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## Removal of chromium(III) from tannery wastewater by electrochemical peroxidation process in a bench scale reactor

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### ABSTRACT

Chromium(III) used in tanning process is not consumed fully and around 30–40% of Chromium(III) is washed away to the environment causing severe environmental problem especially to the aquatic system. To remove Chromium(III) from wastewater, many different treatment techniques have been developed. This study deals with the ability of electrochemical peroxidation process for the removal of Chromium(III) from tannery wastewater in a batch stirred tank bench scale reactor with hopper bottom of 5 L working volume equipped with two iron electrodes which were investigated. The removal percentage of chromium was determined by varying operating parameters such as pH = 2–8,  $\text{Fe}^{2+}$  = 2–5 mg/L,  $\text{H}_2\text{O}_2$  = 5–20 mg/L and current density = 10–40 mA/cm<sup>2</sup> were studied. The results showed that the Chromium(III) removal efficiency of 87% was achieved under optimum condition such as pH = 2,  $\text{Fe}^{2+}$  = 2 mg/L  $\text{H}_2\text{O}_2$  = 15 mg/L, current density = 30 mA/cm<sup>2</sup> and contact time was 120 min with an electrical energy consumption of 0.073 kWh/L. The operating costs for the removal of Chromium(III) was found to be 0.4 \$/m<sup>3</sup> for treated tannery wastewater. The electrochemical peroxidation process proved to be an efficient and appropriate technique for the removal of Chromium(III) from tannery wastewater.

**Keywords:** Electrochemical peroxidation process; Tannery wastewater; Chromium(III); Iron electrodes



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# Assessment of Strength of Paver Blocks by Partial Replacement of Coarse Aggregate with LECA

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**Abstract**— Presently the Concrete paving blocks has found its tremendous use in the construction industry because of its minimal maintenance after being it is laid, also of its good strength properties and durability characteristics. Paver blocks are mostly used in driveways, pavement, patios, town centres and non- traffic areas also. The main advantages of paver blocks include strength, maintenance, durability, environmental sustainability and abrasion resistance. This present study was dealt with the possibility of using Light Expanded Clay Aggregate (LECA) as the partial replacement of coarse aggregate in 10, 20 and 30 percentages for M40 Grade of concrete paver block to meet out the Medium traffic requirements as per IS 15658:2006 and to find the compressive, split tensile strengths, water absorption and abrasion resistance of control and LECA added specimens. Conclusions regarding the use of LECA in paver blocks based on the test results were drawn.

**Keywords**— Paver blocks, Unipavers, coarse aggregate, LECA and Strength properties

## I. INTRODUCTION

Basically, the rigid pavements are done by paver blocks. They are presently used in many situations due to its abrasion resistance, resistance to acids, durability and strength. Paver blocks may get differed by their shapes, quality and grade of concrete which is used as per traffic requirements such as M30, M35, M40, M50, and M55. In the present study, an attempt was made to use LECA as partial replacement of coarse aggregate and the paver block was designed for M40 Grade to meet the Medium traffic requirements which includes ramps of shopping complexes, car parking, housing colonies, office complexes, rotaries on low volume traffic, farm houses, small market roads and boulevard. LECA being a Light Weight aggregate, because of its low density, it was selected to replace the normal coarse aggregate to assess the strength properties, abrasion resistance and water absorption.

## II. MATERIALS USED

### A. Cement

OPC 53 grade of cement conforming to IS 12269 – 2013 with specific gravity of 3.15 was used.

### B. Fine Aggregate

Fine aggregate of River sand with specific gravity of 2.60 conforming to Grading Zone II as per IS 383 – 2016 was used.

### C. Coarse Aggregate

Natural coarse aggregates from locally available quarries were used as per the specifications of IS 383 – 2016. Coarse aggregate with a maximum nominal size of 12 mm and specific gravity of 2.70 was used.

### D. Light Expanded Clay Aggregate

LECA with a specific gravity of 1.00 and maximum size of 12 mm was used.

### E. Water

Water used for the preparation of paver block was as per the requirements given in IS 456: 2000.

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# Experimental Study on mechanical properties of Transparent Concrete by using Rice Husk Ash

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**Abstract**— Transparent concrete is comparatively a new emerging building material which has good light - transmissive properties which is composed of fine concrete and Optical fibers. The chief necessity to produce transparent concrete is to utilize the sunlight as a natural light source to reduce the power consumption of radiance. Also its use in concrete gives good pleasant and artful appearance to the building. In the present investigation , it was aimed to assess the mechanical properties and light transmittance of transparent concrete by partial replacement of cement with Rice Husk Ash (RHA) in 10, 20 and 30 percentages by volume fractions. Plastic Optical Fibers (POF) of 400 micrometer diameter and Glass Optical Fibers (GOF) of 1.5mm diameter were added to the concrete in 4% of total volume. Based on the test results, it was found that the Compressive strength and tensile strength was found to decrease with increase in the percentage of replacement of cement with RHA. But regarding the Light Transmittance, the Glass Optical fibers of 1.5 mm diameter gave a good light guiding property and there was no light transmittance in Plastic Optical Fibers of 400 micrometer diameter fibers.

*micrometer diameter fibers, transparent concrete, Optical fibers, Fine concrete, Rice Husk Ash and Strength*

## I. INTRODUCTION

Transparent concrete is a good exterior material which is used widely used in many countries, because of its aesthetics and energy saving applications. Transparent concrete is similar to ordinary concrete except that it uses coarse aggregate with a maximum nominal size of 10 mm and Optical Fibers which transmits the light through the core of the optical fiber. Transparent concrete has found its main applications in green buildings, interior partition walls and illumination facade which are manufactured as prefabricated building blocks or panels. Transparent concrete was produced by mixing Optical Fibers in 4% of total volume of the concrete mixture. Also the transparent concrete was found to possess reduced weight when compared to the conventional concrete, due to lesser size of coarse aggregates. The main objective of the present study have involved assessing the mechanical properties and Light transmittance of transparent concrete with POF and GOF by partial replacement of cement with Rice Husk Ash (RHA) in 10%, 20% and 30% of volume fractions.

## II MATERIALS USED

## A. Cement

OPC of 53 Grade with specific gravity 3.15 was used conforming to IS 12269 - 2013.

### B. Fine Aggregate

Fine aggregates which passes through 2.36 mm IS sieve with a specific gravity of 2.65 and conforming to zone I as per IS : 383-2016 was used.

### C. Coarse Aggregate

To make the concrete transparent, the Coarse aggregates having a maximum nominal size of 10 mm and specific gravity of aggregates of 2.67 was used.

## D. Water

Water used for casting and curing of the specimens, which was conforming to IS 456-2000.



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# STRENGTHENING OF BEAM-COLUMN JOINT USING FIBER REINFORCED POLYMER COMPOSITES BASED ON DEEP NEURAL NETWORK WITH OPTIMIZATION

Journal: *Journal of the Balkan Tribological Association* 25(4) (2019) Pages: 918 - 932

▼ Authors

**GNANAPRAGASAM, ARUL; CHITRA, G.**

▼ Abstract

In the field of concrete construction all over the world, the behaviour of reinforced concrete resisting frame structures at the time of earthquakes because of its poor performance of beam-column joints. In order to improve the performance of beam-column joints, fiber is added to the concrete material. In the proposed study, two fibers are considered i.e. Basalt Fiber Reinforced Polymer (BFRP) and hybrid (Basalt and Glass) Fiber Reinforced Polymer (HFRP) to strengthen the beam-column joint by wrapping technique. In this modeling, the input parameters are taken as load, area, density, elongation break, tensile strength, and Young modulus. To enhance the performance of FRP-strengthened beam-column joint, simulation modeling is proposed i.e. Deep Neural Network (DNN). Also, to attain the optimized DNN structure, the Firefly Algorithm (FA) is represented. The performances of the two beam-column joints are analyzed and compared with existing algorithms in terms of deflection, ductility and stiffness. The results demonstrate that the HFRP specimen achieves better performance compared to the BFRP specimen.

▼ Keywords

BFRP; DNN; and FA; beam-column joint; experimentation; hybrid; simulation modeling

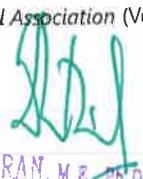
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## Experimental study on Concrete curing agent using Calcium Bentonite powder without curing

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**Abstract:** Bentonite powder is considered to be the easily available and cost effective natural resources. This study covers the uses of Calcium Bentonite Powder as the main component for concrete curing agent to determine the properties of the concrete when comparing to normal water curing. Water is one of the most essential things in our life and it is demandable nowadays. To reduce the usage of water, here we are applying concrete curing agent and the results are discussed.

**Key Words:** Calcium Bentonite powder, Concrete curing agent, Demandable, Natural resources and water.

### I. Introduction

Concrete curing agents were an important part of creating a strong durable concrete member. The article explored why they were necessary and the options for curing and sealing industrial concrete member. When concrete cured, water within the concrete evaporated. If water near the surface of a concrete slab evaporated too quickly, the concrete dried at the surface before drying further down the slab. A concrete curing agent formed a membrane over the top of the concrete slab while it cured. This stopped near the surface of the slab evaporating too quickly and hence helped to reduce cracking and dusting. When a slab had uniform strength it meant it could bear weight and withstand challenging environment more easily. So curing helped a concrete member performed to its full potential.

### II. Materials and Methods

#### Cement

The type of cement used in this work was 53- grade OPC. The specific gravity of the cement was 3.15 and the fineness modulus was 7.5%

#### Fine Aggregate

Fine aggregate was river sand and having the specific gravity of 2.61 and its fineness modulus was 2.25%. The zone of fine aggregate was determined by Sieve analysis. As per Indian standards the zone obtained zone-II.

#### Coarse Aggregate

Coarse aggregate having a size of 12mm its specific gravity and fineness modulus were 2.65 and 5.96% respectively.

#### Calcium Bentonite Powder

The calcium Bentonite powder was bought from online. It was the main active ingredient of fuller's earth, probably one of the earliest industrial cleaning agents. It helped to reduce cracking and dusting when a slab had uniform strength.

TABLE 1: Properties of Calcium Bentonite Powder

Properties	Values
Swelling capacity	27.5 mins
Gelling time	2 mins
Moisture content	12%
pH	10

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## Experimental Investigation on Partial Replacement of Cement by Neem Leaves Ash

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**Abstract:** As a result of the rising cost of building materials, it has become necessary to search for the affordable and cheaply obtainable material which might be partially replaced cement in the production of concrete. This project is an experimental study on the use of Neem Leaf Ash (NLA) as partial replacement for cement. Then, Neem leaves were dried, burnt and heated in a furnace to produce Neem Leaf Ash, which was discovered to possess pozzolanic properties. The Ordinary Portland cement was replaced by NLA at 05%, 10% and 15% by weight and the cubes were crushed to know the compressive strength of the concrete at different curing days. The results revealed that, the workability and strength properties of the resulting concrete was dependent on the water cement ratio, total days of curing, and percentage of replacement of NLA for OPC. It was noticed that the result of 5% and 10% NLA were gradually increasing at 28 days. We hope that this project work will provide a quick reference to practicing Engineer, who will find NLA as a good partial replacement for cement in concrete, thus reducing cost of concrete production.

**Keywords:** Cement, Fine aggregate, Coarse aggregate, Neem leaves ash.

### I. Introduction

Ordinary Portland cement is one of the most important binding materials in terms of quantity produced. Since it is manufactured at very high temperatures, it consumes a lot of energy. Along with huge amounts of energy consumption, it emits harmful gases, which pollute the atmosphere. This affects the durability of Portland cement pastes, mortars and concretes. Natural pozzolans are vitreous cementitious materials, which by themselves possess little or no cementing value, but finely ground in the presence of moisture, they will chemically react with calcium hydroxide at ordinary temperatures to form hydrated phases possessing cementing properties. A sincere attempt has been made to study the possibility of using bamboo leaf ash as a partial substitute to cement, as it is amorphous in nature and has been found to have pozzolanic properties after calcination. Neem is a composite material which grows abundantly in our country. Since the cost of cement is high, neem leaves ashes are partially replaced with cement. Using the facilities present nowadays partial replacement by increasing the percentages of the neem leaves ash as 5%, 10%, 15% and decreasing the amount of cement the strengths such as compressive strength and tensile strength have been planned in our project.

### II. Materials and Methods

#### Cement

The Bureau of Indian Standards (BIS) has classified OPC in three different grades. The grades are (i) 33 grade (ii) 43 grade (iii) 53 grade. The binding materials used in concrete are Ordinary Portland Cement. This cement is of 43 grades conforming to IS 456-2000 and is having desired properties. The compressive strength of cement is checked by casting cube and testing under compressive testing machine and tensile strength of cement is checked by casting cylinder and testing under tensile testing machine.

#### Fine aggregate

Aggregate which is passed through 4.75 sieve and retained on 75 micron(0.075mm) is termed as fine aggregate. Fine aggregate is added to concrete to assist workability and to bring uniformity in mixture.

Usually, the natural river sand is used as fine aggregate.

#### Coarse aggregate

The coarse aggregate for the works should be river gravel or crushed stone. Angular shape aggregate of is 20mm and below. It should be hard, strong, dense, durable, clean and free from clay or vegetable matter. The pieces of aggregates should be cubical, or rounded shaped and should have granular or smooth surfaces. Coarse



# Assessment of Municipal Solid Waste Management of Dindigul City Using Geospatial Tools

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**Abstract:** Solid waste management is among the basic essential services provided by municipal authorities in the country to keep cities clean. Due to industrialization, rural to urban migration and high growth rate of population have induced rapid urbanization in developing countries like India. The urbanization created acute problem of solid waste management. The per capita waste generation rate in India has increased from 0.75 kg per day in 2010 to 1.5 kg per day in 2017; such a steep increase in waste generation within a decade has severed the stress on all infrastructural, natural and budgetary resources. Dindigul is one of the fastest developing city, it generates total quantity of waste is about 6500 tons per day. So, there is need of the proper waste collection, transportation route for prevention of environment form the hazardous waste disposal. The proposed work emphasizes on the assessment of detail process of solid waste management such as collection, storage, segregation, transportation, treatment and disposal by using Geospatial tools like RS, GIS and GPS. It may help in sustainable urban environment of Dindigul city.

**Keywords:** GIS, GPS, Remote Sensing, Municipal Solid Waste Management, Sustainable Urban Environment

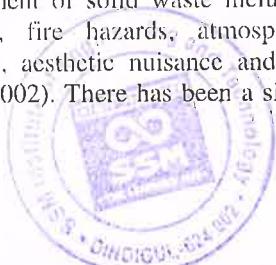
## I. INTRODUCTION

Solid waste comprises unwanted and discarded materials from houses, street sweeping, and commercial and industrial operations. Increase in urban population and changing life styles lead to the generation of solid waste. Generally, solid waste is heterogeneous in nature such as mixture of vegetables, food items, paper, plastics, rags, glass etc. If solid waste is disposed off on land in open areas, then it causes a negative impact on the environment, ground water and on health. The most common problems associated with improper management of solid waste include diseases, odor nuisance, fire hazards, atmospheric and water pollution, aesthetic nuisance and economic losses (Jilani, 2002). There has been a significant increase

in solid waste generation in India over the years from 100 gm per person per day in small towns to 500 grams per persons per day in large towns. Currently most of the municipal waste in India is being disposed unscientifically (Akolkar, 2005). Generally municipal solid waste is collected and deposited in landfill such unscientific disposal attract birds, rodents and fleas to the waste site and create unhygienic conditions (Suchitra, et al. 2007). The degradation of the solid waste results in the emission of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and other trace gases. The unscientific landfill site may reduce the quality of the drinking water and causes the disease like nausea, jaundice, asthma etc (Bean, et al. 1995). In Dindigul city primary sources of solid waste are local households, commercial establishments, hospitals, hotels, restaurants, and markets. The total quantity of waste generated per day is about 1300 to 1400 metric tons (approximate generation per capita per day is 500 grams). Dindigul Municipal Corporation is responsible for collection, storage, segregation, transportation and disposal of all solid waste generated in the city. In the present research work describes an attempt to assess the collection, segregation, transportation, treatment and disposal of DMC land fill site using geospatial tools like Remote Sensing (RS), Geographical Information System (GIS) and Global Position System (GPS).

## II. SIGNIFICANCE OF STUDY

Dindigul city generates large amount of solid waste. This large amount of waste poorly disposed and untreated. The city does not have an engineered or scientific landfill site and the capacity of existing dump site cannot cater the future demand of the waste generated. So, there is an immediate need for designed scientific integrated solid waste management system using Geospatial tools like Remote Sensing, GIS and GPS to minimize adverse effects on environment, social and economic of solid



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## A STUDY AND INVESTIGATION ON STRENGTH PARAMETERS OF POLYPROPYLENE FIBER REINFORCED CONCRETE

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### ABSTRACT

Fiber reinforced concrete (FRC) is concrete containing fibrous material which increases its structural integrity. It contains short discrete fiber that are uniformly distributed and randomly oriented. High performance fiber reinforced cementations composites have been engineered to satisfy various field performance requirements such as high durability or impact load resistance. Fibers are usually used in concrete to control cracking due to both plastic shrinkage and drying shrinkage.

They also reduce the permeability of concrete and thus reduce bleeding of water. Taking these advantages into account a study was done on FRC. The interest in the use of fibers for the reinforcement of composites has increased during the last several years. A combination of high strength, stiffness and thermal resistance favorably characterizes the fiber. In this study, the results of the Strength properties of Polypropylene fiber reinforced concrete have been presented.

The compressive strength, flexural strength of concrete samples made with different fibers amounts varles from 0%, 0.1 %, 0.2% 0.3% and 0.4% were studied. The samples with added Polypropylene fibers of 0.3% showed better results in comparison with the others.

### I. INTRODUCTION

#### 1.1 GENERAL

The term fiber reinforced concrete (FRC) is defined as a concrete made of hydraulic cements containing fine or fine and coarse aggregates and discontinuous discrete fibers.

Inherently concrete is brittle under tensile loading. Mechanical properties of concrete can be improved by reinforcement with randomly oriented short discrete fibers, which prevent and control initiation, propagation, or coalescence of cracks.

FRC can continue to sustain considerable loads even at deflection exceeding fracture deflections of plain concrete. The character and performance of FRC changes depending on matrix properties as well as the fiber material, fiber concentration and fiber distributions.

FRC can be regarded as composite materials with two phases in which concrete represents the matrix phase and the fiber constitutes the inclusion phase. Volume fraction of fiber inclusion is the most commonly used parameter attributed to the properties of FRC.

Fiber count, fiber specific surface area, and fiber spacing are other parameters, which may also be used for this purpose. Another convenient numerical parameter describing a fiber is its aspect ratio, defined as the fiber length divided by its equivalent diameter.

It is possible to make several classifications among fiber types. Fibers can be divided into two groups; those with elastic moduli lower than the cement matrix, such as cellulose, nylon, and polypropylene and those with higher elastic moduli such as asbestos, glass, steel, and carbon.

