

# The MATLAB GUI is used to do wavelet-based analysis of medical image fusion.

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## Abstract:

Medical image fusion is a technique for combining two or more medical images into a single image that contains information from both of the recorded medical images. It is used in the field of imaging to treat patients. It is used in medical imaging to increase the accuracy of the images. The majority of the time, this strategy is employed in the diagnosis of disorders. In the field of medical imaging, MRI and CT scans are often used as source images. Medical image fusion is implemented using the Discrete Wavelet Transform (DWT), which is a discrete wavelet transform. This study analyses the use of numerous fusion algorithms to medical images that make use of wavelets such as db, coif, sym, dmey, bior, rbio, and haar, among other types of wavelets. These fusion procedures are assessed based on a number of performance criteria such as entropy, standard deviation, PSNR, NAE, and RMSE in order to identify which method is the most successful in terms of fusion efficiency.

**KEYWORDS:**Image fusion,DWT, PSNR, NAE, RMSE, IDWT,CT,MRI,Entropy, Fusion rules, GUI.

## I. INTRODUCTION

A technique known as image fusion is the process of combining information from many photographs into a single image that combines elements of information from each of the various photos [1. Pictures from numerous photos are merged into a single image that has the information from each of the multiple images. Image fusion is a process in which the information from many images is combined into a single image that contains the information from each of the multiple images. As a consequence, the final image should include far more information than the original images. Through the extraction of important information from the source picture, the image fusion technique reduces redundancy and uncertainty [2], and hence improves accuracy. Prior to image fusion, it is vital to undertake proper alignment of the images in order to produce a fused image that is more clearly viewed [3]. With the help of the Medical image fusion technique, we can combine two or more recorded medical images into a single image that contains the information from both of the recorded medical images. The majority of the time, this strategy is employed in the diagnosis of disorders. Imagery such as magnetic resonance imaging (MRI) and computed tomography (CT) scans are often used for this purpose since they provide doctors with useful information that may benefit them in their treatment. Many other types of fusion operations are discussed in further detail in the literature [4-5]. In the proposed work, which is a pixel-level image fusion strategy, wavelet transform-based fusion is used in combination with the wavelet transform in order to get the desired results.

The wavelet transform decomposes a picture into high frequency band and low frequency band at different levels, such as low-low, high-low, low-high, and high-high bands, depending on how much decomposition is performed on the image. Infrared low frequency bands that provide a replica picture of the original image, as well as all of the information pertaining to the original image, are known as approximation coefficients. These low frequency bands, which are referred to as approximation coefficients, are used to create these replica pictures. High frequency bands provide edge and outline information of the source image in the fused image, and it also determines the luminance change with reference to the edge information, which is referred to as detailed coefficients. High frequency bands are also used to combine multiple images into a single image. High-frequency bands are also used to combine

# Computational Fluid Dynamics to optimise the design of an internal combustion engine's muffler.

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**Abstract:** A Muffler is a device used to reduce the amount of noise produced by exhaust gases from an internal combustion engine. To muffle the acoustic beat, many internal combustion engines are equipped with a fume suppressor (Silencer) that is generated during the ignition process. The tension and temperature of exhaust gases as they pass through the silencer are the direct sources of engine backpressure. The engine's power must be used to alleviate the back pressure inside the exhaust system. Design analysis is often used to learn about the Muffler's performance in various operating conditions. Compressible flow execution parameters are difficult to get a hold of, and trials may be expensive. In this instance, a mathematical fluid dynamics approach yields superior outcomes. It is a test of the analytical fluid components' appropriateness for determining the circumstances of their display that they may be used. The project's purpose is to study the suppressor's present and changed structure's gas stream properties. Our goal is to reduce the amount of weight on the back and increase the lifespan of the silencer by improving the construction. The CFD device CFX would be used to finish the inquiry of the Computational Fluid Elements. An in-depth report would be prepared based on variables such as weight and temperature distribution, disturbance power, and liquid power under various load circumstances.

**Keywords:** CFD, Muffler

## I. INTRODUCTION

To reduce the disturbance of an inward ignition motor's exhaust, a Muffler (Silencer) is used [1]. Although the Muffler isn't designed to offer any critical fumes task, it's installed within the fumes arrangement of most inside ignition motors. As an acoustical sound-sealing device, the Muffler is designed to reduce the motor's clamorous sound output noise by Acoustic Calming [2]. Most of the sound pressure created by the motor is radiated out of

the calm exhaust fumes are eaten by a progression of sections and chambers fixed with meandering fibreglass protection [3-5] and resounding chambers agreeably set to generate destructive blockage where inverse sound waves counter each other. The use of mufflers has the inescapable consequence of increasing backpressure, which reduces motor output [6]. A muffler's purpose is to reduce the sound weight of a vehicle, hence it must have a complicated exit route for the exhaust gases [7-8]. Exhaust gases must be able to travel through the car muffler while also limiting sound transmission [9]. The terms "muffler" and "silencer" are often used interchangeably, although there is no technical difference between the two [10]. It has long been known as a "silencer," whereas mufflers are smaller, mass-produced devices that suppress exhaust noise from both engines. This exhaust muffler's ultimate decision depends on the balance between its predicted acoustic, aerodynamic, mechanical, and structural dependability as well as its total cost in particular applications.

