weather systems in addition to precipitation location and intensity. Other types of active collection include plasmas in the ionosphere. Interferon metric synthetic aperture radar is used to produce precise digital elevation models of large scale terrain (See RADARSAT, TerraSAR-X, and Magellan).

II. LITERATURE SURVEY

2.1 Topographic correction (also called terrain correction)

In rugged mountains, as a result of terrain, the effective illumination of pixels varies considerably. In a remote sensing image, the pixel on the shady slope receives weak illumination and has a low radiance value, in contrast, the pixel on the sunny slope receives strong illumination and has a high radiance value. For the same object, the pixel radiance value on the shady slope will be different from that on the sunny slope. Additionally, different objects may have similar radiance values. These ambiguities seriously affected remote sensing image information extraction accuracy in mountainous areas. It became the main obstacle to further application of remote sensing images. The purpose of topographic correction is to eliminate this effect, recovering the true reflectivity or radiance of objects in horizontal conditions. It is the premise of quantitative remote sensing application.

2.2 Atmospheric correction

Elimination of atmospheric haze by rescaling each frequency band so that its minimum value (usually realised in water bodies) corresponds to a pixel value of 0. The digitizing of data also makes it possible to manipulate the data by changing gray-scale values.

Interpretation is the critical process of making sense of the data. The first application was that of aerial photographic collection which used the following process; spatial measurement through the use of a light table in both conventional single or stereographic coverage, added skills such as the use of photogrammetry, the use of photomosaics, repeat coverage, Making use of objects' known dimensions in order to detect modifications. Image Analysis is the recently developed automated computer-aided application which is in increasing use.

Object-Based Image Analysis (OBIA) is a sub-discipline of GIScience devoted to partitioning remote sensing (RS) imagery into meaningful image-objects, and assessing their characteristics through spatial, spectral and temporal scale.

Old data from remote sensing is often valuable because it may provide the only long-term data for a large extent of geography. At the same time, the data is often complex to interpret, and bulky to store. Modern systems tend to store the data digitally, often with lossless compression. The difficulty with this approach is that the data is fragile, the format may be archaic, and the data may be easy to falsify. One of the best systems for archiving data series is as computer-generated machine-readable ultrafiche, usually in typefonts such as OCR-B, or as digitized half-tone images. Ultrafiches survive well in standard libraries, with lifetimes of several centuries. They can be created, copied, filed and retrieved by automated systems. They are about as compact as archival magnetic media, and yet can be read by human beings with minimal, standardized equipment.

III. SYSTEM DESCRIPTION

3.1 EXISTING SYSTEM

Due to the shortcomings of pixel-level shadow detection, in this study, we propose a new technique: an object-oriented shadow detection and removal method. First, the shadow features are evaluated through image segmentation, and suspected shadows are detected with the threshold method. Second, object properties such as spectral features and geometric features are combined with a spatial relationship in which the false shadows are ruled out (i.e., water region). This will allow only the real shadows to be detected in subsequent steps. Shadow removal employs a series of steps. We extract the inner and outer outline lines of the boundary of shadows. The grayscale values of the corresponding points on the inner and outer outline lines are indicated by the inner−outer outline profile lines (IOOPLs). Homogeneous sections are obtained through IOOPL sectional matching. Finally, using the homogeneous sections, the relative radiation calibration parameters between the shadow and nonshadow regions are obtained, and shadow removal is performed.

3.2 PROPOSED SYSTEM

Images with higher resolution contain richer spatial information. The spectral differences of neighboring pixels within an object increase gradually. Pixel-based methods may pay too much attention to the details of an object when processing highresolution images, making it difficult to obtain overall structural information about the object. In order to use spatial information to detect shadows, image segmentation is needed. A segmentation-based shadow detector is proposed that utilises a Kernel Fuzzy C-Means Clustering algorithm with parameters that are robust against dynamic range variances seen in multitemporal imagery. The shadow removal method based on IOOPL matching can effectively restore the information in a shadow area. The homogeneous sections obtained by IOOPL matching can show the radiation gray scale of the same object in a shadow area and a nonshadow area. The parameters calculated by using the radiation difference between inner and outer homogeneous sections can retrieve a shadow very effectively.

IV. SYSTEM IMPLEMENTATION

4.1 Image segmentation using KFCM

Images with higher resolution contain richer spatial information. The spectral differences of neighboring pixels within an object increase gradually. Pixel-based methods may pay too much attention to the details of an object when processing highresolution images, making it difficult to obtain overall structural information about the object. In order to use spatial information to detect shadows, image segmentation is needed. Traditional image segmentation methods are likely to result in insufficient segmentation, which makes it difficult to separate shadows from dark objects. The KFCM constraints can improve the situation to a certain degree. To make a further distinction between shadows and dark objects, color factor and shape factor have been added to the segmentation criteria. The parameters of each object have been recorded, including grayscale average, variance, area, and perimeter. The segmentation scale could be set empirically for better and less time-consuming results, or it could be adaptively estimated according to data such as resolution. The algorithm is obtained by modifying the main function in the primitive fuzzy c-means algorithm using a kernel. Experimental results show that the proposed algorithm is more prone to noise than the conventional fuzzy image segmentation algorithms. KFCM confines the prototypes in the kernel space that are actually mapped from the original data space. The different types of image pixels with different information are combined in the kernel space are combined using different kernel functions Here $1 - k(x_j, o_i)$ can be considered as a direct measure for measuring the distance between the kernel space .

4.2 Shadow detection

Shadows are created because the light source has been blocked by something. There are two types of shadows: the self-shadow and the cast shadow. A self-shadow is the shadow on a subject on the side that is not directly facing the light source. A cast shadow is the shadow of a subject falling on the surface of another subject because the former subject has blocked the light source. A cast shadow consists of two parts: the umbra and the penumbra. The umbra is created because the direct light has been completely blocked, while the penumbra is created by something partly blocking the direct light. In this paper, we mainly focus on the shadows in the cast shadow area of the remote sensing images. For shadow detection, a properly set threshold can separate shadow from nonshadow without too many pixels being misclassified. Researchers have used several different methods to find the threshold to accurately separate shadow and nonshadow areas. Bimodal histogram splitting provides a feasible way to find the threshold for shadow detection, and the mean of the two peaks is adopted as the threshold. In our work, we attain the threshold according to the histogram of the original image and then find the suspected shadow objects by comparing the threshold and grayscale average of each object obtained in segmentation.
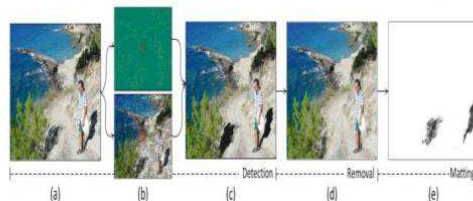

Fig. 1: From left to right: Original image (a). Our framework first detects shadows (c) using the learned features along the boundaries (top image in (b)) and the regions (bottom image in (b)). It then extracts the shadow matte (e) and removes it to produce a shadow free image (d).

4.3 Inner and outer outlines generation

To recover the shadow areas in an image, we use a shadow removal method based on IOOPL matching. There is a large probability that both shadow and nonshadow areas in close range on both sides of the shadow boundary belong to the same type of object. The inner and outer outlines can be obtained by contacting the shadow boundary inward and expanding it outward, respectively. Then, the inner and outer outline profile lines are generated along the inner and outer outline lines to determine the radiation features of the same type of object on both sides. R is the vector line of the shadow boundary obtained from shadow detection, $R1$ is the outer outline in the nonshadow area after expanding R outward, and $R2$ is the inner outline in the shadow area after contracting R inward.
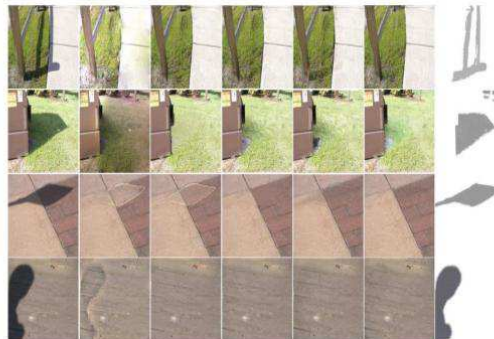
Fig: Comparison with Automatic/Semi-Automatic Methods: Recovered shadow-less images are compared with the state-of-the-art shadow removal methods which are either automatic [13, 23] or require minimal user input [21, 35]. We compare our work with:

The Gaussian smoothing template parameters were $\sigma = 2$ and $n = 11$. To rule out the nonhomogeneous sections, the IOOPL is divided into average sections with the same standard, and then, the similarity of each line pair is calculated section by section. If the correlation coefficient is large, it means that the shade and light fluctuation features of the IOOPL line pair at this section are consistent. If consistent, then this line pair belongs to the same type of object, with different illuminations, and thus is considered to be matching. If the correlation coefficient is small, then some abnormal parts representing some different types of objects exist in this section; therefore, these parts should be ruled out. The sections that have failed the matching are indicated in red. If more accurate matching is needed, the two sections adjacent to the section with the smallest correlation coefficient can be segmented for matching again.

4.4 Shadow removal

Shadows are removed by using the homogeneous sections obtained by line pair matching. There are two approaches for shadow removal. One approach calculates the radiation parameter according to the homogeneous points of each object and then applies the relative radiation correction to each object. The other approach collects and analyzes all the homogeneous sections for polynomial fitting (PF) and retrieves all shadows directly with the obtained fitting parameters. *1) Relative Radiometric Correction:* In the same urban image, if objects in a shadow area and a nonshadow area belong roughly to the same category, and they are in different lighting conditions, relative radiation correction can be used for shadow removal. To avoid the influence of scattering light from the environment, each single object has been taken as a unit for which the shadow removal process is conducted for that object.

Fig. 8: Shadow Removal Steps: (from *left* to *right*) (i) An original image with shadow. (ii) An initial estimate of the shadow-less image using a multi-level color transfer strategy. (iii) Improved estimate along the boundaries using in-painting. (iv, v and vi) The Bayesian formulation is optimized to solve for α (iv) and β matte (vi) and the final shadow-less image (v).

This enhances reliability. *2) PF:* As mentioned previously, in high-resolution remote sensing images, the inner and outer homologous points represent the grayscale level of the same type of object of both sides of the shadow boundary in shadow and under normal illumination. It has been found by Lorenzi *et al.* that shadows and the corresponding nonshadows exhibit a linear relationship. After transforming the gray scale of the shadow area through $f(x)$, the shadow removal result can be obtained. It is not appropriate to perform PF at greater than the third degree. One reason is to avoid the overly complex calculation; the other reason is that higher fitting to degrees greater than three does not significantly improve accuracy. The next step assumes that the illumination model of the entire image is consistent. To ensure that enough statistical subjects are obtained, the grayscale values of all matching points on the inner and outer outline lines of all shadows in the entire image are determined. These provide the fitting parameters for shadow removal. This method has solved the problem of not being able to obtain the inner and outer outlines of the minor shadows and the lack of availability of enough IOOPL matching points.

V. CONCLUSION AND FUTURE WORK

5.1 CONCLUSION

In this paper, accuracy assessment is an integral part in an image classification procedure. In case of noise, the input image undergoes pre-processing before the segmentation process. The output of the segmentation is the best image out of the three images obtained y KFCM. We have put forward a systematic and effective method for shadow detection and removal in a single urban high-resolution remote sensing image. In order to get a shadow detection result, image segmentation considering shadows is applied first. Then, suspected shadows are selected through spectral features and spatial information of objects, and false shadows are ruled out. The subsequent shadow detection experiments compared traditional image segmentation and the segmentation considering shadows, as well as results from traditional pixel-level threshold detection and object-oriented detection. Meanwhile, they also show the effects of different steps with the proposed method. For shadow removal, after the homogeneous sections have been obtained by IOOPL matching, we put forward two strategies: relative radiation correction for the objects one at a time, and removal of all shadows directly after PF is applied to all the homogeneous sections and correction parameters are obtained. Both strategies were implemented in high-resolution images, and their performances were compared in experiments.

5.2 FUTURE WORK

Future research will focus on swarm based feature selection with segmentation to improve the shadow removal process.

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P. Rasukkanu, Assistant Professor of Computer Science	International Journal of Innovative Research in Computer and Communication Engineering	Detection of Lung Cancer with Digital Image Processing Over CT Scan Images	International	2320-9801 Volume 9, Issue 3	March 2021	http://ijircce.com/admin/main/storage/app/pdf/1cn4wpK59eBRDUTQuIyyFtSLP6MmVCGskuwmGVpq.pdf

Deduction of Lung Cancer with Digital Image Processing Over CT Scan Images

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ABSTRACT: This study aims to highlight the significance of data analytics and machine learning in prognosis in health sciences, particularly in detecting life threatening and terminal diseases like cancer. Here, we consider lung cancer for our study. For this purpose, preexisting lung cancer patients' data are collected to get the desired results. A predictive algorithm is developed to predict the probability of a patient catching lung cancer based on dataset comes from the Data Science Bowl 2017. Data set (in the form of diagnostic images) is run past Matlab for analysis and forecasting. Image processing is employed for this purpose. Medical image segmentation and classification are done to achieve this. Classification depends on features extracted from the images. The emphasis is on the feature extraction stage to yield better classification performance. Image quality and accuracy is the core factors of this research, image quality assessment as well as improvement are depending on the enhancement stage where low pre-processing techniques is used based on Gabor filter within Gaussian rules. Following the segmentation principles, an enhanced region of the object of interest that is used as a basic foundation of feature extraction is obtained. This information is then fed to machine learning algorithms to discern a pattern that can give some good insights into what combination of features are most likely to result in an abnormality.

I. INTRODUCTION

Lung cancer is a disease of abnormal cells multiplying and growing into a tumour. Cancer cells can be carried away from the lungs in blood, or lymph fluid that surrounds lung tissue. Lymph flows through lymphatic vessels, which drain into lymph nodes located in the lungs and in the centre of the chest. Lung cancer often spreads toward the centre of the chest because the natural flow of lymph out of the lungs is toward the centre of the chest. Metastasis occurs when a cancer cell leaves the site where it began and moves into a lymph node or to another part of the body through the blood stream [1].

Cancer that starts in the lung is called primary lung cancer. There are several different types of lung cancer, and these are divided into two main groups: Small cell lung cancer and non-small cell lung cancer which has three subtypes: Carcinoma, Adenocarcinoma and Squamous cell carcinomas. The rank order of cancers for both males and females among Jordanians in 2008 indicated that there were 356 cases of lung cancer accounting for (7.7 %) of all newly diagnosed cancer cases in 2008. Lung cancer affected 297 (13.1 %) males and 59 (2.5%) females with a male to female ratio of 5:1 which Lung cancer ranked second among males and 10th among females [2]. Figure 1 shows a general description of lung cancer detection system that contains four basic stages.

The first stage starts with taking a collection of CT images (normal and abnormal) from the available Database from IMBA Home (VIA-ELCAP Public Access) [3]. The second stage applies several techniques of image enhancement, to get best level of quality and clearness. The third stage applies image segmentation algorithms which play an effective rule in image processing stages, and the fourth stage obtains the general features from enhanced segmented image which gives indicators of normality or abnormality of images.

Lung cancer is the most dangerous and widespread cancer in the world according to stage of discovery of the cancer cells in the lungs, so the process early detection of the disease plays a very important and essential role to avoid serious advanced stages to reduce its percentage of distribution. The aim of this research was to detect features for accurate images comparison as pixels percentage and mask-labelling.

II. LITERATURE SURVEY

AUTOMATED METHOD BASED ON SPATIO-TEMPORAL WATERSHED CUTS

We propose a new automated and fast procedure to segment the left ventricular myocardium in 4D MRI sequences. Both quantitative and qualitative evaluations are provided. We demonstrate the accuracy of the proposed method. Here we used discrete mathematical morphology. The time efficiency is high. The accuracy of the automated method compared to manual segmentations performed by two cardiologists; the ability of the method to compute reliable characteristics of the LV (ejection fraction and left ventricular mass); the temporal continuity of the resulting automated segmentation; the time-efficiency (about 3' to segment a sequence of 25 3D-images on a low-end computer) of the proposed method; and the robustness of the few parameters whose setting rely mostly on physical and anatomical facts. MR images of the LV, together with three associated segmentations: two handmade segmentations – each one of them performed by an independent and blinded expert cardiologist and one 4D automated segmentation obtained by the proposed method. The first objective of this paper is to show that mathematical morphology offers interesting alternatives to these approaches in the important and difficult task of designing cardiac segmentation methods that can be used in clinical routine. We introduced the watershed cuts, a notion of watershed in edge-weighted graphs which is optimal in a sense equivalent to minimum spanning trees. This paper presents the first application of this new paradigm. Furthermore, this paper introduces the watershed-cuts in 4-dimensional spaces (3D+time). Our second objective is to show the ability of this operator to take into account both the spatial and temporal gradient of the images and therefore its ability to produce segmentations that are spatially as well as temporally consistent. The proposed method is evaluated on cine-MR image following by this sequence

Since it is independent of any high-level model, the proposed method can be used to fairly assess model-based segmentation schemes by comparing their results with our non-model based segmentation, hence, discarding bias due to the choice of different models. Furthermore, the proposed method can be used to register generic physiological models of the heart to real patient specific cardiac images. In general, it is indeed easier to register a model to a binary segmentation than directly to images. So we introduce in this paper a new watershed framework which allows for segmenting spatio temporal images that we apply to medical image analysis. Specifically, we propose a new automated and fast procedure to segment the left ventricular myocardium in 4D (3D+t) cine-MRI sequences. The successive segmentations obtained over the time take into account spatio-temporal properties of the images. Thanks to the comparison with manual segmentation performed by two cardiologists, we demonstrate the accuracy of the proposed method and the relevance of the ejection fraction and myocardium mass derived from the automated segmentations. Therefore, this automated method can be used in clinical routine. The proposed scheme does not permit the direct derivation of deformation parameters. Such deformation parameters can be obtained thanks to a model of the heart movement, and such a heart model needs the obtained segmentations as control points. Future work will aim at computing deformation fields whose accuracy will be improved by registration with other modalities such as delayed enhanced MRI and CT scan.