There are various applications of FRC. Asbestos fibers have been used in pipes or thin sheet elements for a long time. Glass fibers are also used in thin sheet element production as well as shotcrete applications.

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## TRAFFIC ROUTE ANALYSIS OF TRAMWAY IN DINDIGUL SMART CITY

M. P. Karthik, K. Robinson, A. Shankar, S. Siva Rama Sudhakar, M. Tamil Selvan

### Abstract

Dindigul district is one of the fast growing districts with millions of population in Tamilnadu. Due to the implementation of "Smart city" & modernization for their personal need many of the village people were coming to town daily by various vehicles these cause traffic problems. The project is about a traffic route analysis of tramway in Dindigul city. This tramway can be used by all the peoples of Dindigul which runs around the Dindigul city covering all the important places. We have planned to provide tramway covering all the places like bus stand, 6 schools and colleges, St.joseph hospital, government hospital, market, police station, banks, Temples, Cinema theatres and other commercial areas.

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## Concrete Experimental Study on Elastic Constants of Hybrid Geopolymer

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**Abstract:** In this project low calcium fly ash with GGBS were used as the source material in concrete to fully replace cement is known as Geopolymer concrete. Additionally Steel, Polypropylene, and coir are incorporated to improve its strength aspects in the concrete are called as hybrid geopolymer concrete at low volume fraction of 0.5. The manufacturing of geopolymer concrete was carried out using the usual concrete technology methods. The silicon and the aluminium are the source material to activate by a combination of sodium hydroxide and sodium silicate solutions to form the geopolymer paste that binds the aggregate sand other un-reacted materials. This paper aims to study about the elastic constants of hybrid geopolymer concrete for the different molarities of NaOH. The molarities of NaOH solution used in this work were 8M, 10M & 12M.

**Keywords:** Fly ash, GGBS, Geopolymer Concrete, Steel, Polypropylene, coir s, hybrid geopolymer concrete, elastic constants, molarities of NaOH

### Introduction

Concrete is conventionally formed by using the ordinary Portland cement as the primary ring binder. Cement developed causes environmental impacts at all stages of the process. The manufacturing of Portland cement releases carbon dioxide ( $CO_2$ ) that is a significant provider of the greenhouse gas emissions to the atmosphere. The amount of  $CO_2$  emitted by the cement industry is nearly 900 kg of  $CO_2$  for every 1000 kg of cement produced. To reduce the environmental impact of the concrete industry, Mehta (2002) suggests two approaches, a short term and a long term approach. The short term approach would be to practise "industrial ecology" which involves the use of industrial by-products as cement surrogate materials. According to the report of Central Electricity Authority of India (CEA), the total fly ash generation from April 2014 to March 2015 is 184.14 Million Tonnes. The use of Ground Granulated Blast-furnace Slag (GGBS) will increase the strength as well as enhance the mechanical properties of the concrete.

In 1978, Davidovits (1999) projected that binders might be produced by a polymeric reaction of alkaline liquids with the silicon and the aluminium in source materials of geological origin or by-product materials such as fly ash and rice husk ash. He termed these binders as geopolymers.

Concrete is the largest part broadly used construction substance in the world due to its high compressive strength, long service life, and low cost. However, concrete has inbuilt disadvantages of low tensile strength and crack resistance. To perk up such weaknesses of the material, numerous studies on reinforced have been performed by Sung Bae Kim et al 2012.

The variation of two or more fibres in the concrete is called as Hybrid Fibre Reinforced Concrete. The function of short-cut fibres as secondary reinforcement in concrete is primarily to reduce crack instigation and transmission (Hsie et al., 2008).

The large and the strong fibres control large cracks. The small and soft fibres control crack initiation and propagation of small cracks (Sivakumar and Santhanam, 2007).

In this experimental work the cement is replaced by low calcium fly ash and Ground Granulated Blast-furnace Slag (GGBS). Low calcium fly ash and GGBS is activated by alkaline activator solution for binding. The bond between the materials in concrete is achieved by the process of polymerization. Additionally s have been added in 0.5% of volume fraction by keeping the steel as permanent and adding other s as partial. The manufacture of hybrid geopolymer concrete (H<sub>y</sub>GPC) is carried out using the usual concrete technology methods.

### Materials Used:

**Fly Ash:** Fly ash used in this experimental work was collected from Tuticorin Thermal Power Station located in Tamil Nadu, India. The burning of harder, older anthracite and bituminous coal typically produces Class F fly ash. This fly ash is pozzolanic in nature, and contains less than 7%lime (CaO) is used.

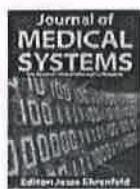
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**GGBS:** Ground Granulated Blast-Furnace Slag is a waste material generated in iron or steel industry, Dindigul has significant impact on Strength and Durability of Geopolymer Concrete. It also continues to gain strength over



# Hybrid Laplacian Gaussian Based Speckle Removal in SAR Image Processing

Transactional Processing Systems Published 11 June 2019 / 43, Article number: 222 (2019)

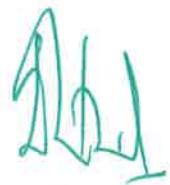


## Journal of Medical Systems

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## Abstract

Synthetic Aperture Radar (SAR) images play a significant role in different application fields like airborne, civilian and to observe various scenarios over the horizon. Unfortunately, SAR images are heavily affected by speckle noise. The speckle degrades the image quality which makes interpretation of images harder. Therefore suppression of speckle is important for further processing. In this paper a new method is proposed for despeckling of SAR image comprises of two stages. First stage is despeckling process which is based on directional smoothing and hard thresholding technique and second stage is image enhancement process which is based on applying HLGF filter. The proposed work has been tested on and show remarkable performance over the existing system. The simulation results confirmed that achieving a better Peak Signal to Noise Ratio (PSNR), Speckle Suppression Index (SSI) compared with existing method.



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# DESIGN OF OPTIMIZED QCA SEQUENTIAL CIRCUITS

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**Abstract-** The scenario of the digital industry has changed in the past few years due to the rapid development of technology. Among several other alternatives, QCA is the innovative technology to design digital logic circuits using quantum dots confined in the potential well. This paper proposes the optimum design of sequential circuits like flip-flops and counters by using majority gates and is implemented by cell minimization technique. It will reduce the area and complexity. The functionality of the circuits can be tested by using QCADesigner version 2.0.3.

**Keywords-** Quantum-dot cellular automata , sequential circuit, flip-flops, counters, QCADesigner.

## I.INTRODUCTION

To making the small transistor, it is a great advancement in electronics and computer industry over the past 60 years. In CMOS the serious effects due to physical barriers such as short channel effect, leakage current and excessive power dissipation at Nanoscale regions. Hence one possible alternative method is QCA to overcome this problem. QCA technology transfer's information by means of polarization using the flow of electrical current. It provides ultra-small factor, power consumption and high speed clock circuits.

A sequential circuit is a type of digital circuit who's the output depends on the present value of the input signal as well as the sequence of past inputs.

**Types of sequential circuit:**

1. Synchronous circuit: It uses the clock input to derive the circuit.
2. Asynchronous circuit: It doesn't use the clock signal to drive the circuit.

QCA is the new paradigm that performs computation and routing information at Nano domain. The advantage of QCA over the CMOS is lesser delay, high density circuit and low power consumption.

## II.REVIEW OF QCA

The logic states are the unique feature of the QCA and it is represented by a cell. QCA cell contain four quantum dots arranged in corners of the square. Then two electrons are used to provide a tunneling between these two dots. The polarized charge can transfer by the columbic repulsion within the square cells.

A basic QCA cell consists of four quantum dots in square array.

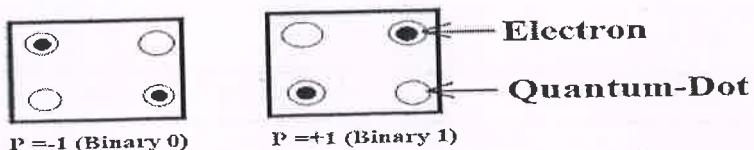
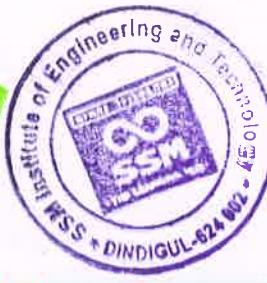


Fig.1 Polarized QCA cells



# Benign and Malignant Brain Tumor Pre-processing and Segmentation Techniques: A Survey

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**Abstract -** The lump inside the brain is considered a brain tumor, due to cells divide and grow in an uncontrolled way the lump formed inside the brain. At present-day, processing of medical images is a developing and important field. It includes many different types of imaging methods, they are Computed Tomography scans (CT scans), X-rays and Magnetic Resonance Imaging (MRI) etc. The technologies like MRI and CT allow us to separate even the smallest imperfections in the human body. Brain tissues abnormal growth affect functions of the brain are considered as a tumor. The medical image processing is a tool to classify and groups perfect and significant information in Magnetic Resonance Images with the acceptable error rate. Brain tumor identifications through MRI images are a difficult task because of the complexity of the brain. These tumors can be segmented using various image segmentation with pre-processing techniques. Pre-processing and Enhancement of an image is the first step of image processing it is used to enhance the chances of detecting the suspicious region. Image segmentation is the method of partitioning a digital image into superpixels. The objective of segmentation is to convert the MRI into meaningful and easier to scrutiny. In this paper, various image processing methods for the detection and segmentation of brain tumors are discussed in detail with their simulation results.

**Keywords -** Magnetic Resonance Imaging, Medical Image Processing, Pre-processing and Enhancement, Segmentation.

## I. INTRODUCTION

The abnormal growth of cells inside the skull which leads to a brain tumor and it also damages the other functioning cells in the brain. Estimation of the World Health Organization (WHO) pieces of evidence, the most common brain diseases is a tumor and there are more than 120 types of brain and Central Nervous System (CNS) tumors. The brain tumor detection is a thought-provoking task due to the complex structure of the human brain. Basically, tumor in the human brain is classified in to benign or malignant. The objective of this survey is to elaborate different pre-processing and segmentation techniques available to determine benign or malignant cells inside the brain.

MRI helps identify tumors by magnifying the differences in water content and blood flow between tissues. The growth of malignant tumors creates their own network of blood vessels via angiogenesis; because of this a huge supply of blood to the surrounding tissues. Contrast material points out the blood vessels with high concentration, helps locate growth of malignant. Computer programs have defeated humans in Jeopardy. Pre-processing is the first step, performed to extract the Region Of Interest (ROI) using manual skull stripping and noise effects are removed by filters. Segmentation is the second step, dividing the image to its essential parts sharing

identical properties such as color, texture, contrast and boundaries.

Processing and analyzing of Magnetic Resonance brain tumor images are the most upcoming and challenging field. MRI is an advanced medical imaging technique used to characterize and discriminate among tissues using their physical and biochemical properties (water, iron, fat, and extravascular blood and its breakdown products) and it is very important process for determining the correct treatment at right stage for tumor-infected individual.

## II. MAGNETIC RESONANCE IMAGE PRE-PROCESSING

Most of the real-life data (MRI) is noisy, inconsistent and incomplete, so pre-processing becomes necessary. The aim of digital image pre-processing is an improvement of the image data that suppresses unwanted distortions or enhances some image features important for further processing.

The CT and MRI cardiac images normally consist of some artifacts; patient specific and image processing and equipment based artifacts. Patient specific artifacts includes motion beam hardening, metal artifact. Others include partial volume effect, ring and staircase artifacts. So, it is needed to be removed by pre-processing procedures before any analyzing. The enhancement activities also used to remove the film artifacts, labels and filtering the images. Several denoising approaches have been surveyed and analysed in this section.

The incorporated noise during Magnetic Resonance Image acquisition however degrades the human interpretation or computer-aided analysis of the features in MRI images. Time averaging of image sequences aimed at improving the Signal to Noise Ratio (SNR) would leads to additional acquisition time and reduces the temporal resolution. Therefore, denoising instead should be performed to enhance the image quality for more accurate diagnosis [1].

### 1. Artifacts Removal from Magnetic Resonance Image:

Magnetic Resonance Imaging may contain artifacts or label. Different types of artifacts in brain MRI: (i) Chemical Shift, (ii) Aliasing, (iii) Black Boundary, (iv) Gibbs Ringing, (v) Zipper, (vi) Motion, (vii) Field (B0) inhomogeneity, (viii) Slice-overlap, (ix) RF Overflow, (x) Central Point, (xi) Quadrature Ghost, (xii) Susceptibility, (xiii) Eddy Current, (xiv) RF inhomogeneity, (xv) Partial Volume, (xvii) Flow, (xviii) Entry Slice, (xix) Moire Fringes and (xx) Gradient failure (B1 inhomogeneity). Brain imaging artefacts may occur at any stage of image preparation, ranging from acquisition to the post-processing period. Artifacts may also result from hardware problems



# Design of Implantable Antenna for Patient monitoring system

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Dr. S. Karthigai Lakshmi, Professor/ECE, SSMIET, Dindigul,

**Abstract:** We present a low cost implantable antenna for wireless medical application especially for patient monitoring. The antenna is a patch antenna with a dielectric Superstrate. It is designed for an Industrial Scientific and medical band (ISM) (2.4 -2.5 GHz) and communication band (3.25GHz) application. From the simulated results, it is seen that  $|S_{11}|$  is less than -10dB in the operating frequency. This provides an Omnidirectional Pattern. The key factors like gain and directivity is also obtained.

**Keywords-** *implantable antenna: ISM (industrial scientific and medical) band:low cost.*

## 1. INTRODUCTION:

Presently, the medical technology involving in the reduction of complexity in the treatment process. To overcome the problems in wired technology in medical field the wireless telemetry system is now days used. The medical device is used to detect the various parameters like glucose levels, temperature, Heart rate, etc. There are three types of communication off body, on body, in body communication. Off body communication which refers to the communication outside the body. On body communication deals with antenna fixed on the surface of the body, example textile antenna. The In body communication deals with the antenna which is placed inside the body, example implantable antenna. The implantable antenna can plays a vital role in wireless medical communication and it can be used in two ways as a sensor antenna and simple Antenna. When an Implantable antenna is placed in human body, based on the permittivity of muscles, the radiation pattern of an antenna changes in this manner it act as an sensor antenna. The permittivity varies for every person. Based on this change the radiation pattern also Varies, by comparing the defect person's radiation pattern with the standard radiation pattern, We can calculate the above mentioned body parameters. The simple antenna produce a radiation pattern based on the sensor output. Implanted antenna is an miniature sized antenna. As we referred our Base Paper they used the material called Rogers, having permittivity(10.2). They obtain single band frequency of 402-405 MHz (MICS band) in simulation and two medical band during Fabrication in the frequency range of 402-405 MHz (MICS band) 2.4-2.48GHz (industrial scientific and medical band : ISM band) and they use HFSS simulation tool. The proposed

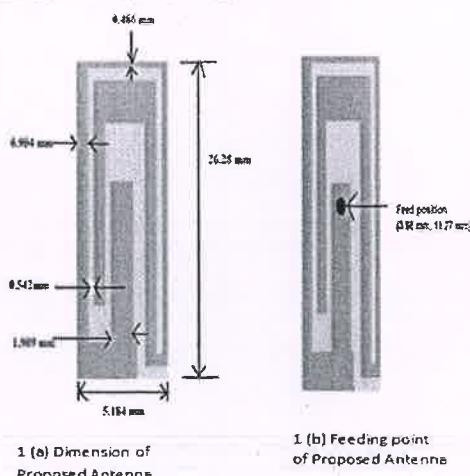
antenna will be analyzed by using Computer simulation tool (CST). In this design we create a internal loop, here substrate used is Fr4 having the permittivity of 4.6 at low cost compare to rogers. In simulation there obtain two bands at the range of (2.45GHz and 3.25GHz).CST is an 3D plot which is for low and medium frequency range. It

uses the perfect boundary Approximation method. The range of simulation methods in CST MWS allows the engineer to choose the best technique for each application. The transient solver could be best for wideband or planar antennas, the frequency domain solver may be more suitable for electrically small antennas, while the integral equation solver can efficiently simulate electrically large or wire antennas.

It is fast, accurate and easy to use.

## II. STRUCTURE ANALYSIS

The structure of implantable antenna is discussed. It is shown in Fig. 1 (a) and (b). There are two monopole with an Interior loop responded to low frequency(2.45GHz) and high frequency (3.25GHz)bands, respectively. The dielectric superstrate is employed to reduce the total size of the antenna thus it consists of two layers of dielectric superstrate and substrate, respectively. The printed circuit board (PCB) of Fr4 is used in the design, where it has a relative permittivity ( $\epsilon_r$ ) equal to 4.6 and the thickness is 1.6 mm. The feed is given at a position of (3.98mm,11.27mm). The antenna characteristic is evaluated by the CST simulation software



1 (a) Dimension of Proposed Antenna  
1 (b) Feeding point of Proposed Antenna

## III. SIMULATION RESULTS:

In this paper, figure 2(a) shows  $S_{11}$  result 2(b) shows directivity and 2(c) shows gain plot. There will be no side lobe and back lobe hence there is no backward radiation. The reflection coefficient is attained below -10 dB which is an efficient result. Maximum Directivity of an implantable is 1.5 in this paper the directivity is minimum since it radiates in omni-directional pattern. The gain is a combination of directivity and efficiency. Here the efficiency is less for miniature size antenna. Since the impedance match is poor and body act as a resistive load.

## UNDERWATER IMAGE COLOR CORRECTION USING IMAGE ENHANCEMENT AND BOUNDARY DETECTION TECHNIQUES

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**Abstract—**Absorption and scattering of causes heavy colour damage in underwater. So, result of the underwater images is blur, noisy and dark shaded. It is very difficult to analyse the living and non-living things in underwater. Absorptions means it is removing energy of light and Scattering is defined as change of direction of light path. Scattering has two process. These are forward scattering process and reverse scattering process. Where various of methods to increases contrast and reduce noise of underwater image. Applied log and power law modification of integrated RGB and HSV colour models. Mapping various pixel values according to cache and contrast stretching process. Limiting dynamic range of colour models to reduce blur and noise over-enhanced areas of pixels. other state of the art method in term of contrast and noise reduction. In this proposed method we use image enhancement and boundary detection algorithm to correct the colour in the underwater images. In image enhancement technique, to improve the colour by log transformation at which one of the methods of gray scale transformation to maintain the white balance on the image. Another method of grey scale transformation is power-law transformation at which square the value of pixel. The haze of image can be removing by cache process and maintain the RGB colours by use of contrast stretching process. Also, we used Morphological operator for detect the edges. These operators useful for clearly detect the edges.