## II. DEFINITION OF PROBLEM

Excessive engine noise is the only function of an automotive muffler. They'll have a lot of noise around them if the car doesn't have a muffler. Mufflers for autos have been created several times in recent years, but stationary engine mufflers have received less attention. new-design exhaust mufflers are the subject of published research focusing on both theoretical modelling and experimental findings Of the basic knowledge of gas flow behaviour, surprisingly little is published to build techniques for designing new, higher-performance exhaust systems.

The following will be the goal of the proposal:

Analysis of the flow characteristics of exhaust gases in the present and changed muffler designs about the following parameters under changing load conditions: a)Pressure, temperature, distribution, the intensity of turbulence, d) Fluid force.

To lessen the stress on the muffler and extend its service life.

# DESIGN AND ANALYSIS OF 16nm GNRFET AND CMOS BASED LOW POWER 4Kb SRAM ARRAY USING 1-BIT 6T SRAM CELL

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## **Abstract:**

*With the evolution in the microelectronic applications like high speed processors, multimedia and in current electronic communication for artificial intelligence devices and IOT necessitates bigger SOC SRAM arrays for high performance with low power consumption and less space. Generally, CMOS based technologies are most extensively utilised for the construction of 6T SRAM cell. When the nanoscale technology is scaling down CMOS devices are usually confronting with leakage current and short channel impact. The constant scaling of CMOS technology restricts the performance of 6T SRAM cell in terms of leakage power. Leakage current is the biggest contributor in the power consumption of SRAM. So, the researchers have invented GNRFET technology to compensate the CMOS technology. Graphene Nano Ribbon Field Effect Transistor is a three terminal device similar to MOSFET, here the semiconducting channel is created using graphene. In this study employing 1-bit 6T SRAM cell, 4kb memory array is developed using CMOS and GNRFET technologies at 16nm technology with supply voltage of 1v. Initially 4x4, 16x16, 32x32 SRAM arrays are created in two technologies and the parameter such as read delay, write delay and average power consumption are evaluated and the results are compared for the two technologies using HSPICE tool.*

*Keywords: SOC, SRAM, CMOS, GNRFET, MOSFET, HSPICE tool, read delay, write delay, average power.*

## **1. INTRODUCTION**

The organisation of embedded memory in current very large-scale integration (VLSI) systems has progressed to a more sophisticated level. Random access memory cells are generally divided into two types: static random-access memory (SRAM) cells and dynamic random-access memory (DRAM) cells. When compared to SRAM cells, which are implemented with transistors and latches, DRAM cells are implemented with capacitors and a single transistor, which takes a long time to charge and discharge the capacitors for storing and retrieving data, as well as consuming a significant amount of power during the process. Because of this benefit, SRAM cells are commonly employed in SOC devices which are semiconductor-based electronics [1].

As a result of the increasing need for power reduction and improved performance in modern SOC devices, several SRAM cells designs have been

presented that are optimized for high performance. However, the 6T SRAM cell is often regarded as offering an excellent balance between size and performance. To boost performance, SOC devices make advantage of bigger SRAM arrays than are typically seen in other devices. Consequently, the effect on area resulting from the incorporation of a bigger SRAM array on the chip results in an indirect increase in power consumption, chip size, and cost [2]. When it comes to standard CMOS and GNRFET-based 16nm technology SRAM arrays, 1-bit 6T SRAM cells have been used to create them in the age of nanotechnology creation. The high-speed devices in extremely large-scale integrated circuits are becoming more prevalent as the size of the transistor's channel continue to reduce (VLSI). Because of the shrinking size of the transistor with each successive generation, the bulk CMOS technology has resulted in a continuous increase in the performance of contemporary digital circuits. In order to maintain the continuous scaling of bulk CMOS, considerable obstacles must be overcome owing to the underlying material and technological limitations of process technology. In order for the MOS transistor to work properly when its channel size approaches nanometers, leakage currents begin to cause abnormalities in its operation. Short Channel Effects are the term used to describe these functional abnormalities.

