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ORGANIZING CHAIR



Current designs, unlike the earliest devices, use extensive design automation and automated logic synthesis to layout the transistors, enabling higher levels of complexity in the resulting logic functionality. We are glad to host International conference on VLSI, SIGNAL PROCESSING & COMMUNICATIONS (ICVSComs-2021) at Vignan's Foundation for Science, Technology and Research (VFSTR). We hope this conference will bring together the researchers, academicians, and industry experts to share their knowledge for mutual benefit, and enlighten the participants with latest happenings of VLSI, Communications & Signal Processing.

We welcome you all to this national event being conducted by VFSTR. We thank the Chairman and Vice chairman of Vignan's group for patronizing the conference. We express our sincere thanks to the Chancellor, Vice-chancellor, Registrar and Dean (R&D) of VFSTR, for extending their support in conducting this national event. It is very encouraging that the response to the conference's call for papers has been outstanding. We express our sincere thanks to all the contributing authors and reviewers. We express our sincere gratitude to our chief guest, keynote speakers, invited speakers and session chairs for accepting our invitation and taking part in this event.

Dr. T. Pitchaiah
Conference Chair

**Prof. M. V. Karthikeyan**

Professor,
IIT, Tirupathi

Abstract - It is a great honor and pleasure to deliver the Keynote speech at The International Conference on VLSI, Signal Processing & Communications. This conference is highly appreciated and useful to researchers and scholars and it represents a great opportunity to share thoughts and exchange ideas on broad important computer science topics such as VLSI, Biomedical Instrumentation, Medical Image Processing and Systems, Communication Systems, Networks. I wish everyone a successful and rewarding meeting and look forward to seeing you again at future edition of the International Conference on VLSI, Signal Processing & Communications.

Importance RF Simulation Tools

Driven largely by ever high levels of circuit integration and complexity, the use of electromagnetic (EM) field solvers is becoming increasingly important to many RF/Microwave Designers and High Speed Digital Designers. Whilst commercial computer aided design (CAD) tools are widely used in the industry for analysing circuits using a circuit theory approach the use of EM field solvers is less pervasive and for many, EM simulation is regarded as something of a 'Dark art'. Several key EM simulation technologies have emerged over recent years, these include the Method of Moments (MoM), Finite Element (FEM) and Finite Difference Time Domain (FDTD) solutions.

**Amit Jha**

RFIC Design Engineer,
Qualcomm, San Jose, USA

Abstract - It is a great honor and pleasure to deliver the Invited talk at The International Conference on ICVSComs'2021. This conference is highly appreciated and useful to researchers and scholars and it represents a great opportunity to share thoughts and exchange ideas on broad important computer science topics such as VLSI, Biomedical Instrumentation, Medical Image Processing and Systems, Communication Systems, Networks. I hope that the discussions during the conference will inspire participants from a wide array of themes to initiate collaborations within and across disciplines for the advancement of our field. I wish everyone a successful and rewarding meeting and look forward to seeing you again at future edition of the international Conference on VLSI, Signal Processing & Communications.

ICVSComs'21 - SPEAKERS



Prof. Prithviraj Venkatapathy
Former Principal, PEC, Pondicherry

Abstract - I am delighted to note that the ECE dept of Vignan University is organizing the International Conference ICVSComs'2021 from 3&4 Sept'21. Under the proficient guidance of our Management, Vignan University continues to march ahead towards the path of success with tremendous confidence. I have no doubt that this conference would provide a vibrant platform for Faculty Members , Research Scholars, PG/UG Students and the participants drawn from various Institutions to present their Innovative ideas, Up-to-date findings highlighting the recent technical proficiency in the various fields and research trends pertaining to VLSI, Signal Processing and Communications. On behalf of the ECE Dept of VU, I welcome the Honourable Keynote Speakers, Eminent Academicians, Scientists, Corporate delegates and all the paper presenters for this International Conference. I take this opportunity to Congratulate the HOD, Faculty and Staff Members, Research Scholars and Students of the ECE Dept who have put in tremendous time and effort to organize this conference in a meticulous manner and make it a grand success. I wholeheartedly wish the Conference conduction a grand success in their endeavor.

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Dr. L. RATHAIAH

It is with immense pleasure that I offer my sincere support and best wishes, to the Department of Electronics and Communication Engineering for organizing the International Conference on VLSI, Signal Processing & Communications (ICVSComs'21). We at Vignan believe that knowledge grows by sharing. Hence this kind of initiatives in the form of workshops, conferences etc. The conference will provide opportunities for professionals from the Academia, Industry and Research Institutions to meet, network & exchange knowledge. Sharing ideas is essential to overcome the current technology limitations and to have prospective towards the field of VLSI. I hope the participants will enjoy their stay in our campus, and actively network to seek avenues for collaboration later. On this occasion, I extend my hearty greetings to the organizers of the Department of Electronics and Communication Engineering and participants and wish the conference organizers all success in their endeavour. I wish you all a very fruitful and rewarding experience.

I sincerely believe that this conference will throw more light in these emerging areas like VLSI, Signal Processing and Communications.

I wish you all the best.