III. SYSTEM ANALYSIS

3.1 PROBLEM IDENTIFICATION

In the scheme does not permit the direct derivation of deformation parameters. Detection accuracy is low. This particularly complex segmentation task, prior knowledge is required. Major challenges linked to this segmentation task. Image processing and pattern recognition problems are occurring. The LBP method has proved to outperform many existing methods, including the linear discriminate analysis and the principal component analysis. The system presented not only enables classification of whole images but also presents a better performance for sub images when compared with some of the existing systems.
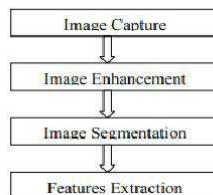

Figure 1. Lung cancer image processing stages

3.2 EXISTING SYSTEM

This paper presents techniques that are required to achieve an automatic classification system to diagnosis the presence of the acute Lung cancer from CT scan images. This is important because segmentation of nucleus is much easier than the segmentation of the entire cell, especially in the bone marrow where the white blood cell density is very high. In the experiments, a set of manually segmented images of the nucleus are used to decouple segmentation errors.
A microscopic blood image of size 184×138 is considered for evaluation.

3.3 PROPOSED SYSTEM

The proposed technique has been applied on peripheral lung smear images obtained from two places, as aforementioned. The presented system performs automated processing, including color correlation, segmentation of the affected cells, and effective validation and classification. A feature set exploiting the shape, color, and texture parameters of a CD images are constructed to obtain all the information required to perform efficient classification. The impact of the LBP operator on the HD proved to be a promising feature for this analysis. Furthermore, a color feature called cell energy was introduced, and results show that this feature presents a good demarcation between cancer and non cancer cells.

3.4 ARCHITECTURE
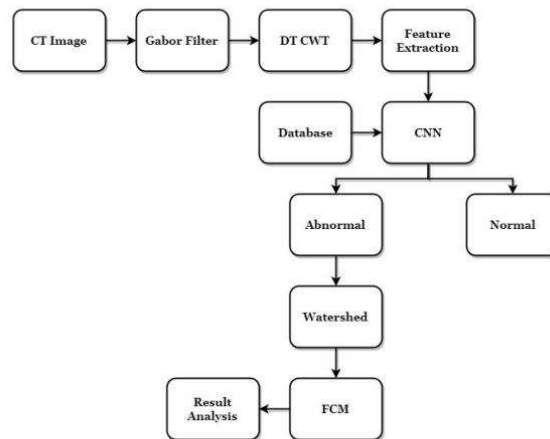
IV. SYSTEM IMPLEMENTATION

Image Enhancement The image Pre-processing stage starts with image enhancement; the aim of image enhancement is to improve the interpretability or perception of information included in the image for human viewers, or to provide better input for other automated image processing techniques.

4.1 Gabor Filter

Image presentation based on Gabor function constitutes an excellent local and multiscale decomposition in terms of logons that are simultaneously (and optimally) localization in space and frequency domains [5]. A Gabor filter is a linear filter whose impulse response is defined by a harmonic function multiplied by a Gaussian function. Because of the multiplication-convolution property (Convolution theorem), the Fourier transform of a Gabor filter's impulse response is the convolution of the Fourier transform of the harmonic function and the Fourier transform of the Gaussian function.

Figure 2 describes (a) the original image and (b) the enhanced image using Gabor Filter.

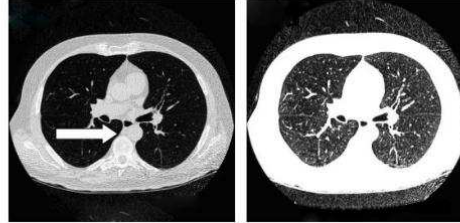Auto enhancement method is strongly depends on subjective observation and statistical operations such as mean and variance calculation. The enhancement percentage in this research was equal to 38.025%.

4.2 Fast Fourier Transform

Fast Fourier Transform technique operates on Fourier transform of a given image. The frequency domain is a space in which each image value at image position F represents the amount that the intensity values in image "I" vary over a specific distance related to F. Fast Fourier Transform is used here in image filtering (enhancement). Figure 3 describes the effect of applying FFT on original images, where FFT method has an enhancement percentage of 27.51%.
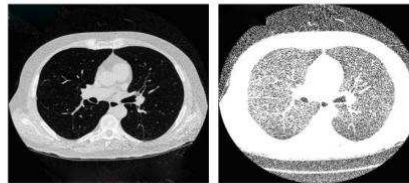
(a) Original Image   (b) Enhanced by FFT
Figure 3. Auto enhancement technique using FFT

Table 1 shows a comparison of the three mentioned techniques used for image enhancement. According to the values shown in the Table 1, we can conclude that the Gabor Enhancement is the most suitable technique for image enhancement. Observing the images enhanced by this method, we notice that new image details have appeared, in addition to good clearance and brightness shown by the enhanced images.

4.3 Image Segmentation

Image segmentation is an essential process for most image analysis subsequent tasks. In particular, many of the existing techniques for image description and recognition depend highly on the segmentation results [7]. Segmentation divides the image into its constituent regions or objects. Segmentation of medical images in 2D, slice by slice has many useful applications for the medical professional such as: visualization and volume estimation of objects of interest, detection of abnormalities (e.g. tumours, polyps, etc.), tissue quantification and classification, and more [8].

4.4 Thresholding approach

Thresholding is one of the most powerful tools for image segmentation. The segmented image obtained from thresholding has the advantages of smaller storage space, fast processing speed and ease in manipulation, compared with gray level image which usually contains 256 levels. Therefore, thresholding techniques have drawn a lot of attention during the past 20 years [10]. Thresholding is a non-linear operation that converts a gray-scale image into a binary image where the two levels are assigned to pixels that are below or above the specified threshold value. In this research, Otsu's method that uses (gray thresh) function to compute global image threshold is used. Otsu's method is based on threshold selection by statistical criteria.
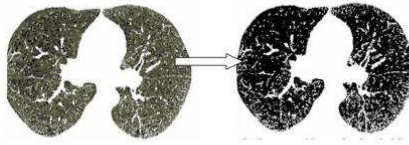
(a) Enhanced image by Gabor (b) Segmented image by thresholding
Figure 4. Normal enhanced image by Gabor filter and its segmentation using thresholding approach

5.5 Marker-Controlled Watershed Segmentation Approach

Marker-driven watershed segmentation technique extracts seeds that indicate the presence of objects or background at specific image locations. Marker-controlled watershed approach has two types: External associated with the background and Internal associated with the objects of interest. Image Segmentation using the watershed transforms works well if we can identify or "mark" foreground objects and background locations, to find "catchment basins" and "watershed ridge lines" in an image by treating it as a surface where light pixels are high and dark pixels are low. Figure 5 shows a segmented image by watershed.
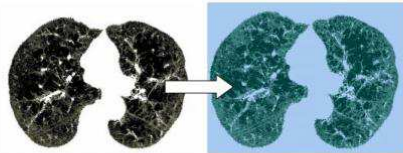
(a) Enhanced image by Gabor   (b) Segmented image by Watershed
Figure 5. Normal Enhanced image by Gabor filter and its Segmentation using MarkerControlled Watershed approach

5.6 Features Extraction

Image features Extraction stage is an important stage that uses algorithms and techniques to detect and isolate various desired portions or shapes (features) of a given image. To predict the probability of lung cancer presence, the following two methods are used: binarization and masking, both methods are based on facts that strongly related to lung anatomy and information of lung CT imaging.

5.7 Masking Approach

Masking approach depends on the fact that the masses are appeared as white connected areas inside ROI (lungs), as they increase the percent of cancer presence increase. The appearance of solid blue colour indicates normal case while appearance of RGB masses indicates the presence of cancer, the TAR of this method is (85.7%) and FAR has (14.3%). Figure 8 shows normal and abnormal images resulted by implementing Masking approach using MATLAB.
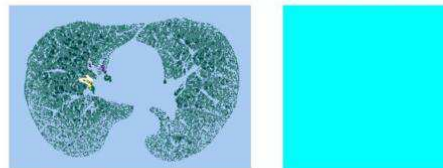
(a)   Normal Image enhanced by Gabor, segmented by watershed (b) The resulted image indicates normality
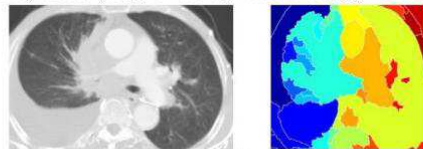
(c) Abnormal image   (d) The resulted indicates abnormality

Figure 8. Normal and abnormal images using Masking approach Combining Binarization and Masking approaches together will lead us to take a decision whether the case is normal or abnormal according to the mentioned assumptions in the previous two approaches, we can conclude that image that has number of black pixels greater than white ones, indicates normality, and otherwise it indicates abnormality.

V. CONCLUSIONS

An image improvement technique is developing for earlier disease detection and treatment stages; the time factor was taken in account to discover the abnormality issues in target images. Image quality and accuracy is the core factors of this research, image quality assessment as well as enhancement stage where were adopted on low pre-processing techniques based on Gabor filter within Gaussian rules. The proposed technique is efficient for segmentation principles to be a region of interest foundation for feature extraction obtaining. The proposed technique gives very promising results comparing with other used techniques. Relying on general features, a normality comparison is made. The main detected features for accurate images comparison are pixels percentage and mask-labelling with high accuracy and robust operation.

VI. FUTURE ENHANCEMENT

In future idea to make a combination with genetically defined mouse models of lung cancer; these new technologies hold particular promise for the discovery of potentially useful biomarkers. Future directions include the further refinement of existing mouse models, such as the sequential activation or inactivation of target genes, to more closely mimic the accumulation of genetic alterations in human lung tumor genesis.

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Losseless Image and Video Compression Technique

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ABSTRACT: Images are being used in many fields of research. One of the major issues of images is their resolution. In this paper we are studying different image resolution enhancement techniques that use Wavelet Transform (WT). Basis functions of the WT are small waves located in different times. They are obtained using scaling and translation of a scaling function and wavelet function Therefore, the WT is localized in both time and frequency. In this method is used to improve the image resolution for different type of images. In this paper we are comparing different image resolution enhancement techniques those using Wavelet Transform. The increasing demand to incorporate video data into telecommunication series, the corporate environment the entertainment industry, and even at home as made digital video technology a necessity. A problem however is that still image and digital video data rates are very large typically in the range of 150Mbits/sec. Data rates of this magnitude would consume a lot of the bandwidth, storage and computing resources in the typical personal computer. For this reason Video summarization standards have been developed to eliminate picture redundancy, allowing video information to be transmitted and stored in a compact and efficient manner.

I. INTRODUCTION

Image resolution enhancement is a usable preprocess for many satellite image processing applications, such as vehicle recognition, bridge recognition, and building recognition to name a few. Image resolution enhancement techniques can be categorized into two major classes according to the domain they are applied in: 1) image-domain; and 2) transform-domain. The techniques in image-domain use the statistical and geometric data directly extracted from the input image itself [1], [2],while transform-domain techniques use transformations such as decimated discrete wavelet transform to achieve the image resolution enhancement [3]–[6].

The decimated discrete wavelet transform (DWT) has been widely used for performing image resolution enhancement [3]–[5]. A common assumption of DWT-based image resolution enhancement is that the low-resolution (LR) image is the low-passfiltered subband of the wavelet-transformed high-resolution (HR) image. This type of approach requires the estimation of wavelet coefficients in subbands containing high-pass spatial frequency information in order to estimate the HR image from the LR image.

In order to estimate the high-pass spatial frequency information, many different approaches have been introduced. In [3], [4], only the high-pass coefficients with significant magnitudes are estimated as the evolution of the wavelet coefficients among the scales. The performance is mainly affected from the fact that the signs of estimated coefficients are copied directly from parent coefficients without any attempt being made to estimate the actual signs. This is contradictory to the fact that there is very little correlation between the signs of the parent coefficients and their descendants. As a result, the signs of the coefficients estimated using extreme evolution techniques cannot be relied upon. Hidden Markov tree (HMT) based method in [5] models the unknown wavelet coefficients as belonging to mixed Gaussian distributions which are symmetrical about the zero mean.

HMT models are used to determine the most probable state for the coefficients to be estimated. The performance also suffers mainly from the sign changes between the scales. The decimated DWT is not shift-invariant and, as a result, suppression of wavelet coefficients introduces artifacts into the image which manifests as ringing in the neighbourhood of discontinuities [6]. In order to combat this drawback in DWT-based image resolution enhancement, cycle-spinning methodology was adopted in [6]. The perceptual and objective quality of the resolution enhanced images by their method compare favorably with recent methods [3], [5] in the field.

Dual-tree complex wavelet transform (DT-CWT) is introduced to alleviate the drawbacks caused by the decimated DWT [7]. It is shift invariant and has improved directional resolution when compared with that of the decimated DWT. Such features make it suitable for image resolution enhancement. In this letter, a complex wavelet-domain image resolution enhancement algorithm based on the estimation of wavelet coefficients at high resolution scales is proposed. The initial estimate of the HR image is constructed by applying cycle-spinning methodology [6] in DT-CWT domain. It is then decomposed using the one-level DT-CWT to create a set of high-pass coefficients at the same spatial resolution of the LR image. The high-pass coefficients together with the LR image are used to reconstruct the HR image using inverse DT-CWT. The letter is organized as follows. Section II gives a brief review of the DT-CWT. Section III describes the proposed DT-CWT domain satellite image resolution enhancement algorithm. Section IV provides some experimental results of the proposed approach and comparisons with the approaches in [1], [2], [4], and [6]. Section V concludes the letter.

Resolution has been frequently referred as an important property of an image. Images are being processed in order to obtain super enhanced resolution. One of the commonly used techniques for image resolution enhancement is Interpolation. Interpolation has been widely used in many image processing applications. Interpolation in image processing is a method to increase the number of pixels in a digital image. Traditionally there are three techniques for image interpolation namely Linear, Nearest Neighbor and cubic. Nearest Neighbor result in significant —Jaggy‖ edge distortion. The Bilinear Interpolation result in smoother edges but somewhat blurred appearance overall. Bicubic Interpolation look's best with smooth edges and much less blurring than the bilinear result .By applying the 1-D discrete wavelet transform (DWT) along the rows of the image first, and then along the columns to produce 2-D decomposition of image.DWT produce four sub bands low-low(LL),low-high(LH),high-low(HL)and high-high(HH).By using these four sub bands we can regenerate original image.

II. LITERATURE SURVEY

NEW ENHANCEMENT APPROACH FOR ENHANCING IMAGE OF DIGITAL CAMERAS BY CHANGING THE CONTRAST

There are four well-known traditional interpolation techniques namely nearest neighbor, linear, and Lanczos. In [4] using bilinear, bicubic method the PSNR values for Lena's image are 26.34 and 26.86. W. Knox. Carey, Daniel. B. Chuang, and S. S. Hemami in [5] presented the regularity-preserving interpolation technique for image resolution enhancement synthesizes a new wavelet subband based on the known wavelet transform coefficients decay. Which gives PSNR (db) value for Lena's Image as 31.7 [5]. Xin. Li and Michael. T. Orchard in [6] presented a hybrid approach produced by combining bilinear interpolation and covariance-based adaptive interpolation called New Edge-Directed Interpolation Which gives PSNR(db) value for Lena's Image as 28.81 [4]. Alptekin. Temizel and Theo. Vlachos in [7] presented technique named "Wavelet domain image resolution enhancement using cycle-spinning and edge modelling ", which improves PSNR (db) values for Lena's image up to 29.27 [4]. Hasan. Demirel and Gholamreza. Anbarjafari in [8] presented an approach DT- CWT based image resolution enhancement which gives PSNR (db) value for Lena's Image as 33.74 [4]. Gholamreza. Anbarjafari and Hasan. Demirel in [9] presented a method named "Image super resolution based on interpolation of wavelet domain high frequency subbands and the spatial domain input image", whichgives PSNR(db) value for Lena's image up to 34.79 [4]. Hasan. Demirel and Gholamreza. Anbarjafari in [4] presented new method named "Image Resolution Enhancement by Using Discrete and Stationary Wavelet Decomposition", which give PSNR(db) value for Lena's image as 34.82 [4].

This paper proposes a new simple method of DCT feature extraction that utilize to accelerate the speed and decrease storage needed in image retrieving process by the aim of direct content access and extraction from JPEG compressed domain. Our method extracts the average of some DCT block coefficients. This method needs only a vector of six coefficients per block over the whole image blocks In our retrieval system, for simplicity, an image of both query and database are normalized and resized from the original database based on the cantered position of the eyes, the normalized image equally divided into non overlapping 8X8 block pixel Therefore, each of which are associated with a feature vector derived directly from discrete cosine transform DCT. Users can select any query as the main theme of the query image. The retrieval images is the relevance between a query image and any database image, the relevance similarity is ranked according to the closest similar measures computed by the Euclidean distance. The experimental results show that our approach is easy to identify main objects and reduce the influence of background in the image, and thus improve the performance of image retrieval. A **discrete cosine transform** (**DCT**) expresses a finite sequence of data points in terms of a sum of cosine functions oscillating at different frequencies. DCTs are important to numerous applications in science and engineering, from loss compression of audio (e.g. MP3) and images (e.g. JPEG) (where small high-frequency components can be discarded), to spectral methods for the numerical solution of partial

differential equations. The use of cosine rather than sine functions is critical in these applications: for compression, it turns out that cosine functions are much more efficient (as described below, fewer functions are needed to approximate a typical signal), whereas for differential equations the cosines express a particular choice of boundary conditions. In particular, a DCT is a Fourier-related transform similar to the discrete Fourier transform (DFT), but using only real numbers. DCTs are equivalent to DFTs of roughly twice the length, operating on real data with even symmetry (since the Fourier transform of a real and even function is real and even), where in some variants the input and/or output data are shifted by half a sample. There are eight standard DCT variants, of which four are common. The most common variant of discrete cosine transform is the type-II DCT, which is often called simply "the DCT" its inverse, the type-III DCT, is correspondingly often called simply "the inverse DCT" or "the IDCT". Two related transforms are the discrete sine transforms (DST), which is equivalent to a DFT of real and odd functions, and the modified discrete cosines transform (MDCT), which is based on a DCT of overlapping data.