In order to comply with Moore's law, transistors must be scaled down in size. However, when the dimensions are reduced to nanometers, the short channel effect becomes superior, resulting in a trade-off between power dissipation and area [3]. The transistor leakage current is caused by the short channel effect, which is also caused by the short channel effect. As a consequence of this leakage current in the transistors, the power dissipation rises, and the transistor performance becomes less predictable. The search for an alternative device to CMOS devices has been conducted in order to avoid this trade-off while simultaneously ensuring the continuation of Moore's law [3, 4]. The graphene-

# A Routing Delay Predication Based on Packet Loss and Explicit Delay Acknowledgement for Congestion Control in MANET

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**Abstract:** In Mobile Ad hoc Networks congestion control and prevention are demanding because of network node mobility and dynamic topology. Congestion occurs primarily due to the large traffic volume in the case of data flow because the rate of inflow of data traffic is higher than the rate of data packets on the node. This alteration in sending rate results in routing delays and low throughput. The Rate control is a significant concern in streaming applications, especially in wireless networks. The TCP friendly rate control method is extensively recognized as a rate control mechanism for wired networks, which is effective in minimizing packet loss (PL) in the event of congestion. In this paper, we propose a routing delay prediction based on PL and Explicit Delay Acknowledgement (EDA) mechanism for data rate and congestion control in MANET to control data rate to minimize the loss of packets and improve the throughput. The experiment is performed over a reactive routing protocol to reduce the packet loss, jitter, and improvisation of throughput.

**Keywords:** Routing, Delay prediction, Packet Loss, Rate control, EDA, Congestion.

## 1. Introduction

A mobile ad-hoc network (MANET) is a collection of self-sufficient mobile nodes that communicate using a shared wireless multi-hop link without a fixed infrastructure. It has unique features consist of dynamic network topology, asymmetry, multi-hop communication, and inadequate bandwidth and energy resources. The attributes make difficult for the provision of quality of service (QoS) and raise diverse problems in congestion control (CC) design [3], [9], [12]. In MANET, intensive streaming traffic can result in more packet loss, longer delay, and QoS-related performance degradation caused by congestion. Congestion among various problems of communication is a measurement method that affects network performance [1], [2], [4].

Congestion in node mainly causes because of buffer overflow, link interference or collision. The TCP / IP is the protocol most commonly used for communications. However, it goes after the strict hierarchical constitution of the "OSI model" and has some limitations at every layer. Every layer is allocated a preset assignment to control communication. Although it can occur when the data rate exceeds the rate of data reception, it is significant to regulate the data rate used by each source to avoid overloading the network where numerous sources participate for linkage bandwidth. Lost packets often lead to retransmissions and excessive amounts of packets cause network bottlenecks so

that more control packets arrive on congested networks [5], [6]. Researchers focus on congestion prevention because congestion causes great losses in related to throughput and energy consumption.

Conventional TCP end-to-end congestion CC methods have data rate control and coordination capabilities [7], [11], [13]. A congestion window is typically assigned a value of 1 when a TCP connection is initiated. The bandwidth available for a connection can be a great deal above the "maximum segment size (MSS)" of every "round trip time (RTT)". The TCP Source prolongs to enhance the baud rate exponentially in anticipation of a loss instance occurs. Later whichever loss observe from the destination, the transmitter node executes the stream control method. The main effects of congestion are routing delays and packet loss (PL) [5], [8], [18], [23]. For high traffic rates, it is important to have a way to detect congestion. In an "end-to-end CC approach", in the network layer does not offer precise sustain for the transport layer. Even the occurrence of network congestion has to be experiential with the end system depend on network nature, PL, packet arrival delay, jitter, etc.

In this paper, we propose a routing delay prediction (RDP) based on PL and Explicit Delay Acknowledgement (EDA) mechanism for data rate and CC in MANET. It will efficiently control data rate for streaming application to minimize the loss of packets and improve the throughput. It tries to focus on the problem of TCP-CC mechanism in MANET. The extensively utilized transport protocol is TCP [9], [10], [14] is not appropriate for the streaming applications on MANET. This is due to the reality that TCP infers missing packets as a suggestion of a network congestion that does not always correspond to MANET. Packet loss (PL) can be caused by the unique nature of the MANET, such as "node mobility", "link bit errors", "media contention", and "path errors". On account of this unusual nature, the PL rate of a wireless link is much advanced than its wired link. The TCP protocol responds to this wireless loss in the identical way as it reacts to PL because of congestion. This proposed work will contribute two assessment parameter for the RDP. 1) Detecting of packet losses because of congestion, 2) Controlling the data Rate using EDA.