Dr. L. Rathaiah
Chairman, Vignan Group

**Dr. K. RAMAMURTHY NAIDU**

I am very delighted to know that the Department of Electronics and Communication Engineering is organizing the International Conference on VLSI, Signal Processing & Communications (ICVSComs'21). This caters to the current trends in the fields of VLSI, Communications & Signal Processing. The conference organized covers a wide range of knowledge that is currently needed by the society and about the improvements in the VLSI technologies for future perspective. Being a university, a part from imparting education we have a sense of responsibility towards the society. The conference creates a platform where researchers, technocrats and engineers gather and exchange knowledge. I congratulate the department and wish them a grand success.

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Dr. K. Ramamurthy Naidu
Chancellor

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**Dr. M.Y.S. PRASAD**

I am happy to learn that the Department of Electronics and Communication Engineering is organizing International Conference on VLSI, Signal Processing & Communications (ICVSCOMS'21) during 3rd - 4th September 2021.

I hope that this two day conference on VLSI, Signal Processing & Communications will provide opportunities to take a fresh look at the domain and conduct further deliberations on the emerging trends. Present day commercial and frontier technologies are characterized by high level of synergy among electronics, computers and communications. In this scenario, many more new concepts and subjects emerge and develop. I hope the present conference will open new window towards VLSI technology and give new orientations on technical research and development to working professionals, scholars and academicians.

I wish the conference good success.

Dr. M.Y.S. Prasad*Vice-Chancellor*



Commodore Dr. M.S. RAGHUNATHAN

The International Conference on VLSI, Signal Processing & Communications (ICVSCOMS'21) being organized by Department of Electronics and Communication Engineering of Vignan's Foundation for Science Technology and Research during 3rd-4th September 2021, aims to provide a platform to address the new trends and challenges and unravel the new vistas in the field of VLSI systems. It will provide a great opportunity to all the members of VLSI and Communication fraternity to share their knowledge in the emerging technology and development that are taking place world over. It will also provide a unique opportunity to all the academicians, scholars and professionals working in the field to gain knowledge from experts in the domain.

I take the opportunity to congratulate the Department of Electronics and Communication Engineering for their initiative in organizing ICVSCOMS'21.

I wish the conference a grand success.

MESSAGES

Commodore Dr. M.S. Raghunathan

Registrar

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**Dr. G. SRINIVASA RAO**

It is my pleasure to welcome you all to the International Conference on VLSI, SIGNAL PROCESSING & COMMUNICATIONS (ICVSComs-2021), during 3rd- 4th September 2021 at Vignan's Foundation for Science Technology and Research Deemed to be University, India. I earnestly hope that attending the conference will be a rewarding experience for Academia, Budding Engineers, Research Scholars, upcoming young minds and Industries to address new trends and challenges and emerging technologies on the topics relevant to today's fast moving areas of VLSI, Communications & Signal Processing.

The conference will feature invited talks and referred paper presentations. The conference focuses on specific Engineering streams allowing the speaker to drill deep into the issue and ensure that we return to our workplace with actionable information that we can put to use the very next day. I congratulate the organizers for their team effort and sincerely wish the conference a great success.

**Dr. G. Srinivasa Rao
Dean, R&D**

**Dr. M. SARADA**

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The main goal of this conference is to create professional interactions among eminent personalities, a platform for exchange of ideas and spread of knowledge. This “International Conference on VLSI, SIGNAL PROCESSING & COMMUNICATIONS” (ICVSComs-2021) conference will be a perfect platform for scientists, researchers, academicians to express their innovative thoughts and unique research work at a global level. It is also for emphasizing the current advancements in the industry to make the researchers and academicians unite their ideas about project development and provide an opportunity to students to meet and interact with national speakers and scientists of National Importance. This conference provides scope for various disciplines of communication engineering to elevate communication industry, to generate standards and will offer a wonderful forum to unveil the efforts of researchers, engineers and scholars.

This conference was initiated with the directions of honorable Vice Chancellor Dr. M.Y.S. Prasad garu. I extend my sincere gratitude to the management of Vignan's Foundation for Science Technology and Research for granting the department a wondrous opportunity to organize and conduct this prolific occasion helping us to take it forward to the global level. I am very happy to announce that this is the third conference organized in this region on VLSI, Communications & Signals and wish to continue this conference every year.

**Dr. M. Sarada
Conference Co-Chair**

MESSAGES



We welcome all the speakers and participants of International Conference on VLSI, SIGNAL PROCESSING & COMMUNICATIONS (ICVSComs-2021), organized by Department of Electronics and communications engineering of Vignan's Foundation for Science Technology and Research. The main goal for organizing this conference is to share and enhance the knowledge of each and every individual working in the fields of communication technology. This conference reflects the importance of VLSI, SIGNAL PROCESSING & COMMUNICATIONS in the firm of spectrally efficient signaling and better management. All the researchers, academicians and scholars will get the ample opportunities to widen their knowledge and network towards the VLSI, Communications & Signal Processing and other related fields.

We thank the management Vignan's Foundation for Science Technology and Research, for providing this opportunity and thank all other faculty and Staff members for extending their valuable time in organizing this conference. We also thank all the authors, reviewers and other contributors for their sparkling efforts and belief in the excellence of ICVSCComs-2021. We hope that all of speakers and participants will enjoy the attractions found in and around the newly formed capital Amravati.