### 1. INTRODUCTION

The development of underwater imaging techniques has attracted considerable attentions in recent years. However, absorption and scattering of light in an underwater scene cause heavy colour distortion, making it difficult to recognize and analyse objects. An image contains descriptive information about the object it represents. An image is defined as a two dimensional function  $(x,y)$  that carries some information. Where  $x$  and  $y$  are known as spatial or plane coordinates. The amplitude of ' $f$ ' at any pair of

coordinates  $(x,y)$  is called the intensity or gray level of the image at that points. In current times the underwater image enhancement techniques and Edge detection techniques are very helpful for research field. But absorption and scattering causes high colour distortion in underwater image. So, the images are dark shaded, noisy, low contrast and blur. Due to this effect very difficult to analyse the objects. The solution for this effect is image enhancement method and edge detection technique. This method very useful for underwater research purpose. These operators must segment the edges, boundary and shape of the object in underwater haze image. Which are leads to identify the mystery creature at which living in the very depth ocean or sea. Also, these methods are used to provide the helps to the peoples in flood time. During dam surviving, it can be inspecting the structure of the dam and monitoring the cracks and damages. Its analysis the sea bed, coral reef structures and tectonics plate of the earth. The aim of the project is to be enhancing the underwater image and also detect the object or obstacle in blur, noisy and haze image.

### 2. EXISTING METHOD

Hazing and bluish effect caused by light scattering and colour change in underwater images. Haze is caused by suspended particles such as sand, minerals in lakes, river and oceans. Capturing image underwater is challenging due to haze caused by incident light. Incident light traverses from surface of water reaching the image scene covering range from  $D$  through  $D+R$ , where  $R$  corresponds to image depth range and background light is usually assumed to be pixel intensity with highest brightness. Thus, foreground and background intensities are known and

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# A Thin and Flexible UWB Rectangular Array of Vivaldi Antenna with Increased Bandwidth

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**Abstract** - An Omni-directional ultra wide band Vivaldi array antenna is designed in this paper. The UWB Technology provides wide band wireless communications using vary narrow pulses and at very low spectral densities. The Federal Commission of Communications allocates the bandwidth of UWB from 2.1GHZ to 10.3GHZ for unlicensed radio applications.. The return loss responses and radiation patterns are considered in the parametric study. The results of simulations realized using Ansoft HFSS, a high frequency electromagnetic field simulation program, are shown and discussed.

**Keywords:** *Omni directional antenna, Ultra wide band, Rectangular array, Line feed, WBAN*

## 1 INTRODUCTION

Rapid developing technology of satellite, wireless communication, remote sensing and radio detection and ranging has LED to the radical wide band (UWB) electronic systems. Any radio technology using signals with a spectrum occupying a bandwidth either greater than 20% of the centre frequency or a bandwidth greater than 500MHz is defined as UWB technology [1].

UWB technology needs antennas with broad information measure and minimum distortion of received and radiated pulses. Moreover, UWB mobile applications have strict needs on the scale of antenna arrays to be used because of the restricted house.

The tapered slot antennas (TSA) are the best candidates for use in UWB technology. These antennas offer a wide bandwidth, significant gain and symmetric patterns in both co-polarization and cross-polarization. TSAs are efficient and lightweight. In addition, TSAs are appreciably simple in geometry making them more advantageous. The most commonly used class of TSA in UWB technology is Vivaldi antenna. Vivaldi antenna, first introduced by Gibson [2] in 1979, has an exponentially tapered slot line. As a member of the class of TSA, the Vivaldi antenna provides broad bandwidth, low cross polarization and directive propagation at microwave frequencies. Vivaldi antennas are low cost, easy to fabricate and insensitive to dimensional tolerances in fabrication process due to printed circuit technology used for the construction of these antennas. Moreover, Vivaldi arrays are small size and low weight enabling compact arrays. It shall be also noted that the beam-width and directivity of a Vivaldi antenna might be considerably improved varying the design parameters.

This paper deals with small size Vivaldi antennas and arrays. The parameters affecting antenna and array designs are studied comprehensively. The design of Vivaldi antenna and array with the requirements given in following chapters are realized as well, based on this parametric study.



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# Hardware Implementation of Road Network Extraction Using Simplified Gabor Wavelet in Field Programmable Gate Array

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## Abstract

Automatic detection of road networks from the satellite and aerial images is the most demanded research area, and it is used for various remote sensing applications. The Simplified Gabor Wavelet based approaches are used to extract the road network automatically. In this paper, a field programmable gate array architecture designed for automatic extraction of road network using Simplified Gabor Wavelet is proposed. The hardware implementation results are compared with software implementation results. The performance measures such as completeness, correctness and quality are calculated. In the software implementation, the average value of completeness, correctness, and quality of various images are 91%, 98%, and 89% respectively. In the hardware implementation, the average value of completeness, correctness, and quality are 89%, 97%, and 87% respectively. The performance of the proposed algorithm is also proved in noisy images. These measures prove that the proposed work yields road network very resembling to reference road map.

**Keywords:** road network extraction, simplified Gabor wavelet, field programmable gate array, connected component

## 1. Introduction

Automatic detection of road networks from the satellite and aerial images is the most demanded research subject and it is used in many computer vision applications [1]. The updating of road network databases is essential to many GIS (Geographic Information System) applications like navigation, urban planning, route planning, health care accessibility planning, land cover classification and infrastructure management etc. The proposed work is boundary and centerline of road network extraction using Simplified Gabor Wavelet (SGW) and FPGA architecture is proposed for this road network extraction method.

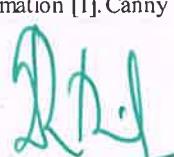
The remaining part of this paper is organized as follows. In Section 2, a literature survey on road network extraction is given. Section 3 presents road network extraction using SGW. Section 4 provides the results and discussion of the proposed algorithm. In Section 5, FPGA Architecture for Road Network Extraction using SGW is proposed. Section 6 gives FPGA implementation and synthesis results of the proposed architecture, and Section 7 provides the conclusion of the paper.

## 2. Literature Survey

Many research works have been proposed for automatic road network extraction using wavelet transform for the past few years. Guan et al. have presented an approach for road centerlines extraction and width estimation [1]. Canny is used to detecting

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# Tumour Classification and Ellipsification for Breast Cancer in Mammogram Images using Image Processing in MATLAB

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## Abstract

Recent advances in using quantitative ultrasound (QUS) methods have provided a promising framework to non-invasively and inexpensively monitor or predict the effectiveness of therapeutic cancer responses. One of the earliest steps in using QUS methods is contouring a region of interest (ROI) inside the tumours in ultrasound B-mode images. This contouring is done by manual segmentation which is a very time-consuming and tedious process whereas auto-contouring is also an extremely difficult task for computers due to the poor quality of ultrasound B-mode images. For the prediction of cancer response cell, a rough boundary of the tumours as an ROI is only needed. In this work, a semi-automated tumours localization approach is proposed for ROI estimation in mammogram B-mode images acquired from the patients with locally advanced breast cancer (LABC). The proposed approach consists of some different modules, including 1) feature extraction using keypoint descriptors, 2) adding the feature descriptors with the distance of the keypoints to the user-input pixel as the center of the tumours, 3) a support vector machine (SVM) to classify keypoints as "tumours" or "non-tumours", and 4) ellipse as an outline of the ROI representing the tumours. These process with the B-mode images from LABC patients yielded promising results with an accuracy of about 80 to 90% using random functions. These results demonstrated that the proposed method can be used as the first stage in a computer assisted cancer response prediction system for semi-automated contouring of breast tumours.

**Keywords** - Image Enhancement, Image Segmentation, Image Classification.

## I. INTRODUCTION

In this technique the tumor cells are identified by using classification and ellipcification process. The main aim of this process is to predict a means to assess the individual report to treat them early by this approach. There are several functional imaging modalities such as Magnetic Resonance Imaging (MRI), Diffuse Optical Spectroscopy (DOS), and Positron Emission Tomography (PET) that can

provide imaging at a microscopic level to detect dead cells. The two main drawbacks of these imaging technologies include: (i) the requirements for a large capital investment and an external agent (ii) The latter is also expensive, and may cause some side effects and allergic reactions. In contrast, Quantitative UltraSound (QUS) methods in mammogram images provide a portable, non-expensive, and noninvasive means for a rapid acquisition of functional images that can be used for an early assessment of cancer cells. Moreover, in QUS methods, the endogenous contrast – generated by the process of cell death which is employed in treatment assessment, which reduces the requirement for injecting external agents. The applications of QUS methods have recently been extended from cancer response monitoring the tissue characterization (or) visualization using 3-D Automated Breast UltraSound (ABUS) scanners. The first major step in the implementation of each of these applications is to contour a Region of Interest (ROI) inside the tumours in frames with identifiable tumours areas. This step is currently performed manually as there is no automated software to segment an ROI in ultrasound B-mode images. The manual segmentation of tumours is a very time-consuming task. With the availability of 3-D scanners such as ABUS technologies, the problem will be even more severe to be contoured in each patient. Therefore, designing an automated segmentation method can save a significant amount of expert's time and efforts. In this work, a semi-automated supervised tumours localization method was proposed for ROI estimation in B-mode images gathered from patients with Locally Advanced Breast Cancer (LABC) and determining their accuracy of the cancer cells.

## II. BACKGROUND

Several segmentation techniques has been tried for different mammogram images. Different classification techniques were applied on some expressive features have been employed to extract segments from the images. These classification techniques include some methods like FAST, SURF, BRISK and some simple methods like k-means and Fuzzy c-means(FCM).

*k-mean algorithm*

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# Density Based Traffic Control System and Green Light Transition Time Estimation using Image Processing

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## **Abstract**

Traditionally, equal weightage has been given to the traffic signals to undergo transitions at each side of the junction. In metropolitan cities, this system would give rise to tremendous delay effect which is discomfort to the commuters. Traffic congestion affects the daily routine of passengers and in the long run there will be a declination in productivity if such situation is not addressed effectively. If an Ambulance, unfortunately got stuck in the middle of congested road, any further delay can endanger the life of the patient and many such cases require intelligent, powerful and reliable traffic control system. With the emerging technology such as advanced version of Microcontrollers, Sensors, etc., the smooth functioning of traffic signal system can be attained. For instance, in the density based traffic control system, the interface between IR Sensors and Microcontrollers System on Chip (SoCs) keeps track of vehicle's density across the lane. The microcontroller in response to sensor's output generates the control signals to alter the traffic signals accordingly. During each transition phase, the Voice Recognition (VR) modules installed on different lanes sense the emergency vehicle's siren and thus temporarily allow passage to such vehicles by turning the signal "green" for the corresponding lane, while others being remained at "red".

Using Image Processing analysis, the exact count of vehicles can be visualized in the GUI Tool (created using MATLAB®) and the green light timings for the "consecutive turns" can also be estimated. Due to globalization, the vehicle density is increasing year-by-year, hence we took the motives to propose an improvement in the existing system. We have included larger number of sensors for accuracy as well. In future, we will interface the Image Processing result and the embedded part (the one with separate program running on micro-controller) to get accurate timings to switch to different lanes and circumvent delay issues.

**Keywords** - ATmega2560, Infra-Red (IR) Sensors, Edge detection (Image Processing), GUI (Graphical User Interface).

## II. I. INTRODUCTION

Vehicle density [1] at any traffic junction is a probabilistic event [2], hence it becomes complex to monitor their counts at a given time. However, the objective of traffic research is to regulate or smoothen out the flow of traffic in order to suppress the unintentional delays and deliver comfort experience to commuters. Though there are many existing models/methods available to control the traffic signals using IR sensors and the micro-controller, but we felt "incorporating/embedding the so-called "density [3] mode" into the "normal/traditional mode" will surely change the way the traffic control [4] system operates." In this research, we have tried to emphasize this effect, and the algorithm used can be made compatible to multiple junctions by modifying (manually) just one section of code (say a control function). Secondly, the VR module installed on each and every junction can handle the emergency situations by diverting the normal transitions of traffic signals into "emergency-mode". For convenience, the setup of the proposed system is shown in Fig 1.

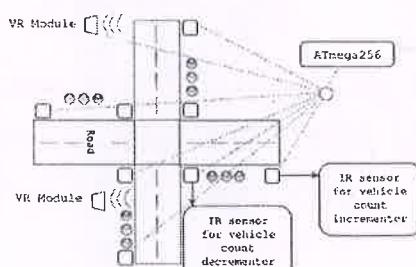


Fig 1: Proposed system architecture

Using image processing [5], the misinterpretation issues in vehicle's count can be addressed effectively. The Image Processing part offers parameters such as percentage match, vehicles count and green light timings, as discussed in design and development section. In future, the correlated version of embedded and image processing part will surely provide "All-in-One" support for traffic research. Notice the position of IR sensors, the one at the extreme end of the road counts the vehicle entry and the other near the traffic post decrements the vehicle's count. Though the logic can be achieved using single sensor but for accuracy



# Connected Component Based Segmentation Technique for Vehicles Detection from High Resolution Satellite Images

C. Sujatha, N. M. Masoodhu Banu, S. Karthigai Lakshmi

**Abstract:** Satellite images are used for various applications like geographical, weather and geological applications. The forecasters used the low-resolution satellite images to predict the atmospheric changes. The high resolution satellite images are used in more applications especially for object segmentation and detection. The research on the high resolution satellite image is a challenging task. Less research is performed on high resolution satellite imagery as it is a challenging task. Traffic monitoring is a challenging task in developing countries. Automatic vehicle detection is very much useful for the traffic monitoring system. Vehicle images appear in miniature size in high resolution satellite images which is very difficult to extract from the images. Many researchers are working in these areas for the past few decades and most of the research is based on various types of sensor data. In sensor images, complete road network cannot be captured. In this paper, automatic detection of vehicles from high resolution satellite is proposed. Connected component based algorithm for automatic vehicle detection in high resolution satellite images is proposed in this paper.

**Index Terms:** Adaptive global thresholding, Connected component analysis, Morphological operator, Vehicle detection.

## I. INTRODUCTION

Vehicle detection and tracking are mainly used in many real time applications such as urban planning, traffic monitoring and control etc. Vehicle segmentation is used to find out the number of vehicles, the speed of the vehicle, and classification of the vehicles. In urban areas, traffic monitoring and controlling is the most needed task [1]. Vehicles details are necessary for traffic management, assessment of fuel requirement, traffic emissions control and control the air pollution [2]. Image processing approaches and investigation tools used for vehicle detection is given in this section. In this paper, a brief outline of image processing techniques and tools used to detect the vehicles which are used to develop the traffic surveillance systems is proposed. Automatic vehicle detection is most needed for traffic monitoring and surveillance system to control the traffic flow [3]. In the traffic monitor system, rather than the traditional method, high resolution satellite images are mainly used because of its compatibility, cost and accuracy [4]. The performance of vehicle segmentation is influenced in various areas such as urban planning, transport planning, evaluation

of air and noise pollution levels in the atmosphere etc. Thus, an automatic approach of vehicle detection is essentially needed to solve the traffic-related issues and town planning.

The rest of the paper is arranged as follows. Section 2 gives the literature survey on vehicle detection. The proposed methodology of vehicle detection using connected component based approach is presented in section 3. Section 4 provides the results and discussion of the proposed algorithm and conclusion of the paper is present in section 5.

## II. LITERATURE SURVEY

An important property of the vehicle image detection method is its ability to extract accurate vehicle images, and much literature on vehicle segmentation has been published in the past decades. Some of these works are stated here.

Noorpreet proposed vehicle detection method from high resolution satellite images [5]. This algorithm applied Otsu thresholding method to get a binary image, edges of the images are extracted with the help of canny operator after that blob analysis is applied to identify the vehicles objects in the image. Leitloff has presented a vehicle segmentation approach in very high resolution satellite images of urban zone [6]. This approach consists of four main processes. The region of interest (ROI) is determined by preprocessing steps, and then adaptive boosting classifier is applied. Then, the grouped vehicles and single vehicles are categorized. The location of vehicles is identified and reliability is measured in this paper.

Qu has introduced an automatic vehicle detection approach, which is based on Binary Normed Gradients (BING) and convolutional Neural Network (CNN) [7]. This model consisted of two stages; Binary Normed Gradients (BING) is applied to extract region proposals. Convolution Neural Network (CNN), which combines feature extraction and classification, is used to enhance the robustness and improve the accuracy rate. Aaron presented an algorithm for 3D object centred change detection in satellite image [8]. This paper implanted the integrated cartographic modelling with image processing to utilize various government and commercial image data and geospatial data.

Kembhavi et al. [9] proposed a model based on multi-scale HOG features. Thus it can effectively detect vehicles in different sizes and scales. Grabner [10] proposed a car detection system using the robust boosting method. In [11], edges are detected then thresholding is applied to detect the changes in an image.

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## International Journal of Scientific Research and Reviews

### Automatic Detection of Diabetic Retinopathy in Retinal Image

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#### ABSTRACT

**Objective-** In these days, medical image analysis is a very popular research area where digital images are analyzed for the diagnosis and screening of various medical problems. Diabetic Retinopathy (DR) is an eye disease caused by increased blood insulin and may result in blindness. An automated early detection system for DR can save a patient's vision. Early diagnosis is beneficial in preventing visual impairment and blindness through regular screening and treatment.

**Methods-**This project presents a method to detect and classify exudates in colored images of the retinal. Several image processing techniques have been developed for early detection of DR based on features. Such as blood vessels, exudes, hemorrhages and micro aneurysms, including image enhancement, skin locus segmentation.

**Results-**This project presents a review of the latest work on DR feature detection using image processing techniques. Based on their results, Image processing techniques are evaluated. The exudates are classified as true or false exudates with the help of grading system were able to distinguish between four different types of grading level with an average accuracy of 94.17%.

**Conclusion-** In this paper the finding of optic disk is made by means of skin locust techniques, blood vessel segmentation and exudates detection by means of intensity computation and feature extraction.

**KEYWORDS-** Skin locus segmentation, Diabetic Retinopathy, graphical User Interface (GUI).

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# ENHANCED DESIGN OF BINARY TO GRAY AND GRAY TO BINARY CODE CONVERTERS USING QUANTUM DOT CELLULAR AUTOMATA (QCA)

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**Abstract-**Nanotechnology has contributed to major developments in computing and electronics which results in quicker, smaller and more movable systems that can handle and store more amounts of data. Quantum dot Cellular Automata (QCA) is one of the emerging trends in the field of nanotechnology for designing digital circuits. It has the potential features such as faster speed, smaller size, and low power consumption than transistor based CMOS technology. The proposed work implements an efficient 3-bit,4-bit,5-bit binary to gray and 3-bit,4-bit gray to binary code convertors using Quantum dot Cellular Automata.