The paper organization as follows. In section-2 related works, in section-3 proposed routing delay prediction approach, in section-4 experiment analysis, and section-5 conclusion of the paper.

# A Combined TCP-friendly Rate control with WFQ Approach for Congestion Control for MANET

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**Abstract**—Congestion control techniques are extensively used to avoid congestion over the wireless network. But these techniques are incapability of to handle the increased utilization of the various application which raising high congestion and packet loss over the network and causing inconvenient to different services. The TCP-friendly rate control (TFRC) protocol is primarily considered to describe the effective and finest potential provision for such applications which is following it preeminent in the wired and wireless environment. But it also suffers due to slow start and time-consuming process which required several round-trip-time (RTT) to reach an optimal level of the communication rate. As the TRFC transmission rate is highly affected by the increase RTTs and this results in an raise in the packet loss and a corresponding significant decrease in the throughput. In this paper, we propose an integrated TFRC with weighted fair queue (WFQ) approach to overcoming the congestion and minimize the RTTs. The WFQ mechanism manages the incoming heavy traffic to ease the data rate control for smooth data flow to improve throughput. The simulation evaluation of the approach shows an improvisation in throughput with the low delay in different data flow conditions.

**Index Terms**—TCP-friendly rate control, Congestion control, WFQ, MANET.

## I. INTRODUCTION

With the rapid development of Wireless network, traffic congestion control has become one of the most important concerns in the existing network services and traffic types to accommodate increasingly dissimilar range [1]. Congestion control mechanisms that facilitate different types of Wireless traffic to meet certain types of quality of service (QoS) constraints are becoming increasingly important. Several systems in the network environment monitor for impending congestion before it

occurs. The QoS design is a fundamental feature of next-generation IP routers to enable differentiated delivery and to ensure delivery quality for various service traffic [5],[20],[27]. Although the TCP protocol handles "data-oriented applications" firmly, so UDP protocol mostly being utilized for the streaming relevance.

Data-driven applications are able to bear extensive delays and changing speeds without problems but require extremely stable services. For these applications, the TCP protocol is suitable. However, streaming applications, like voice and video, can tolerate some damage, but fluctuations in transmission speed should be least and smooth. The importance of quality of service (QoS) is comparable to the evolution of recent telecommunication networks, which is considered by a very large heterogeneity [3], [24]. All applications requiring a certain level of assurance from the network, especially real-time video applications, have the excellence of service (QoS) prerequisites [10].

The concept of a relatively slow response to "congestion control algorithms" erstwhile established to performs with applications, where comparative soft transmission rates are essential [3], [6], [7]. The main suggestion of "TCP Friendly Rate Control (TFRC)" [4] to utilize an "equation model of Reno" for throughput improvisation [12], and to calculate the communication rate. An algorithm that does not use the "self-clocking principle" execute in TCP can demonstrate tremendous reconcile moment. Specifically, many RTTs could possibly need to adjust the participation rate to the bandwidth accessible on the network [31]. In [2], [28], [30] proposed some adaptation techniques to allocate enhanced parameter amendment under diverse context settings. However, the parameter amendment approach in this technique is based on the hypothesis that there is a known grouping of optimal parameter settings to which the technique is to be adjusted. On the other hand, the optimality of preferences depends on environmental factors that cannot be universally true, so adjustment might not be beneficial [11].

# **SEMI-SUPERVISED MACHINE LEARNING APPROACH FOR DDOS DETECTION**

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**Abstract** - Distributed denial of service (DDoS) attacks are a major threat to any network-based service provider. The ability of an attacker to harness the power of a lot of compromised devices to launch an attack makes it even more complex to handle. This complexity can increase even more when several attackers coordinate to launch an attack on one victim. Moreover, attackers these days do not need to be highly skilled to perpetrate an attack. Tools for orchestrating an attack can easily be found online and require little to no knowledge about attack scripts to initiate an attack. The purpose of this paper is to detect and mitigate known and unknown DDoS attacks in real time environments. Identify high volume of genuine traffic as genuine without being dropped. Prevent DDoS attacking (forged) packets from reaching the target while allowing genuine packets to get through. A DDoS attack slows or halts communications between devices as well as the victim machine itself. It introduces loss of Internet services like email, online applications or programme performance. We apply an automatic characteristic selection algorithm primarily based on N-gram sequence to obtain meaningful capabilities from the semantics of site visitors flows. DDoS attacks are the perfect planned attacks with the aim to stop the legitimate users from accessing the system or the service by consuming the bandwidth or by making the system or service unavailable. The attackers do not attack to steal or access any information but they decline the performance of the network and the system.