We wish the conference be a grand success.

***Dr. K. Annapurna
Organizing Secretary***

***Dr. V. Vijayaraghavan
Organizing Secretary***



We welcome all the speakers and participants of International Conference on VLSI, SIGNAL PROCESSING & COMMUNICATIONS (ICVSCComs-2021), organized by Department of Electronics and communications engineering of Vignan's Foundation for Science Technology and Research. The main goal for organizing this conference is to share and enhance the knowledge of each and every individual working in the fields of communication technology. This conference reflects the importance of VLSI, SIGNAL PROCESSING & COMMUNICATIONS in the firm of spectrally efficient signaling and better management. All the researchers, academicians and scholars will get the ample opportunities to widen their knowledge and network towards the VLSI, Communications & Signal Processing and other related fields.

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We wish the conference be a grand success.

Dr. N. Suman
Co-organising Secretary

Dr. K. Venkata Kishore
Co-organising Secretary

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COMMUNICATION & SIGNAL PROCESSING

1. Implementation of OISD Multiuser Detection Scheme for Uplink Grant Free NOMA

Jyothi Swarupa Maripi¹, Gyana Prasanna Nadipilli², Harsha Vardhan Kilaparthi³, Sarath Kumar Nanubala⁴

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B.Tech Students^{1,2,3,4}, Associate Professor⁵

ECE Department, LENDI Institute of Engineering and Technology, Jonnada, Vizianagaram, India.

Abstract: Multiple access techniques has been viewed as the milestone of every age of remote wireless communication. Especially, orthogonal multiple access (OMA), i.e., orthogonal frequency division multiple access (OFDMA), is utilized in current 4G frameworks. In OMA, the quantity of acceptable users is rigorously restricted by the quantity of accessible symmetrical assets, which is hard to satisfy the interest of massive network connectivity and spectral efficiency in future 5G wireless technology. To address this test, non-orthogonal multiple access (NOMA) has been effectively examined, which can understand over-burdening by non-orthogonal resource allocation at the expense of expanded receiver complexity.

A few methods have been proposed to acknowledge user activity identification dependent on compressive detecting (CS) by exploiting the user activity sparsity because of irregular correspondence in Web of-Things (IoT). Be that as it may, in these CS-based multi user detection schemes where the user action relationship in various time slots was not thought of. A low-intricacy dynamic compressive detecting (DCS)- based MUD for NOMA to together acknowledge user movement and information recognition is proposed, by abusing temporal correlation. Nonetheless, user action must be recognized in grant free NOMA frameworks, which is trying by and by.

In NOMA frameworks, we propose a low-intricacy multi-user detection dependent on organized compressive detecting to acknowledge joint user action and information detection. Specifically, we propose an organized iterative support detection(OSID) calculation by exploiting such organized sparsity, which can together distinguish user action and sent information in a few nonstop time allotments.

Index Terms: 5G, non-orthogonal multiple access (NOMA), multi-user detection (MUD), structured compressive sensing (SCS).

2. Review on Channel Estimation in 5G Massive MIMO using TDM and AI

Tirupathaiah Kanaparthi¹, Ramesh Sundar², Research Scholar¹; Associate Professor VFSTR-Guntur tiru434@gmail.com, rameshb04@gmail.com

Abstract:

In the wireless communication sector, there is higher shortage in bandwidth has motivated to the exploration of a wireless access technology named as Massive Multiple-Input Multiple- output (MIMO). Massive MIMO is an advanced technology for future

generation networks in grouping the antennas at transmitter and receiver to furnish higher spectral and efficiency of energy using relatively simple processing. By deploying 5G-TDM-Artificial Intelligence- networks will overcome the above mentioned issues for accomplish various applications of the intelligent system. This paper furnishes the comprehensive study on evolution of cellular networks and key enabling technology for 5G. The time-division multiplexing (TDM) helps in estimating the channel and improves the performance of error rate. Also this research proposes the new methodology of integrating the hybrid deep learning algorithms in channel estimation with massive MIMO models. This paper also presents the benefits and importance of Massive MIMO and 5G networks. Additionally, a comparative analysis is presented between distant algorithms of artificial intelligence for MIMO.

Keywords: Channel Estimation, Energy, Massive MIMO, 5G, TDM.

3. A Study of Massive MIMO and mmWave MIMO Techniques for 5G

Wireless Communication

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Abstract. The great evolution of wireless communication has been made possible because of various physical layer technologies. The next generation of wireless communication requires an increase in data rate, large connectivity, and low latency. In this paper study two of the key physical layer technologies is presented which are MIMO(Multiple Input Multiple Out) which involves the high number of antennas and mmWave MIMO mmWave MIMO which uses a high frequency mm band to increase the bandwidth to support high data rate. The aim is to study MIMO Model and mmWave Model and to find challenges in the implementation of these technologies. Advanced applications like self-driving cars, smart homes, augmented reality and new IOT solutions are supported by these technologies.