**Keywords-** QCA designer; quantum dots; majority gate; cell interaction; reversible logic.

## I.INTRODUCTION

A Quantum dot Cellular Automata (QCA) is a nanostructure of square shape which is able to perform computational functions.QCA technology transfers information through the polarization state of various cells instead of passing the information through current and voltage.QCA have gained a lot of attention as a result of its extremely small feature size and its ultra power consumption made it a replacement solution of CMOS technology. In CMOS logic gates, size of circuits cannot be scaled down further which shows inauspicious consequence not only from physical and technological frame of reference but also from material and economic perspective like tunnel currents, subthreshold leakage, etc. Logical Operations and data transfers takes place via columbic interaction between adjacent QCA cells rather than current flow. Quantum Dot Cellular Automata provides an original information processing and communication. It has been acknowledged as one of the complete nano scale computing devices. A crucial advantage of QCA over other nano electronic architectural scales is that the same cells are used for making Logic Gates. The QCA permits operating frequencies of about few Tera hertz and the circuit does not need extra power supply for its operation, which is not possible in current CMOS technologies. By taking this favorable superior position of QCA, it can be able to design fascinating computational architectures. The device pattern based on QCA cells offers the chance to escape from FET based logic and to make use of the quantum effects that come with nanoscopic dimensions.QCA cells are able to measure molecular sizes and hence the behavior improves as the size minimizes.





## International Journal of Intellectual Advancements and Research in Engineering Computations

### Smart driving with automatic control mechanism

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#### **ABSTRACT**

Every vehicle has its own emission of gases, but the problem occurs when the emission is beyond the standardized values. The primary reason for this breach of emission level being the incomplete combustion of fuel supplied to the engine which is due to the improper maintenance of vehicles. This emission from vehicles cannot be completely avoided, but it definitely can be controlled. The aim of the project is to monitor and control the pollutants in the vehicle by using the pollution control circuit. Internal Co Emission Check and Control for Clean Environment. Vehicle can be controlled by government authority by Server. Automatic Speed Control based on vehicle distance measurement. Fuel Theft detection using ultrasonic sensor and sending SMS to owner using GSM technology. Automatic Air conditioner Functioning based on High precision temperature measurement and control.

#### **INTRODUCTION**

The incomplete combustion in the engine of a vehicle leads to emission of different gases contributing to increase in the pollution and adversely affecting the environment. Detection and control of these gases is an important area of work. This emission from vehicles cannot be completely avoided but, it definitely can be controlled. Now a day's accidents are common reason for deaths. These are critical things to control so here we come

up with a concept to reduce pollution and detect the location of accident using GPS. As a solution to the above problems we aim to build an automated control system for emission level control of vehicle and accident place detection. Smoke detector is used to detect the carbon percentage in the smoke released by the vehicle due to combustion of fuel in it. Smoke detector is fixed at the end of the exhaust of vehicle from where smoke is released into the environment.

#### **Pre-defined values**

POLLUTANT	PERMISSIBLE LIMIT
Nitrogen dioxide	60-80g/m <sup>3</sup>
Carbon monoxide	2-4mg/m <sup>3</sup>
Sulphur dioxide	60-80g/m <sup>3</sup>



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# Multi featured Automatic Headlight Switching System for Human Safety

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**Abstract—** Headlights of vehicles place a great danger during night driving. The drivers of most vehicles use high, bright beam while driving at night. In a Period of time Enormous accidents occur due to the disability of the humans to have control over their cars. The person travelling from the opposite direction suddenly experience the glare due high beam. This occurs due to the Opposite Vehicle that has high intense headlight beam towards the opposite vehicle. In this project, an Automatic Headlight Switching System (AHSS) using a Light Dependent Resistor (LDR) detector has been designed to dim and bright the Headlight of our vehicles to avoid human eye from the glare. Specifically, system aims to automatically control a vehicle's beam state ( high beam or low beam ) during night time drive based on the detection of On-Coming. Reverse parking sensor is added in this project so that it can sense the car when it is near to an object when it is reverse state, it indicates by sound from an particular distance.

**Keywords—** Arduino Board, LDR, Ultrasonic Sensor

## I. INTRODUCTION

Light is electromagnetic wave within a particular portion of the spectrum. Visible light is sometimes outlined as having wavelengths within the vary of 400–700 nanometres (nm), or  $400 \times 10^{-9}$  m to  $700 \times 10^{-9}$  m, between the infrared and the ultraviolet. Light may be frequently produced naturally or by humans. It works virtually a complete day with none rest. There are two varying visions namely scotopic vision and photopic vision. Actually Human eyes behave as differently in variable conditions. In morning bright condition, our eye can resist up to 3 cd/m<sup>2</sup> is called as photopic vision [5]. During night or dark conditions, our eye switches to night vision that makes a variation of 30-45  $\mu$ cd/m<sup>2</sup>. It takes four seconds for our eye to glare from sight to night sight. This is an example of a Troxler impact. Headlight is essential throughout night travel. High Intensity light beam that causes accidents in the night travel [6]. During coal black conditions where we can not change from the high intensive beam. Other than that we prefer low intensive beam . But during a two way road traffic, there are vehicles moving on both sides of the road. So once the intense light-weight from the light of a vehicle returning from the alternative direction falls on someone, it glares him for a certain amount of time. This causes disorientation to that driver. This discomfort can lead to involuntary closing of the driver's eyes momentarily [1, 13-15]. This fraction of distraction is that the prime explanation for several road accidents. The model that has been designed to scale back this drawback by truly dimming down the bright headlamp of our vehicle to beam mechanically once it senses a vehicle at close proximity approaching from the other direction [2,7]. The entire operating of the variable resistor may be a straightforward electronic equipment arrangement that senses and switches the headlight inline with the conditions needed [3,4].

## II. RELATED WORKS

Motorists face a large drawback because of Ray of light that falls directly onto their eyes once driving at night time or throughout foggy conditions. There is medical effect associated with these phenomena. This impact includes temporary vision defect, glare, weakening impact of image and generally inflicting accident resulting in loss of the many lives. This effect contributes to a terminology known as Troxler Effect [4]. Troxler impact is employed to explain a form of temporary vision defect. It is otherwise known as the 'fading effect'. A study shows that if our eyes expose a bright light of around ten thousand lumens, we tend to see the glareness [8,16]. This glare is produced due to over exposure of the rods and cones inside our eye. Even after the source of glare is removed, an after-image remains in our eye that creates a blind spot. This phenomenon is called Troxler effect. This means that the driver's reaction time is increased by 1.4 seconds [9]. As an illustration, let us take a motorist travelling at 60 miles per hour takes 0.5 seconds to respond to a hazard and will stop within 41 feet.

Due to Troxler impact, the same person travelling under the same conditions will take 0.9 seconds longer to react and hence will come to a complete halt only at 123 feet. There is a huge difference of 82 feet. This is quite enough to cause a



# EMBEDDED BASED AUTONOMOUS SEED SOWING ROBOT

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**Abstract:** A seed sewing machine is a device that sows the seed by positioning them in the soil and covering them to a certain depth. The basic requirement of the seed sowing machine is that it should be suitable to all farms and all types of crops. The construction of this machine should be robust. Thus this paper proposes the construction of sowing machine that reduces the efforts of the farmers. This machine is operated manually and has increased efficiency and accuracy. The seed to seed spacing, seed rate and depth of seed placement may vary from crop to crop for different agro. Climatic conditions to achieve optimum yields. This machine renders a great help in achieving these conditions to get the yield. The proposed design is so cheap and usable for small scale farmers. The design is so much simplified that it could be handled by any farmers or untrained workers.

## 1. INTRODUCTION

The agriculture is always the backbone of India. The demand for production increase as the population increases. Hence, there is a greater need for multiple cropping that requires efficient and time saving machines. There are also traditional methods used in India. As India has huge man power the manual planting is popular in villages of India. But this method is very troublesome for large scale area. The time required for planting is much more compared to smaller areas and thus required man power to complete the task in stipulated time which is costlier.

More amount of wastage happens during manual planting. Cropping is tedious activity for any farmer and for large scale this activity is so lengthy and also required more workers. Thus agriculture machine was developed to reduce human effort.

Sow of the seeding equipment's are,

Rotary dibbler.

Manual oil seed drill.

Manual seed and fertilizer etc.



## 2. EXISTING METHOD

In traditional method of seed planting we have following limitation.

1. In manual seeding, it is not possible to achieve uniformly in distribution of seeds.
2. A farmer may achieve the desire seed rate but inter and intra row distribution of seeds is likely to be uneven.
3. Poor control over depth of seed placement.

Thus we need to make the proper design of the agriculture machine.

The process of using machine is called Mechanization. Along with mechanization automatic helps to increase the efficiency. This paper proposes the hardware implementation, selection of components and controller of the four-wheel robot's system on which seed tank, sowing mechanism is installed to turn it into the automatic operated vehicle.

### 2.1 FACTORS AFFECTING SEED EMERGENCE

Factors that affect seed germination are,

1. Depth with regard to the placement of seed.
2. Uniform distribution along the rows.
3. Transverse displacement with regard to the row.
4. Loose soil setting.
5. Uniform coverage of soil over the seed.
6. Mix-age of fertilizer.

The above factors help to get best performance of the seed drill or planter. To improve the performance, we need to optimize the above factors to get the desired efficiency from the system in economical way.

The design is simplified and components are selected to suit the need of crops. The working of the seed drill plays a vital role in maintaining the system environment. The system serves the need that the seen should not be damaged while working.

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# DESIGN OF LOW PROFILE GRID SLOTTED MICRO STRIP PATCH ANTENNA

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**ABSTRACT:** This paper represents the well formed rectangular slotted microstrip patch antenna. The proposed antenna is simulated using HFSS tool. The purpose of this paper is to design the rectangular microstrip patch antenna and concentrating on the effect of antennas radiation pattern and gain. By considering the parameters of relative dielectric constant ( $\epsilon_r$ ), substrate material & thickness of the material, length & width of the patch. Conducting patch is formed by using rectangular configuration. The presented grid-slotted patch antenna acquires the measured bandwidth of 2.45 for the slot lesser than 3db and the maximal attained gain is 2.25dbi.

**Keywords:** HFSS, microstrip patch antenna.

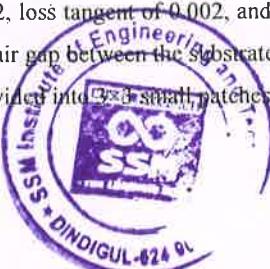
## I. INTRODUCTION

A patch antenna also known as a rectangular micro strip antenna is a type of radio antenna with a low profile which can be mounted on a flat surface. It consists of a flat rectangular sheet or "patch" of a metal mounted over a large sheet of metal called ground plane. A patch antenna is a narrow band, wide beam antenna fabricated by etching the antenna element pattern in metal trace bonded to an insulating dielectric substrate such as printed circuit board with a continuous metal layer bonded to the opposite side of the substrate which forms a ground plane. Common micro strip antenna shapes are square, rectangular, circular and elliptical but any continuous shape in antenna is not possible.

Some antenna does not have dielectric substrate instead they are made of metal patch mounted above a ground plane which has wider bandwidth. The industrial, scientific and medical (ISM)radio bands are used for the purpose of telecommunication. These bands have been used for short range, low power wireless communication systems since these bands are often approved for such devices that can be used without a government license.ISM frequencies are often choose for that purpose as they already have serious interference. Cordlesphones, Bluetooth devices ,near field communication(NFC) devices and wireless computer networks may also use the same ISM frequencies.

## II. LITERATURE SURVEY

The antenna consists of three metal layer separated by two square F4B substrates with size of  $70 \times 70$  mm<sup>2</sup>, relative permittivity of 2.2, loss tangent of 0.002, and thickness of 1 mm.. The two substrates are stacked together closely and there is no air gap between the substrates. A grid-slotted patch works as a radiator is printed on the top layer. The patch is divided into 2x3 small patches by two horizontal slots and two vertical slots.



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# SMART COMMUNICATION HAPTIC GLOVE FOR DEAF AND DUMB PEOPLE

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**Abstract-**Technology is developing day by day but no significant developments are undertaken for deaf and dumb people. Deaf and dumb people have no ability to interact with their environment. Such people depend on the sign language. We design and implement the smart communication for deaf and dumb people using line sensor. The glove records the gestures made by the user and then it translates their gestures into visual form.

## I.INTRODUCTION

According to the statistics of the world federation of the deaf and the world health organization approximately 70 million people in the world are deaf and dumb people. The majority of speech and hearing impaired people cannot read or write in regular languages. Sign language is the native language used by the deaf and dumb to communicate with others. To solve this problem using two modes of operation in this system. If measuring the actions performed by the deaf and dumb people using resistors array (analog sensor) attached to gloves in a hand of the user. Once the glove is placed in the hands, whenever an action for sign language is accomplished, the analog voltage value acquired and the analogous action is recognized by the arduino uno board. LCD display and BLUETOOTH is used as output device to convey the message from deaf and dumb people to the receiver. Also play-back is used to play the respective sound. Arduino IDE and proteus software tools are used for compiling software coding and simulating the design. This project detects the movements of deaf and dumb or paralyzed patients and results, action show on LCD screen and alerting notification as we desired, and plays the stored sound in the play. Haptic relating to the sense of touch of sensation can be converted to meaningful sentence by using line sensor.

## II.LITERATURE SURVEY

A smart glove available in the market that uses a sign language recognition system is implemented and it is translating their gestures into meaningful English letters. They found the sign language for all English alphabet letters. It is difficult to communicate and it takes more time to complete single word or sentence [1]. sign speech/text system presents designing and implementing smart glove for deaf and dumb people. Translate sign to Arabic language by a haptic glove. They found the sign language for alphabet letters in Arabic sign language. This language is not understood by all normal people. It can only be understood by Arabic people it also takes more time [2]. hand gesture recognition presents a sign language for numbers. The main advantage of this presented in accuracy. This publishes numbers from 1 to 10. They found the sign language for a numbers from 1 to 10 and they use only one hand for gesture recognition. It takes more time to display one number to another [3]. Hand talk assistive technology presents a sign language for required sentence by using flex sensor. Flex sensor is used in one finger. This method is used by all deaf and dumb people. They found the sign language for only two sentences. In this flex sensor it creates only one sentence for single bend and it is costly [4].

## III.BLOCK DIAGRAM

### GENERAL WORKFLOW

Every person's hand shape is unique. This creates a lot of variability and it was required to create a device that encloses these variations. Arduino is an open source electronic platform. It uses simple programming language for input commands and simple hardware output. Line sensors are expensive high-end wired gloves can also serve haptic assessment which is a simulation of these sense of touch.





## International Journal of Intellectual Advancements and Research in Engineering Computations

### Face recognition using image processing with raspberry pi

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#### **ABSTRACT**

Face Recognition is concerned with finding whether or not there are any faces in a given image and, if Present, returns the image location and content of each face. Security and surveillance are the two important aspects of human being. In this paper we propose face detection and recognition system that will capable of processing images very fast while acquiring very high true positive face detection rate. Most face detection algorithms are designed in the software domain band have a high detection rate, but they often require several seconds to detect faces in a single image, a processing speed that is insufficient for real-time applications. This Paper describes a simple and easy hardware implementation of face detection system using Raspberry Pi, which itself is a minicomputer of a credit card and is of a very low price. The system is programmed using Python Programming language. Both real time face detection and face detection from specific images, i.e. Object Recognition, is carried out and the proposed system is to provide a high security system using face recognition on Raspberry Pi board and send an alert to the authorized person email, this will increase the security of our Project.

**Keywords:** Face Recognition, Haar cascade Algorithm, Local Binary Patterns Histograms (LBPH) Algorithm, Raspberry Pi.

#### **INTRODUCTION**

In associations, enterprises and many organizations are taking the whole participation utilizations RFID techniques, registers, Moodle based understudy ID recognizable proof and unique finger impression modules. In Registers, the whole participation will be figured and reports will be assembled toward the end.

It requires greater investment for computation. RFID innovation disentangles customized remote utilizing advanced inactive and dynamic with distinguishing pieces of proof suitable per users. In brief span, worth's of dispersion and usage for a RFID card based passage bunch framework can be fairly costly. An RFID based passage bunch framework has the capability of genuinely abusing human's sec unity or protection. RFID procedures at last impacts programming that permits each individual to be broke down by essential

information base. This kind of condition will be under assault of programmers. In the event that the RFID per user and recipient are not legitimately coordinated then less read rate can happens. Biometric time and neamess framework is one of the most precise prerequisite in biometric innovation.

Unique finger impression acknowledgment based participation administration framework is a running field today, yet acknowledgement of singular unique finger impression from an arrangement of selected fingerprints is a period taking procedure. Most unique finger impression based participation frameworks store the fingerprints of a client in the unique mark module database. The unique mark framework does not uncover any information about the first unique mark of the client. This suspicion has now been appeared to be false, numerous calculations have been expressed that can reestablish unique mark pictures from

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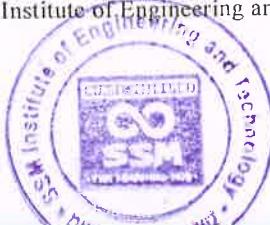
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# MRF Exemplar Based Comprehensive Framework For Image Inpainting

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**Abstract**— Image inpainting techniques bring about visual information in the marked region (other names are unknown and missing region) of an image so that the inpainted image becomes visually pleasant. This paper presents a Markov random field(MRF)-based image inpainting algorithm adopting patch selection from groups of related patches and optimal patch assignment through joint patch refinement. Exemplar-based texture synthesis method for refilling of pixels contains the necessary measure required to replicate both texture and structure. Preliminary results on a lavish number of candid images and comparison with well-known existing methods demonstrate the efficacy and advancement of the proposed method.

**Keywords**— Texture, Inpainting, Reconstruction, Image Restoration, Image Decomposition, Scratch Removal, Isophote.

## I.INTRODUCTION

Article eviction from images is an icon handling technique such has a long history. The unwanted objects are removed from the desired content by “airbrushing” out political enemies from portraits of notable events. Coexistent photographic manipulations, such as red eye removal from pictures, also utilized this technique. The process of doing away objects from images initiates with masking out the undesired object, making the section where the object previously occupies a cleft. Then the target region would be filled with certain graphical techniques such as inpainting. Amidst the graphical techniques used to fill the target region after removing the object, two are most commonly used they are: image inpainting and texture synthesis.

Correcting images using inpainting has a long history. Most remarkably, during the Renaissance, many unconventional medieval artworks had been brought “up to date”. Missing or damaged parts in the paintings were reconstructed in a resembling saunter that are not detectable from human eyes. Structures and textures at the boundaries of the gap were carefully extended into the missing area. The results would be natural so that observers who do not have any prior knowledge of the original image will not tend notice the gaps. Bertalmio, etc.[2]’s algorithm imitates the accustomed inpainting processes, such as designate the area to be corrected, examine the boundary of the region to be filled, and continuing lines of similar color. Differential equations are carry out related works. The most important equation is to evaluate the isophote

(direction and intensity) of a pixel. Every pixel is altered by adding its current intensity to an updated intensity times a delta factor. The updated intensity consists of an adjustment of smoothness estimation projected along the direction of shortest change. Approximation of smoothness value is done with the help of discrete Laplacian. The direction of shortest change is defined as the vector perpendicular to the gradient, and the dot product of this vector with the vector consisting of the x and y undulations in the Laplacian is multiplied by a slope-limited norm of the gradient of numerical stability.