**Keywords** - Distributed Denial of Service (DDoS), Malware Detection, Machine learning, NLP Method, Text semantics.

## **INTRODUCTION**

Data mining techniques have been used to develop sophisticated intrusion detection systems for the last two decades. Artificial Intelligence, Machine Learning (ML), Pattern Recognition, Statistics, Information Theory are the most used data mining techniques for intrusion detection. With the increase in dependability of the internet comes with it an important challenge: data availability. Data availability is a key requirement for a network system to be considered secure. Distributed denial of service attacks are intentional attempts by malicious users to disrupt or degrade the quality of a network or service. These attacks involve a number of compromised connected online devices. The use of botnets makes it easier for attackers to launch massive attacks due to the fact that they harness the power of a lot of devices for an attack. Attacks involving botnets also make it difficult to determine the exact source of the attack. Differentiating between flash crowds also poses a major challenge.

There are two main methods to launch DDoS attacks in the Internet. The first method is for the attacker to send some malformed packets to the victim to confuse a protocol or an application running on it (i.e., vulnerability attack). The other method, which is the most common one, involves an attacker trying to do one or both of the following:

(i) Disrupt a legitimate user's connectivity by exhausting bandwidth, router processing capacity or network resources; or (ii) Disrupt a legitimate user's services by exhausting the server resources (e.g., sockets, CPU, memory, disk/database bandwidth, and I/O bandwidth). Employing the resources of recruited computers to perform DDoS attacks allows attackers to launch a much larger and more disruptive attack. Furthermore, it becomes more complicated for the defense mechanisms to recognize the original attacker because of the use of counterfeit (i.e., spoofed) IP addresses by zombies under the control of the attacker. Most of the DDoS attacks launched to date have tried to make the victims' services unavailable, leading to revenue losses and increased costs of mitigating the attacks and restoring the services. In today's DDoS attacks, attackers use more complicated methods to launch an attack. Despite all of the efforts towards decreasing the number of DDoS attack incidents, they have expanded rapidly in the frequency and the size of the targeted networks and computers.

## **Comparative investment Analysis Of mutual Funds At HDFC Bank**

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### **ABSTRACT:**

Despite the notion that money attracts money, natural people are more interested in making money today than they were in the past because of the high inflation rate, the decline in the rupee's value, and the rising cost of living. Money can only be doubled on stock exchanges, but the market is plagued by extreme volatility.

volatility and high risk that draws primarily large corporations, banks, and wealthy individuals. the upper echelons of society. Investing in the stock market is tough for those in the lower middle class because they are afraid of losing money and do not want to take a risk. Mutual funds are a viable option for those who are struggling to make ends meet with their hard-earned money. There is a new study in this article. A comparison of two well-known bank mutual fund programmes.

### **INTRODUCTION**

#### **SECTORAL FUNDS**

Sectoral funds, popular with investors in mutual funds during the previous Bull Run, are again in mode and will be promoted this year as Sector Exchange Traded Funds or sector ETFs.

A number of asset management firms are introducing ETFs with the underlying themes such as electricity & infrastructure, automotive, services, FMCG, metals and pharmaceutical industries.

These funds are commercialized with the hope of raising a reasonable quantity of money through these methods. Regular sectoral mutual funds produced excellent returns in one year on their banking funds portfolios with 58 percent returns. Pharmaceutical, FMCG and Sectoral Mutual Fund categories have yielded 50%, 46% and 36%, respectively, during a one year period. In the previous year, flexi cap equity funds returned 31 percent on a broader scale.

"Sectoral ETFs provide advantages in accordance with the sector's performance. This provides an affordable way for investors to engage in areas in which they are booming," said Lakshmi Iyer, Head, Fixed Revenue & Products, Kotak Mutual Fund, which intends to introduce metals and other market cap-based ETFs in the coming months.

According to Mrs Iyer, sectoral ETFs offer investors with a simple method to trade and profit from knowing the values of their fund investment's almost real-time pricing.

The Benchmark Mutual Fund has requested permits from Sebi to establish six ETFs that include IT, FMCG, services, energy, pharmaceuticals and real estate. CNX IT, CNX FMCG, CNX Services Sector, CNX Energy, CNX pharmaceutical, and CNX Realty indexes will be designated for ETF. The minimum investment in these programmes is Rs 10,000 and thereafter in multiples Re 1. In addition to Benchmark, UTI, Edelweiss MF and Relegate Mutual are planning to establish ETF sector in the near future.