4. Spatial correlation STC SAC OCDM-MIMO based on beam space channel estimation for 5G applications

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Abstract—The major goal of this research is to offer the lowest efficiency limit for fast Fourier transform in a large MIMO receiver with 100 antennas based on space channel estimate. After the antennas' digital signal processing, beam space channel estimation is adopted to minimize complexity. To solve the problems, STC SAC OCDMA methods

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were developed. To maximize the diversity gain and enhance the productivity of BER and SNR utilizing the OCDMA methodology, the suggested system uses space-time coding and spectral amplitude coding with OCDMA. Various modulation algorithms are utilized, including QPSK, 64-QAM, and 256-QAM.

The BER performance is further influenced by spatial correlation. The proposed method sends the data to the intended recipient in a secure manner.

Keywords— Beam space channel estimation (BSCE), Space time coding(STC), Spectral amplitude coding(SAC), Optical code division multiple access(OCDMA), Bit error rate(BER), Signal to noise ratio(SNR).

5. Comparative Analysis of Intrusion Detection System in Reactive Routing Protocols of Mobile Adhoc Networks

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Abstract— Mobile Nodes in Mobile Adhoc Network (MANET) interact wirelessly with the neighbor nodes without aid of central management. They are subject to a variety of attacks, including as the black hole, insider, grey hole, wormhole, flooding attack, and packet drop, all of which severely impair secure communication. This paper incorporated an intrusion detection system (IDS) into a reactive MANET routing protocol, such as Adhoc On-Demand Distance Vector (AODV), for the detection and prevention of malicious nodes. To make a comparison with the implemented AODV+IDS, the existing NetSim code of Intrusion Detection System (IDS) based on Dynamic Source Routing (DSR) protocol is utilized. We created a Black-hole node to conduct malicious activities in the network. The AODV+IDS and DSR+IDS are analyzed for different Quality of Service (QoS) characteristics such as Packet Delivery Ratio (PDR), Throughput, Energy Consumption, and delay in a network size of 10 nodes for simulation period of 100 seconds. The NetSim tool was utilized as a simulation tool for creating network with malicious node and to implement IDS. The results demonstrate that the AODV+IDS and DSR+IDS efficiently identify and prevent a BH attack on the network. The AODV+IDS improves PDR and throughput while consuming more energy and having a little higher delay.

Keywords— AODV, Black-Hole attack, DSR, intrusion detection system, network layer attacks, security mechanism.

6. DUAL-BEAM LEAKY-WAVE ANTENNA (LWA) BASED on MICROSTRIP

Abhay Kumar Singh , Paras

Abstract- Second-order higher mode periodic leaky-wave antennas (LWAs) are proposed. The distributed circuit model is used to balance the impedance matching and open stop-band suppression. By loading the longitudinal slots in the unit cell, the leaky-wave antenna produces a dual symmetrical beam that scans from backward to forward. The LWA shows good radiation performance and gain in the scanning region of -50° (backward region) to +50° (forward region).

Keywords—Beam scanning, higher-order modes, open stop-band suppression, LWA

7. COMPARISON OF SOFT FUSION TECHNIQUES FOR COOPERATIVE SPECTRUM SENSING IN COGNITIVE RADIO NETWORKS

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Abstract: Spectrum sensing plays a major role cognitive radio networks. To avoid the interference to primary users and to detect the spectrum holes for secondary users and hence to improve the spectrums utilization, the sensing should be more accurate. But, the sensing accuracy in practice is often degraded with shadowing, multipath fading and receiver uncertainty issues. To overcome the impact of these problems, cooperative spectrum sensing is being used to enhance the sensing accuracy with the help of spatial diversity. In cooperative sensing, fusion center will investigate the sensing data received from different nodes and by applying fusion rule final decision will be taken. In this paper hard and soft fusion rules are compared and from simulation results, the soft fusion rule is found to be more accurate than hard fusion rule.

Keywords: Cognitive Radio Networks, Fusion, Cooperative Spectrum Sensing, Sensing Accuracy, signal detection.

8.Designing Sidelobe-Free Range Region Nearby Identified Radar Target

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Abstract— In pulse radar matched filtering results in range sidelobes. These sidelobes are often objectionable

because they may mask small targets or may mislead for targets themselves. To obtain a good range response, the pulse radars transmit modulated or coded waveforms with better periodic AutoCorrelationFunction (ACF) and also use a Matched Filter (MF) receiver. Range Sidelobe (SL) can be substantially reduced by using a MisMatched Filter (MMF), designed to lower the integrated or peak sidelobe. Minimum SL prevents masking of weak adjacent targets and reduce clutter. This paper proposes a new method to reduce sidelobes it is achieved by designing a Modified MisMatched Filter (MMMF) in which the nearby sidelobe of the Cross Correlation Function (CCF) are given higher weight in the process of sidelobe reduction. A fusion of the Modified MisMatched Filter and a standard Matched Filter (MF) can generate a Sidelobe-Free response.

Keywords: PulseRadar, SidelobeReduction, MatchedFilter, Mismatchedfilter, AutocorrelationFunction, Crosscorrelation function.