III. SYSTEM ANALYSIS

3.1 PROBLEM DEFINITION:
In this Existing system has most complicated to improve image resolution. In traditionally there are three techniques for image interpolation namely Linear, Nearest Neighbor and Bicubic. Nearest Neighbor result in significant —Jaggy edge distortion. The Bilinear Interpolation result in smoother edges but somewhat blurred appearance overall. Bicubic Interpolation look's best with smooth edges and much less blurring than the bilinear result. Traditional interpolation methods work in the time domain.

3.2 PROBLEM SOLVED:
In this proposed system we resolved the high frequency components (i.e. the edges) problem by applying ('linear' (default) | 'nearest' | 'spline' | 'pchip' | 'cubic') interpolation. The main loss in image resolution enhancement by using interpolation is on its high frequency components (i.e., edges), which is due to the smoothing caused by interpolation. Edges plays very important role in image. To increase the quality of the super resolved image, it is essential to preserve all the edges in image. It is cleared from the output image values that the image resolution enhancement method using Wavelet Transform and Image Interpolation is giving far better result than any other technique.

3.3 Proposed System
 The goals for this thesis have been the following.
One goal has been to compile an introduction to the subject of H.263 encoders and decoders. There exist a number of studies of various parts of the encoder and decoder, but complete treatments on a technical level are not as common. Material from papers, journals, and conference proceedings   are used that best describe the various parts.
 Another goal has been to search for algorithms that can be used to implement the most demanding components of H. 263 Video summarization standards.
1. Motion compensation & Motion estimation
2. Discrete Cosine Transform (DCT) &Inverse discrete cosine transform(IDCT)
3. Scaling and Quantization
4. Entropy encoding & Decoding

A third goal is to evaluate their performance with regard to speed, memory requirements, and complexity. These properties were chosen because they have the greatest impact on the implementation effort and the computation demands .
 A final goal has been to design and implement an H.263 encoder & Decoder. This should be done in matlab . The source code should be easy to understand so that it can serve as a reference on the standard for designers that need to implement a encoder. The proposed system should be compatible such way it has high summarization rate which can be used for (DVB) digital video broadcasting. This system can be enhanced to implement in video conferencing and video –on- demand applications. The files SUMMARIZATION using H.263 encoder are smaller than MPEG files which is faster to download. This advantage motivate us to begin the projectn .where we begin to modify the discrete cosine transform to adaptive DCT.

3.4 Architecture
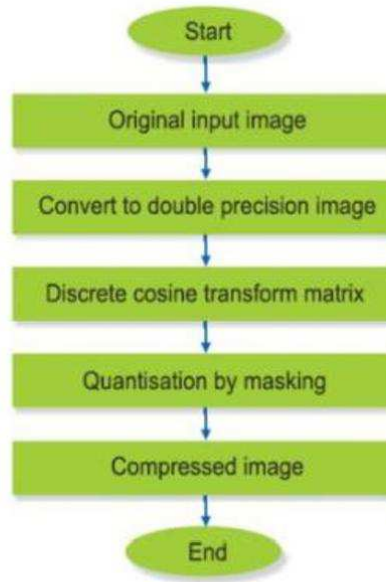
IV. RESULT AND DISCUSSION

Bilinear interpolation
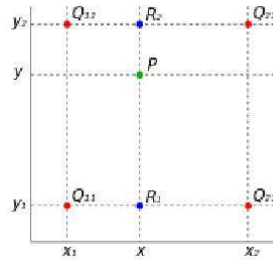
The four red dots show the data points and the green dot is the point at which we want to interpolate.
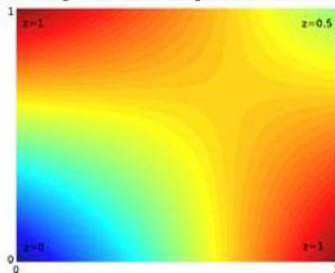
Example of bilinear interpolation on the unit square with the z-values 0, 1, 1 and 0.5 as indicated. Interpolated values in between represented by color.

In mathematics, **bilinear interpolation** is an extension of linear interpolation for interpolating functions of two variables (e.g., x and y) on a rectilinear 2D grid.

The key idea is to perform linear interpolation first in one direction, and then again in the other direction. Although each step is linear in the sampled values and in the position, the interpolation as a whole is not linear but rather quadratic in the sample location.

Algorithm

Suppose that we want to find the value of the unknown function f at the point (x, y). It is assumed that we know the value of f at the four points $Q_{11} = (x_1, y_1)$, $Q_{12} = (x_1, y_2)$, $Q_{21} = (x_2, y_1)$, and $Q_{22} = (x_2, y_2)$.

We first do linear interpolation in the x-direction. This yields

$$f(x, y_1) \approx \frac{x_2 - x}{x_2 - x_1} f(Q_{11}) + \frac{x - x_1}{x_2 - x_1} f(Q_{21})$$

$$f(x, y_2) \approx \frac{x_2 - x}{x_2 - x_1} f(Q_{12}) + \frac{x - x_1}{x_2 - x_1} f(Q_{22})$$

We proceed by interpolating in the y-direction to obtain the desired estimate:

$$f(x, y) \approx \frac{y_2 - y}{y_2 - y_1} f(x, y_1) + \frac{y - y_1}{y_2 - y_1} f(x, y_2)$$

$$= \frac{y_2 - y}{y_2 - y_1} \left(\frac{x_2 - x}{x_2 - x_1} f(Q_{11}) + \frac{x - x_1}{x_2 - x_1} f(Q_{21}) \right) + \frac{y - y_1}{y_2 - y_1} \left(\frac{x_2 - x}{x_2 - x_1} f(Q_{12}) + \frac{x - x_1}{x_2 - x_1} f(Q_{22}) \right)$$

$$= \frac{1}{(x_2 - x_1)(y_2 - y_1)} \left(f(Q_{11})(x_2 - x)(y_2 - y) + f(Q_{21})(x - x_1)(y_2 - y) + f(Q_{12})(x_2 - x)(y - y_1) + f(Q_{22})(x - x_1)(y - y_1) \right)$$

$$= \frac{1}{(x_2 - x_1)(y_2 - y_1)} [x_2 - x \quad x - x_1] \begin{bmatrix} f(Q_{11}) & f(Q_{12}) \\ f(Q_{21}) & f(Q_{22}) \end{bmatrix} \begin{bmatrix} y_2 - y \\ y - y_1 \end{bmatrix}$$

Note that we will arrive at the same result if the interpolation is done first along the y-direction and then along the x-direction.

Algorithm Working Process

An alternative way to write the solution to the interpolation problem is

$$f(x, y) \approx a_0 + a_1 x + a_2 y + a_3 xy$$

Where the coefficients are found by solving the linear system

$$\begin{bmatrix} 1 & x_1 & y_1 & x_1 y_1 \\ 1 & x_1 & y_2 & x_1 y_2 \\ 1 & x_2 & y_1 & x_2 y_1 \\ 1 & x_2 & y_2 & x_2 y_2 \end{bmatrix} \begin{bmatrix} a_0 \\ a_1 \\ a_2 \\ a_3 \end{bmatrix} = \begin{bmatrix} f(Q_{11}) \\ f(Q_{12}) \\ f(Q_{21}) \\ f(Q_{22}) \end{bmatrix}$$

If a solution is preferred in terms of $f(Q)$ then we can write

$$f(x, y) \approx b_{11} f(Q_{11}) + b_{12} f(Q_{12}) + b_{21} f(Q_{21}) + b_{22} f(Q_{22})$$

Where the coefficients are found by solving

$$\begin{bmatrix} b_{11} \\ b_{12} \\ b_{21} \\ b_{22} \end{bmatrix} = \left(\begin{bmatrix} 1 & x_1 & y_1 & x_1 y_1 \\ 1 & x_1 & y_2 & x_1 y_2 \\ 1 & x_2 & y_1 & x_2 y_1 \\ 1 & x_2 & y_2 & x_2 y_2 \end{bmatrix}^{-1} \right)^T \begin{bmatrix} 1 \\ x \\ y \\ xy \end{bmatrix}$$
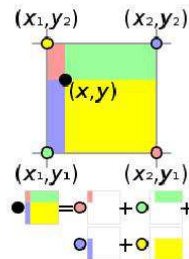
Unit Square

If we choose a coordinate system in which the four points where f is known are $(0, 0)$, $(0, 1)$, $(1, 0)$, and $(1, 1)$, then the interpolation formula simplifies to

$$f(x,y) \approx f(0,0)(1-x)(1-y) + f(1,0)x(1-y) + f(0,1)(1-x)y + f(1,1)xy.$$

Or equivalently, in matrix operations:

$$f(x,y) \approx \begin{bmatrix} 1-x & x \end{bmatrix} \begin{bmatrix} f(0,0) & f(0,1) \\ f(1,0) & f(1,1) \end{bmatrix} \begin{bmatrix} 1-y \\ y \end{bmatrix}.$$

In this geometric visualisation, the value at the black spot is the sum of the value at each coloured spot multiplied by the area of the rectangle of the same colour, divided by the total area of all four rectangles.

Nonlinear

Contrary to what the name suggests, the bilinear interpolant is *not* linear; but it is the product of two linear functions. Alternatively, the interpolant can be written as

$$f(x,y) = \sum_{i=0}^{1} \sum_{j=0}^{1} a_{ij} x^i y^j = a_{00} + a_{10}x + a_{01}y + a_{11}xy$$

where

$$a_{00} = f(0,0)$$
$$a_{10} = f(1,0) - f(0,0)$$
$$a_{01} = f(0,1) - f(0,0)$$
$$a_{11} = f(1,1) + f(0,0) - (f(1,0) + f(0,1))$$

In both cases, the number of constants (four) corresponds to the number of data points where f is given. The interpolant is linear along lines parallel to either the x or the y direction, equivalently if x or y is set constant. Along any other straight line, the interpolant is quadratic. However, even if the interpolation is *not* linear in the position (x and y), it *is* linear in the amplitude, as it is apparent from the equations above: all the coefficient b_j, $j=1..4$, are proportional to the value of the function $f(,)$.

The result of bilinear interpolation is independent of which axis is interpolated first and which second. If we had first performed the linear interpolation in the y-direction and then in the x-direction, the resulting approximation would be the same.

The obvious extension of bilinear interpolation to three dimensions is called trilinear interpolation.

Application in image processing
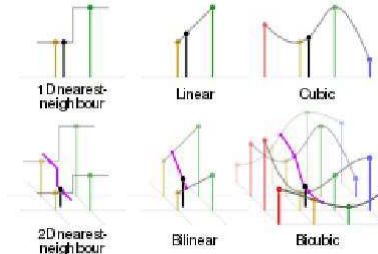
Comparison of *Bilinear interpolation* with some 1- and 2-dimensional interpolations. Black and red/yellow/green/blue dots correspond to the interpolated point and neighbouring samples, respectively. Their heights above the ground correspond to their values.

In texture mapping, it is also known as bilinear filtering or *bilinear texture mapping*, and it can be used to produce a reasonably realistic image. An algorithm is used to map a screen pixel location to a corresponding point on the texture map. A weighted average of the attributes (color, alpha, etc.) of the four surrounding texels is computed and applied to the screen pixel. This process is repeated for each pixel forming the object being textured.

When an image needs to be scaled up, each pixel of the original image needs to be moved in a certain direction based on the scale constant. However, when scaling up an image by a non-integral scale factor, there are pixels (i.e., *holes*) that are not assigned appropriate pixel values. In this case, those *holes* should be assigned appropriate RGB or grayscale values so that the output image does not have non-valued pixels.

Bilinear interpolation can be used where perfect image transformation with pixel matching is impossible, so that one can calculate and assign appropriate intensity values to pixels. Unlike other interpolation techniques such as nearest-neighbor interpolation and bicubic interpolation, bilinear interpolation uses only the 4 nearest pixel values which are located in diagonal directions from a given pixel in order to find the appropriate color intensity values of that pixel.

Bilinear interpolation considers the closest 2x2 neighborhood of known pixel values surrounding the unknown pixel's computed location. It then takes a weighted average of these 4 pixels to arrive at its final, interpolated value. The weight on each of the 4 pixel values is based on the computed pixel's distance (in 2D space) from each of the known points.
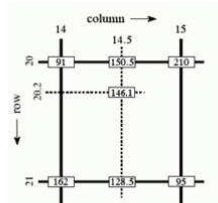
Example of bilinear interpolation in grayscale values.

As seen in the example on the right, the intensity value at the pixel computed to be at row 20.2, column 14.5 can be calculated by first linearly interpolating between the values at column 14 and 15 on each rows 20 and 21, giving

$$I_{20,14.5} = \frac{15-14.5}{15-14} \cdot 91 + \frac{14.5-14}{15-14} \cdot 210 = 150.5$$
$$I_{21,14.5} = \frac{15-14.5}{15-14} \cdot 162 + \frac{14.5-14}{15-14} \cdot 95 = 128.5$$

and then interpolating linearly between these values, giving

$$I_{20.2,14.5} = \frac{21-20.2}{21-20} \cdot 150.5 + \frac{20.2-20}{21-20} \cdot 128.5 = 146.1$$

This algorithm reduces some of the visual distortion caused by resizing an image to a non-integral zoom factor, as opposed to nearest-neighbor interpolation, which will make some pixels appear larger than others in the resized image.

V. CONCLUSION

The proposed adaptive Video codec is mainly meant for mobile communication and ownership protection. This algorithm can be extended to work with 3D video images. Since the codec eliminates particular insignificant subbands that saves the computations required to calculate a subband it can be implemented in areas where the battery constraints and the resources should be dealt economically. It has a high summarization ratio if the parameter values applied are increased and enables to minimize the number of bits transmitted. Though the proposed algorithm has advantages it has some limitations. Since the high pass sub bands are eliminated it incurs a heavy loss of information, when the elimination is performed for higher levels of decomposition. Also, since the bands are eliminated entirely without considering any significant bits in that band, the video obtained after summarization is distorted. These drawbacks can be overcome by performing elimination of subbands only at lower levels of transform. Since there is only a minimal degradation in video quality, the adaptive and energy efficient multiwavelet codec presents a potential solution to the problem of high energy and bandwidth requirements that cannot be fulfilled by limited growth in battery technologies or the projected growth in available cellular bandwidth. The energy efficient wavelet combined with the watermarking scheme used for digital copyright protection and management.

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Skin Cancer Detection Using MATLAB

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ABSTRACT: Human Cancer is one of the most dangerous disease which is mainly caused by genetic instability of multiple molecular alterations. Among many forms of human cancer, skin cancer is the most common one. To identify skin cancer at an early stage we will study and analyze them through various techniques named as segmentation and feature extraction. Here, we focus malignant melanoma skin cancer, (due to the high concentration of Melanoma- Hier we offer our skin, in the dermis layer of the skin) detection. In this, We used our ABCD rule dermoscopy technology for malignant melanoma skin cancer detection. In this system different step for melanoma skin lesion characterization i.e, first the Image Acquisition Technique, pre-processing, segmentation, define feature for skin Feature Selection determines lesion characterization, classification methods. In the Feature extraction by digital image processing method includes, symmetry detection, Border Detection, color, and diameter detection and also we used LBP for extract the texture based features. Here we proposed the Back Propagation Neural Network to classify the benign or malignant stage.

I. INTRODUCTION

A collection of abnormal cells in our body is name as cancer. In humans cancer can start anywhere in the body and spread into the surrounding tissues which is made up of trillions of cells. Normally, human cell grow and divide to form new cells according to the requirement of the body and it vary person to person. When cancer starts to develop in the body the process of reconstruction of new cell stops and the cell becomes more and more abnormal and a new cell form which is not required. That extra cell grows without stopping and called as tumors. Cancerous tumors are malignant. This means that they can grow and spread into nearby tissues. In short diseases in which abnormal cells divide uncontrollably and destroy body tissue resulting tumors The skin is the largest organ of the body. The skin protects us from microbes and from the other harmful materials.

Skin has three layers:
❑ **Epidermis-** the outer most layer of the skin and creates our skin tone.
❑ **Dermis** − it is beneath the epidermis and contains tough connective tissue and sweat glands.
❑ **Hypodermis** − made up of fat and connective tissue.
Most often skin cancer develops on skin exposed to the sun but it can also occur on areas which is not sun exposed. There are three types of skin cancer-basel cell cancer, squamous cell cancer and melanoma tumors.
❑ **Basel cell**-it starts in bassel layer of the skin. It occurs on the face.
❑ **Souamous cell** − it begins in squamous cell and mostly found in dark people.
❑ **Melanoma-** it begins in melocytes layer and occur at mouth and eyes.
The first two are not so common and do not spread quickly but the third skin cancer spread very quickly over the body. If it is not found in early stages, it is found to be more dangerous.

II. LITERATURE SURVEY

Vascular segmentation through the use of image processing tools provides significant information that allows for the accurate diagnosis, categorization, registration, and visualization of vascular disease. Currently, in the assessment of Abdominal Aortic Aneurysms (AAA), radiologists manually segment different regions on interest on each medical image to create a full volume of the abdominal aorta. Such manual segmentation is a time consuming task, prone to errors and a subjective approach especially when non-contrast enhanced images are present. In this paper, we introduce an automatic system to segment the aortic lumen in non-contrast enhanced CT scans and PC-MR images using digital image processing algorithms where image enhancement, denoising, edge detection, and regional growing algorithms are utilized. The output of this work forms the basis for a future reliable inner and outer wall segmentation of the AAA.

This paper presents a method for automated delineation of the outer aneurysm boundary in multiple MR sequences. The method is inspired by the Active Shape Model (ASM) framework as proposed by Cootes and Taylor.5 ASMs consist of a landmark based shape model, linear models of gray value appearance around the landmarks, and an iterative optimization scheme. Both the shape model and the boundary appearance model are derived from segmented example images. The components of the original ASM scheme are modified to enable AAA segmentation. The landmark based shape model, called Point Distribution Model (PDM), is adapted to better describe tubular objects if the training set is small. A non-linear gray value model is proposed which can deal with the highly variable boundary appearance of AAA and exploits information of different MR images. The shape parameters are more robustly estimated using dynamic programming regularization6 and a weighted fit. To increase segmentation speed and robustness, a multi-resolution approach is used.