# **Incorporating Voltage Stability Index and the "-" Transformation Theory into the Design of Multi-Machine Power Systems**

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## **Abstract**

*When it comes to FACTS devices, the Unified Power Flow Controller (UPFC) has emerged as one of the most flexible. Based on this research, the Unified Power Flow Controller (UPFC) is developed and tested. A 3-phase system (abc) is reduced to a 2-axis system (-) here, allowing the power profile to be individually regulated while simultaneously managing the local bus voltage. Implementation and analysis of an integrated power flow controller for varying loads are discussed in this paper's 3 machine 9 bus standard (WSCC) implementation and analysis. A UPFC placement study is also included in this work, which aims to establish the best location and operating parameters for a power system's voltage profile improvement. The Voltage Stability Index (VSI) or L-index approach is used to determine the placement of the UPFC under various loading scenarios. Matlab/Simulink12a is used for all simulations, and the results demonstrate that the controller improves the system's power profile and voltage profile.*

*Voltage Stability Index, L-index approach, UPFC, power flow control, - theory Voltage Stability Index*

## **INTRODUCTION**

Improved power quality is required in today's increasingly complicated power system to meet rising demand. Improved power quality is required because modern technologies are being employed to enhance power system security, resiliency, and profitability. In order to do this, the transmission network's stability and power profile must be improved. When the system is faulty, excessively loaded, or reactive power demand spikes unexpectedly, the voltage collapse happens in the power system due to new transmission line networks and power stations, a variety of loads, and transformers. Due to the increasing load on long transmission lines and the inability of the system to fulfil reactive power demands caused by voltage variations, the power system becomes unstable and unbalanced.

Power electronics controllers, also known as Flexible AC Transmission Systems (FACTS) controllers, were made possible due to the introduction of semiconductor devices such as the thyristor switch FACTS devices are semiconductor devices that may either inject or absorb reactive power in a system, and they are one of the most significant reactive power sources. Third generation FACTS controller, Unified Power Flow Controller (UPFC).

UPFC power and voltage profiles are studied in this article under various loading circumstances using the - control theory. Using the Voltage Stability Index (VSI) or L-index approach, the best position of UPFC in the power system is also described in this work. To determine the best

# **MINING OF NUTRITIONAL INGREDIENTS IN FOOD FOR DISEASE ANALYSIS**

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## **ABSTRACT**

In the prevention and treatment of noncommunicable illnesses, such as cancer, it has long been recognised that a well-balanced, nutritious diet is essential (NCDs). Research has been conducted on the nutritional components of food that are beneficial in the rehabilitation of noncommunicable diseases, on the other hand, but only a small amount has been done. Because of the use of data mining technologies, we were able to conduct a thorough investigation into the association between food components and illnesses. In order to get started, we compiled a list of more than 7,000 disorders, after which we decided which foods were recommended for each condition and which foods were strictly forbidden. Using the China Food Nutrition as a reference, we went on to predict which nutritional ingredients are most likely to have beneficial impacts on disease using noise-intensity and information entropy.

At the conclusion of the research, we proposed an improved technique called CVNDA Red, which is based on rough sets and is used to select the necessary core ingredients from among the most favourable nutritional components. CVNDA Red is based on rough sets and is used to select the necessary core ingredients from among the most favourable nutritional components. A contraction of the phrases CVNDA and Red, which translates as "CVNDA Red." CVNDA Red is a trademark of the CVNDA Corporation. According to our knowledge, this is the first research in China to analyse the association between nutritious elements in food and illnesses via the use of data mining techniques based on rough set theory, which we believe is the case. We have shown via experiments carried out on real-world information that our data mining technique outperforms the conventional statistical approach, with accuracy 1.682 times greater than the conventional statistical methodology. By way of aside, our research has been beneficial in uncovering the first two to three nutritional components contained within foods that may be used to aid in the rehabilitation of a range of common conditions such as type 2 diabetes, hypertension, and cardiovascular disease. These experimental findings indicate the utility of using data mining to choose nutritional components in food for illness analysis when choosing nutritional ingredients in food when selecting nutritional elements in food when selecting nutritional components in food.

## **1. INTRODUCTION**

As defined by the National Council on Chronic Illnesses (NCDS), chronic illnesses are those that are primarily caused by occupational and environmental factors, as well as lifestyle and

# **Analysis of the Flexure Behavior and Compressive Strength of Fly Ash Core Sandwiched Composite Material**

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## **ABSTRACT**

A woven glass fabric is utilised as the outer skin, while epoxy is used as the matrix/adhesive substance in this article's core material." For testing the flexural and compressive strength of epoxy and fly ash sandwiched composites, three different mixtures were employed. Composites having 65-35 percent fly ash and epoxy resin, 60-40 percent fly ash and resin, and 55-45 percent epoxy resin are only a few examples of this kind of material (fly ash and epoxy resin). The 60-40 percent composite specimen fared better in flexure and compression tests than the 60-40 percent metal specimen. The findings of the investigation are discussed and presented in this publication. Just a few of the criteria utilised to evaluate this product include epoxy resin, compressive strength, and flexural strength.