9. Performance Analysis of AODV, DSR, DSDV and OLSR VANET Routing Protocols

Mahabub Subhani Pathan¹, , K. Annapurna²

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Abstract - An ad hoc network that is formed by moving vehicles and in which vehicles communicate with one another through a wireless technology called Dedicated Short Range Communication (DSRC) is known as vehicular ad hoc network (VANET). In an environment like VANET which has some unique characteristics like high dynamic topology, variable network density, frequently disconnected network, etc. an important challenge is to design a routing protocol for effective routing of packets. Over the last decade, various routing protocols have been proposed for VANETs and some of the most important among these are DSDV, OLSR, AODV and DSR. This paper gives an overview of these routing protocols and their comparison for similar environment conditions. Their performance is evaluated based on MAC/PHY layer overhead, number of packets received and receive rate. The simulations are carried out in NS3 and results are generated for two different traffic density scenarios (39 nodes and 104 nodes).

Keywords—VANET, AODV, DSR, DSDV, OLSR.

10. A New blind zone free PFD in Fractional-N PLL for bluetooth applications

Azeem Mohammed Abdul,Usha Rani Nelakuditi

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Abstract

This paper presents a New Phase Frequency Detector (PFD) used in the Fractional-N synthesizer PLL for the bluetooth range frequencies using TSPC based D-FF. The PFD is designed by using 16 transistors. The operating frequency of the PFD can be modelled in between 2.2GHz-3.7GHz with an input reference frequency applied of about 50MHz. The design of PFD is done by using GPDK 45nm CMOS technology on SPECTRE simulator with 0.45V supply voltage. The designed PFD is having maximum operating range and free from blind zone. The results reported in this paper are compared and focused on the blind zone and minimum jitter contribution. The designed PFD consumes least power, minimum number of transistors and minimum jitter contributed by the transistors as compared with the reset free based PFD.

11.Improved Hungarian Algorithm for Unbalanced Assignment Problems

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Abstract. Hungarian algorithm gives optimum one to one assignment when there are equal number of machines and jobs. For unbalanced assignment problems, prior to solve it, dummy jobs/machines are to be added to convert the unbalanced problem in to a balanced problem. But the jobs which are assigned to dummy machines cannot be served in reality. So to avoid this problem duplication of required number of machines/jobs, that is multiple jobs (machines) are assigned to a single machine (job) is proposed. At most care is taken while selecting the duplicate machines/jobs to minimize the cost of final assignment. In addition to that the proposed algorithm ensures no overloading of particular machine/job. Some researchers have proposed this concept, but an improved Hungarian algorithm is

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introduced in this paper, which gives the optimum result with reduced computational complexity. In addition to this, the proposed algorithm is most generalized one which solves the assignment problem for all possible number of machines and jobs, which is not addressed by other researchers. Furthermore, it ensures no machine or job is overloaded.

Keywords: Unbalanced Assignment, Improved Hungarian, Reduced computational complexity, No overload.

12. Performance evolution of routing protocols in MANET

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Abstract: Mobile ad-hoc networks are special kind of wireless networks. These networks offer a value added services in various difficulty situation in real time. In these networks information can be exchanged between all wireless devices within the pre-determined range. Data forwarding from source node to the destination node, they require efficient route because wireless networks are prone to many problems. There are so many route finding protocols are available in the literature. In this article a well known route finding methods like AODV, DSR and DSDV routing protocol performance is compared and suggested for new route finding methods.

13. Comparative Study of Direction-of-Arrival Estimation Methods for Massive MIMO

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Abstract

Direction-of-Arrival (DoA) estimation is one of the sought after research topics in signal processing owing to its applications in Wireless communication, Acoustics and Radar. The popular DoA estimation methods include conventional beam-scanning and super resolution techniques such as CAPONs and MUSIC(Multiple Signal Classification), ESPRIT (Estimation of Signal Parameters via Rotational Invariant Techniques), root-MUSIC, respectively. Aforementioned methods, especially the super-resolution ones like MUSIC and ESPRIT are mostly studied for 1D DOA estimation. Massive MIMO is another technology which employs Multiple antenna elements to increase the capacity and data rate of the communication systems. Massive MIMOs together with DOAs can be used for 3D beamforming. However, for precise 3D beam-forming the knowledge of both azimuth

and elevation angles is required. This paper compares the performance and computational complexity of the 2D-MUSIC and 2D-ESPRIT DOA methods using different MIMO antenna configurations.

Index Terms-DOA, MIMO, Array Signal Processing, MUSIC, Direction-of-Arrival.

14. Analysis of Dual Layer Patch Antenna For WLAN Applications

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Abstract: This research is based on developing a dual-layer microstrip patch antenna for WLAN applications. The target frequency for the desired antenna is 5.2GHz. The overall

dimension of the antenna is $36 \times 32 \times 3.2$ mm³. To obtain broad bandwidth and gains, several attempts have been undertaken, such as using different heights of the substrate with the same FR-4 material. The results of the simulations were obtained using the CSTMW software 2018. The antenna's benefits include a simple construction, wideband performance, minimal return loss, and increased gains above conventional designs. Throughout this analysis dielectric Fr-4 substrate was used. Finally, it was found from the analysis compared to the single layer the return loss having -17dB with gain 2.94dB and double layer substrate with equal heights (1.6mm+1.6mm) achieved -36.5dB and having gain 4.48dB as compared with single layer and dual layer with substrate (0.8mm+0.8mm) heights. From the analysis this proposed antenna well suited for WLAN applications.