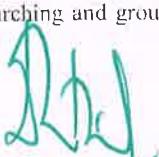
## II.RELATED WORKS

Hui Yu et al introduce a learned approach for texture synthesis based on support vector machines (SVM). This approach benefits from the accounting of SVM that the sample texture sequence is learned using a model, and the sample itself can be discarded during the synthesis stage

Wenhan Yang et al presented a new framework for the stylization of text-based binary images. First, our intention is to stylize the stroke-based geometric shape like text, symbols, and icons in the target binary image based on an input style image. Next, the backdrop image is scrutinized and the configuration of the stylized geometric shape is examined.

Hongchuan Yu et al proposed an advanced GAN to overcome the forementioned limitations. Our proposed GAN-based structure consists of a quite convolutional design for the generator which helps to better preserve spatial structures and a joint loss function with a revised perceptual loss to capture high-level semantics in the context

Ting-Zhu Huang et al aims at reconstructing the missing information by a nonlocal low-rank tensor completion manner. Initially, nonlocal correlations in the spatial domain are taken into account by searching and grouping similar image patches in a large search window.



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# SESCAS: A System for Mitigating Forwarding Misbehaviour in Wireless Sensor Networks

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**Abstract:** Remote Sensor arrange is the most standard administrations utilized in business and modern applications because of its specialized advancement in the processing, communication and low-control utilization of installed PC equipment. Due to open sent nature, the attackers effectively attack the node, so there is an absence of security. To avoid this, Selective sending approach is actualized. This paper aims to establish a simple countermeasure Scalable and Energy efficient Single Check Point based Acknowledgement Scheme; SESCAS is to detect and isolate the misbehaviour node in a wireless sensor network based on time out and retransmission. We carry out extensive simulation experiments to evaluate and compare performance with the extensive CHEMAS, CAM and CAD. The result of the simulation shows that the proposed mechanism can diminish the false recognition rate, collision of packets, energy utilization rate, propagation delay; we likewise enhance the packet delivery ratio and identification rate.

**Index Terms:** Check point detection, Forward misbehaviour, Software Cluster based Management, Wireless sensor network.

## I. INTRODUCTION

A wireless sensor network (WSN) is a network which consists of many low powered devices that are spatially deployed to supervise the environmental conditions in hostile areas. These gadgets, or nodes, when combined with routers and a gateway, give rise to a typical WSN system. These distributed nodes will communicate wirelessly to a central gateway. It provides a link between the wired world and them to collect, process, evaluate, and present the data. To extend distance and improve the reliability in a WSN, the routers can be used to gain an additional communication link between end nodes and the gateway. Currently, the WSNs are ready to be deployed at an accelerated pace. This new technology is exciting with unlimited potential for numerous application areas including environmental monitoring, medical applications, transportation, crisis management, homeland defence, entertainment and smart spaces.

Since, nodes of WSNs are exposed to different environmental factors during deployment stage and are often left unprotected during communication, this make them vulnerable to attacks. When sensor network are deployed in

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hostile environments security becomes more important as they are prone to different types of malicious attacks [16] & [22]. The attacker easily attacks the nodes and retrieves the data or even change the data due to its open nature. Most of the networks routing protocol are not suitable for security purpose. WSNs are easily attacked by the popularly-known denial of service attack (DoS) [15] that mainly target the availability of services by interrupting network routing protocols or interfering with currently running communications. Selective forwarding attack means disruption in packet transmission due to the unfortunate invitation of one or more malicious nodes in the communication path. In selective forwarding attack, dropping of packets takes place due to the malicious node in the network. This malicious node does not allow the forwarding of the packet to the sink [14]. This type of selective forwarding attack drops the packet from the nodes in a random manner. In black hole attack [1] & [11], whereby an infected node drops any incoming packet without letting the communication parties have knowledge about it (blindly), is a problem that needs greater attention to address forwarding misbehaviour issues aroused due to such nodes.

In order to provide security for sensor network, various types of key management techniques are applied. Due to this attack, adversaries cannot forward the certain messages and simply drop them. This leaves the attacker to stick to an option to use a malevolent device to create a huge number of entities in order to gain influence in the network traffic. The ID of these malevolent nodes can be the result of forged network additions or duplication of existing legitimate identities. The attack especially Sybil targets fault tolerant schemes including distributed storage, topology maintenance, and multi-hop routing and it leads to data loss.

## II. RELATED WORKS

In this paper, the selective forwarding misbehaviour is overcome [3], [11-13] & [21], which means the malicious node in the network, deny the forwarding packets and selectively drop the packets and lack of security in the network. This mainly affects the forwarding packet transmission efficiency. To overcome this, in the network, the neighbouring node will intimate the previous node regarding failure and then it decides to change the path. Then the packet follows the alternate path which means shortest path. The remaining packet is forwarded to the destination as it is. This leads to reduction in the fake recognition rate and improve packet transport efficiency.



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# Novel Multiband Microstrip Loop Antenna for Wearable Applications

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**Abstract:** Multiband microstrip loop antenna with single shorting pin for wearable purpose is proposed. An antenna is efficient to operate in four different bands that includes Medical Implant Communication Service (MICS) (402-405 MHz), Industrial Scientific Medical (ISM) (2.4-4.8 GHz), Global System for Mobile communications (GSM) (975-1023 MHz) and Communication band (3-30 GHz). The Computer Simulation Technology (CST) simulator which can simulate electromagnetic signals and solve electromagnetic problems from Low frequency based on Finite Integration in Technique (FIT) is used for the design. The proposed antenna is designed for on body application that will radiate at MICS, ISM, GSM and Communication bands with very low reflection loss.

**Indexed terms:** On body communication, MICS, ISM, GSM, CST tool

## I. INTRODUCTION

Antennas are very much essential components of all equipment that are using radio. They are widely used in Different types of communication systems. Antenna consists of an arrangement of number of conductors and they are connected electrically to the transmitter or receiver. An oscillating current of electrons imposed through the antenna by a transmitter will create an oscillating magnetic field around the antenna elements, while the charge of the electrons will also create an oscillating electric field along the elements and these time-varying fields discharge away from the antenna into space as a moving transverse electromagnetic field wave. There are many types of antennas are used for various purpose of communication. As compared with conventional antennas the microstrip patch antennas have more advantages. Microstrip patch antenna has patch which is conducting in nature. Here, we are designing the Microstrip patch antenna for On-body communication. Microstrip or patch antennas are becoming increasingly useful because they can be printed directly on to a circuit board. Microstrip antennas are becoming very widespread within the mobile phone market. Patch antenna are low cost, have a low profile and easily fabricated.

Body-centric wireless communication consists of on-body, off-body and in-body communication. On-body communication means, accurate monitoring has become extensive research area in recent days and communication between on-body/wearable devices. Off-body communication can be defined as communication with external networks. In-body communication means the antenna is being implantable into the body. This uses radio frequency signal as a carrier for modulation, and uses the wireless communication to share the data about body parameters like temperature, blood pressure etc.. of the human body.

Wireless communication generally works based on electromagnetic signals that are transmit by an enabled device through the air, physical environment or atmosphere. To design antenna for body-centric wireless communication it associated parameters like frequency bands, Bandwidth, Materials used in antenna fabrication, design approaches and performance. Implantable Medical Devices (IMDs) have the capability to communicate wirelessly with an external device. They are specifically operable for lower frequencies that they should be capable of communication with the equipment's and devices that are outside/external. These IMDs are receiving great attention for obtaining both real time and stored physiological data in biomedical telemetry. A differentially feed implantable antenna worked at two near bands (MICS band and ISM band). The size of the differentially feed implantable antenna is a little large. A small-size differentially feed implantable antenna was designed for the MICS band and the ISM band. For this purpose, Medical Implantable Communication Service (MICS) (402-405 MHz) and Industrial Scientific and Medical (ISM) (2.4-4.8 GHz) are used. And also we can use two more bands like GSM and Communication band for communication purpose. The antenna operates at four frequencies that induce the return loss is less. Return loss is the loss of power in the signal returned/reflected by a discontinuity in a transmission line or optical fiber. It is a quantity of often used within the RF circuits, where impedance matching is important. The return loss is the proportion of a signal that is reflected as a result of an impedance mismatch. S-parameters describe the input-output relationship between ports. S11 means transmitted and delivered at the same port i.e., port 1. If S11 = -10dB this implies that if 3dB of power is delivered to the antenna, -7dB is the reflected power. The frequency that operates less than -10dB means it produces low return loss. The CST software which is used to simulate the antenna design. CST offers accurate, efficient computational solutions for electromagnetic design and analysis. Our 3D EM simulation software is user-friendly and enables you to choose the most appropriate method for the design and optimization of devices operating in a wide range of frequencies. The proposed antenna has been designed for on-body communication in human body. The designed antenna is being aimed to be utilized on skin as well as inside the body.

## II. LITERATURE SURVEY

A wearable antenna device is proposed or design as a replacement for existing continuous monitoring systems. Different shapes of antennas are designed for several uses in medical field. The literature shows that the spiral shape is the most optimal shape for medical purpose. So, antenna is designed positively to resonate around the frequency band that is around 402-405MHz (MICS) band and 2.4-4.8GHz (ISM) bands reserved for medical and industrial use, respectively. So, the antenna parameters are optimized to radiate at MICS and ISM bands. Figure 1 shows the design having 22.5mm square shaped antenna with 2.5mm thickness. Figure 2 shows the simulation results of respective antenna design.



# LPG LEAKAGE DETECTION WITH PREVENTION AND AUTOMATIC CYLINDER BOOKING WITH ALERT SYSTEM

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**Abstract:** In today's technology there has been rapid development which forces the human life in several appearances due to different fields so we need to adopt the technology and make their life better. This system detects the leakage of the gas and alerts the user about it and then sends the SMS to the user with the help of GSM module. Mostly people engaged with their works in companies or any other places at that time we will see the SMS, and we can't control the gas leakage which cause fire in house. In order to avoid this problem whenever the gas leakage exceeds the abnormal level it will automatically turn off the regulator by using relay driver circuit. In our house many times LPG gets empty. Advance LPG booking through IVRS or online which is most troublesome for the uneducated people and busy working individuals to book the gas cylinder. so the system continuously monitor the level of the present LPG using load cell and gas reaches below the threshold value around 14Kg it will automatically send the SMS to the user as well as LPG gas providing agency with the help of relay driver circuit. This system also senses the room temperature using temperature sensor.

**Keywords:** MQ-2 Sensor, Load cell, Arduino, Temperature sensor, Relay Driver circuit, GSM Module.

## I. INTRODUCTION

LPG gas is a mixture of propane, butane, flammable mixture of hydrocarbon and natural gases, it was produced by Dr. Walter Snelling in the year 1910. Propane and butane can easily cause the fire in hotels, homes, industries. Gas leakage due to various problems resulting in both financial loss and human life. In day to day life human life can busy with their own works, and they don't about the lack of awareness about gas leakage and cylinder booking. Without human intercession it cans automatically booking the cylinder when gas reaches minimum threshold value. In recent years the number of deaths were increased due to explosion of the gas. LPG is heavier than air. Unlike natural gas and these will flow along floors and tend to settle in low spots such as basements. There are two main dangers from this. The first one is, if the mixture of LPG and air is within the explosive limits and there is an ignition source. The explosion limits of propane and butane are 2.15 and 9.6, 1.9 and 8.5 and ignition temperature range is 493-604 °C and 482-538 °C. Natural gas is 4.7-15 and ignition source is 482-632 °C. The second

one is suffocation due to LPG displacing air causing a decrease in oxygen concentration. In order to avoid this problem to detect the gas leakage is easy due to smell but controlling the gas leakage is very important in human's day life. With the help of temperature sensor we will sense the room temperature.

## II. LITERATURE SURVEY

In the year 2011 a paper: "Design and Implementation of Economic Gas Leakage Detector" was written by A.Mahalingam, R.T.Naayagi, N.E.Mastorakis, they detect the gas leakage and providing immediate alarm or intimation to the user. Later in 2013 a authors Rahul Varma, Rajeev Kumar designed the "GSM based gas leakage detection system". This project when gas leakage exceeds the peak value it alerts the surrounding people about the leakage through the SMS.

In the year 2014 Hitendra Rawat, Ashish Kushwah, Khyati Ashthana and Akanksha Shivare proposed the "LPG Gas monitoring and automatic cylinder booking with alert system". These report focus on the measure the weight of the cylinder it reaches the minimum threshold value it automatically sends the SMS to the LPG agent.

In the proposed system we designed the "LPG leakage detection with prevention and Automatic cylinder booking with alert system". These project focus on detects the gas leakage ,when the gas leakage exceeds the abnormal level ,it automatically turns off the valve and it also the sense the surroundings temperature. When the weight of the cylinder reaches the threshold value, it will automatically booking the cylinder with help of GSM module.

## III. BLOCK DIAGRAM

The main platform of this project is Arduino which is based on the platform of Microcontroller. It is an open source and easy programming.

The other principle part we are utilizing is Strain gauge Load cell. Load cell other name is a Weight sensor, which senses the weight of the cylinder. It alerts the user when the weight of the cylinder reaches the threshold value.



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# Automated Effective Incubator System with Sub-Bag for Child Care

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**Abstract-**Approximately in India, more than 1 million cases per year and 15 million cases around all over the world born as preterm babies. Maximum of all preterm babies are born between 32 to 37 weeks of gestation period and die due to the scarcity of the vital care and monitor such as warmth and oxygen level. So, prematurely born babies are generally nursed in the (NICU) infant incubators for first several weeks of life to contribute the maximum possible warmth condition required for the new born. By this way, we handle the infant until it becomes stable. Instead of monitoring the baby's condition, the system should be monitored to care the infant. This paper focuses the system, in which oxygen level is monitoring by the flow sensor. If the oxygen level in the incubator is shortage, flow sensor senses and switched to sub-bag system for few minutes, which contains oxygen. This system also indicates with alarm sound, if the voltage or current inside the block.

**Keywords**—Neonatal Intensive Care Unit (NICU), Sub-bag system, Flow sensor.

## I. INTRODUCTION

Toddle (Young Child) concerning epoch to accustom to the external environment specially if they are premature and Low Birth Weight. As they are on risk to oxygen deprivation, hypothermia and other many associated adverse conditions, who needs core regards and attention. The most advanced, user - comfortable and developmentally helpful microenvironment available today; combining state of the art technology, innovative block and intelligent thermal play to create an unsurpassed healing environment for intensively inauspicious infants. Whatever the level of care required, all newborn infants tinkle to be primarily kept kind hearted, receive fluid & nutrition. Keeping the pamper agreeable may be done by wrapping the baby in a blanket, or by placing it under an overhead warmer, or by placing it in an incubator. The term incubator has a set of pronouncement from a Latin word Incubare that means lie on. Incubator is an apparatus used to care the premature, underweight, and very weak babies in thermo neutral environment.

Firstly, modern incubator systems was invented by Alexandre Lion of France. The Lion incubators which were afterward used in the first American incubator hospitals, were invented in 1891. These incubators were warmed by a cylindrical water boiler that was mounted on the outside block of the incubator. This type of incubator system was stand as singular, because the incubators had their own ventilation system. Inspired by Lion's achievement and fascinated by the popularity of the exhibits, Martin Couney set up an incubator exhibit at an reveal in Berlin. Couney was German, and a admirer of the famous Paediatrician Pierre Budin. Budin had studied under Stephane Tarnier, who had invented the foremost warm air Incubator. Couney set up his primary American incubator hospital at the Trans- Mississippi Exposition in 1898 in Omaha, Nebraska.

The up to date incubator available in most specialized Nurseries is an first-class device to maintain the temperature and humidity according to babies requirement. The effective Nursery temperature is around 30°C. Incubatorenable exact observation of infant general condition, colour, respiration, etc.

A new born non-electric transport incubator has been improved for shift babies between health facilities in emerging countries. The temperature performance of this model was compared with practical electric incubator. 45 non-distressed premature babies, elderly 24-72 hours with a gestational adulthood of less than 37 weeks, were continuously evaluated for a 2hour epoch .25 babies with a average weight of 2,073g (range 1,500-2,500g) were studied in the model and 20 babies with a average weight of 2076g (range 1,550-

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## Abstract

At current scenario Dengue fever is consider as a deadly malaise. The malaise usually is self-limiting but in some people can present with life-threatening complications such as Dengue Haemorrhagic Fever and Dengue Shock Syndrome. Dengue fever is wide spreading and Government has taken initiatives to control it. However in rural areas it is still required to create awareness and appoint doctors for regular check-ups.

**Keywords:** IoMT, malaise detection, dengue

## Full Text:

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## Refbacks

There are currently no refbacks.



  
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# A KSOM based neural network model for classifying the epilepsy using adjustable analytic wavelet transform

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## Abstract

Epilepsy is a nervous disorder occurring in the cerebral cortex location of the brain which is caused by irregular harmonization of neurons. Since the existence of this disorder is between the neurons, it is tedious to diagnose correctly. Research works of epilepsy mostly done on an Electroencephalogram (EEG) signals for analyzing the neuron activity of the brain during seizures. Analyzing the continuing EEG reports manually for a patient affected by epilepsy is time-consuming, and it needs a large storage volume. The proposed paper is based on a unique method for detecting epileptic seizures by Adjustable Analytic Wavelet Transform (AAWT). This work is also focused on testing the practicability of utilizing the Kohonen network maps for predicting the dynamics of the brain states in the form of the trajectory which may provide the occurrence of the seizure event. AAWT is applied on each EEG signal to decompose EEG signals into the sub-band signals. The fractal dimension is applied to these sub-bands signals as a discriminating feature due to its nonlinear chaotic trait. The received solutions are fed into a Kohonen self-organizing network map (KSOM) to get a stable performance rate for the categorization of an epileptic seizure. The results proved that the introduced methodology achieved 98.72% sensitivity, 93.90% specificity, 93.03% selectivity, and 94.12% efficiency than the existing models and provided promising classification accuracy.

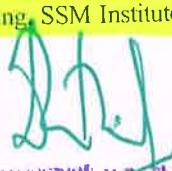
**Keywords** Epilepsy · Electroencephalogram (EEG) · Adjustable analytic wavelet transform (AAWT) · Fractal dimension · Kohonen self-organizing network map (KSOM)

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# DETECTION OF UNHEALTHY PLANT LEAVES USING GENETIC ALGORITHM

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**Abstract—** The identification of disease on the plant is a very important key to prevent a heavy loss of yield and the quantity of agricultural product. The symptoms can be recognized on the parts of the plants such as leaf, stems, lesions and fruits. The leaf shows the symptoms by uncertain colour, showing the spots on it. This identification of the disease is done by manual observation and virus detection which can consume more time and may prove costly. The aim of the project is to analyze and classify the disease accurately from the leaf images using less time. Image processing toolbox of Matlab is used for measuring affected area of disease and to determine the difference in the color of the disease affected area. The steps required in the process are Preprocessing, Training and Identification. The disease examined are Powdery Mildew, Downey Mildew which can cause heavy loss to Grape fruit. For recognition of disease features of leaf such as major axis, minor axis etc. are extracted from leaf and given to classifier for classification.