## **Introduction**

The macroscopically joined components of two or more chemically distinct kinds of materials generate a functional substance, which is known as a composite. An interface between two or more distinct materials may be seen in a composite material. Electrical, thermal, tribological, and environmental properties of composites are also important considerations. Materials that have a continuous matrix element binding together and giving shape to an array of stronger, stiffer reinforcing constituents may be considered composites. Fiber or particle phases in composites are usually stiffer and stronger than matrix phases in these materials. A lower coefficient of thermal expansion (CTE) than the matrix is characteristic of several reinforcement forms, as is strong wear resistance. Core is a lightweight, thick slab that is sandwiched between two thin, yet robust, face sheets. There are several ways to define these materials, but the most important characteristic is the lightweight core, which decreases the sandwich structures that have been extensively used in aviation applications over the previous few decades. A structural sandwich's design is influenced by the material it is made of. Rather of relying just on geometric design, an integrated approach to material selection must be taken into consideration.

Due to their high specific stiffness structure, glass-fibre skins and eco-cores are often used in aerospace sandwiches because their flat surfaces can withstand exceptionally high compression stress without buckling. Ideally, control surfaces should remain smooth even when subjected to high levels of stress. Regardless of tensile or compressive pressures, the sandwich structure will experience stress fluctuation over its service life.. The research investigates the effects of different loading conditions on the face-sheet of the sandwich structure. In order to better understand the mechanical properties of glass fibre face sheet with an eco-core sandwich composite, the primary objective is to meet ASTM standards.

## **A REVIEW OF THE BOOKS.**

The influence of fly ash filler on HDPE mechanical properties was investigated by Ahmad and Mahanwar (2010). Fly ash was used in three different particle sizes. Up to 40% of the fly ash's weight was changed. Injection moulding was used to manufacture test specimens after the composites were made using a twin screw extruder. The qualities of tensile, flexural, and impact

# Decomposition and reconstruction of medical images in MATLAB using various Wavelet parameters

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## Abstract:

*Med-Im-Fusion is the process of extracting meaningful information from medical photos, which may include data that is of major clinical significance for doctors to use in their everyday practise.analysis. Picture fusion is a concept that is based on the concept of combining two pictures into a single image.enhance the amount of information included in a picture by combining two pictures, as in an MRI scan(Magnetic resonance imaging) and computed tomography are two types of imaging (Computer tomography)Photos are used to provide physicians with useful and precise information about their patients.In this research, the term "Discrete Wavelet" is used to refer to their medical treatment method.Directed Wavelet Transforms (DWT) have been utilised to integrate two medical pictures in this case study.Images to be utilised in the deconstruction of functional and anatomical images will be represented by pictures.TheWhen the two images are combined, they include both functional information and extra information.Spatial features are retained since there is no colour distortion. There's a lot to think about while you're in the thick of it all.task that has been proposed by others Several different fusion experiments are carried out in this experiment.with the use of seven distinct wavelet transform algorithms applied to medical imagesA few of the names are bior, coif, db, dmey, haar, rbio, sym, and a few more are not. analyses the matter in further detailthe measuring tool is used to compare all of the fused pictures togetherparametersThere are two crucial characteristics to consider: entropy and standard deviation. ExperimentalThe data reveal that the best fusion performance is achieved by the use of theSymlets (sym) are a kind of wavelet transform that may be applied to data.*

*Keywords- Image fusion,Frequency,CT,MRI,Entropy, 2-D Discrete wavelet transform Fusion metrics,Phase information.*

## I.INTRODUCTION

Photographs are fused to create a more aesthetically attractive picture by integrating two or more photographs in order to extract the most significant information from these images [1]. The process of integrating two or more images is called image fusion. Combination of two picturesapproaches, as well as their combination and integrationanything that is complementary to the otherVarious image sensor data are combined to make the information that is utilised to build theimproved visual perception and comprehension by the use of a more favourable

# UNDERWATER WINDOW BAND ANTENNAS - ESSENTIAL PROPERTIES AND DESIGN PRINCIPLES

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## Abstract

Right present, fundamental ultra-wide-band (UWB) radiation standards are being shown and evaluated. The discussion begins with an overview of how recovering wires affects UWB transmission. In time and in the recurrence field, the parameters characterizing the radio wires are computed. Because the number of potential receiving apparatus structures is almost limitless, the emphasis would be on characterisation as shown by various radiation standards. With each of these instruments, the standard points of significance and limits are discussed, as well as a sample radio wire and its properties. For a distant architect, the primary problem is the appropriate construction of a receiving device with optimal radiation characteristics. The conclusion of this article is that although there are many UWB radio wires available, not all of them are appropriate for every application, especially in terms of radar and communication framework requirements.