Keywords:Micro-strip patch antenna, Gain, Bandwidth, Dual-Layer, WLAN

15.Truncated Corner Rectangular Patch Antenna for Radar Applications: Design and Analysis

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Abstract- This Paper presents truncated corner rectangular patch antenna for radar applications operate at 10 GHz frequency band. The antenna was designed using by combining the two rectangular antennas to bring out the desired frequency. The antenna

has a -10 dB impedance bandwidth 800 MHz from 9.6GHz to 10.42GHz. Microstrip feeding is used for excitation of the proposed antenna also the size of the antenna has been reduced. The overall dimensions of the antenna is $18 \times 16 \times 1.6$ mm³. The gain of the proposed antenna is 4dB and the VSWR is found less than 2. FR-4 loss tangent is used as a dielectric material for the substrate. At the desired frequency 10GHz the return loss value is -58dB. The Simulation has been done with the help of CSTMW 2018 software. The results are in good agreement with the desired value. In this paper we also observed the E-field and H-field radiation pattern of the desired antenna.

Keywords- Patch antenna, Radar, Truncated corner.

16.Sensor based water treatment methods for dyeing-water recycling with Automation system

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Abstract - Water is an elixir for living things and an inevitable resource for its daily needs. Water plays a major role in all different fields like medicine, agriculture, automobile, fashion technology, industries and many more. India is facing huge water crisis in its history and if this condition continues there will be no water in 2030. The available water resources are utilized exponentially. It is a basic right of all living things to have access to an adequate amount of safe drinking water. The major reason of this crisis is generally the water is not reused. It is found an average of 1000 liters of water is utilized by every family in India. The water can be conserved by treating the water and re-utilize for various agriculture or other fields. Hence, water treatment should be made faster and easier. Based on several experimental evidence it is noted that one third of the water resource is wasted during treatment. Though several new techniques are implemented to improve water treatment, the method is not suitable for water with varying pH, TDS, Turbidity and mineral level. In this paper a novel technique of choosing varying technique of water treatment based on pH, TDS, turbidity and mineral level by applying IoT based model for automatic detection and recording in cloud. The experimental results proven that this method improves water treatment and conserves 37% of electricity and 63% of water. Also, the automation system provided added advantage for the system.

Keywords - Water treatment; IoT; Artificial Intelligence; Sensor Network

17.Routing attacks in VANETs

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ABSTRACT: Now-a-days many accidents are taking place due to inefficient drivers, traffic congestion, violation of traffic laws, inadequate road information, increased automobile usage, and due to lack of security assured infrastructure. With the help of intelligent road transportation system, researchers and industry people are enhancing the vehicular communication to reduce the number of accidents. VANET is a sub class of MANET, which is a very promising and latest technology. Security means protecting the privacy (confidentiality), availability, integrity and non-repudiation. Security implies the identification of potential attacks, threats and vulnerability of a certain system from unauthorized access, use, modification or destruction. A security attack is any action that compromises or bypasses the security of information illegally or in an unauthorized way. . In this paper, the need for security, different possible attacks in VANETs and how to overcome them are presented.

Index Terms—V2V, V2I, VANET, Security, Availability, Privacy, Data Integrity, DSRC, Attacks, Challenges, preventive measures.

18. DPSW2A: DESIGN AND IMPLEMENTATION OF DYNAMIC PACKET SCHEDULING WITH WAITING TIME AWARE using DPSW2A

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Abstract— One of the principal goals of 5G is to enhance performance in connection with speed and delay curtailment. To accomplish this, IETF has proposed Multipath TCP to utilize the accessible interface for communication. The demand for mobile communication is escalating day by day. The predominant communication option for people is mobile. For better service for users' nodes are fitted out with multiple interfaces. Multiple interfaces are as well one of the benefits of 5G. Multi path protocols are used to load balancing and resilience to failure. When communicating with asymmetric interfaces, latency is an imperative factor. To attain low latency is hard when asymmetric interfaces are used. When communication happens using multiple interfaces, the scheduler plays a central role since it

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decides which interface needs to be used for the packet. In this article we spotlight on scheduling algorithms, how this schedule will play a vital role to transfer data to receiver nodes with low latency. In this paper, we emphasize on the Scheduler named DPSWWA with the objective of minimizing delay

Keywords— MPTCP; scheduler; latency; delay; transport protocol; Waiting Time;

19. DESIGN OF CO-PLANAR WAVEGUIDE ANTENNA FOR BLUETOOTH AND 5G APPLICATIONS

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Abstract: This paper presents, a CPW fed dual band antenna with dual parasitic patches. The realized antenna is printed on FR4 substrate of thickness 1.6mm with dimensions of 50×50 mm². Here the inverted F shaped active patch produces the upper band. The lower band is obtained by embedding two parasitic rectangular patches at the opposite corners of the active patch. The return loss bandwidth of the antenna extend from 2.312 - 2.476 GHz in lower band and 3.468 - 3.73 GHz in the upper band, thereby covers the Bluetooth (2.33-2.45 GHz) and 5G (3.3-3.8 GHz) bands. The proposed antenna is simulated using CST

20. On the Efficient Design of Mother Constellation based Codebook for SCMA

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Abstract: In recent years, to improvise the connectivity for massive users, 5G wireless communications introduce Non-Orthogonal Multiple Access (NOMA) techniques. Sparse code multiple access (SCMA) is one of the candidates of NOMA that emphasises on the codebook design to enhance the system parameters. This paper introduces study of SCMA system model and technique for constructing an efficient mother constellation to design codebook to improve symbol error rate.