III. SYSTEM ANALYSIS

3.1 EXISTING METHOD
- Principal Component Analysis
- Local binary pattern and shape features
- KNN and FNN classifier

3.3 PROPOSED METHOD
Skin lesion classification for Computer Aided Diagnosis (CAD) system based on,
- Hybrid features involves color features and texture descriptors
- NN-Back Propagation Neural Network classifier
-

ARCHITECTURE DIAGRAM
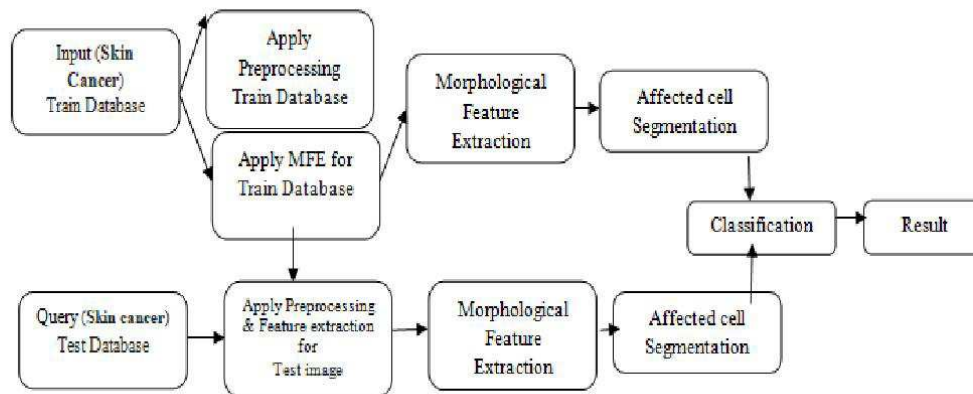
IV. SYSTEM IMPLEMENTATION

4.1. Preprocessing
The purpose of image preprocessing is to eliminate unwanted noise present in the original input image and improve the quality of fine details present in it [2, 3]. This will make it informal for further processing of image in order to achieve the defined aim. The image preprocessing includes image enhancement, removal of noise and breast part extraction. Smoothing image pixel using averaging filter, Otsu technique to separate background from breast region, morphological operations, sharpening have been used for preprocessing on digital mammographic images.
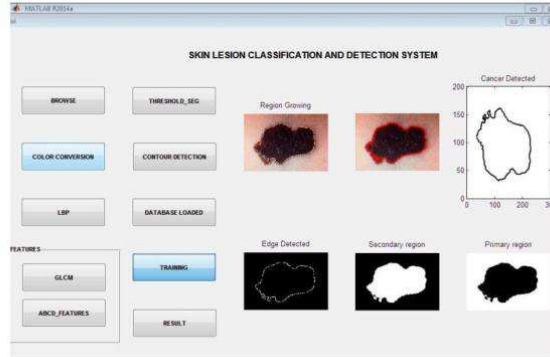
4.2. Calculate cell features in the input image

Feature extraction in image processing is a technique of redefining a large set of redundant data into a set of features of reduced dimension. Transforming the input data into the set of features is called feature extraction. Feature selection greatly influences the classifier performance; therefore, a correct choice of features is a very crucial step. In order to construct an effective feature set, several published articles were studied, and their feature selection methodology was observed. It was noted that certain features were widely used as they gave a good classification. We implemented these features onwhole images in our system. Those features were considered to boost the classifier performance.

Morphological techniques probe an image with a small shape or template called a structuring element. The structuring element is positioned at all possible locations in the image and it is compared with the corresponding neighbourhood of pixels. Some operations test whether the element "fits" within the neighbourhood, while others test whether it "hits" or intersects the neighbourhood:
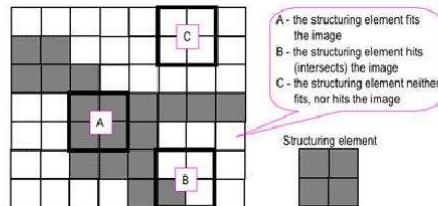
Probing of an image with a structuring element
(white and grey pixels have zero and non-zero values, respectively).

4.3 CLASSIFIED FEATURES
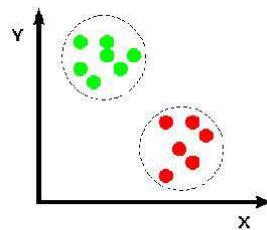
Common Names: Classification

Classification includes a broad range of decision-theoretic approaches to the identification of images (or parts thereof). All classification algorithms are based on the assumption that the image in question depicts one or more features (*e.g.*, geometric parts in the case of a manufacturing classification system, or spectral regions in the case of remote sensing, as shown in the examples below) and that each of these features belongs to one of several distinct and exclusive classes.

The classes may be specified *a priori* by an analyst (as in *supervised classification*) or automatically clustered (*i.e.* as in *unsupervised classification*) into sets of prototype classes, where the analyst merely specifies the number of desired categories. (Classification and *segmentation* have closely related objectives, as the former is another form of component labeling that can result in segmentation of various features in a scene.)
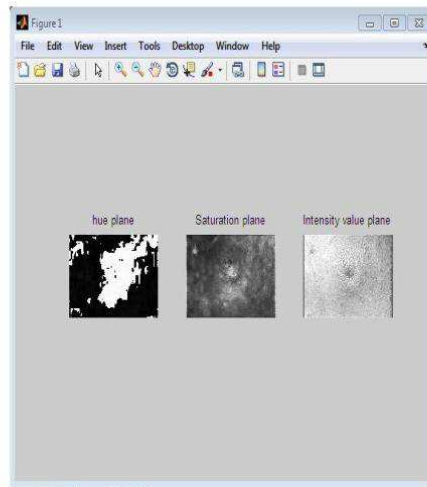
Process:

Image classification analyzes the numerical properties of various image features and organizes data into categories. Classification algorithms typically employ two phases of processing: *training* and *testing*. In the initial training phase, characteristic properties of typical image features are isolated and, based on these, a unique description of each classification category, *i.e. training class*, is created. In the subsequent testing phase, these feature-space partitions are used to classify image features.

4.4. CLASSIFICATION

This classification result gives the details about breast cancer and non cancer. To get the spitted part from the k means segmentation result. Above the result which is used to find the cancer and non cancer skin from this module.
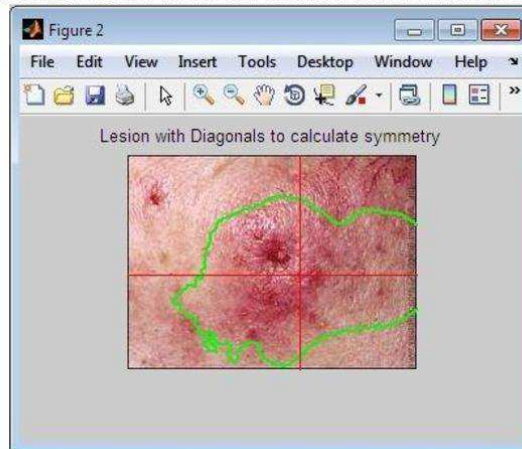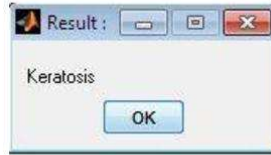
After extracting the pertinent feature, the final stage is to classify the attained data and assign it to a particular class. For this purpose, classifiers like Support Vector Machine, Decision tree, KNN are used.

V. RESULT AND DISCUSSION

5.1 PROBLEM IDENTIFICATION

This paper focuses upon the detection of a tumor in the breast from skin cancer images. By utilizing various image processing techniques such as segmentation, Binarization, thinning, triangulation and EDT, the demarcation of the tumor in the mri is obtained. The following results shows the output received after each step in the algorithm. For our proposed work 10 normal images and 20 tumor affected images are taken as input images and their features are extracted and the classification results are shown below.

This paper presents techniques that are required to achieve an automatic classification system to diagnosis the presence of the skin cancer from MRI.

Drawbacks
- Accuracy is low
- Cannot provide optimized cancer detect
- Segmentation process have some trouble

APPLICATION
- Skin cancer diagnosis support system in Health care fields

VI. CONCLUSION AND FUTURE ENHANCEMENT

In this paper, the various steps involved in automatic tumor detection were implemented. The proposed approach in this paper with images processed and classification proved via its performance such as Sensitivity is 100%, Specificity is 100% and its accuracy in classification is 99.66%. Our system gives the better performance when compared existing method, so it is very helpful to the medical people in detecting tumor in breast. Also these proposed algorithms can help rural people to find out the tumor occurrence in mammogram image in case of emergency situations. The purpose of this algorithm is to provide a useful advice to the end user, not to give a final decision concerning presence of cancerous changes in an image. Our system has potential of improving physician diagnostic performance.

6.1 FUTURE PERSPECTIVES

Future we are in corporating the above algorithm for genetic algorithm that mimics the evolution method within the nature could be a heuristic search technique to get the optimum answer in an exceeding immense solution. This work will incorporate on extraction of the clinical utility of mri image.

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LITERARY DRUID

Be Eco-Friendly

Contents

Be Eco-Friendly

The Wheels of Life in Preeti Shenoy's *A Hundred Little Flames*

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Abstract

India has a variety of cultures which are more common in south India. India's culture collectively refers to the thousands of unique and distinct cultures of all the religious and communities present in India. The language, religion, dance, music, architecture, food and customs of India vary from one place to another within the country. Indian culture has often described as a fusion of several cultures. Preeti Shenoy's "A Hundred Little Flames" revolves around relationship between father and a son across two generations. Ayan unravels mysteries surroundings in the life of his grandfather Gopal Shanker. Ayan, the protangist of the novel, does not have any wish on his own. He feels like puppet in his father's hand. Ayan left his job due to an unfortunate incident in his office party. His father sent him to village to take care of his grandfather. During his stay at Poongavanam, Ayan find out the sad truth about his grandfather's past life Ayan determined to bring back his grandfather's lost love. The novel "A Hundred Little Flames" explores the lives of the people who forget to look during after their parents in their old age. They were busy running for the material treasure leaving behind their soulful treasure. Author cleverly wheels out the plot and reveals how the society succumbs itself blindly with so called modernism leaving behind their traditional inheritance and humanistic values.

Keywords: culture, relationship, family, friendship and elder abuse.

This article aims at the life of an old man, Gopal, whose hundred flames his desire are doused off by his progenies. The crushed and crumpled soul of Gopal longs for a hold. The generation gap exists between his kids and him bring in multiple disruptions in his life. This paper also investigates the generation gap that prevails among the main characters Gopal, Jairaj, Shaila and Ayan. And it will also enlightens us on a good path and brightens our lives like hundred little flames.

Preeti Shenoy was born in 1971 in India. She is an Indian writer, author and novelist. She is in the big league. She started her writing career with 34 Bubble gums and candies 2008 which received good response from readers. Her writing style is loved by thousands of peoples. Her books also gained a lot of popularity among readers. The novel A Hundred Little Flames begins with in Ayan, the protagonist of the novel, does not have any wish on his own. He was worked in MNC Company in Pune. Due to an unfortunate incident in his office party, he left his job. Though he is an obliging son, he is enforced to execute certain wishes of his father which he dislikes to the core. Ayan's father sends him to village to take care of his grandfather. During his stay at Thekke Madom in Kerala has changed his

perspectives about life. He agrees with his grandfather in many of his opinion. He is able to identify passion and genuineness of his grandfather's platonic love that exists between his grandfather and his ex-beloved. He realises the value of rustic life which is not tarnished by technology. The serene and eco-friendly life is juxtaposition of urban life. Altogether Ayan relieves himself from the monotony of mundane world. He sets his aim to revive his grandfather's dream.

Ayan's grandfather is not a pure modern. For instance his affinity towards his soil which has not felt the transformation or influence of technology is very strong. But when his grandson depends on technology he remains quiet and does not interrupt in his ways. Ayan's grandfather is very nostalgic. He refuses to accept transformation. He adheres to metanarratives. Post moderns do not adhere to grand narratives. "……there is a tone of lament, pessimism and despair about the world which finds its appropriate representation in these "fractured" art forms…." (Watt, 81). This is evident in the life of Ayan. Everything is lost for Ayan at one juncture. His life becomes fragmented desperate in his love and career. He is hopeful to pursue his life with confidence. He does not carry over his dejection after his failures. He adapts to the new environment in Thekke Madom. Besides he maintains good rapport with his grandfather. Ayan is his grandfather's ardent aide. Gopal denies staying with his son who lives abroad. Thekke Madom is a palatial ancestral home of Gopal Sankar and his siblings lived together in a joint family. "Little by little, the joint family had disintegrated with members moving away to different cities to make a living." (A Hundred 19). Gopal's son Jairaj plans to sell their ancestral home and asks his father to stay with him in Bahrain. Gopal contends his son's plan saying: "People like to live in match boxes, where there is not even a piece of land" (P,20) Gopal is for "minimalism". He has grudges towards his son who prioritizes monetary development and socio-economic status. His son and daughter never value their source the place in which they spent their childhood days and brought up.

Gopal finds a pot of gold in the form of his grandson who is able to sympathise him unlike his son. Ayan realizes his grandfather's affinity towards his place. Ayan's father defends his plan on the ground that "who is going to live in that huge house after him?" (P 81). His father's words "fall like a stab to Ayan" (P 81). What Jairaj is unable to cope with is realized by Ayan. He immediately thinks of his grandfather's plight once the home is sold. Ayan knows that his father is very practical. Simultaneously he is able to sense that selling Thekke Madom is equal to that of uprooting his grandfather from a place to which he affixes to the core. Ayan's sadness is profound. This incident highlights that age is not a barrier for generation gap. What a son fails to understand is understood by a grandson. In Indian context, though it is primarily a patriarchal set up in the society, father and son relationship does not exist smoothly in majority of the cases. Most of them wheels with one another. In the case of Gopal, his son and daughter fail to realize him. It is a common expectation of a parent to see his progenies occasionally.

Gopal's children are against his expectation. Both of them stay away from him. They never care to visit him. Phone calls and Skype connect them and that too for their material benefit in the view of Gopal. Gopal, who is stuck by traditional codes and conduct says: Yes.

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Jairaj hasn't come here for thirteen years or may be more. I have stopped counting. He hasn't the title or heads unless they are unavoidable. He hasn't come here even after Akshu was born. The family tradition is to give a thulabaram at the devi kshetram. (P 102) Gopal feels a lot toward his children's negligence. He too keeps himself away from his children and never expects anything from them. He leads an isolated life until the arrival of Ayan. The ego clash between the father and the daughter touches their raw nerve and kindles their fury. Gopal's friendship with his schoolmate Rohini leads to a wide gap between his family members and himself.

Gopal is not given a chance to defend or justify the purity of his friendship with Rohini. Before he tries to sort out the issues his friend Rohini vanishes from his life mysteriously. It is Ayan who brings back Rohini and revives their friendship. Gopal's wife, Padmaja meets her end badly out of depression. Shaila strongly believes that it is father who has deserted her mother and killed her. Gopal gets through all his trouble all alone. Lack of mutual understanding and humanitarian concern among family member's leads to mishap. Jairaj cares his father yet he fails to understand his emotions and feelings. He never respects his father's individual expectation in his old age. According to Jairaj, nothing is essential for his father. This misconception pushes him to take a dreadful decision of admitting his father in an asylum. Again Ayan becomes Gopal's redeemer. Ayan distances himself from his father and does his best to reunite Rohini and Gopal.

There is an unexpected twist in the end of the story. Gopal who meets with numerous ups and downs in his family life has been very determinate while facing oddities. On the contrary when he is about to meet Rohini after many decades unable to bear the jubilation, gives up his enthusiasm feels ache when he is at the reach of Rohini. He breathes his last in the place in Pondicherry where they have met numerous times. His departure proves that man's aboding assures him peace while he lives and when he dies. Intra personal relationship among family members irrespective of age is essential in order to maintain a healthy and peaceful relationship.

Ego should be shirked off by all individuals in the family. Empathizing elders is very important to avoid them making feel that they are marginalized from the rest of the family members. Jairaj's rash decision in the novel widens cleavage between him and his son. Ayan becomes too rigid toward his father and plans to transform "Thekke Madom" to an art gallery with the help of Rohini by getting support from the Kerala government. Ayan felt like a subservient to his father and fears him initially but now turns to be a determinate as well as independent individual saying: …..having the courage to stand up to my father and tell him to fuck off. All my life I was afraid of him. Now the only person I answer to, is myself. (P 360).

Every individual should realize one's responsibility to maintain a strong relationship which is devoid of expectation. In order to patch up with the different generations irrespective of age differences individuals should shirk off their selfishness. Each one creates one's own trends and sticks to them badly because they want their comfort zone to be undisturbed by any external agent. Emanation of self-realization to create oneness among the

family members to bridge the gaping gap is the solution to cover up the frictions that exist among the postmodern individuals.

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செ.அருள் கிரேஸி	வேல்ஸ் அறிவியல் தொழில் நுட்ப உயர் ஆராய்ச்சி நிறுவனம்	எட்டுத்தொகையில் காணாலாகும் மருத்துவம்	National	978-93-91699-08-6	October 2021

எட்டுத்தொகையில் காணாலாகும் மருத்துவம்

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முன்னுரை

மனிதன் அறிவியல் துறையில் முன்னேறியுள்ள இன்றைய கால கட்டத்தில் இயற்கையிலேயே நாம் இயற்கையை விட்டு விலகி வாழ்ந்து கொண்டிருப்பதால் நோய்கள் பல பெருகிக் காணப்படுகின்றன. மருத்துவக் கண்டுபிடிப்புகள் பல மனிதனின் ஆயுள் காலத்தைச் சிறிது நீட்டிக்கின்றன. இன்றைய கண்டுபிடிப்புகளின் அடித்தளம் நம் தமிழ் இலக்கியங்களில் காணப்படுகின்றன. குறிப்பாக இன்று நமது உலகையே ஆட்டிப்படைத்துக் கொண்டிருக்கின்ற "கொரோனா" வைரஸ் என்ற கொடிய நோயை குணப்படுத்துவதற்கு கபசுரக் குடிநீர் என்ற மூலிகை மருந்தை உபயோகிக்கின்றோம். இதைத் தயாரிப்பதற்குத் தேவையான மூலிகைப்பொருட்களைப் பற்றிய செய்திகளும் நம்முடைய தமிழ் இலக்கியங்களில் காணப்படுகின்றன.