**Keywords:** Imageprocessing, Genetic algorithm, PowderyMildew, Downcy Mildew.

## I. INTRODUCTION

Digital image process is the use of computer algorithms to perform image process on digital images. It privilege a far wider vary of algorithms to be applied to the computer file and might avoid issues like the expand of noise and signal distortion throughout process. Digital image process has terribly important role in agriculture field. it's widely addicted to observe the crop disease with high accuracy. Detection and recognition of diseases in plants

Plant pathologists will analyze the digital pictures mistreatment digital image process for diagnosing of crop diseases. Computer Systems area unit developed for agricultural applications, like detection of leaf diseases, fruits diseases etc. altogether these techniques, digital pictures are collected employing a camera and image process techniques are applied on these pictures to extract valuable data that are essential for analysis. The diseases are viral, bacterial, fungal, diseases due to insects, rust, nematodes etc. on plant. It is important assignment for farmers to find out these diseases as early as possible. Following example shows that how diseases on cotton plant reduces the productivity. Image processing techniques could be applied on various applications as follows: 1. To detect plant leaf, stem, and fruit diseases. 2. To specify affected area by disease. 3. To find the boundaries of the affected area. 4. To determine the color of the damaged area 5. To determine size & shape of fruits.

## II. LITERATURE REVIEW:

Sanjeev S Sannakki, Vijay S Rajpurohit, V B Naigund, and Pallavi Kulkarni proposed a new approach for “Diagnosis and Classification of Grape Leaf Diseases using Neural Networks”. Plant diseases cause significant damage and economic losses in crops. Subsequently, reduction in plant diseases by early diagnosis results in substantial improvement in quality of the product. Erroneous diagnosis of disease and its severity leads to inappropriate use of pesticides. The goal of proposed work is to diagnose the disease using image processing and artificial intelligence techniques on images of



# Liver Tumor and Spleen Detection Based on Region Growing Segmentation and Ensemble Classification

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**Abstract**— This paper proposes an automatic classification method based on region growing in Ultrasonography of focal liver lesions using image processing techniques. This method can yield spatial and temporal features in the arterial phase, portal phase, and post-vascular phase, as well as max-hold images. Liver region segmentation is done by Region growing technique. This technique used for determining the liver lesion region directly. The lesions are classified as benign or malignant liver tumor using Ensemble Classifier with a combination of selected texture features. The selected features are important for classifying liver tumor, especially for the benign and malignant classifications. The experimental results are consistent with guidelines for diagnosing FLLs. This can be considered to be a validation study that confirms the importance of using features from these phases of the examination in a quantitative manner. Additionally, the experimental results indicate that for the benign and malignant classifications, the specificity without the post-vascular phase features is significantly lower than the specificity with the post-vascular phase features.

**Keywords**—Ultrasonography, Feature extraction, Segmentation, Classification.

## I. INTRODUCTION

We are operating towards victimizing the absolutely machine controlled segmentation of the spleen and liver as a volumetrical diagnostic tool. It has been observed that the 3D shape and size variation of liver and spleen can be essential image biomarkers of disorders [3]. The implementation of a completely machine controlled segmentation permits the medical specialist and other health professionals for an straightforward and convenient access to organ measurements, whereas avoiding long manual measurements or biased diagnosis based on 2D projection images [2]. We have a tendency to propose a technique to segment the liver/spleen freelance of morphological changes due to disease and/or normal anatomical variability. In clinical observe, the liver size is calculable by height measurements at the mid-hepatic line; equally, the spleen height is measured this applies to cephalocaudal height. Liver height, for example, doesn't totally characterize the morphology of the liver, like accounting for associate degree enlarged left lobe. Spleen measurements suffer out of similar shortcomings, or else, studies have asserted on the liver/spleen volume computed by multiplying the calculated slice space from manual segmentations by the slice thickness. [8].

Various types of automatic and interactive ways to segment the liver has been suggested. A technique based on statistical analysis and spatial property reduction from insufficient information models was presented in [5]. In [4] a shape-guided deformable model was introduced using an evolutionary algorithm, however unacceptable segmentations were omitted within the analysis. Most recently, active contours using gradient vector flow were used to deal with both liver and hepatic tumor segmentation [12], while a hierarchical statistical atlas was utilized in [13]. These ways suffer from either serious manual format or present significant segmentation errors.

In 2007, a liver segmentation competition from computerized tomography (CT) data was command [6]. Amongst the automated techniques, most notably a mixture of shape-constrained statistical deformable models supported a heuristic intensity model had the most effective performance amongst automated methods [10] with slight under-segmentation of the liver. Region growing was utilized in [16] with good results, however the technique was sensitive to liver abnormalities. A semantic formulation of information and context was presented in [15], however the segmentation overlap was only 84%.

Despite the abundance of research on liver segmentation, there are few studies specializing in the spleen. However, the segmentation of abdominal multi-organs, as well as the liver and spleen, has been addressed, however with limited accuracy. In [14] a priori probabilistic data were utilized in combination with measures of relationship and hierarchy between organs and manual landmarks. On a different note, multi-dimensional data from contrast-enhanced CT were employed in [9,11], applying variational Bayesian mixture and tissue homogeneity constraints.



# Vehicle Number Plate Recognition and Validation

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**Abstract :** Due to globalization and the increase of automobiles, gated communities, corporate premises and university campuses witness a lot of unfamiliar vehicles with number plates in different formats, fonts, font sizes and sometimes even in various languages which enter and leave the state every day, and it is difficult to register the vehicle numbers manually even for a multi-lingual person. This document aims to extract image frames from a streaming CCTV footage, recognize the vehicle number into its corresponding text format and showing the details about the vehicle and owner. Template matching has been used earlier in recognition of digits and letters, this paper also uses the concept of template matching methodology in image processing which is developed to extract the vehicle number from the number plate. The alphanumeric values are extracted from the image containing the number plate, one after the other, and are matched with its corresponding template with the help of the template matching methodology. This template matching block compares each and every pixel value of the original image with the pixel values of the corresponding stored template and returns a template metrics value as an output. After getting the value it will validate with the database which will show the full details of the vehicle and owner.

**Keywords**—License plate extraction; License plate recognition; MATLAB; Image processing; Template matching; validation

## 1. INTRODUCTION

Vehicle number plate [1] recognition plays an important role in various applications such as highway traffic monitoring, automatic toll charges, access control of parking lots, identification of vehicles being plundered, etc. It was first employed in a police station in the United Kingdom in 1976. [2] Prototype systems were introduced in 1979 and commercial systems were awarded contracts this type of application.

A system is required to easily identify a vehicle in order to automate these processes and make them more efficient. How to identify a particular vehicle is the important question here? The obvious answer to this question is to use the number plate of the vehicle as each vehicle has a unique number which makes it easily [3]distinguishable from other vehicles.

Moreover, a system can be integrated with the speed camera, which could automatically identify and record the extracted vehicle number plate of the vehicles travelling beyond the speed limit into a database.

## 2. METHODOLOGY

As the vehicle approaches the entrance of the gate, a camera captures the image of the vehicle (plate number being the [4]predominant subject). This picture is loaded into the system to extract different regions of interest (license plate number) from the captured image. Once the image is loaded into the system, the first step that the program would be coded to do is to convert the color image into binary image as shown in Fig. 4. This allows the detection of number plates of all colors (yellow, red, white, blue etc.). After the reduction of noise from the grayscale picture, the image is converted into a binary image form. The system then proceeds to isolate the regions of interest (further remove noise elements) from the captured image using different combinations of [5]morphological operations.



# STACKED NAND/NOR AND TUNABLE DELAY KEY-GATE FOR IC CHIP DESIGN SECURITY

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**Abstract**—In recent years, the hackers attack the knowledge, throughout the information transmission, in IC chip. Hardware piracy could be a threat that's turning into a lot of serious issues in these last years. Throughout the time of knowledge transmission, the power dissipates from the IC chip. This dissipation provides an opportunity to get the key information from power leakage. Blurring gate is used to change the power profile of an IC chip. Hence the hackers attack the information from power dissipation during the activation of Blurring gate. This project, introduces a new Tunable delay locking technique to enhance the security of existing techniques. A new type of key-gate called tunable delay key-gate (TDK) is introduced, which has two types of keys, functional-key and delay-key. The functional-key controls the TDK's functionality while the delay-key determines its gate delay. For delay protection, the key into a locked circuit not only determines its functionality, but also its timing profile. A functionality correct but timing-incorrect key will result in timing violations and thus making the circuit malfunction. Xilinx 12.1 and Tina tool has been used to evaluate the slice and space.

## I.INTRODUCTION

Hardware has long been viewed as a trusty party supporting the total pc system and is often treated as an abstract layer running directions passed from the software package layer. Therefore, hardware-related security analysis is usually spoken hardware implementations of crypto graphical algorithms wherever hardware is used to improve the calculation performance and efficiency for cryptographic applications. Hardware copyright protections are also classified as hardware connected security research where watermarking is widely used to solve the copyright problems. However, researchers from these areas don't think about the protection on the hardware itself. For a long time, cybersecurity researchers believed that the microcircuit (IC) offer chain was well-protected with high barriers such that attackers couldn't simply compromise the fabricated chips. With the high value of up-to-date foundries and increasing design complexity of modern system-on-chip (SOC) platforms, the IC supply chain, which was once located in one country or even in one company, has been unfold round the globe . Following this trend, third-party resources in hardware circuit styles, mostly in the format of third-party fabrication services and third-party soft/hard IP cores for SOC development, are prevailingly used in modern circuit designs and fabrications.

The availability of these resources for the most part alleviates the design workload, lowers the fabrication cost, and shortens the time-to-market (TTM). However, the serious reliance on third-party resources/services conjointly breeds security issues and invalidates the



# PLANT DISEASE DETECTION USING IMAGE PROCESSING

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**Abstract-** In recent days, agriculturalists faces many problems because of the disease that affected on plants. Due to the crop disease, Year productivity of farmers gets lower. Manual monitoring of plant disease tends to require tremendous amount of work and also require the excessive processing time. Hence, the method used in this paper is image processing. The steps that are implemented here is image acquisition, segmentation, feature extraction and classification of plant diseases.

**Keywords-** plant disease, image processing, feature extraction, manual monitoring, and segmentation.

## I. INTRODUCTION

Agriculture is the most significant sector of Indian Economy. Indian agriculture sector detailed for 18 percent of India's gross domestic product (GDP) and provides employment to 50% of the countries workforce. India is the world's bulkiest producer of pulses, rice, wheat, spices and spice products. India has emerged as the second most essential producer of fruits and vegetables in the world. India is an agricultural based country, where more than 50% of population is depend on agriculture. This structures the main source of income. The commitment of agribusiness in the national income is all the more, subsequently, it is said that agriculture is a backbone for Indian Economy. The crops in India have been divided into Rabi, Kharif and Zaid crops on the basis of season moving on. The major crops can be divided into four categories.

- i. Food grains(Rice, wheat, Maize, Millet and pulses)
- ii. Cash crops(Cotton, Jute, Sugarcane, Tobacco and oilseeds)
- iii. Plantation crops(Tea, coffee, coconut and rubber)
- iv. Horticulture crops(Fruits and vegetables)

Inorder to yield the crops, farmers spend billions of dollars are on disease management, often without adequate technical support, resulting in poor disease control, pollution and harmful conditions. If agriculture is to be active and sustainable, it is essential to have healthy crops. There are number of steps to reduce the chances of disease affecting the crops. The basic remedies that have been taken by the farmers are pests. It may losses some nutrients. Hence, that may leads to reduction in both quality and quantity of agricultural products. Inspite of providing pesticides to the crops, we must go for monitoring plants. Monitoring the plants is prior solution to overcome these problems. Manual monitoring is not an easy way to monitor whether the crop gets affected or not. The course of plant disease refers to visually observable patterns on the plants. This paper provides image processing technique used for disease detection. In these technique, digital images are captured using digital cameras or any android mobile cameras or any other capturing devices that provided in the form images are given to image processing method to extract effective information for further analysis. The photographic image of this disease are recognised to enhance are invaluable in research, detecting and teaching, etc. Earlier detection may help to farmers to avoid huge productivity loss. Hence, the support of technology would help them in early detection of plant diseases, no cost of using pesticides, and efforts of them may not be useless. We can make use of robot that are made for agricultural purposes. The agricultural robot will capture the image of leaf using webcam tends unable to provide appropriate result. Because the webcam is unable to give accurate and clear image. But here clarity is most important feature for enhance the affected areas on leaves.



# IoT Based Solar Panel Fault Monitoring and Control

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**Abstract-** Continual monitoring of the status and detecting the faults to guarantee the infallible faculties administering of Solar panel in aloof district is our contribution in this form, this work is part of occupation. This paper describes the hardware implementation for fault detection and continual monitoring system for solar panel in remote area using IOT. This analysis problem has been stated by engineers working in Solar panel maintenance system. As expected solution to this wireless sensor node is provided with Voltage sensor, Existing antenna, Light sensor, Temperature sensor and Dust sensor and XBeeS2 to implement WSN. Materials are being continuously stored and monitored at central station called HUB and through that data are being sent to server via Ethernet. A accessible GUI using Python is implemented to visualize monitoring performance and save data on Excel file. The described system is built and acceptable results has been obtained.

**Keywords**—Wireless Sensor Network (WSN), Light Dependent Resistor (LDR)

## I. INTRODUCTION

As non-renewable energy resources are depleted with time it is prime to use renewable energy resources like Solar and air efficiency because of its unlimited supply, monetary long-term benefits and environmental friendliness. According to DJ Pandian, principal secretary, energy and petrochemicals department of the state government, they foretaste more 300 MW of solar proficiency generation capacity to be commissioned in the state before 31st December 2015. The heaping of solar photo-voltaic promotes in consumer market shows awareness of renewable energy. In function to reach maximum benefit and efficiency and to prevent damage it is necessary to monitor the condition of photovoltaic panels continuously [1][2][5]. No matter how here is frank debased luck of sway mistreat of capacity fitting adventitious or unconditional nervous breakdown of encode it is vital to limit and notify the center station to prevent from damage as the cost of components are unconditionally decidedly snobbish.

Essential cause like bolt strikes, cyclone, blast and heavy rain or even a insect can also damage solar panel and overloading in supply grid can also force power reduction and sometimes shutdowns in addition to. So it is foremost to monitor each and every smallest fault and give result to central station quickly otherwise it leads to large financial losses. Expect for it is plead to acquire losses fitting to hesitating of Solar panel. In present industrial scenario PLC and SCADA structures are being used to monitor Voltage and Current of Solar panel plant. In this manufacture of monitoring system all the panels are connected and the monitoring system is placed after the inverter. Calling with this type of monitoring system is we cannot get each solar panel Voltage and Current of individual solar panel and also we can't detect fault or take effort to crash of solar panel. Corporation orthodoxy is very much costlier also and once it is wired it is static.

In order to overcome this problems and as a better alternative solution to this we provide wireless solar panel condition monitoring system that measures electrical parameters of all of the solar panel individually and also it monitors the condition of solar panel continuously. This micro-controller based system is also cost-effective as it does not requires any extra sensor circuits for voltage and current, also the end node is powered by solar panel so it is versatile solution.



## COMPREHENSIVE APPROACH FOR FOREST FIRE DETECTION USING WAVELET TRANSFORM

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**Abstract** -Since ancient times humans have known fire. We had feared it, welcomed it and now fire is an important parameter which is used in both domestic and industrial applications. Though fire is an unavoidable factor but if it is not handled with proper safety precautions it causes damage to both human life and property. But today fire accidents become very common which is responsible for loss of many valuable resources, human lives and loss of property. So it is necessary to detect and estimate the fire before its occurrence to save the lives of living organisms. Much recent technological advancement had lead to the detection of fire but MATLAB provides an efficient method to detect and estimate fire. Many algorithms were developed to detect and estimate fire some of the notable algorithms are edge detection, boundary detection, Fast Fourier Transform, etc. Though these algorithms can detect fire, the efficiency of these systems are comparatively low, so these algorithms must be modified to obtain highly efficient detection of fire. Wavelet transform is an alternative approach which is used to detect the fire effectively, when wavelet transform is used to detect the flames we can able to obtain the accuracy of about 90 percentage which is an efficient approach compared to other methods.

### INTRODUCTION

Fire causes a huge loss to human life and property, hence early detection of fire is very important. Fire detection systems are among the most important components in surveillance systems used to monitor buildings and the environment. Fire detectors, smoke detectors and temperature detectors have been widely used to protect property and give warning of fires. Traditional methods

like sensor based methods have many disadvantages: they have transmission delay; they are applicable mainly for indoor regions and cannot be used for outdoor regions to monitor a large area. In a sensor-based fire detection System for an outdoor environment, coverage of large areas is impractical due to the necessity of a regular distribution of sensors in close proximity. Thus they can't be operated in open space and large covered areas. Besides, they usually are unable to provide additional information such as the location and size of the fire and degree of burning. Due to rapid developments in digital camera technology and video processing techniques, there is a major trend to replace conventional fire detection methods with computer vision based systems. In general, computer vision-based fire detection systems employ three major stages: fire pixel classification, moving object segmentation, and analysis of the candidate regions. This analysis is usually based on two figures: the shape of the region and the temporal changes of the region. The fire detection performance depends critically on the effectiveness of the fire pixel classifier which generates seed areas that the rest of the system will exercise. The fire pixel classifier is thus required to have a very high detection rate and preferably, a low false alarm rate. There exist few algorithms which directly deal with the fire pixel classification in the literature. While vision based fire detection has many advantages: a large area can be monitored, the cost of equipment is very low because nowadays closed television systems are already installed in many public places for surveillance purposes. The response



## EMBEDDED BASED INGENIOUS GOODS TRANSPORT VEHICLE USING AUTO ID TECHNOLOGY AND ANDROID APPLICATION

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**Abstract -** AGV is a robot used in a wide variety of applications to transport many different types of materials and goods around a factory autonomously.

It can operate in two environments, unguided, Guided. In Existing Method, Guided mode, traverse shorter distance and Tape should be maintained periodically. There is no android application for controlling the overall system. Obstacles cannot be avoided. For path determining antenna is used. These drawbacks are overcome in our project.

In this project it can be operated in both Unguided and Guided mode. Robot traverse in predetermined path. RFID is used to traverse the robot in predetermined path in a wide variety of applications to transport many different types of material. Android app is created for controlling robot in manual mode, automatic mode and for storing data. Ultrasonic Sensors are used to avoid collision. In this three ultrasonic sensors are used for avoiding obstacles in 180°. Database is created for collecting the overall information.