Keywords: 5G, MPA, NOMA, Mother Constellations

VLSI

1.Designing of online ALU Based -BIST for Stack of Multi Width RAM's

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Abstract: Memory cores are usually the densest portion with the smallest feature size in system-on-chip (SOC) designs. The reliability of memory cores thus has heavy impact on the reliability of SOCs. Transparent test is one of useful technique for improving the reliability of memories during life time. Transparent BIST schemes for RAM modules assure the preservation of the memory contents during periodic testing Symmetric Transparent Built-in SelfTest (BIST) schemes skip the signature prediction phase required in traditional transparent BIST. Achieving considerable reduction in test time. Previous works or symmetric transparent BIST schemes require that a separate BIST module is utilized for each RAM under test. This approach, given the large number of memories available in current chips, increase the hardware overhead of the BIST circuitry. In this work we propose a Symmetric transparent BIST scheme that can be utilized to test Rams. For 5 different word widths hence, more than one RAMs can be tested in a roving manner.

Keywords: online BIST, symmetric, SOC

2.Analysis of NBTI Impact on Clock path Duty cycle Degradation

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Abstract:In CMOS devices over the lifetime of the device degradation can cause severe threats to the system performance. Bias Temperature Instability (BTI) and Hot Carrier Injection (HCI) are considered the most important sources of the aging mechanisms. Temperature and stress are the major sources of transistor aging, which vary for different applications. Asymmetric aging is observed in p-FinFETs and n-FinFETs, which can be catastrophic for the design. In this paper, the effect of NBTI on duty cycle degradation at each stage of the clock path is analyzed. The results are obtained using 5nm technology standard cells and validated using HSPICE simulator.

Keywords:Negative Bias Temperature Instability, Asymmetric Aging, HSPICE, Duty Cycle Degradation

3. Design and Implementation of 8-bit Augmented Carry based Accretion Adder using Kogg-Stone Technique

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Abstract: The Kogge – Stone adder may be an enhanced carry increment adder style prefix. In O time the signal is produced and thus the shortest adder type is commonly

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mirrored. It is the growing design to high-performance arithmetic circuits in industry. In KSA, the area unit is easily determined by being measured at the price of inflated room in parallel. The simulation is under the tool of DSCH tool in constructing 4-bit and 8-bit enhanced carry increment adder by the implementation of kogge-stone stance.

Keywords: Kogge-stone, carry increment adder, VLSI adders, Kogge-stone adder

4.Optimization of Cloning of Clock Gating Cells in High Performance Clock Networks

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Abstract—In VLSI circuits, power consumption has been a major concern for semiconductor product usability and reliability issues, particularly with the increasing application of portable devices such as smartphones in recent years. The clock tree is a major source of dynamic power consumption, accounting for up to 45% of system power. Clock gating is a commonly used approach for minimizing switching power usage. Clock Gating Cells (CGCs) are introduced by the designer in the RTL (Register Transfer Logic) of the design. These CGCs are cloned at the Synthesis stage of the design to obtain the predictable timing closure which results in many of the CGCs with low fanout. In this paper, we have proposed a methodology for reducing the count of cloned CGCs with low fanout as CGCs with low fanout does impact much on power savings. Hence, it must be assured that a clock gate inserted should be gating off a minimal number of registers in order to obtain a considerable active power savings. The resulting clock gating methodology shows significant improvements in reduction of CGC count which overall improved the dynamic power savings and fixed low fanout issue of CGCs. The CGC count is reduced by 87.19% at Synthesis stage and 88.71% after Place and Route (PnR) stage of which 98.31% CGCs were of low fanout. This resulted in reduction in total power of 84.41%.

Index Terms: Clock Gating Cells, Register Transfer Logic, Synthesis, fanout, PnR.

5.Implementation of the Communication Protocols SPI by the HDL-Verilog Language

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Abstract: In this paper design and development of SPI protocol is presented. The SPI module permits synchronous, full duplex serial communication between the microcontroller units and peripheral devices. The SPI master is the device that possesses the clock. The data transmitted in the SPI protocol is synchronised to the clock possessed by the master. In this paper a single Master and Slave have been designed and implemented in Verilog. The Finite-State-Machines (FSM) and the state diagrams of both Master and Slave are used for verification purposes. The input clock Frequency is taken 50MHz. Voltage taken is 1.8V. The designed SPI module can transfer data up to 7Mbps.