மருத்துவர் குறிப்பு

'நோவு,நோதல்' போன்ற சொற்கள் நோயைக் குறிக்கின்றன. நோயை அறிந்து குணப்படுத்துபவரை மருத்துவர் என்று அழைக்கின்றோம். நோயுற்றோரின் உடல் நிலையை அறிந்து அதற்குத் தகுந்தாற்போல் பழங்காலத் தமிழ் மருத்துவர்கள் மருந்து கொடுக்கின்றனர். இதனை

"பொருந்தியன் வேட்ட பொருளவின் நினைத்து
திருந்திய யாக்கையுடன் மருத்துவன் ஊட்டிய மருந்து"

என்ற கலித்தொகைப் பாடல் எடுத்துரைக்கின்றது. அறத்தொழில் மருத்துவரை அரவோன் என்று கீழ்காணும் நற்றினைப் பாடல் சுட்டிக்காட்டுகிறது. இங்கு நோயினை அறிந்து அதற்கேற்ற மருந்து கொடுத்த மருத்துவர்களை அரவோன் என்று கூறிய செய்தி புலப்படுகிறது. ப

"பிறர் நோயும் தம் நோய்; போல் போற்றி அறனறிதல்
சான்றோர்க்கு எல்லாம் கடன்"

இவர்களில் நோயாளிகளுக்கு சிகிச்சை அளிக்கும் மருத்துவர் தன்னையோ நோயாளியாகப் பாவித்து சிகிச்சை அளிக்க வேண்டும் என்று கூறப்பட்டுள்ளது. மருத்துவர் தாமோதரனார் போன்ற சங்கப் புலவர்கள் பலர் மருத்துவத்திலும் தேர்ச்சி பெற்றிருந்தனர்.

மருந்து விளக்கம்

சங்க கால ஏராளமான மூலிகைகள் பற்றியும் அற்றின் நோய் தீர்க்கும் பண்புகள் பற்றியும் நன்கு அறிந்திருந்தனர். இருப்பினும் இன்றுபோல் அன்றும் பல விதாமான நோய்களாலும் உடல் ஊனங்களாலும் மக்கள் பாதிக்கப்பட்டு இருந்தனர் என்பதை தமிழ் இலக்கிய நூல்கள் நன்று வெளிப்படுத்தியுள்ளன.

"அருந்துயர் அவலம் தீர்க்கும் மருந்து"

இங்கு நோயாளிகளின் துன்பத்தையும் வேதனையையும் துடைப்பது மருந்து என்று நற்றினை கூறுகிறது.

"அருந்துயர் அரஞர் தீர்க்கும் மருந்து"

என்ற கலித்தொகையின் குறிஞ்சிக் கலியிலும் மருந்துக்கு இதுபோன்றதொரு வரையறை கூறப்பட்டுள்ளது. நோயாளின் அருந்துயரையும் கடும் வேதனையையும் தீர்ப்பது மருந்தாகும்.

"இன்னுயிர் செய்யும் மருந்து"

என்ற இப்பாடலின் மூலம் உயிர் காப்பது மருந்து என்றும் உயிரைப்பாதுகாக்கும் பொருளான மருந்தினை வரையறைத்துள்ளமையை அறிய முடிகிறது.

"திருந்திய யாக்கையுள் மருத்துவன் ஊட்டிய
மருந்து போல் மருந்தாகி மனன் உவப்ப"

இப்பாடலில் நன்கு பாதுகாக்கப்பட்ட உடம்பினை நோயாளி கொண்டிருந்தால் மருத்துவர் தரும் மருந்து நோயாளியின் பாதிக்கப்பட்ட உறுப்பினை விரைவாகச் சென்றடைந்து நன்கு வேலை செய்யும் எனக் குறிப்பிடப்பட்டுள்ளது.

இயற்கை மருத்துவம்

தமிழரின் மருத்துவ முறையில் இயற்கையில் கிடைக்கக் கூடிய மரம், செடி, கொடிகள் போன்றவை மருந்தாகப் பயன்படும் நிலையினைக் காண முடிகிறது.

> "புளிங்காய் வேட்கை தந்து மலர்ந்துத
> இவள் வயா நோய்க்கே"

என்று கர்ப்பக காலத்தில் ஏற்படுகின்ற வேட்கையானது 'வயா' என்று இலக்கியத்தில் கூறப்பட்டுள்ளதை அறிய முடிகிறது.

> "பசும்புளி வேட்கை கடுஞ்சூல் மகளிர்"

கருவுற்ற பெண்களுக்கு கர்;ப்பகாலத்தில் ஏற்படுகின்ற வாந்தியெடுக்கும் உணர்வினை புளியங்காய் கட்டுப்படுத்தும் என்று புளியங்காயின் மருத்துவக் குணம் கூறப்பட்டுள்ளது.

சங்க காலத்தில் வயா நோயினால் துன்புற்ற கர்;பிணிப் பெண்கள் மண்ணை உண்ணும் பழக்கத்தினைக் கொண்டிருந்தனர்.

> "வயவுறு மகளிர் வேட்டுவனின் அல்லாது
> பகைவர் உண்ணா அரும் மண்ணினையே"

சேர மன்னன் யானைக்கட்சேய் மாந்தரஞ்சேரல் இரும்பொறையை புகழ்ந்து பாடும் பொருட்டு, குறுங்கோழியூர் கிழார் என்ற என்ற புலவர் அவருடைய நாட்டில் வயா நோயினால் துன்புறும் கர்ப்பிணிப் பெண்களன்றி அவரது எதிரிகளின் நாட்டைச் சேர்ந்த எவரும் அவரது நாட்டின் மண்ணை உண்டதில்லை என்று அவரது நாட்டின் பெருமையினைப் புகழ்ந்து பாடியிருப்பதைப் புறநானூற்றின் வாயிலாக அறிய முடிகின்றது.

வேம்பு, கடுகு, கீரை, நெல்லி போன்ற இயற்கையில் கிடைக்கும் பொருட்களில் மருத்துவக் குணம் இருப்பதை தமிழர்கள் அறிந்திருந்த செய்தியை எட்டுத்தொகை நூல்கள் புலப்படுத்துகின்றன.

"தீங்கனி இரவமொடு வேம்புமனைச் செடி"
வாங்கு மருப்புயாழொடு பல்இயம் கறங்கக்
கைபயப் பெயர்த்து மை இழுது இழுகி
ஐயவி சிதறி, ஆம்பல் ஊதி
இசைமணி எறிந்து காஞ்சி பாடி
நெடுநகர் வரைப்பின் புகைஇக்
காக்கம் வம்மோ!
வேந்தரு விழுமும்"

இப்பாடலின் வாயிலாக போரில் விழுப்புண் பெற்றத் தலைவனுக்கு மருந்திட்டு காக்க இயற்கையில் உள்ள பொருட்களைப் பயன்படுத்தியுள்ளமையை அறிய முடிகிறது.

அறுவை சிகிச்சை முறை

இன்றைய மருத்துவத்தின் உயரிய நிலையான அறுவைச் சிகிச்சை முறைக்கு முன்னோடிகள் நம் தமிழ்ச் சான்றோர்களே ஆவார். போரில் புண்பட்ட வீரர்களின் உடலானது ஊசி கொண்டு தைக்கப்பட்டதாக பதிற்றுப்பத்து பறை சாற்றுகின்றது.

"மீன் கொட்பின் பனிக்கயம் மூழ்கி
சிரல் பெயர்ந்தனை நெடுவள் ஊசி
நெடுவசி பரந்த வடுவாழ்
மார்பின் அம்பசேர் உடம்பினர்"

இப்பாடலில் ஊசி கொண்டு தைக்கும் அறுவைச் சிகிச்சை முறை எடுத்துரைக்கப்பட்டுள்ளது.

"செருவா யுழக்கிக் குருதி யோட்டிக்
கதுவாய் போக்கி துதிவாயெஃகமொடு
பஞ்சியுங் களையாப் புண்ணார்"

இவ்வரிகளில் போரில் புண்பட்டு கிழிந்த தசையைத் தைத்து பஞ்சு கொண்டு கட்டிய செய்தி புலப்;படுகிறது. ஊசியால் தைத்து பஞ்சினால் கட்டுப்போடுகின்ற இன்றைய அறுவைச் சிகிச்சை முறையை பழந்தமிழர்கள் அன்றே அறிந்து மேற்கொண்டனர்.

முடிவுரை

மனிதன் தோன்றிய நாளிலிருந்து நோய்களும் காணப்படுகின்றன. நோய்களுக்கான மருத்துவ முறைகள்

மனிதனுடைய அறிவின் விளைவாக ஏற்பட்டவையாகும் மனிதனுடைய அறிவின்; படிநிலை வளர்ச்சியாக படிப்படியாகவே மருத்துவ முறைகளும் வளர்ச்சி பெற்று வந்துள்ளன. பழந்தமிழர்கள் நோயால் அவதி பட்ட போது அதனைத் தீர்க்கும் வழிமுறைகளைத் தேடி கண்டுகொண்டனர். இன்றைய மருத்துவ உலகின் முன்னோடியாக தமிழர்கள் கண்ட மருத்துவம் திகழ்கின்றது. இன்றைய சித்த மருத்துவம் போன்ற மருத்துவமுறைகள் அன்றைய இயற்கை மருத்துவத்திலிருந்தே வளர்ச்சி பெற்றிருக்கின்றன என்பதை எட்டுத்தொகை நூல்களின் வழியாகவும் நம்மால் அறிந்து கொள்ள முடிகிறது.

பார்வை நூல்கள்

1.க.சுப்பிரமணியம் சங்ககால பதிப்பகம், சென்னை.

2.சின்னச்சாமி தமிழ்நாட்டு மருத்துவம் அறிவுப்பதிப்பகம், சென்னை

3.சங்க இலக்கியம்; பாரி நிலையம், சென்னை

4.அ.தட்சினாமூர்த்தி தமிழர் நாகரீகமும் பண்பாடும்.

தமிழ் இலக்கியத்தில் மருத்துவத்தின் தொன்மை

திருமதி பெ. சத்யா
தமிழ்த்துறை, உதவிப்பேராசிரியர்
சக்தி மகளிர் கலை மற்றும் அறிவியல் கல்லூரி,
ஒட்டன்சத்திரம்.

முன்னுரை

உலகில் தோன்றியுள்ள மொழிகள் ஏராளம். அவற்றுள்ளே செம்மொழிகள் எனக் கூறப்படுவை ஐந்து. இந்த ஐந்து மொழிகளில் இன்று வரையும் குன்றாப் புகழுடன் நாட்டு வழக்கிலும் ஏட்டு வழக்கிலும் கணக்கற்ற இலக்கிய இலக்கணங்களிலே புரண்டு கொண்டும் இருப்பது தமிழ்மொழியே, தமிழர் பண்பாடு அறம் ,பொருள், இன்பம், வீடு என்னும் நான்கு வகை ஒழுக்கங்களைக் கொண்டது. ஒழுக்கங்களுக்கு முதலாக இருப்பது இன்பமாகும் மனித வாழ்வு இன்பமுடனிருக்க வேண்டும். உடல் நலமும் உள நலமும். செம்மையாகப் பேணப்பட வேண்டும் என்பதைக் கருத்தில் கொண்டு உருவானது தமிழ் மருத்துவம் ஆகும்.

தமிழின் தொன்மை

உலகில் பல்வேறு மொழிகள் எல்லாம் ஏட்டு வழக்கில் மட்டும் உள்ளதே தவிர நாட்டு வழக்கில் இல்லை. தென்னிந்தியாவில் வழங்கப்படும் மொழிகளைத் திராவிட மொழிகள் என்று வழங்குகிறோம் திராவிட மொழிகளில் தமிழே தொன்மையான மொழியாகும். தமிழின் தொன்மையை தமிழ் இலக்கியங்கள் பலப்படப் பேசுகின்றன.

இறையனார் களவியல் உரையில் காட்டப்படும் முச்சங்க வரலாறு தமிழ் இலக்கியத்தின் தொன்மையை

எடுத்துரைப்பதாக உள்ளது சங்கங்கள் இருந்தன என்பதற்கும் அவை பழமை வாய்ந்தவை என்பதற்கும் உரிய பல இலக்கியக் குறிப்புகள் சங்கபாடல்களிலேயே கிடைக்கின்றன.

"ஈனரம் பதின்மரும் பொருது
களத்தொழியப் பெருஞ்சோற்று மிகுபதம்
வரையாது கொடுத்தாய்"- 1

என்ற பாவடிகள் சேரமன்னனான பெருஞ்சோற்று உதியன் சேரலாதனைப் பெருமைப்படுத்த முடிநாகராயர் என்ற புலவரால் பாடப்பட்டதாகும். இவ்வடிகளில் பாண்டவர்கள் ஐவர் கௌரவர்கள் நூற்றுவர் ஆகியோருக்குப் பாரதப்Nபhரிண் போது பெருஞ் சோற்றினை மேற்கொண்ட அரசன் வழங்கினான் என்று குறிப்பிடுகின்றன. இது போன்ற பல இலக்கிய சான்றுகள் தமிழின் தொன்மையை சான்றுகளுடன் விளக்குகின்றனர்.

தமிழ் மருத்துவம்

தமிழ் மருத்துவம் மிகவும் தொன்மையானது என்பதற்கு சான்றுகள் பல உள்ளன. தொல்காப்பியம் இசங்க இலக்கியம்இ ஐம்பெருங்காப்பியம், எட்டுத்தொகைஇ பத்துப்பாட்டுஇ பதினெனகீழ்கணக்கு நூல்கள் ஆகியவற்றில் மருத்துவக் குறிப்புகளும் நோய் பற்றிய குறிப்புகளும் கிடைக்கப் பெறுகின்றன. குறிஞ்சிப் பாடலில் தொகுத்துக் கூறப்பட்டுள்ள மூலிகைப் பட்டியலே தமிழ் மருத்துவப் புலமைக்கு சான்றாக அமைகின்றது.

சங்க இலக்கியத்தில் மருத்துவம்

சங்க கால மக்கள் பல்வேறு மூலிகைகள் பற்றியும்இ அவற்றின் நோய்தீர்க்கும் பண்புகள் பற்றியும் நன்கு அறிந்திருந்தனர். எல்லாக் காலங்களிலும் மக்களிடம் பல்வேறு நோய்களும் உடற் குறைபாடுகளும் உள்ளன என்பதை தமிழ் இலக்கியங்கள் வழி அறிய முடிகின்றது.

"திருந்திய யாக்கையுள் மருத்துவன் ஊட்டிய
மருந்துபோல் மருந்தாகி மனன் உவப்ப"-2

என்று கலித்தொகையில் நன்கு பாதுகாக்கப்பட்ட உடம்பினை நேயாளி கொண்டிருந்தால் கொடுக்கப்படும

மருந்தானது நோயாளியின் உடல் உறுப்புகளை விரைவாக குணமடைய செய்து விடும் என்கிறது.

வேம்பின் மருத்துவம்

வீடுகளில் உள்ளவர்களுக்கு நோய் ஏற்பட்டாலோ ஊரில் உள்ள பலருக்கும் ஒரே மாதிரியான நோய் அறிகுறி காணப்பட்டால் நோய் தடுப்பு முறையால் வீடுகளை சுற்றியுள்ள பகுதிகளையும் அதைப்போல வெளிப்புறமிருந்து நோய்க்கிருமிகள் வீடுக்குள் புகாமல் இருக்க வீட்டின் இறைப்பில் வேம்பின் இலைகளைக் கொத்துக் கொத்தாகச் செருகி வைக்கும் பழக்கம் இருந்திருக்கின்றது.

"தீங்கனி இரவுமொடு வேம்பு மனைச் செரீஇ"-3

என்னும் புறநானூற்றுள் செய்யுள் விழுப்புண் கொண்ட போர்வீரன் கிடத்தப்பட்டிருக்கும் வீட்டில் இறைப்பில் இரவம் வேம்பு ஆகிய இலைகளைச் செருகி வைத்திருப்பர் என்பதை விளக்குகின்றது.

குழந்தை மருத்துவம்

தமிழர்கள் வாழ்வில் இடம் பெற்றிருந்த பல்வேறு வளர்ச்சி படிகளை கொண்டு விளங்கியது என்பதற்கு இளங்குழந்தைகளுக்குச் செய்யப்படுகின்ற மருத்துவம் மிகவும் தேர்ந்தநிலை பெற்று சிறப்புடன் இருந்ததை சான்றுகள் வழியாக அறியமுடிகின்றது.

இளங்குழந்தைகளிடம் நோயையோ நோயின் குறியையோ கூறும் நிலையில் இருப்பதில்லை குறிப்பறிந்தும் சோதித்தறிந்துமே மருத்துவம் பார்க்க வேண்டியிருக்கும் அம்மாதிரியான மருத்துவத்தை மனையுறையும் பெண்டிரே செய்தனர் என்பதற்குச் சீவக சிந்தாமணி சான்றாகிறது.

"காடியாடித் தாரய்ச் சாறும் கன்னன் மணியும் நறு நெய்யும்
கூடச் செம்பொன் கொளத் தேய்த்துக்கொண்டு நாளும் வாயுறீஇப்
பாடற் கினிய பகுவாயும் கண்ணும்பெருக உகிர் உறுத்தித்

தேடித் தீந்தேன் திப்பிலி தேய்த்துஅண்ணா உரிஞ்சி மூக்குயர்ந்தார்-4

பிரமிச்சாறு கண்ட சருக்கரை தேன் நறுநெய் ஆகியவற்றுடன் காடியைக் கூட்டி பொன்னினால் தேய்த்துக் குழந்தைகள் உண்ணுகின்ற அளவிற்கும் பக்குவப்படுத்திய மருந்தாக்கி தினமும் வாய் வழி ஊட்டினர். என்றதனால் குழந்தை மருத்துவத்தினை மகளிரும் அறிந்தருந்தனர் என்பது பெறப்படுகின்றது.