**Key Words:** AGV, Collision Detection, Database, RFID, Un-Guided and Guided Medium.

### 1. INTRODUCTION

Recent days we are facing much difficulties and utilizing major manual power to transport the raw materials, finished products and materials in and around in the campus in major factories, industries and companies. To overcome the difficulties AGV is now proposed in all sectors. The AGV (Automatic guided vehicles) is a portable robot used for transporting materials, foods, finished goods, medicines and products in the smart factories and major companies. AGVs are engaged in every industry, including pulp, paper, metals, newspapers and general manufacturing. (AGV) play a vital role and used in industrial application to lift and convey the materials around a manufacturing facility or warehouse. To facilitate the easy access and function

in the AGV, the channel for navigation, markers or wires in the floor or uses of vision, magnets or lasers are followed. Wired navigation, wireless navigation and Magnetic tape on the floor are different types of selection. These types of navigation perform the function of guiding the AGV and also to issue steering commands and speed control. Indeed, they are being used almost and frequently in factories, major industries to convey finished products, raw materials from go-down and or warehouses to the manufacturing point. Due to advanced technology and developments in industrial, alternative scope suitable for the existing circumstantial situation considered necessary to cope up with the modern trend and economical point of view. To eliminate the difficulties and disadvantages in laser navigation in automated vehicles and to curtail maintenance cost in all sources, the new method is proposed. This will suit in all leading Automotive industries, Food industries, Autopilot technology, Transportation in smart cities and Medical Field.

### 2. EXISTING METHOD

#### 2.1 INTRODUCTION

In the existing method, AGV uses tape for comfortable environment. The AGV uses Magnetic tape and coloured tapes to make path decisions. For identifying and following the path of the magnetic tape, Guide sensors is used. Though the Coloured tape is considered less expensive initially, in high traffic areas both the type of tapes may get damaged and dirty and become unserviceable. Besides, the disadvantages are High maintenance cost, less durability and cost of materials are on the high side.

“However, this system has no obstacle avoiding support and it does not contain android application for controlling overall system. Also, in the proposed system we have incorporated



# *Intelligent Load Monitoring System of 11KV/440V Multi Distribution Transformers Using SCADA*

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## Abstract

Transformer gets a vital role in transmission and distribution of electric power. Reducing the

failures ensures an increased chance of uninterrupted power to be supplied to consumers. Overload, Voltage fluctuations and heating up of transformers causes severe damages to the



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transformers, which takes much time and a lot of expenses. Major portion of the losses in the power system networks is attributed towards the use of distribution transformers (DT). Excess thermal losses in DT become an unsolved major hazard. Only under heavy loads, the winding losses and saturation comes into consideration.

A proper monitoring scheme is designed based on the monitoring of key operating parameters of the distribution transformer. The system is intended on providing essential data regarding the wellbeing of DT. The utility system would make use of the data for optimal avocation of available resources, which is DT in this case. The monitoring provides an easier approach to deal with all interruptions, from minor to the most catastrophic failure. In other words, an optimal monitoring setup to maintain the reliability of DT's.

**Index Terms**— Load monitoring, on-line monitoring, Distribution transformer (DT), SCADA.

## Introduction

DT, like the other machines, proves to have a reliable operation throughout its lifetime only if operated under prescribed conditions. However overloading of DT results in unanticipated failures, which in turn results in discontinuous power to the consumers. Insufficient or ineffective cooling system provides evidence causing the DT prone to failures.

Supervisory Control And Data Acquisition (SCADA) system is made use for online monitoring of transformers in transmission and distribution networks. The main purpose of SCADA is collection and logging of data. The SCADA can be pulled out towards DT's also, but proving to be costlier.

Typically the consumer side of the single phase transformer is designed to operate at 230V AC. When the consumer side voltage is maintained more than 250V AC for a prolonged duration, subsequently there is a possibility of a risk that the damage to the due to over voltage is excessive. As a defensive measure, the primary is supplied through a relayed contact which disconnects the supply whenever the relay is energized. The data from SCADA system; namely load levels, temperature levels and voltage, are fed through a series of digital communication channels towards a primary controller for prompt action. The scheme, designed taking into account the practical difficulties, biases its objective towards a mobile based embedded system. This embedded system monitors and collects data of key markers such as winding current, oil levels and temperature of the DT. The planned on-line observance system incorporates a Global System for Mobile

communications (GSM) Modem, with impartial single-chip microcontroller and set of transducers/sensor.

Distribution transformers are currently observed manually wherever someone sporadically by visiting the transformer site at the time of maintenance and keeps track of the necessary data. This kind of monitoring cannot endow with information about intermittent overloads and heating-up of transformer oil and windings. All these factors will considerably cut back transformer life.

## 1. Load Monitoring

Load monitoring is performed by applying instrumentation towards the power system from the main supply to consumer end. This monitoring emphasizes on locating the key equipments and locations for monitoring. The fundamental load data obtained such comprises of voltage, current and frequency. The monitoring equipment varies for single phase system and three phase systems. For example, voltage measurement/power monitoring for single phase system and three phase system has one and three probes respectively, apart from a separate reference or ground probe.

One main difficulty faced is placing these monitoring instruments at required locations. Whenever the data is to be monitored, the instrument is connected, which is mostly kept connected to the system almost permanently. The instruments may not be able to operate at higher voltage levels. Under such circumstances, where direct connection to the facility is complex, the current and voltage values are provided through CT or PT.

The load monitoring is done regularly and the data log is maintained at an interval of 3 to 5 days, depending on the size of the system. The instrumentation is calibrated for accurate measurements over a period of 7 to 30 days depending on the deviations. The harmonics and other values can be monitored if a necessity arises. The load monitoring data with respect to the load levels is continuously mapped.

Once the data has been gathered and put together for a loading profile, a report is generated that includes:

- System Voltage
- Winding current,
- Real power, reactive power
- Harmonics, PQ problems (if required)

### 1.1 Needs of Electrical load monitoring

Load data is a prerequisite for planning, restructuring and dimensioning of power system at



# OPTIMIZATION OF TOOL LIFE FOR CLOSED TYPE FORGING TOOL

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*Abstract -- In this review paper, some of the commercially available die materials were compared based on their hardness data available in material data sheets. These materials are used for hot and warm forging in mechanical presses. This paper also includes the results of a study by ERC/NSM, in which wear and plastic deformation on warm forging dies was successfully estimated by using Finite Element Analysis. Some of the studies on ceramic die materials presented in literature were reviewed. Surface treatment techniques such as nitriding and weld overlays, as well as ceramic coatings, are also discussed. In hot and warm forging, mainly hot work die steels are used due to their ability to retain their hardness at elevated temperatures with sufficient strength and toughness to withstand the stresses that are imposed during forging. There have also been some cost effective applications of other materials such as ceramics, carbides and super alloys although these applications are limited due to design restrictions and costs. Hot working die steels used at temperatures between 310 °C and 650 °C contain additions of chromium, tungsten, vanadium and molybdenum to provide deep hardening characteristics and resistance to abrasion and thermal softening at high temperatures. Molybdenum increases resistance to thermal softening, vanadium improves wear and thermal fatigue characteristics. Tungsten alloy steels are not resistant to thermal shock and must not be cooled intermittently with water.*

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- Wear (abrasive, adhesive and oxidation)
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- Plastic deformation

Of these, wear (abrasive and adhesive) and mechanical failures are the most common forms of failure Figure 4(a). Of the two mode of wear, abrasive wear is the more common form of wear. Adhesive wear is not very common in hot and warm forging of steels because of the presence of lubricant film and/or scales and oxide layer. It does become a mode of die wear when the lubricant film is non-existent either because there is no lubricant application or when excessive sliding and deformation thins the lubricant film. Good tooling design and material selection can overcome gross cracking and mechanical fatigue. Thermal fatigue, in almost all cases, serves as a catalyst to accelerate abrasive wear. The main physical phenomenon that control the abrasive wear in a metallic surface sliding past another surface are relative sliding distance, normal pressure and hardness of the surface.

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Principal



## Heat Exchanger Design Modification for Performance Optimization Using CFD Tools

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### Abstract

Heat exchangers are used in the thermal system to maintain the temperature of the working liquid. Among the various types of heat exchanger, the shell and tube heat exchanger is the most commonly used heat exchanger based on its simple design and performance aspects. Even though these shell and tube heat exchangers operates at its designed point, it can be even effectively designed to achieve better heat transfer rate.

Since most of the shell and tube heat exchangers are designed based on the traditional design concepts, in this paper, we have planned to modify the design of the heat exchanger. For this purpose, we have selected a reference heat exchanger with its practical performance results. Using the design data from the existing heat exchanger, the CAD model was generated using solid works software and it was analysed using the CFD software under the actual operating conditions.

Then, the design modifications was carried out in the inner tubes and baffles accordingly. Initially we have changed the design of baffles and based on the analysis results, the cross section of the tube was modified. These modified design was analysed using the CFD tools under the same operating conditions and the results was compared with the actual and modified designs.

By this, we will be justifying the application of CFD tools in the design of heat exchangers to predict its performance in the early design stage. Due to this, the time and money invested on the man and equipments will be reduced to the industry for developing an efficient heat exchanger.

**Keywords:** Heat exchangers – CFD tools – performance analysis – design optimization.

### INTRODUCTION

Heat exchangers are widely used in the thermal systems where there are requirement of maintaining the system temperature in order to get the quality product. The quality of the final product is directly associated with the efficiency and effectiveness of the heat exchanger. The efficiency of the heat exchanger is based on the quantitative values of the inlet and exit temperature difference.

The efficiency of this type of heat exchanger is determined by the amount of heat transferred from hot to cold mediums and in vice versa. Also in some peculiar cases, for the customized purposes, the flow inside the heat exchangers are changes

from counter flow to parallel flow. This is purely based on the application where it is been used. In most of the cases, the type of fluid flowing in the shell and in the tubes are also changed to get better efficiency.

Based on the above, this project is based on the performance study of a shell and tube heat exchanger using a CFD tool. This study is carried out with respect to the available practical data. The practical data are taken from the reference paper and the design of the heat exchanger is also taken from the reference paper. The reference paper contains the practical experimental data. This study is to justify the application of CFD tools in the design of the heat exchanger system. The analysis will be carried under varied conditions as per the reference paper.

The first phase of this project deals with the study and analysis of the heat exchangers along with the selection of reference paper continued by the modelling of the heat exchanger system. The second phase of this project will be contained with the CFD analysis of the system using the solid works flow simulation tools. Then the experimental and CFD results will be compared to justify the effective application of the CFD tools in thermal system design.

### METHODOLOGY

Methodology is the basic requirement for a project, because it defines the proper start and end conditions of the works to be done. Proper planning and execution of the workflow decides the successful completion of the project. The methodology of this project is as follows.

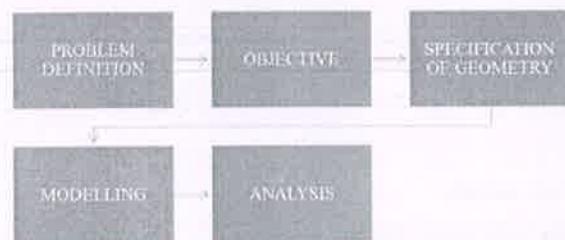


Figure 1: The strategic planning process



# OPTIMIZATION OF TOOL LIFE FOR CLOSED TYPE FORGING TOOL

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## Deformation and energy absorption analysis of simple and multi-cell thin-walled tubes under quasi-static axial crushing

I. Vimal Kannan & R. Rajkumar

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# Experimental Investigation of Unidirectional and Natural Fiber Composites for Ceiling Fan Blade Application

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**Abstract :** Ceiling fans are one of the main power consuming sources. In the recent world most of the household appliances and industrial appliances are using electric power. Because of the enormous use of Electric power, electricity shortage is main problem throughout the world. Ceiling fan is the one of the appliance that consumes electric power. This has been minimized by means of reducing the weight of the blade. The best way to reduce the power consumption without sacrificing safety is to employ fiber reinforced composite materials in the fan blades. The objective is to compare the power consumption, cost and weight of composite fan blade with that of steel fan blade. In this work the design and fabrication of composite fan blade made up of hybrid fiber reinforced polymer is carried out by which weight of the fan blade can be reduced. The properties are examined to, tensile strength, hardness and flexural strength.. This results obtained in this work were compared with that of commercial ceiling fan blade.

**IndexTerms** -- ceiling fan blade, hybrid fiber, hardness, flexural strength, tensile strength

## I. INTRODUCTION

A ceiling fan is a device hanging from the ceiling of a room. Ceiling fans utilize hub-mounted rotating paddles in order to produce a cooling effect as a result of air circulation. The circulation of air creates a wind-chill effect that makes a person feel cooler. The ceiling fan blades are usually made up of aluminium, steel, wood, etc. The ceiling fans have become a common appliance both in domestic and industrial applications. Though the power consumed by these fans is less, it is to be considered that these fans run on a continuous duty and this makes the power consumption significant. Energy crisis and less availability of natural resources being the major challenge, selection of better material and effective manufacturing processes, can reduce both the power consumption and the manufacturing cost. Composite materials have found a wide range of application in replacing the conventional materials with enhanced strength and mould ability.

Composites are compound materials, differ from alloys in the fact that individual components retain their characteristics but are so incorporated into composites so as to take advantages only of attributes, not that characteristics of short comings, to obtain improved materials.

Composite materials (also called composition materials or shortened to composites) are materials made from two or more constituent materials with significantly different physical or chemical properties, that when combined, produce a material with characteristics different from the individual components. The individual components remain separate and distinct within the finished structure. Properties of composites are strongly influenced by the properties of their constituent materials, their type, their distribution and the interaction between them. Like conventional materials, composites are not homogeneous and isotropic.

Composites are generally completely elastic up to failure exhibit no yield point or a region of plasticity.

At present steel is widely deployed in blade manufacturing mainly due to the advantages such as less density compared to steel, corrosion resistance and aesthetic look. Though steel has wide advantages when compared to steel, it stays back in certain properties such as less strength to weight ratio, paint coating etc. Composites have become a better replacement for conventional steel with adequate improvement of mechanical properties and their reduced weight

Though a variety of resins and fibres are available, considering the manufacturing easiness and the mechanical aspects general polymer resin and hybrid fiber is employed in the fabrication work. Hybrid fiber has good tensile and compressive strength and stiffness, good electrical properties. It is relatively low cost, but the impact resistance is relatively poor.

## II. LITERATURE REVIEW

Amazing Comfortson S was et all discussed about the fabrication of composite fan blade made up of glass fiber resin forced polymer is carried out and the performance of this fan is compared with the conventional fans. Compared to existing ceiling fan blade, the composite blade saves 31% of power, an reduces the cost by 28%. The weight is reduced by 30% without sacrificing the strength thus reducing the power consumption

Ahamed Faiyaz was et all discussed about the fabrication of composite fan blade made up of glass fibre reinforced polymer is carried out and the performance of this fan is compared with the conventional fans. Compared to existing ceiling fan blade, the composite blade saves 26% of power, and reduces the cost by 28%. The weight is reduced by 27% thus reducing the power consumption. It is also determined that the flow velocity through the composite blade is 15% more than that of the conventional fan.



# An improved design for cellular manufacturing system associating scheduling decisions

Published: 04 June 2019 Article number: 455 (2019)

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## Abstract

This paper presents a model for the design of Cellular Manufacturing System (CMS) to evolve simultaneously structural design decisions of Cell Formation (CF) and operational issue decisions of optimal schedule. This integrated decision approach is important for designing a better performing cell. The model allows machine duplication and incorporates cross-flow for scheduling flexibility. The cross-flow is the term introduced to mean the inter-cell movement of parts from parent cell to identical machines in other cells though machines are available in the parent cell. This cross-flow facilitates routing flexibility and paves way for reduced schedule length thereby optimizing resources leading to minimized operational cost. A non-linear integer mathematical programming model is formulated with



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## EXPERIMENTAL PREDICTION AND INVESTIGATION OF SPRING BACK IN U BENDING PROFILE PROCESS USING RSM AND ANOVA

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### **ABSTRACT**

*One of the most important sensitive features that affect the accuracy of the sheet metal processes is the elastic recovery during unloading, called spring back. In this investigation, the objective is to optimize the process parameters to minimize the spring back effect using different statistical approaches like Taguchi and Response Surface Methodology (RSM). This research paper discusses the various process parameters such as punch nose radius, sheet thickness and blank holder force that affects on spring back behavior of Ms, SS316 sheet metal during U bending process. Finally, the effects of U bending process parameters like thickness of plate, punch nose radius and blank holder force on the spring back is studied and optimized with the use of Design of Experiments (Taguchi) Method and analysis of variance (ANOVA) and RSM using DOE++ software for std material MS, SS in order to minimize the amount of spring back sheet metal industry.*

**KEYWORDS:** U, V Bending Process, Spring Back, Taguchi, RSM & ANOVA

**Original Article**

### **1. INTRODUCTION**

In different assembling forms, sheet metal shaping involves an extraordinary place since it produces parts of unrivaled mechanical properties with least misuse of material in a brief span. High material usage, exact make, and simple to acknowledge robotization are the attributes of sheet metal shaping. The sheet metal items have an extensive variety of utilization, for example, aeronautical (boards, nose skins, and so on.), car (body boards, gas tanks, and so forth.), electrical (housings, switch boxes, and so on.), family unit apparatuses (kitchenware, clothes washers, and so on.) and building (rooftops, clean items, and so on.). In the previous years, sheet shaping building has developed with the coming of new materials, procedures and control strategies. The sheet shaping conduct is affected by material properties, device and process parameters in a mind-boggling style. The proper information of material conduct, process parameter configuration, apparatus plan and issues identified with advances in material and shaping innovation is basic for effectively controlling and enhancing a procedure to create a superior item. Thus, it winds up basic to think about the procedure experimentally to satisfy these 2 necessities. Today, in the sheet framing industry, like some other, there is a solid requirement for a decrease in cost, enhancement in item quality and shortening of the term of the advancement cycle to meet out the focused market. Thus, the PC supported to plan and reenactment of sheet framing forms which lessens or disposes of tedious, asset serious and



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## Optimized sequencing of CNC milling toolpath segments using metaheuristic algorithms<sup>†</sup>

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### Abstract

Intelligent selection of a short toolpath is made possible by reducing machining cycle time. Each metal cutting layer in a workpiece is composed of several entities, such as lines and arcs, which form the different cutting segments of a cutting plan. During machining, the cutter moves at controlled feed rates along various segments at a high speed in a single cutting pass. The end of a segment is bridged to the start point of the next segment by the non-cutting movement of the tool. Any two consecutive segments can be connected in eight different ways. Finding the shortest tool path at polynomial time is impossible because toolpaths are constructed in millions of ways by sequencing the segments. This paper presents an effective method that uses heuristic optimization techniques to solve this NP-hard problem, which is known as the traveling salesman problem, for segments. The proposed method adopts particle swarm optimization (PSO) and the genetic algorithm (GA) because of their capability to generate quality solutions for optimization problems. GA and PSO are implemented in the MATLABR2016b computing environment because of the platform's flexibility and simple coding method. The optimization procedure is validated by comparing its results with those of two industry standard CAM systems, namely, Autodesk Inventor HSM and Mastercam. Using the proposed optimization method saves up to 40 % of the tool's airtime during machining.