**KEYWORDS** | Ultra-wide-band (UWB); UWB antenna characterisation; UWB relationship; UWB switch functionalities

## 1. Introducing

Thin band radio wires and engendering are frequently portrayed in the recurrence area. Over a band width of two or three thousand, the mark qualities are thought to stay stable. For super wide-band (UWB) frameworks, the recurrence subordinate attributes of the receiving wires and the recurrence subordinate exercises of the channel should be considered. In a motivation based innovation, then again, UWB structures are constantly delivered, in this way time-space impacts and attributes should likewise be perceived [1]. Therefore, both a recurrence area and a period space portrayal of the gadget's understanding are required. The recurrence space and worldly area portrayals of these portrayals are displayed beneath. All standards are reliably used all through the article, despite the fact that they may not really match to the meaning given in the writing referred to. The facilitate framework utilized in this examination is displayed in Fig. 1.

### A. The UWB Frequency-Domain Signal Relationship is Characterized

For the recurrence area definition, the communicate radio wire ought to be animated with a constant wave sign of recurrence  $f$ . Coming up next are the necessary boundaries for characterizing a recurrence space relationship:

# Tunnel Ventilation System Design Using Computational Fluid Dynamics

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## Abstract:

Computational Fluid Dynamics is used to examine a realistic model of a naturally ventilated tunnel with side ducts. Diverse heat sources and different domains are taken into consideration in this research as the phenomena of smoke marching longitudinally is caught. According to the findings, the first domain is air, followed by CO. The study examines the impact of altering the heat intensity with the moving of smoke. Smoke velocity and airflow direction are taken into consideration. As a convective issue, the study focuses primarily on temperature distribution.

## Keywords:

Large Eddy Simulation, Turbulence Flow, Computational fluid dynamics, Boundary Conditions.

## I. INTRODUCTION

Urbanization and the utilisation of sophisticated structures and buildings, such as subways, are on the rise as a result of population expansion. As we know, long-distance transportation and travel need a region that may either be open or closed. Tunnel design is a difficult process that needs research into air movement and, on occasion, the analyses of different species or gases to be completed.

Because it is a difficult process that relies on several assumptions, there aren't many studies dedicated to smoke control and fire safety in tunnels.

To regulate smoke in a tunnel, Yang, Xing et al. [1] used a variety of sizes and forms of dampers. To better understand how the damper regulates CO (a hazardous gas), they tracked its spread and how well it is reduced. According to the findings, flat dampers are more efficient in capturing sound waves. According to Wojciench et al [2], wind conditions may have an impact on the design of natural smoke and heat ventilation systems. They also performed a transient CFD study to account for the different and significant design flaws. The study also looked at fire-related concerns, such as a shopping centre fire in Warsaw, Poland. Ansys Fluent was used for the simulation.

Road ventilation systems in southern Poland were the primary focus of Krol et al. [3]. They ran numerical simulations in Ansys fluent to figure out how fast the train would go after it emerged from the tunnel. Using the buckling impact of smoke and the stack effect, they came up with their findings. Chen, Shu, and colleagues [4] This study was prompted by a 2012 fire mishap in the Hsuehshah road tunnel, that resulted in two deaths and a large number of injuries. Fire Dynamic Simulator was used to simulate the fire (F.D.S.). Doors or tunnel connections should be automatically closed during an outbreak, so that fewer accidents occur and the rescue effort can be carried out effectively.

Peng, Zhang et al. [5] investigated the influence of vehicle obstruction on the performance of smoke control in a tunnel. For their simulation, they used Ansys Fluent 14 and F.D.S. Their main concern was the pace at which smoke was extracted. A semi-transverse smoke management system they created, based on their models of the tunnel's smoke patterns, allowed them to effectively maintain safe smoke extraction procedures.

## II. EXPERIMENTAL SETUP

A 8000x600x523 mm tube serves as the basis for the design. A train, side vents, and a heat source make up the tunnel. In addition, six ducts with a combined width and depth of 450 mm and 110 mm have been installed in the tunnel. Each duct is separated from the next by 950 millimetres. The tunnel is hollow, and a train of 1920x138.43x362.56 mm is located within. Smoke will be expelled from the train via windows of 130x50 mm. It is located 1000mm from the intake of the train. The heat source measures 1045x100x20 millimetres.