முடிவுரை

சங்க இலக்கியங்களில் இடம் பெறுகின்ற மருத்துவ குறிப்புகள் தமிழ் மொழியின் தொன்மைகள் தமிழ் மருத்துவம் மூலம் குழந்தைகளுக்கான மருத்துவ முறைகளை மகளிர் எவ்வாறு கையாண்டனர் என்பதை இக்கட்டுரைவயிலாக அறிலாம்

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பக்தி இலக்கிய மருத்துவத்தில் வள்ளலாரின் பங்கு

முனைவர் மா. தமிழ்செல்வி
தமிழ்த்துறை உதவிப்பேராசிரியர்
சக்தி மகளிர் கலை மற்றும் அறிவியல் கல்லூரி,
ஒட்டன்சத்திரம்.

முன்னுரை

"நோயற்ற வாழ்வே குறைவற்ற செல்வம்" என்ற தமிழ் மக்கள் பொன்போல் போற்றிய நன்மொழியாகும். ஆரோக்கியமான வாழ்வே நிறைவான செல்வம் ஆகும். நோய்களைப் பற்றியும், நோய் தீர்க்கும் முறை பற்றியும் தமிழர் அறிந்தனர். அத்தகைய மருத்துவத்தைப் பற்றி வள்ளலார் கூறும் செய்திகள் மூலம் அறிய முடிகிறது.

மருத்துவம்

மருத்துவம் என்பது மக்கள் வாழ்;வோடும், இணைந்து காணப்படுவதால் மருநத்துவர்கள் மதிப்புமிக்கவர்களாக போற்றப்பட்டனர்.

மருத்துவத்தைக் குறிக்கும் சொற்கள் 'அறவோன்' மருத்துரை 'இடுவோர்' இன்னுயிர்ப் போத்தரு மருத்துவர் என்று ஆராயப்பட்டதில் அறவோன் என்று அழைக்கப்பட்டனர்.

மருந்து என்பதற்கு "அமுதம், 'ஓடதம்',ஒளடதம் எனப் பொருள் கூறுகிறது தமிழ் மொழியகராதி.

மருந்தானது நோயாளியின் நோயைக் கட்டுப்படுத்தி உயிருக்குத் தீங்கு ஏற்படாமல் காப்பதும், பின் விளைவுகளை ஏற்படுத்தாமல் நோயை மட்டும் விரைவாகத் தீர்க்கம் மருந்தாக இருக்க வேண்டும்.

கலித்தொகையின் மருத்துவத்தில் பிறருடைய நோயை தான் உற்றது போல் கருதி மருத்துவம் செய்ய வேண்டும் என்பதை

> "பிறர்நோயும் தந்நோய் போல்போற்றி அறனறிதல்
> துன்றவர்க் கெல்லாம் கடனாம்"

மருத்துவத்தின் பொருட்கள்

மக்கள் தங்கள் வருகின்ற பகுதிகளுக்கு அருகிலே கிடைத்த பச்சிலையையும், கனிமப் பொருட்களையும் நோய் தீர்க்கும் மருந்துகளாகப் பயன்படுத்தினர்.

> "புல்லும் மரமும் புதலும் பூடும்
> வல்லியும் பெயரும்; கொண்ட மருந்தெனப் படும்"

என்று சேந்தன் திவாகரம் கூறுகிறது. புல் முதல் மரங்கள் வரை அனைத்துப் பாகங்களும் மருந்தாகப் பயன்பட்டன.

வள்ளலார் கூறும் ஆலோசனைகள்

> "நித்தியம் சூரியோதயமாக ஐந்து நாழிகைக்கு
> முன் எழுந்திருத்தல்"

பசி கண்டவுடன் தடை செய்யாமல் ஆகாரம் கொடுத்தல் வேண்டும். கிழங்கு வகைகளில் கருணைக் கிழங்கு மட்டும் பதார்த்தங்களில் புளி, மிளகாய் சிறிது சேர்க்க வேண்டும். மிளகு, சீரகம் அதிகமாய்ச் சேர்த்தல் வேண்டும். உப்பு குறைவாகச் சேர்த்தல் வேண்டும். பகலில் எந்த வகையிலும் நித்திரை ஆகாது.

வள்ளலார் கூறும் மருத்துவம்

பூர்ணக் கர்ப்பம் உருவாவதற்கு – கறுட
கசாயம் ஐந்து மாதத்துக் கர்ப்பிணிக்கு கொடுக்க பத்து மாததுல் பூர்ணக் கர்ப்பம் உண்டாகிப் பிரசவம் ஆகும்.

தேக மெலிவிற்கு பொன்னாங்கண்ணி ஒரு பங்கு, கரிசலாங்கண்ணி முக்கால் பங்கு சேர்த்து ஒருமுறை வேகவைத்து தண்ணீர் வடித்துப் பின்பு மிளகு சீரகம் போட்டுச் சாப்பிட்டால் குணமாகும்.

> "அகத்தே கருத்து புறத்து வெழுந்து திரிந்த உலக ரனைவ
> ரையுஞ்
> சகத்தே திரித்திச் சன்மார்க்கச் சங்கத் தடைவித் இட

—————— பழந்தமிழ் இலக்கியத்தில் மருந்து | **183**

இகத்தே பரத்தை பெற்று மகிழ்ந் திடுவர் கென்றே
யென இந்த முகத்தே இறைவன் குருதிக் கவுற்றே நருளப்
பெற்றேனே"

பிறவி நோக்கத்தை அறிவித்தார் வள்ளலார் பெருமனார்.
மனிதன் இப்பூவுலகில் அவதரித்ததன் முதன்மை நோக்கம்
நற்காரியங்கள் பலவற்றிலும் தன்னை ஈடுபடுத்திக் கொண்டு
தனக்கும் சமூகத்திற்கும் தன்னால் இயன்ற சேவையைச் செய்து
வாழ்வதாகும்.

வளமான வாழ்விற்கு வள்ளலர்

"சூரியோதற்கு முன் நித்திரை நீங்கி எழுந்து விபூதி தரித்து
சிறிது நேரம் உட்கார்ந்து கடவுளைத் தியானம் செய்தல்"

ஆலும் வேலும் பல்லுக்குறுதி என்ற முன்னோர் மொழியை
பொன்போல் போற்றும் விதத்தில் வள்ளலார் பெருமனார்
'வேலங்குச்சி' ஆலம் விழுதுகளைக் கொண்டு பல்துலக்கல்
'கரிசலாங்கண்ணித் தூளைக்கொண்டு பல்த்துலக்கல் உண்ணக்கூடிய
உணவில் கிழங்கு வகைகள் உணவும் பழைய கரிகளையும்
உப்பு மிகுதியாகவும் வடை அதிரசம் தோசை போன்றவை
கொள்ளப்பட்டது. எந்தக் காலத்திலும் பசித்தால் அல்லது எந்த
வகையிலும் போஜனம் செய்யப்படாது. உண்ணத்தகுந்தவையாக
பழ வகையும் புளி, மிளகாயும் மிளகு சீரகம் பருப்பு வகைகளில்
முளைக்காட்டாத துவரம் பருப்பு போன்றவை சேர்த்துக்
கொள்ளுதல் வேண்டும்.

உணவு உட்கொண்ட பின் நித்திரை கூடாது, படுக்கும்
போது இடது கைப்பக்கமாகவே படுத்தல் வேண்டும். ஏழரை
அல்லது பத்து நாழிகை அளவு நித்திரை செய்தால் இரவில்
சொப்பனம் வராது. மிருதுவாகவே நித்திரை செய்து விழித்துக்
கொள்ளல் வேண்டும். வள்ளலாரின் கருணை நோக்கினை அறிய
அவர் கூறிய 'வாடிய பயிரைக் கண்ட போதெல்லாம் வாடினேன்'
என்ற வாக்கினை நினைவு கூர்தல் வேண்டும்.

"ஒழுக்கம் விழுப்பம் தரலான் ஒழுக்கம்
உயிரினும் ஓம்பப் படும்"

என்ற வள்ளுவரின் கூற்றானது ராமலிங்க அடிகளாரும்

நீடுழி வாழவும் மனத்தை வளப்படுத்திடவும், ஒழுக்கத்தை வலியுறுத்துகின்றார். இவர் ஒழுக்கமில்லா வாழ்வை காவல் இல்லா ஊருக்கும் மனமில்லா மலருக்கும் ஒப்பிடுகிறார்.

வள்ளலாரின் மூலிகை வைத்தியம்

சூட்டைத் தணித்து வயோதிகத் தன்மை அடையாவண்ணம் இருந்திட ஓர்ரைத் தாமரை உதவுகிறது. இதனைக் காயகல்பம் மூலிகை எனலாம்.

"சிரசுடலாம் ஆக்கும் வெண்டை பிறசுநீர் நீக்கும் ஆதண்டை"

என்றும் வள்ளலாரின் கூற்றை நூறு மில்லி எண்ணெயில் ஐம்பது மில்லி ஆதந்தை இலையில் சாற்றை கலந்து கொதிக்க வைத்து வடிகட்டி வாரம் இருமுறை தேய்த்து வெந்நீரில் தலைமுழுகி வர சிரசு நீர் குணமாகும். கரிசலாங்கண்ணிக் கீரையை தொடர்ந்து உணவில் சேர்த்து வர தேகமானது கட்டித் தங்கம் போன்ற உறுதியுடனும் பொலிவுடனும் விளங்கும், சலித் தொந்தரவினைப் போக்கும். கொட்டைக் கரத்தை மூலிகையை இளம் வயதில் ஏற்படும் பித்த நரைகளைப் போக்கிட உதவும்.

முடிவுரை

உலகில் உள்ள அனைவரும் நாடு, மொழி, இனம் ஆகியவற்றைக் கடந்து எல்லோராலும் ஏற்றுக்கொள்ளத்தக்க மருத்துவக் கருத்துகளை வள்ளலாரின் திருவருட்பாவில் அறிய முடிகிறது. தோன்றின் புகழொடு தோன்றுக அஃதிலார் தோன்றலின் தோன்றாமை நன்று என்ற வள்ளுவரின் வாக்கிற்கேற்ப வள்ளலார் ஓர் மருத்துவர் ஆவார்.

பார்வை நூல்கள்

1. திருவருட்பா இராமலிங்க அடிகள், அண்ணாமலைப பல்கலைக்கழக வெளியீடு.

2. டாக்டர் சு.அமிர்தலிங்கம், வள்ளலார் வழங்கிய கொடை, சென்னை.

3. டாக்டர்.பா.அருள்செல்வி, சமரச சுத்த சன்மார்க்க நெறி, அருட்ஜோதி பதிப்பகம்.

இரட்டைக்காப்பியம் காட்டும் மருத்துவம்

திருமதி ந.திவ்யா
தமிழ்த்துறை, உதவிப்பேராசிரியர்
சக்தி மகளிர் கலை மற்றும் அறிவியல் கல்லூரி
ஒட்டன்சத்திரம்

முன்னுரை

தமிழ் மருத்துவ மரபை தோற்றுவித்தவர் திருமூலர் என்கின்றனர். திருமூலர் இயற்றிய எண்ணாயிரம் என்னும் நூல் கிடைக்கவில்லை. தனிமனிதன் உடலும் உள்ளமும் நலமாக அமைவது அவனுக்கு மட்டுமின்றி அவனைச் சார்ந்தோருக்கும் நலம் தரும் ஏனெனில் நலமான மனிதனே நல்ல சமுதாத்திற்கான வழிகாட்டியாகத் திகழ்வான். இலக்கியங்கள் அனுபவத்தின் வெளிப்பாடுகள் இரட்டைக் காப்பியங்களில் உடல், மனம் சார்ந்த நோய்கள் அந்நோய்களைத் தீர்க்கும் வழிமுறைகள் குறித்து கூறப்பட்டுள்ளதை இவண் ஆராய உள்ளோம்.

சிலப்பதிகாரம் மற்றும் மணிமேகலை கா காணப்படும் நோய்கள் குறித்தும் மருத்துவ முறை இக்கட்டுரையில் விளக்கப்பட்டுள்ளது.

இளங்கோவடிகள் காட்டும் மருத்துவம்

சிலப்பதிகாரத்தில் இந்திரவிழா ஊரெடுத்த காதையில் இளங்கோவடிகள்

"கோவியன் வீதியும் கொடித்தேர் வீதியும்
பீடிகைத் தெருவும் பெருங்குடி வணிகர்
மாடமறுகும், மறையோர் இருக்கையும்
வீழ்குடி உழவரொடு விளங்கிய கொள்கை

மருத்துவத்திற்குப் பயன்படுகின்ற ஒவ்வொரு மருந்தும் ஒவ்வொரு குணப்பண்பினைக் கொண்டது. அதே போல் அம்மருந்துகள் ஒன்றோடொன்று கூடி வினையாற்றும் போது நேர்வினை எதிர்வினை ஆகியவற்றைத் தோற்றுவிக்கக்கூடியன. இந்த இரு வகைகளையும் மருத்துவ நூலார் நட்பு பகை என்னும் இரண்டு பண்புகளாகக் குறிப்பிடுகின்றனர்.

நோய்கள்

மனித உடலில் உள்ள வாதம், பித்தம், கபம் என்ற மூன்று கூறுகளும் தத்தம் தொழில் இருந்து மாறுபடும் பொழுதும் நோய்கள் ஏற்படுகின்றன. மணிமேகலையில் பிணி மூப்பு சாக்காடு பற்றிய அறிய விளக்கங்களை காணமுடிகிறது. பிணி என்பது உடலின் இயல்பாக நடைபெறும் நிகழ்வுகளிலிருந்து மாறுபட்டு உடம்பிற்கு துன்பத்தைத் தருவதாகும். மூப்பு என்பது வயதாகியதனால் சத்துக் குறைந்து உடல் தளர்ச்சியடைவதாகும். சாக்காடு என்பது சூரியன் மறைவது போல உடல் மறைவதாகும் இது இறத்தல் என்று சொல்லப்படும். இதனை பிணியெனப்படுவது சார்பிற் பிறதாய் இயற்கையிற் 'றிரிந்துடம் இடும்பைப் புரிதல் மூப்பென மொழிப தந்தத் தளவுந் தாக்குநிலை யாமயிற் ராண்டலந் திடுதல் சாக்கா டென்ப தருவுறுத் தன்மை யாக்கை வீழ்கதி றென மறைந்து திடுதல்' என மணிமேகலை குறிப்பிடுகின்றது.

பெரும்பசி நோய்

காயசண்டிகை என்னும் பெண்ணிற்கு யானைத்தீ என்னும் பெரும் பசிநோய் இருந்தமையை மணிமேகலை கூறுகின்றது. இதனை

"யானைத் தீ நோய் அகவயிற்றடங்கிய"

எனும் அடி உணர்த்துகின்றது.

மருத்துவம்

மனித உடலில் ஏற்படும் நோய்களுக்குத் தவாரப்பொருட்களையோ விலங்குப்பொருட்களையோ பயன்படுத்தி நோய் தீர்க்கும் முறை மருத்துவம் என்று அழைக்கப்படுகின்றது. மணிமேகலையில் கருநாகற் கனி பசிப்பிணியைப் போக்க மருந்தாகப் பயன்பட்டதை அறியலாம்.

ஆயுள் வேதரும், காலக் கணிதரும்."

என்று நம் பழந்தமிழர்கள் 'ஆயுர்வேதம்' என்னும் மருத்துவமுறையை நன்கு அறிந்திருந்தனர் என்பதை இதன் மூலம் அறிய முடிகிறது.

சிலப்பதிகாரத்தின் கூட்டு மருந்து

பல மருந்துகளைத் தொகையாகக் குறிப்பிடும் சொல் பழந்தமிழரிடையே காணப்படுகிறது. மருந்துகளைக் குறிக்கும் தொகைச்சொல் வழக்கில் இருந்திருந்ததைக் கொண்டு மருந்தியலின் வளர்ந்த நிலையினை உணரலாம். நிலவரைப்பு என்பது மருந்தின் தொகைச் சொல் இச்சொல்லைப் பற்றிய கருத்துரை வழங்கிய அடியார்க்கு நல்லார் கீழ்கண்ட நான்கு மருந்துகளைக் குறிப்பிடுகிறார்.

சிலப்பதிகாரத்தில் அரைப்பு முறையால் செய்யும் மருந்துகள் பற்றிய குறிப்புகள் கிடைக்கின்றன. அவை,

சந்தான கரணி – முறிந்த உறுப்புக்களை ஒட்டுவது
சல்லிய கரணி – வேல் தைத்த புண்ணை ஆற்றுவது
தமனிய கரணி – புண்ணின் தழும்பை மாற்றுவது
மிருத சஞ்சீவினி - இறந்த உடலை உயிர்ப்பிக்கச் செய்வது

ஆனால் இம்மருந்துகளைப் பற்றிய குறிப்புகள் எந்த மருத்துவ நூலிலும் காணப்படவில்லை.மேலும் கரணி என்பது அரைப்பு முறையால் செய்யப்படுகின்ற மருந்துகளைக் குறிப்பிடும்.