**Keywords:** CAM; CNC milling; Genetic algorithm; Metaheuristics; Particle swarm optimization; Toolpath optimization; Traveling salesman problem

### 1. Introduction

Milling is a versatile machining process commonly used to manufacture industrial products with various shapes and sizes. Rotary cutters remove a material through several small, separate cuts from a workpiece by feeding the workpiece to a path. The workpiece dimensions are defined using a computer-aided design program and transformed into machining commands by a computer-aided manufacturing system. When metal removal is performed with a typical toolpath, a large amount of unproductive time is spent on positioning the workpiece between the ends of one segment of the path to the starting coordinate of the subsequent segment. The non-cutting movement of the tool in air follows a straight line in many operations. Non-machining time can be minimized through efficient toolpath selection. Cycle time is the sum of tool engagement time, the time the tool is away from the workpiece, and the time required for other activities, such as tool changes and inspection. This non-engagement time increases with the number of segments planned and multiplies further with the number of passes for a required cutting depth

to complete metal removal. With an increase in production volume, this non-productive time becomes considerable in the overall manufacturing time of the product. The standard procedure of creating toolpaths involves the use of CAM software, which has built-in functions to optimize the cycle time to a certain extent. Toolpaths must be optimized with intelligent techniques to achieve efficiency and increased productivity in a large product mix business.

In contour milling, the tool plunges into the workpiece at one end of the arc and leaves for the next segment after performing the cut. Kovacic and Balic [1] developed a method for optimized toolpath between cutting trajectories in a laser-cutting operation. They reported that the tool for a toolpath with a single segment could begin from either end. Thus, selecting between these two paths is an option. A 10-segment cutting plan has 3.71 billion possible routes. The possible number of toolpaths for a given number of "n" trajectories is  $2^n!$  (for bidirectional edges). Table I shows the complexity of selecting a toolpath. Determining the best solution via traditional calculation is difficult, even for a simple toolpath program with 10 segments. The best solution obtained after exhaustive calculation becomes minimally effective because of the considerable time spent, and this necessitates the use of heuristic approaches to determine the solution within a short

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## Optimisation of identical parallel machine scheduling problem

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**Abstract:** Scheduling is allocating the resources optimally over a period of time. The productivity and customer goodwill of the company increases by proper scheduling. This work focuses on scheduling of identical parallel machines (IPM) with an objective to makespan minimisation by using Grey Wolf Optimiser (GWO) algorithm. Makespan is the maximum completion time of all the jobs. In this work, the different jobs in different identical parallel machines are classified as experiments E1, E2, E3 and E4. These experiments were computationally solved by new metaheuristic GWO algorithm. The experimental computational results of GWO were compared with GA to obtain near optimal solution in all experiments.

**Keywords:** makespan; Grey Wolf Optimiser; GWO; identical parallel machine; IPM.

Reference to this paper should be made as follows: Kamaraj, S. and Saravanan, M. (2019) 'Optimisation of identical parallel machine scheduling problem', *Int. J. Rapid Manufacturing*, Vol. 8, Nos. 1/2, pp.123–132.

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## Tribological characteristics and Corrosion analysis of Mg-SiC composite using stir casting

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### **Abstract:**

Automotive and aerospace applications utilize the advantage of lightweight materials such as pure magnesium owing to its low density, better strength to weight ratio and damping capacity. This investigation attempted to fabricate the two different composition of Magnesium (Mg) - Silicon Carbide (SiC) composites using stir casting method, i.e., 5% and 15% of SiC by weight in magnesium. The fabricated composites were tested to study their microstructural characterization, mechanical, tribological and corrosion resistant properties and they were compared. The better dispersion of reinforcement with the matrix material was found in the 5% SiC than with 15% SiC. However, Mg with 15% SiC produced reduced wear rate of 61.53%, 57.14% and 39.50% with a load of 15N, 30N and 50N respectively when compared with the Mg-5%SiC. The decrease in the corrosion current in polarization study and impedance spectroscopy analysis clearly exhibited the increase in the corrosion resistance of Mg-15%SiC.

**Keywords:** Mg-SiC Composite; Stir casting; SEM; EDAX; Wear and Corrosion

### **1. Introduction**

The metal matrix composites are widely employed in the automobile, aerospace and defence applications because of their distinct properties such as lighter in weight, enhanced strength, stiffness, resistance to wear and corrosion [1-4]. Though magnesium has the amicable properties of light weight, better vibration and damping characteristics, it has the limitation of low elastic modulus, loss of strength with increase in temperature and poor creep resistance. Hence, magnesium is commonly reinforced with the ceramics to overcome these shortcomings. The low density and





## **REVIEW – METHODS AND MEASUREMENTS OF SPRINGBACK EVALUATION**

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### **ABSTRACT**

*Review of Springback has been given major attention in sheet metal forming past research with numerous studies being conducted to understand and solve the problems. They range from inventing new designs of tooling, such as flexible and warm tooling, Forming to improving the accuracy of springback prediction by empirical and analytical methods and computer simulation. The survey of the springback prediction by analytical and numerical simulation depends on constitutive equations and material parameter identification. Thus, several studies have been performed extensively on the matter. An attempt to review previous works is presented and their advantages and disadvantages are discussed here. Based on the review, a conclusion is drawn regarding a knowledge gap, which motivates the current research.*

**Keyword:** Review, Springback, Survey, Evaluation, analytical, numerical simulation.

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## STUDY ON EFFECTS OF SPRING BACK ON SHEET METAL BENDING USING SIMULATION METHODS

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### **ABSTRACT**

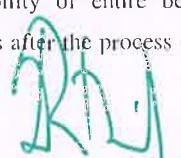
In emergent engineering world in mainly focused on pre-determined simulation analysis of spring back was successfully optimization of the sheet metal bending process. The most of causes in sheet metal thickness and metal type and tool holder and shank and radius and fraction, friction with shapes and tie gap on effects on spring back materials experimented in variable aluminum and copper and high strength steels and sheet metal have been used as variables conducted study in different scenarios. Since the most of belongings of each variable on the formation of this model obtained in results only have spring back effects metal deforming in examined in our research work. This employ calculates results shown in deformed results gathering in Sheet metal thickness from metric standards follows in 1.2 mm to 1.8 mm thickness of spring back issued minimized in 14% and 18.5% determined it. Wherever the maximize of Sheet metal strength and stability spring back maximized behave spring back of this sheet should depend after un-certain loading conditions were significant to determine. The effects of material category as show that using of alloyed sheet metal was plays in high strength and durability of sheet metal spring back effectiveness minimized in 67%. However, the increasing the tool radius leads minimizing the spring back effectiveness was efficient of concern from 0.01 to 0.50 frictions co-efficient was gather it. This friction forces were makes in spring back effects of material shape and tool geometry working simulation and varies parameters and sheet metal orientation, positions were examining it. Since the past literature surveyed ultimate exploited and compensation tool is considered for Sheet metal bending process as done.

**KEYWORDS:** Spring back, Sheet Metal, Bending Process, Effects, Simulation Analysis, Optimization & Variables, and effects

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### **INTRODUCTION**

Engineering fields of bending are one of the most leaded operational causes in widely applied in Sheet metal forming operations consist. [1]This most of research spring effectiveness only focused on Sheetmetal forming operation and process in the especially various automobile industry and aeronautical industries were designed in this cause. [2]The bending process includes maximized deformation of the structure is defined in certain defects analyses in resistance and mechanical process of defects exists. [3]This accompanied by means of strains in the instability of phenomena accompanying of this processing. [4]This instability of entire bending process deformation problems in cracking, breakage, and negative deformation as well as after the process of bending and



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## IMPROVING AUTOMATIC DETECTION OF DEFECTS IN CASTINGS BY APPLYING DAMAGE ESTIMATION TECHNIQUE FOR DIE-CASTING ANALYSIS

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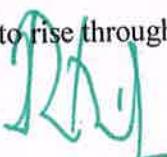
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### **ABSTRACT**

In die casting form, the defects such as macro porosity is difficult to control and eliminate for the manufacturer. It is still an on-going test. The pre set casting cycle and die structure outline area is the main focusing part as for as the Current procedures are concerned. To change and relieve the negative impact and to make the process consistent .the procedures for controlling the process might be utilized to progressively change the operational parameters of the procedure. In this work, a limited heat exchange display component has been produced to identify and predict the development of temperatures and the fluid region exemplification in this die casting process. The correlation with plant trial information has been established for the model. A virtual procedure has been established for the given model to recreate the persistent activity of the system. In order to give a reliable representation of this virtual procedure, a nonlinear state-space display is provided based on data from the virtual method. Direct unique conduct with nonlinear static gain is showed from the control factors driven segment. Linear function is dependent by the feed forward-driven segment characterized by framework identification on the virtual procedure.

### **1. INTRODUCTION**

Die casting is one of the most part,\*connected assembling practice in the die the casting throwing process the liquid metal is infused with strain into the solidified steel dies. It has been lately developed to enable the production of castings that are flawless, have very thin sections, and register a yield approaching even in metals such as aluminum and magnesium. The mould which is made of the metal is filled by upward displacement of molten metal from a sealed melting pot or bath. This displacement is effected by applying relatively low pressure of dry air on the surface of molten metal in the bath. The pressure causes the metal to rise through a central Ceramic riser tube into the die cavity.



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# Experimental investigation of friction stir blind riveting process for similar and dissimilar alloy sheets

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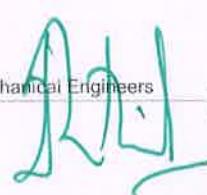
## Abstract

Friction stir blind riveting (FSBR) is a new joining method which eliminates the need to predrill a hole for rivet insertion. A new one-sided mechanical joining process, friction stir blind riveting (FSBR) was developed to form lap-shear joints for similar and dissimilar alloy sheets in different combinations. The similar and dissimilar joints are made from copper, Al 5052-H32, Al 6061-T6 metals. The process window was investigated of CNC machines using only three spindle speeds: 1110, 1750 and 2750 rpm. FSBR joints were observed and discussed during tensile testing. All the similar and dissimilar joints are well fabricated at 1750 rpm. Tensile testing results show that any material with copper combinations (copper used as a top plate) at 1750 rpm as riveting speed gives the appreciable ultimate tensile strength. Further study revealed micro structure of the joint interfaces, when compared with different combinations.

**Keywords :** Aluminum alloys, Copper, FSBR, Mechanical properties, Microstructure analysis

## 1. Introduction

Solid riveting is an important metal joining process in which a hole is made in the sheets and then the rivets are used to join the sheets. A self-piercing riveting was introduced to improve the process. Both these processes require the two sided access, which may be difficult and significantly slow down the joining process. A new metal joining process called as Friction stir blind riveting (FSBR) was developed by Wang and Stevenson, (2007). This process involves a combination of friction stir welding and blind riveting. FSBR process eliminates the need for the separate hole making operation required in the conventional blind riveting process while retaining the advantage of one-sided accessibility. The advantages of FSBR process are: (i) Most of the FSBR processes eliminate the need for a predrilled hole, thereby reducing the difficulties in laminating the multiple holes during joining. (ii) The methods are capable of joining both similar and dissimilar materials with a wide variety of material selections. (iii) They are highly suitable for batch production and automated feeding system. (iv) FSBR processes require a shorter span of process times including post processing and sample preparations as compared to other joining methods, e.g., adhesive bonding combined with welding. (v) FSBR joints have relatively high strengths and large displacements before fracture. (vi) FSBR processes allow the development of newer products and sophisticated design that were previously not possible with conventional joining processes. Gao et al., (2009) conducted experiments on 3 mm-thick AA 5052 sheets using FSBR joints and clearly found that the joints withstand a larger tensile load and possess a high fatigue resistance compared to electrical resistance spot welded joints. Chang et al., (2011) joined a dissimilar high strength steel DP600 (1mm) and magnesium alloys AZ31B (3 mm) sheets using FSBR process. Lathabai et al., (2011) made riveted joints in die cast and wrought Al alloys as well as Mg AZ31 sheet using FSBR process with several types of blind rivets. They concluded that rivets with a hollow mandrel head capture the work piece material displaced by the rivet within



# Tool Path optimization by Genetic algorithm for Energy Efficient Machining

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**Abstract**— The highly flexible CNC machines are used extensively by manufacturing industries for producing a variety of components. The cost of energy is about one fifth of the operating cost of these machines and this cost is increasing steadily. Many strategies are practiced to reduce energy consumption by these machines in order to lower manufacturing expenditures and also to minimize the carbon footprint. The feed drives share considerable amount of energy in the total power consumption of a CNC machine. In this research work, a tool path optimization method is presented to improve the energy efficiency of the machine. This is achieved by making use of the difference in energy requirement of the various feed drives. Genetic algorithm with modified cross over method was used for this purpose. The presented method was experimented analytically with a drilling problem to find an energy efficient path. An optimized tool path for minimum cycle time was also found and the two tool paths were compared in an energy perspective. Results show that the energy efficient tool path consumed less energy than the tool path optimized for minimum time. The proposed method can be adapted to CNC machines with multiple axis with interpolated movements to predict the minimum energy toolpaths.

**Keywords**— Tool path Optimization, CIM, Energy efficiency, TSP, Energy Modelling, Genetic algorithm

## I. INTRODUCTION

Manufacturing processes are found to be energy intensive and the impact on environment by the carbon footprint left by them is high [1,2]. The rising cost of energy also is affecting the manufacturing industry economically. Hence the optimization of the electricity consumption at the production and process level stages of manufacturing is necessary. Researchers accept that performing an exclusive analysis of manufacturing processes to estimate overall energy demand is necessary[3]. For reducing energy demand of machine tools, it is essential to devise methods to characterize the energy consumption of manufacturing processes [4].

Most of the existing works on energy reduction in the manufacturing industry were focused on making energy efficient machining methods. Machine tools which are used in great numbers constitute substantial size of industrial energy consumers [5,6]. The reduction of energy consumption of machines may bring considerable reduction in the environmental impact of consumer products [7]. CNC machines are highly utilized machines for machining operations which require enormous electric power[8]. The ever increasing cost of energy and the release of greenhouse gases by fossil fuels necessitates researchers to minimize the use of energy by these machines [9]. The environmental impacts of CNC machines are mainly due to their electrical energy demand and CO<sub>2</sub> emissions [10,11,12]. The efficient use of energy is an important problem, making the manufacturing industries continuously look for solutions. Energy efficiency of machine tools could be improved by identifying strategies for reducing its non-cutting energy demand [13].The electrical energy consumed by these machines during the material removal process is dominated by the energy required for supporting the non-cutting operations, machine tool feed axes and auxiliary units[14]. The energy spent for non-cutting operations takes major share of the total energy consumption in machining [15]. This means that the machine consumes huge energy even during the non cutting tool movements because of the fixed energy requirements.

### A. Tool path Optimization for productivity by minimum cycle time

Research works on toolpath optimization were mainly aimed at minimizing the time for metal cutting, minimizing the tool in air time, minimizing the tool change time and inspection time. Most research papers presented techniques for the optimization of machining parameters, tool selection and the type of toolpaths to be used [16]. Many researchers presented methods to optimize tool sequence to minimize the tool switch time [17,18]. Optimization algorithms with heuristic approach were used to arrive tool paths in metal cutting operations to minimize the non cutting tool time [19, 20]. Abu Qudeiri et al.[21] proposed a method to optimize the tool path for different operation processes that were located asymmetrically on more than one level, with a single cutting tool. Danijela Peter [22], compared the tool paths created by CAM software and by Genetic Algorithm. A Kumar et al.[23], optimized drilling tool paths using GA . Abu Qudeiri [24] solved The Traveling Salesman Problem (TSP) for two different arrival and departure points with constraints for tool collision. Alwis et al.[25] applied a row by row technique to



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## MOGWO Metaheuristic Method Used to Solve by Identical Parallel Machine Scheduling Problem With Different Objectives Compared With GA and VNS

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### **Abstract**

This paper tackles scheduling of identical parallel machine with an objective to minimize the makespan, tardiness, and number of tardy jobs. This has been considered for the effective utilization of resources and also to satisfy the customer requirements. For scheduling the identical parallel machines with multiple parameters (makespan, tardiness, and number of tardy jobs), assign weights to each parameter and the combined objective function is to be formulated by weighted sum of makespan, tardiness, and number of tardy jobs. In order to obtain the above objective, Multiobjective Grey Wolf Optimizer (MOGWO), swarm-based metaheuristics has been proposed. The effectiveness of the proposed algorithm has been tested by various test problems taken from the literature, and the computational results are also compared with Genetic Algorithm (GA) and Variable neighborhood search (VNS). The computational results show that MOGWO outperforms the GA and VNS.

**Keywords:** Identical parallel machine, Makespan, Tardiness, Number of tardy jobs, Multiobjective, Grey Wolf Optimizer.

### **1. Introduction**

Scheduling is the effective means of allocation of resources to tasks over given periods of time and its goal is optimizing multiple objectives. The resources may be machines in a plant, runways in an airport, and squads at a construction site, processing units in a figuring environment, and so on. Each task may have a certain priority level, an earliest possible starting time and a due date and the objectives can also take many different forms [1]. The Chien-Hung Lin et al, a scheduling problem that assigns 'n' available and independent jobs to 'm' identical parallel machines. Each job can be processed on any of the identical parallel machines, and the machine can process only one job at a time. The importance of the multiple criteria consideration in the multiple machine-scheduling problem is widely appreciated. Serifoglu et al [3], the due dates of the jobs are distinct, which complicates the problem. The parallel machine-scheduling problem is an important and difficult problem. Traditionally, the problem has consisted of scheduling of a set of independent jobs on



## COMPARATIVE STUDY ON SPRING BACK EFFECT OF SHEET METAL MATERIALS AND MINIMIZING THE EFFECT BY OPTIMIZING THE LOADING CONDITION

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### **Abstract**

Sheet metal is a metal formed by an industrial process into thin, flat pieces. It is one of the fundamental forms used in metalworking and it can be cut and bent into a variety of shapes. Products formed from sheet metal require high precession and accuracy, so that they can be easily assembled with matting parts. The small deviation in the given tolerance will result in rejection of the part. The deviations are not because of unskilled labours or general factors but it occurs due to the contraction in work piece, after release of the tool or punch. This phenomenon is called as spring back effect. In this work, we are going to study and compare the spring back effect of two materials (AMS 5504 & Aluminium alloy). Also, a study is made on the causes for spring back effect and its remedial factors. Among the available factors, concentration is given only on the load factor. Spring back effect is minimized by finding the appropriate loading conditions that is applied to the punch. This approximation process is carried out using FEA software in order to reduce the manufacturing cost. For this work, the modelling will be carried out using Solid works package and FEA analysis is carried out using ANSYS software.

**Key words:** *spring back, FEA, ANSYS software, Tolerance.*



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