அழகுக்கு மருந்து

நாட்டிய நாயகி கலைச்செல்வி மாதவி தன் காதல் தலைவன் கோவலனுடன் உலாவி வர தன்னை ஒப்பனை செய்து கொள்ள நீராடுகிறாள். மாதவி நீராடிய நன்னீரில் பத்து வகைப்பட்ட துவர் ஐந்து வகைப்பட்ட விரை முப்பத்தி ரெண்டு வகை ஓமாலிகை ஆகிய நாற்பத்தேழு மருந்து பொருட்களும் ஊறிக் காய்ந்தது என்கிறது சிலம்பு இவை அழகுப் பொருட்களின் கூட்டுப் போலும் அப்பொருட்கள் ஊறிய நீரில் நீராடிய மாதவி நிறம்பெற்றாள் என்ற குறிப்பிடுகிறது. மருந்து நோய்க்கு மட்டுமல்லாமல் உடல் வனப்பிற்கும் பயன்பட்டிருக்கிறது. தமிழ்

பசிப்பிணி போக்கும் கருநாவல்

பன்னிரு ஆண்டு பசி வராமல் தடுக்கும் அரிய வலிமை உடைய கருநாவற் கனி பற்றிய குறிப்பினை மணிமேகலையில் வரும் விருச்சிக முனிவன் கதையில் காணலாம். 'பெருங்குலைப் பெண்ணை கருங்கனி யனைதோர் இருங்கனி நாவற்பழம்' என்று அடையாளம் காட்டப்படும் கருநாவற் பழம் பனைமரத்தின் கரிய கனியைப் போன்று இருக்குமாம். இத்தகைய கருநாவற் பழம் பற்றிய தாவரவியல் ஆய்வு மேற்கொண்டால் இதன் உண்மை வெளிப்படும்.

உணவுப்பழக்கம்

பண்டைத் தமிழரின் மருத்துவம் ஆகிய சித்தமருத்துவத்தில் பயன்படும் மருந்துப் பொருட்கள் பெரும்பாலும் உணவுப்பொருட்களாகவே அமைந்துள்ளன. 'உணவே மருந்து மருந்தே உணவு' என்ற கொள்கையை அவர்கள் கடைபிடித்தனர். உணவுப் பழக்கமும் நோயிலிருந்து விடுபட முக்கியப் பங்கு வகிக்கின்றது. உணவு உண்ட பின் எளிதில் சீரணமாக வெற்றிலைப் பாக்கு போடும் பழக்கம் இன்னும் வழக்கத்தில் உள்ளது. வெற்றிலைப் பாக்குடன் கற்பூரம் சேர்த்து கரிக்கும் பழக்கத்தினை மணிமேகலையில் 'ஆசனத் தேற்றி அறுசுவை நால்வகை போனக மேந்தி பொழுதினிற் உண்ட பின் பாசிலைத் திரயலும் பளிதமும் படைத்து' என்னும் அடிகளால் குறிப்பிடுகிறது.

மந்திர மருத்துவம்

வளர்ச்சியடைந்த மருத்துவத் துறையில் நோய்களில் தன்மைக்கேற்ப பல்வேறு விதமான மருத்துவ முறைகள் உள்ளதைப் போன்று மாற்றுமுறை மருத்துவங்களில் ஒன்றாக மந்திர மருத்துவம் உள்ளது. ஒரு சில உடல் உளத் துன்பங்கள் இறைவனின் கோபத்தாலோ தீய சக்திகளின் ஆற்றலாலோ ஏற்படுவதாக மக்கள் நம்புகின்றனர். அத்தகைய நோய் துன்பங்களை மருத்துவங்களாலோ மூலிகைகளாலோ குணப்படுத்த முடியாது என நம்புகின்றனர்.

ஏனெனில் திருநாமங்களையும் மந்திரங்களையும் மீண்டும் மீண்டும் பல முறை எச்சரிப்பதாலும் குணப்படுத்த முடியும்

என்று நம்புகின்றனர். அத்தகைய மருத்துவம் மந்திர மருத்துவம் எனப்படுகிறது. இன்றும் கிராமங்களில் சுளுக்கு, காய்ச்சல், விசக்கடி, நாய்க்கடி போன்றவற்றிற்கு பாடம் போடுகின்றனர். பேயோட்டுதல், திரிசுற்றிப் போடுதல் இடுமருந்து முதலானவை மந்திரத்தோடு தொடர்புடைய மருத்துவமாகும்.

பசியை நீக்க வல்ல மருந்து

பெரும்பசியை நீக்க வல்லது மந்திரங்கள் என்று நம்பினர்.

"மக்கள் யாக்கை உணவின் பிண்டம் இப்பெரு மந்நதிரம் இரும்பர் யாருக்குமென்"

என்ற அடிகளால் அறிய முடிகின்றது.

இடுமருந்து

தன் இச்சைக்கு ஒருவரை இணங்க வைக்கவும் தன் கட்டுப்பாட்டில் ஒருவரை வைத்துக்கொள்ளவும் உதவும் ஒருவகை மருந்தே இடுமருந்து எனப்படும். சில வகை மூலிகைகளையும், எண்ணெய்களையும் மந்திரித்து அவற்றைத் தாம் விரும்பியவர் உணவிலோ அல்லது வேறு எவ்வகையிலோ சேர்த்துவிடுவர். இம்மருந்தின் குணத்தால் அவர்கள் வசியமானாலும் அதன் பாதிப்பால் வயிற்றுவலி, பசியின்மை, மூளைக்கோளாறு ஆகியன உண்டாகி இறுதியில் நடைப்பிணமாகத் திரிவர். அக்காலத்தில் மருந்தின் மூலம் அறிவைக் கெடுத்து பித்தேறச் செய்யும் இடுமருந்து இருந்ததை, அறிவு திரிந்திவ் வகனக ரெல்லாம் எறிதரு கோலம்யாம் செய்குவ வென்றே மயற் பகை யூட்ட மறுபிறப் புணர்ந்தாள் என்று மணிமேகலை குறிக்கிறது.

முடிவுரை

மனிதன் நோயில்லாது வாழ்வதே சிறந்தது என்பதை "நோயற்ற வாழ்வே குறைவற்ற செல்வம்" என்னும் பழமொழி கூறுகிறது. ஐம்பெருங்காப்பியங்களில் இரட்டைக் காப்பியங்களான சிலப்பதிகாரம், மணிமேகலையில் கூறப்பட்டிருந்த மருந்து முறைகள், அழகுக்குறிப்புகள் மற்றும் பெரும்பசியை போக்கும் முறை என பலவற்றை இக்கட்டுரையின் வழி அறியமுடிகிறது.

பார்வை நூல்கள்

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2.செல்லப்பன் சு.சிலம்பொலி, பாரதி பதிப்பகம், சென்னை

சங்க இலக்கியத்தின் மருத்துவ முறைகள்

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முன்னுரை

நம் இந்தியாவின் தலைசிறந்த பாரம்பரிய சித்த மருத்துவம் மிகப்பழமையான மருத்துவ முறை. ஆகச்சிறந்த மருத்துவம் சித்தா்களின் ஆய்வுகளின் அடிப்படையில் பல ஆயிரம் ஆண்டுகளாக வெற்றி பெற்ற சிகிச்சை முறையாக வழிவழியாக வந்து கொண்டிருக்கும். ஒரு மருத்துவ முறை ஓலைச்சுவடிகளில் எழுதி பராமரிக்கப்பட்டு வந்துள்ள மருத்துவம் குறிப்புகளின் அடிப்படையில் மூலிகை மருத்துவம் பார்க்கப்படுகிறது. பதினெட்டு சித்தா்கள் இயற்கை மருத்துவம் சார்ந்த இந்த சித்த மருத்துவத்தின் வளர்ச்சிக்காக பெரிதும் உழைத்தவாகள் என்று கருதப்படுகிறது.

சித்த மருந்துவ அமைப்பு

சித்த மருந்துகளான குறிப்பிட்ட மூலிகை தயாரிப்பு. கனிம பொருட்கள் என்ற உப்புகள், தாதுக்களிலிருந்து விளையு பொருட்களான கொம்புகள், முத்துக்கள் அல்லது ப போன்றவைகள் மூலம் தயாரிக்கப்படுபவை தாவரங்க தாதுக்கள் மற்றும் விலங்கு பொருட்களின் பண்புகள், உயிர் சூத்திரங்களின் பண்புகள் அதன் சுத்திகரிப்பு செயலாக்கம் அவை நிர்ணயித்தல், நச்சுத்தன்மை, மாற்று மருந்து மற்றும் மருத்துவ பயன்பாடு பற்றிய சித்தர்களின் ஞானம், அதற்கான அவாகளின்

கண்டுபிடிப்புகள் போன்றவை சங்க இலக்கிய பாடல்களின் மூலம் காணலாம்.

தொல்காப்பியம்

அகத்தியம் என்னும் முத்தமிழ் இலக்கண நூலைப் படைத்த அகத்தியா, வாடகம் முதலாம் சித்த மருத்துவ நூல்களையும் உருவாக்கியிருக்கலாம் என்று நம்பப்படுகின்றது. தொல்காப்பியச் சூத்திரங்கள் தொல்காப்பியா காலத்திற்கு முன்பே மருத்துவ நூல்கள் இருந்திருக்கலாம் என்றும் கடைச்சங்க காலத்திற்கு முன்பே சித்த மருத்துவமும் மருத்துவ நூல்களும் இருந்திருக்க வேண்டும் என்பதற்கும் ஆதாரங்களாகின்றன.

> "நிறைமொழி மாந்தர் ஆணையிற் கிளக்கும்
> மறைமொழி தானே மந்திரம் என்ப"

என்ற இந்த தொல்காப்பிய வரிகளே ஆதாரமாகும்.

கலித்தொகை

> "அழிந்து அயல் அறிந்த எவ்வம் மேற்பட
> பெரும் பேதுறுதல் களைமதி, பெரும
> வருந்திய செல்லல் தீர்த்த திறன் அறி ஒருவன்
> மருந்து அறைகோடலின் கொடிதே யாழ நின்ற
> அருந்தியோர் நெஞ்சம் அழிந்து உக விடினே"

உள்ளம் உடைந்து போன வருந்தம் ஊராருக்கும் தெரிந்துவிட்ட வருத்தமும் மிகுந்திட, வேதனையால் பித்துப்பிடித்துப் போவதைத் தடுத்து நிறுத்துவாய் பெருமானே ! வருந்தவைக்கும் நோயைத் தீர்ப்பதற்கான வழியை அறிந்த ஒருவன் அதற்குரிய மருந்தைத் தனக்கு தெரியாது என்று கூறுவதைக் காட்டிலும் கொடியது உன்னை நுகர்தோரின் நெஞ்சம் அழிந்து போகும்படி அவரை கைவிட்டு விடுவது என்ற பாடலின் வரிகள் சுட்டிக்காட்டுகின்றது.

நற்றிணை

சங்க இலக்கியங்களில் மகப்பேறு வைத்தியம் சார்ந்த சில செய்திகளையும் காணமுடிகின்றது. கருவுற்ற பெண்ணுக்குச் செய்யும் சடங்குகள் குறித்தும் குழந்தை பெற்ற பிறகு இளம் தாயான காலத்தே அமைந்த மருத்துவமும் அது தொடாபான கிரியைகள் போன்றவை பற்றியும் தொல்காப்பியம் குறிப்பிடுகிறது நற்றிணை பாடல் ஒன்று

"வாராய் பாண நடுக்கம் நேரிழை
கடும்புடை கடுஞ்சரல் நங்குடிக்கு உதவி
நெய்யோடு இமைக்கும் ஐயவித் திரள் காழ்
விளங்கு நகா விளங்கத் கிடந்தோட் குறுகா
புதல்வன் ஈன்றெனப்"

என்று நற்றிணை பாடல் பிறப்பின் சித்த மருந்தினை
எடுத்துக் கூறுகின்றது.

புறநானூறு

கருவுற்ற பெண்கள் மசக்கை நோய் உடையோராக புளிப்பு
பண்டங்கள் களிமண் உருண்டை முதலாம் பொருள்களைப்
பிறர் அறியாவண்ணம் விரும்பி உண்ணுவதுண்டு அச்செய்தி புற
நானூற்றிலும் கூறப்படுகின்றது.

"பிறர் மண்ணுண்ணும் செம்மல் நின் நாட்டு
வயவுறு மகளிர் வேட்டுணி நல்லது
பகைவருண்ணா அருமண்ணினையோ"

என்ற பாடல் வழிநின்று அறியலாம்.

மேலும்

"பசிப்பிணி மருத்துவனில்லாம் அனித்தோ கூறுமின்
எமக்கே"

என்கிறது பசிப்பிணி என்ற வயிறு தொடர்பான நோய்யினை
கூறுகின்றது.

குறுந்தொகை

"பசும்புளி வேட்கை கடுஞ் சூழ்
மகளிர் போல நீர்கொண்டு"

முதன்முதலாக கருவுற்ற பெண்கள் பசிய புளிப்புச்சுவையில்
விருப்பங்கொள்ளுதலைக் குறுந்தொகை பாடல் மேற்கண்டவாறு
குறிப்பிடுகின்றது.

மேலும்

"இன்னுயிர் போத்தரு மருத்துவர்"

என உயிரை மீட்டுத் தருவோராக மருத்துவரை

கூறப்பட்டதையும்

"திருந்திய யாக்கையுடன் மருத்துவனூட்டி மருந்து போல"

என மருத்துவர் தரும் மருந்தின் மேன்மை பற்றியும் கலித்தொகையில் பேசப்படுகின்றது.

பதிற்றுப்பத்து

இன்றைய மருத்துவத்தின் உயரிய நிலையான அறுவை சிகிச்சை முறைக்கு முன்னோடி நம் தமிழ்ச் சான்றோர்களே ஆவர் போரிலே புண்பட்ட வீரர்களின் உடலானது ஊசி கொண்டு தைக்கப்பட்டதாகப் பதிற்றுப்பத்து பறைசாற்றுகின்றது.

"மீன் கொட்பின் பினிக்கயம் மூழ்கிச்
சிரல் பெயர்ந்தனை நெடுவள் ஊசி
நெடுவசி பரந்த வடுவாழ்
மார்பின் அம்புசேர் உடம்பினர்"

என்று பதிற்றுப்பத்து பாடல் கூறுகின்றது.

முடிவுரை

மனிதன் தோன்றிய நாளிலிருந்தே நோய்களும் காணப்படுகின்றன. நோய்களுக்கான மருத்துவ முறைகள் மனிதனுடைய அறிவின் விளைவாக ஏற்பட்டவையாகும். மனிதனுடைய அறிவின் படிநிலை வளர்ச்சியாகப் படிப்படியாகவே மருத்துவ முறைகளும் வளர்ச்சி பெற்று வந்துள்ளன. பழந்தமிழர்கள் நோயால் அவதிப்பட்ட போது அதனைத் தீர்க்கும் வழிமுறைகளைத் தேடிக் கண்டனர் இன்றைய மருத்துவ உலகின் முன்னோடியாகத் தமிழர்கள் கண்ட மருத்துவம் திகழ்கிறது.

துணைநூல் பட்டியல்

1. சங்க இலக்கியம், பாரிநிலையம்
2. புறநானூறு புலியூர்கேசின் உரை
3. கலித்தொகை
4. குறுந்தொகை
5. தொல்காப்பியம்

தமிழ் இலக்கியங்களில் அறுவை மருத்துவம்

முனைவர் நா.முருகேஸ்வரி MA.,M.Phil.,B.Ed.,Ph.D.,
தமிழ்த்துறை தலைவர் மற்றும் உதவிப்பேராசிரியர்
சக்தி மகளிர் கலை மற்றும் அறிவியல் கல்லூரிaa
ஒட்டன்சத்திரம்.

முன்னுரை

அறிவியல் முன்னேற்றம் பெற்றுள்ள இன்று வரை நோய்களின் தாக்கத்தினால் ஏற்படும் விளைவுகளையும் அந்நோய்களிலிருந்து எவ்வாறு நம்மை காத்துக்கொள்ள வேண்டும் என்பதையும் நமது இலக்கியங்கள் தெளிவாக விளக்குகிறது. தமிழ் இலக்கியங்களில் அறுவை மருத்துவம் குறித்து இவண் ஆராயலாம்.

தொல்காப்பியத்தில் மருத்துவச் சொற்கள்

தொல்காப்பியத்தில் இவ்வுலகம் எப்படி ஐம்பூதங்களால் ஆனதோ அவ்வாறே உடலும் ஐம்பூதங்களால் ஆனது. "நரம்புaa சினைaa விந்துaa தலைaa மிடறுaa நெஞ்சுaa பல்aa இதழ்aa நாaa மூக்குaa அண்ணம்aa முலைaa பால்aa வடிவுaa வெரிந்" போன்ற சொற்களைப் தொல்;காப்பியர் பயன்படுத்தியுள்ளார். உடலின் மீது அக்கால மக்கள் மிகுந்த அக்கறைக் கொண்டவர்களாக விளங்கியதை அறிய முடிகிறது.

தொல்காப்பியத்தில் அறுவை மருந்து

அக்காலப் போர் முறைகள் குறித்து விளக்கும் புறத்திணையில் வீரர்கள் போர்க்களத்தில் புண்படுவதும்aa பாசறை நிகழ்வு குறித்தும், வீரர்கள் போர்க்களத்தில் மடிவதும்aaஉறுப்புக்களை

இழுத்தலும் புண்படுவதும்ஆ "அறுத்தலின் குறைத்தலின் அறுத்தலின் குறைத்தலின் தொகுத்தலின் விரித்தலின்" இவைகளுக்கு மருத்துவம் செய்திருப்பார்கள் எனும் செய்தி தொல்காப்பியத்தின் மூலம் அறிய முடிகிறது. இதற்குத் தமிழ் அறிஞர்கள் விளக்கம் கூறுகையில் அங்கத்தை குறைத்தல் அல்லது ஒரு பகுதியை நீக்குதல் என்று கூறுகின்றார்;கள். மேலும்

"வெகுளி தோன்றுதல் காரணமாக உறுப்பறை"என்கிறார்கள். உறுப்பறை என்பதற்கு உரையாசிரியர் உறுப்பை அறுத்தல் என்று பொருள் கூறுகிறார்.

கம்பராமாயணத்தில் அறுவை மருந்து

அக்காலத்தில் மக்கள் மருத்துவத்தில் சிறப்புற்று விளங்கியதையும்; அறிய முடிகிறது. உடலில் தோன்றும் கட்டிகளை நீக்க அறுத்து எடுத்துள்ளார்கள் அப்போது ஏற்படும் புண்ணிற்கு மருந்திட்டு ஆற வைத்துள்ளார்கள் என்பதைஆ

"உடலிடைத் தோன்றி றொன்றை
அறுத்ததன் உதிரம் மாற்றி
சுடலுறச் சுட்டு வேறோர் மருந்தினால்
துயரம் தீர்த்த வற்றே'

என்று கம்பராமாயணம் செப்புகிறது. மேலும்,

"அயில் வேல் .... நீங்கலது இப்பொழுத கன்றது
காந்தமாம் மணியின்று வாங்க"
"கொன்று நீங்கலது இப்பொழுது அகன்றது
உன் குலப்பூண் ....." என்கிறது.

கைகேயியின் வார்த்தைகள் வேலாயுதாமாகவும் அவைகள் உயிர்ப் போயும் போகாமலும் இருக்கும் நிலையை வெளிப்படுத்துகிறது என்கிறார் கம்பர். கம்பராமாயணம் தோன்றிய நூற்றாண்டுகளிலேயே தமிழ் மக்கள் அறுவை மருத்துவம் குறித்து அறிந்திருந்தார்கள் என்பதை அறிய முடிகிறது.

கம்பனுக்கு முன் தோன்றிய குலசேகராழ்வார் அறுவை மருத்துவம் குறித்து கூறியுள்ளார்

"வாளா லறுத்துச் சுடினி மருத்துவன் பால்
மாளாத காதல் நோயாளன் போல்" என்கிற கருத்தும்

மேலும் வலியுறுத்துகிறது.

சிந்தாமணியில் அறுவை மருத்துவம்

அறுவை மருத்துவம் குறித்து கூறும் சிந்தாமணியில்,

"நெய்க் கிழி வைக்கப்பட்டார்

………………………………

புக்குழி யெஃக நாடி
யிரும்பினார் போழப் பட்டார்

………………………………

இழுது சேர் கவளம் வைத்து
பதுமுகன் கிழப் பயிலச் சேர்த்தி

………………………………

புகுகென நூக்கி நானே"

என மருத்துவ முறைகளைச் சிந்தாமணி தெளிவாக்குகிறது.

மேலும் சிந்தாமணியில் நோயாளிகளுக்கு பருவகால மாற்றத்திற்குத் தகுந்தாற் போல் ஆடைகள் வழங்கியுள்ளார்கள் என்பதையும்; அறிய முடிகிறது.

சித்தமருத்துவத்தில் அறுவை மருத்துவம்

சித்தமருத்துவத்தில் அறுவை மருத்துவக் கருவிகள் இருந்ததாகக் கூறப்படுகிறது. நீளம் 22 மற்றும் 16 கருவிகளின் எடையும் கூறுகிறார்கள். அறுவை செய்யும் கருவிகள் குறித்து

"கத்தி, சத்திரம்ஊ கவின்ஊ குறும்பி, வாங்கியும்
முக்கவா தன்னுடன் முள்ளு வாங்கியும்

……………………………………….

மட்டக் கோலும் மாறும் ஊசியும்

……………………………………….

வெங்கலக் கிழலும்

……………………………………….

சிவனவ னருளால் திகழ் சத்தாயுதமே"

என்று பட்டியலிடுகிறது. இக்கருவிகளை புளிய இலைகளைக் கொண்டு சுத்தம் செய்துள்ளார்கள் என்பதையும்; அறிய முடிகிறது.

சங்க இலக்கியத்தில் அறுவை மருத்துவம்

சங்க காலத்தில் போரில் புண்பட்ட வீரர்களின் உடலை ஊசி கொண்டு சரி செய்தார்கள் என்பதை,

> "மீன் கொட்டில் பனிக்கயம் மூழ்கிச்
> சிரல் பெயர்ந்தனை நெடுவல் ஊசி
> நெடுவசி பரந்த வடுவால்
> மார்பின் அம்பு சேர் உடம்பினர்"

என்று பதிற்றுப் பத்தும்ஆ மேலும்ஆ

> "செருவா யிழக்கிக் குருதியோட்டிக்
> கதுவாய்ப் போக்கி துதிவா யெஃகெடு
> பஞ்சியும் கலையா புண்ணார்"

புறநானூற்றில் போரில் ஏற்பட்ட புண்களின் மேல் பஞ்சிட்டு சுத்தம் செய்தார்கள் என்பதையும் அறிய முடிகிறது.

மருத்துவன்

நோயினைக் குணப்படுத்தும் மருத்துவர் தன்னை ஒரு நோயாளியாகவே எண்ணிக் கொண்டு தன் பணியினை செய்ய வேண்டும் என்பதனைஆ

> "பிறர் நோயும் தம்நோய் போல் போற்றி அறனறிதல்
> சான்றவர்க்கு எல்லாம் கடை"

என்று கலித்தொகையும், மேலும்,

> "அரும்பிணி உறுநர்க்கு வேட்டவை கொடாஅது
> மருந்து ஆய்ந்து கொடுக்கும் அறவோன்"

என நற்றிணைச் சான்று விளக்குகிறது.

மருந்து

பழங்காலம் முதல் பல்வேறு மூலிகைகள் குறித்தும் அம்மூலிகைகள் மூலம் குணமாகும் நோய்கள் குறித்தும் நன்கு அறிந்திருந்தார்கள் என்பதைஆ

> "அருந்துயர் அவலம் தீர்க்கும் மருந்து"
> "திருந்திய யாக்கையின் மருத்துவன் ஊட்டிய
> மருந்துபோல் மருந்தாகி மனன் உவப்ப"

என நற்றிணையும் கலித்தொகையும் விளக்குகிறது.

முடிவுரை

மனித சமூகம் தோன்றிய காலம் முதல் நோய்களும் தோன்றியுள்ளன நோய்களைக் குணப்படுத்த மனிதனின் அறிவின் மூலம் தோன்றியதே மருத்துவம் ஆகும். நோய்கள் தோன்றிய நிலையில் அதனை குணப்படுத்தும் வழிமுறைகளையும் தேடிக் கண்டனர். மருத்துவ உலகில் தமிழர்கள் முன்னோடியாகத் திகழ்ந்துள்ளார்கள். சங்க காலம் முதல் அறுவை சிகிச்சையில் பல்வேறு வளர்ச்சி நிலையை அடைந்துள்ளார்கள் என்பதை இதன் அறிய முடிகிறது.

பார்வை நூல்கள்

1. தொல்காப்பியம் பூம்புகார் பதிப்பகம்�æ சென்னை.

2. கம்பராமாயணம் நியூ செஞ்சூரி புக் ஹவுஸ்æ சென்னை

3. சங்க இலக்கியம்; பாரி நிலையம்æ சென்னை

4. நாலாயிர திவ்விய பிரபந்தம்æ சாரதா பதிப்பகம்.

5. சிந்தாமாணிæ கிழக்குப் பதிப்பகம்.

சங்க இலக்கியங்களில் நாட்டு மருத்துவம்

அ.பாவை,M.A.,M.Phil.,M.Lisc
தமிழ்த்துறை உதவிப்பேராசிரியா்
சக்தி மகளீர் கலை அறிவியல் கல்லூரி
ஒட்டன்சத்திரம்

முன்னுரை

'நோயற்ற வாழ்வே குறைவற்ற செல்வம்' என நோயில்லாத் தன்மையையே நம் முன்னோர் மிகப் பெரிய செல்வமாகக் கருதினா். ஒரு நாட்டின் தட்பவெப்ப நிலைகளால் ஏற்படும் நோய்களுக்கு அந்தந்த நாட்டில் கிடைக்கும் மூலிகைப்பொருள்களைக் கொண்டு பாமரமக்கள் தம் பட்டறிவால் செய்துவரும் மருத்துவமுறையை "நாட்டு மருத்துவம்" என்று கூறுவா். தொல்காப்பியா் செய்யுளியலில் பெரியோர்கள் வாழ்த்தும் முறை பற்றி ஒரு நூற்பா பாடியுள்ளார். அதற்கு வாயுறை வாழ்த்து என்று பெயா்.

"வாயுறை வாழ்த்த வயங்க நாடின்
வேம்பும் கடுகும் போல வெஞ்சொல்"

புறநானூறு காட்டும் மருத்துவம்

காயம்பட்ட புண்ணுக்கு பஞ்சு வைத்துக் கட்டும் மருத்துவ வழக்கம் அக்காலத்தில் இருந்தது என்பதை "பஞ்சியும் களையாப் புண்ணர்" (353 வரி 16) என புறநானூறு கூறுகிறது. மருத்துவ குணம் கொண்ட நெல்லிக்காய் மகத்தான சிறப்பைப் பெற்றதாகும். மக்களிடையே சாக்கரை நோய் பெருகிவிட்ட இக்காலச் சூழ்நிலையில் நெல்லிக்காய் அருமருந்தாகப் பயன்படுகிறது. அதற்கு வாழ்நாளைக் கூட்டும் மருத்துவக்குணம் அதிகம் வேட்டைக்குச் சென்ற அதியமான் பனிரெண்டு ஆண்டுக்கு ஒருமுறை காய்க்கும் நெல்லிக்கனியைப் பறித்துக் கொண்டு வந்து ஔவையாருக்குக் கொடுத்தான் அதற்கு அவா "உன்னுடைய

சாலைக் கூடக்கருதாமல் நீண்டநாள் வாழ வேண்டும் என்று அதை எனக்கு கொடுத்தாயே" (புறம் 91-6-9 வரி) என்று அவனைப் புகழ்ந்து பாடுகிறார்.

நற்றிணை காட்டும் மருத்துவம்

மருத்துவரை அறவோன் என நற்றிணை கூறுகிறது.

"அரும்பிணி உறுநர்க்கு வேட்டது கொடாஅது
மருந்தாய்ந்து கொடுத்த அறவோன்"   (நற் 126)

நோய்வாய்ப்பட்டவர்களுக்கு அவர் விரும்பியதெல்லாம் கொடுக்காமல் நோய்க்குத் தக்க மருந்தை ஆராய்ந்து பார்த்துக் கொடுப்பவனை "அறவோன்" என்று குறிப்பிடுகிறது நற்றிணை.

பழமொழி நானூறு காட்டும் மருத்துவம்

புழைக்கடைப் பச்சிலை பற்றி ஒரு பாடல் உள்ளது.

"அல்லல் ஒருவற்கு அடைந்தக்கால் மற்றவர்க்கு
நல்ல கிளைகள் மற்றதனை நீக்கு மதுவே
மனைமரம் ஆய மருத்து" (பாடல் 53)

ஒருவனுக்குத் துன்பம் வந்தபோது உற்றார் எனப்படுபவர்கள் அந்தத் துன்பத்தை நீக்க வேண்டும். அப்படிச் செய்தால் அவர்கள் வீட்டில் உள்ள பச்சிலை மரம் போல்வா என்பது அப்பாடலின் கருத்து அக்காலத்தில் வீட்டுக்கொள்ளைப் புறத்தில் மூலிகைச் செடிகளை வைத்து வளர்த்தார்கள் என்பதை நன்கு அறியலாம். இவ்வாறு வளர்ப்பது நோய்கண்ட காலத்து அவசர மருந்தாகப் பயன்படுகிறது.

திருக்குறள் காட்டும் மருத்துவம்

சங்ககால இலக்கியத்தில் சித்த மருத்துவக் கோட்பாடுகளைப் பற்றி ஆராயும்போது திருக்குறளில் மருத்துவம் பற்றி வள்ளுவர் அழகிய உவமை கொடுத்துப்பாடியுள்ளார்.

உணவுசெறித்தல் – வள்ளுவரின் அழகிய உவமை

உணவு செறித்தல் பற்றிய கருத்தில் வள்ளுவர் ஈடுபாடு கொண்டுள்ளமையைப் பின்வரும் அழகிய உவமையால் அறியலாம்.

"உணவினும் உண்டது அறலினிது காமம்
புணர்தலினும் ஊடல் இனிது"

பின்னுண்பதிலும் முன்னுண்டது செரித்தல் இன்பந்தருவதாகும் எவ்வாறெனில் 'காமத்தில் மேற்புணர்வதினும் முன்னைத் தவறு பற்றி மகளிர் ஊடுதல் இன்பந்தருவது போலாம்' என்வரும் உவமையால் உணவு செரித்தலின் சிறப்பை விளக்குகிறார்.

குறள் கூறும் 'மருத்துவ நெறி'

திருக்குறளில் மருந்து அதிகாரத்தில் கூறப்பட்டுள்ள கருத்துக்கள் அனைத்தும் உலகளாவிய மருத்துவ நெறியாக அமைந்துள்ளன. சங்ககால இலக்கியத்தில் சித்த மருத்துவக் கோட்பாடுகளைப் பற்றிய கருப்பொருள்கள் கிடைப்பது போன்று சங்கம் மருவிய கால நூல்களான பதினென் கீழ்க்கணக்கு நூலிகளிலும் சித்த மருத்துவக் கோட்பாடுகளைத் தெளிவாகக் காண முடிகிறது.

ஏலாதி காட்டும் மருத்துவம்

பதினெண்கீழக்கணக்கு நூலான ஏலாதி என்ற மருத்துவநூல் ஆறுபொருள்களைச் சேர்ந்த சூர்ணம் ஏலாதி என மருத்துவ நூல்களில் கூறப்பெறும்.

ஏலம்	-	ஒருபங்கு
இலவங்கப்பட்டை	-	இரண்டுபங்கு
நாகேகசரம்	-	மூன்று பங்கு
மிளகு	-	நான்கு பங்கு
திப்பிலி	-	ஐந்து பங்கு
சுக்கு	-	ஆறு பங்கு

என்ற அளவுப்படி சேர்த்து இம்மருந்தை உருவாக்குவார்.

மனித வாழ்விற்கு எப்படி உடல்நலம் முக்கியமோ அதேபோல் மன நலத்தையும் அதை முதலாகக் கொண்டு வாழ்க்கை நலத்தையும் சீராக ஆக்கிக் கொள்வதற்கான வழிமுறைகளைக் காண்பிக்கும் ஒரு வாழ்வியல் நூல் மனநலமும் வாழ்க்கை நலமும் சீராக்கி அறநெறியில் கொண்டு செல்லும் வழிமுறைகளைக் காட்டும் வாழ்வியல் நூலாகப் பயன்படுகிறது.

சிறுபஞ்ச மூலம் காட்டும் மருத்துவம்

பதினெண் கீழ்க்கணக்கு நூல்களுள் ஒன்றான சிறுபஞ்சமூலம் ஐந்து மருந்துப்பொருள்கள் பற்றிக் கூறப்படுகிறது. பஞ்சம் என்றால் 5 என்றும் மூலம் என்றால் வேர் என்பது பொருளாகும். பண்டைய காலத்தில் தமிழர் மருத்துவத்தில் உடல் நோய்களைத் தீர்ப்பதற்கு ஐந்து வகையான வேர்கள் பயன்படுத்தப்பட்டன.

1. கண்டங்கத்திரி
2. சிறுவழுதுணை
3. சிறுமல்லி
4. பெருமல்லி
5. நெருஞ்சில்

ஆகிய ஐந்தின் வேர்களை சேர்த்து மருந்தாக்குவது போல ஐந்து விசயங்கள் மூலம் நீதியை போதிக்கிறது. இந்நூலில் இடம்பெறும் முக்கிய பாடல்வரிகளில் ஒன்று

"பூவாது மரம் காய்க்கும் நன்று அறியார்"

(சிறுபஞ்சமூலம்)

இப்பாடல் மக்களின் அறியாமையைப் பற்றி விளக்குகிறது. பூக்காமலே சில மரங்கள் காய்ப்பது உண்டு. இதைப்போலவே நன்மை தீமைகளை நன்கு உணர்ந்தவர் வயதில் இளையவராக இருந்தாலும் அவர் மூத்தவரோடு வைத்து எண்ணத்தகுந்தவராவார். பாத்தி அமைத்து விதை விதைக்காமலே தானே முளைத்து வளரும் விதைகளும் உள்ளன. அதைப்போலவே மேதை யாவரும் பிறர் உணர்த்தாமல் தாமே வளர்ந்து கொள்வார்.

திரிகடுகம் கூறும் மருத்துவம்

திரிகடுகம் மூன்று மருந்துப்பொருட்களைக் குறிக்கும். சுக்கு, மிளகு, திப்பிலி என்னும் மூலிகைகள் உடலுக்கு நன்மை செய்வது போல் இதில் கூறப்பட்டுள்ள மூன்று நீதிகள் மனிதனின் அறியாமையாகிய நோயைப் போக்கி வாழ்க்கை செம்மையாக நடைபெற பயன்படுகிறது. இத்திரிகடுகத்தின் பயன்களாக நோய் எதிர்ப்பு சக்தியை கொடுக்கிறது. மலச்சிக்கலை போக்குகிறது செரிமானம், அஜீரணம் ஆகியவற்றை சரிசெய்கிறது.

முடிவுரை

தமிழ் இலக்கியங்களில் பாதிக்கப்பட்ட திரிதோஷங்களின் அடிப்படையில் நோய்கள் சீராகப் பாதுபடுத்தப்பட்டுள்ளன. மக்களுக்கு நோய் ஏற்பட்டால் அவர்கள் வாழும் பகுதியிலும், சுற்றியுள்ள மூலிகைகளை மருந்தாகப் பயன்படுத்திக்கொள்ளலாம் தமிழ் மருத்துவம் எல்லாருக்கும் சென்றடைய வேண்டுமெனில் இளைய தலைமுறையினருக்கு சித்த மருத்துவக் கல்வியில் ஆர்வத்தைப் புகுத்த வேண்டும்.

பயன்படுத்திய நூல்கள்

1. கௌமாரீஸ்வரி.எம்   -   சங்க இலக்கியம்
                                     பதினெண்கீழ்க்கணக்கு நூல்கள்

2. திருநாவுக்கரசு.எஸ்   -   திருக்குறள் நீதி இலக்கியம்

3. சு.சக்திவேல்   -   நாட்டுப்புற இலக்கியம்

4. புலியூர் கேசிகன்   -   நற்றிணை

5. புலியூர் கேசிகன்   -   புறநானூறு