Keywords- SPI, UART, Master Slave, Power, Temperature

6.A Case Study of LPDDR4 PHY to Handle the Challenges in Clock Domain Crossings

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Abstract - Due to the increase in complexity and uses of multiple clock domains in IP design, it is essential to analyze the flow of signals across clock boundaries for proper data transmission among different clock domains. There is a need to understand the issues that arise due to clock domain crossings (CDC). This paper illustrated the various synchronizer techniques and proposed the hierarchical approach to handle the various CDC issues in the design. The case study of CDC verification flow for LPDDR4 RTL design, several CDC-related errors and debugging techniques have been presented in this paper.

Keywords – Clock Domain Crossing, Meta-stability, Synchronizer, CDC verification, Glitch.

7. A new modified design of BiCMOS inverter

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Abstarct:

BiCMOS logic is becoming increasingly popular among researchers and industry. This technology combines the bipolar and CMOS circuits on the integrated chip itself. The use of BICMOS circuits helps in combining the benefits of both the bipolar technology as well as the CMOS logic design. It involves low power, high input impedance and wide noise margins of the CMOS technology along with high current driving capability of the bipolar transistor technology. CMOS circuits have a limited current driving capability. It also suffers from distortion after a few stages. In case of other CMOS circuits, it is not an issue to drive just like the case of buffer but in case of high capacitances and loads it is a serious problem. It causes long propagation delays in the circuit. In the case of bipolar technology, the large

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transconductance helps in driving large output current, hence called the current controlled devices. BiCMOS circuits play an important role when the output currents are higher than what conventional CMOS can deal with. It also includes the functionality of designing and simulating both analog and digital logic functions on a single IC chip. Inverter design is achieved through a pair of complementary composite MOS BJT devices, all of the BJT transistors are never in saturation at the same time. In this paper, a new modified design of BiCMOS inverter has been proposed, the circuit schematic has been simulated in PSPICE tools and comparison with CMOS and BiCMOS inverter is done. In future more logic gates using BiCMOS technology can be used along with CMOS and better performance results can be achieved.

Keywords—CMOS, BiCMOS, logic design, BJT, transistor

8. Analysis of the Enhanced Stability 9T SRAM Cell using N-Curve

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Abstract. Stability is a major threat with the shrinking technology nodes. Conventional 6T SRAM design suffers from the read stability for declining VDD. 9T SRAM cell enhances the read stability by arranging a separate read port which reduces the flow of read current through the storage nodes. The N-Curve is used to analyze the 6T and 9T SRAM cells. It shows a 28.55%, 32.43%, 25.41%, 24.11%, 26.21% increase in Static Voltage Noise Margin (SVNM) in the 9T SRAM cell compared to the 6T SRAM Cell at corners TT, FF, SS, FS, and SF respectively. There is a decrease of 0.49%, 2.57%, 2.92% in Write Trip Voltage (WTV) for 9T compared to 6T SRAM Cell for TT, SS, and SF corners respectively. Write Trip Current (WTI) is also higher in 9T SRAM cell making the write operation worse during read operation. This ensures enhanced read stability. The designs are implemented in 45nm technology node at 0.9V VDD using Cadence Virtuoso.

Keywords: N-Curve, Static Current Noise Margin, SVNM, Static Power Noise Margin, WTV, WTI

9. Ultra-Low Power High-Speed Dynamic Comparator for Biomedical Devices

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Abstract. This paper presents a low power dynamic comparator intended for biomedical devices. As ADC forms a power thirsty block of biomedical devices, and as comparator of ADC consumes significant power for each comparison, it is required to have a low power and high-speed dynamic comparator for efficient and prolong working of the implant. To achieve low power consumption, dynamic comparator proposed connects the pre-amplifier to the latch nodes through switches to block the static current and the design is made suitable for lower supply voltage. The switching speed of the design is enhanced and the design is

made suitable for comparing low voltage signals with the implementation of bulk driven technology. Cascode current source is employed for the dynamic offset cancellation. This design has been simulated in 180nm, 90nm, 45nm CMOS technology using cadence Virtuoso tool.

Keywords: Cardioverter defibrillator, ultra-low-power, offset cancellation, bulk-driven technology, cascode current source, CMOS & FINFET technology.

10.Low Power High Stable SRAM Cell Using Separate Read Port and Sleep Transistor Methodology: A Review

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Abstract- The traditional 6T static random-access memory - (SRAM) cell's static power dissipation and stability are difficult to overcome with lesser technology. Many SRAM (11T) have been offered to overcome this problem, to increase the reader's stability and reduce static power dissipation. The storage node is segregated from the read port in these 11T SRAM cells, and the sleep transistor technique is used to save battery power. The read static noise margin (RSNM) of the ST11T SRAM, 11T ST1 SRAM cell, 11T ST2 SRAM cell, and 11T SRAM cell is calculated and compared to the base cell 6T SRAM cell in cadence 180nm technology files. The write stability is also calculated, and it is discovered that the 11T SRAM cell has better stability than the others.

Keywords-11T SRAM cell, Multi threshold transistor, Read port, Stability, Static power dissipation.

11.Hardware/Software Co-Design using ZYNQ SoC

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Abstract:

A Programmable Logic (PL) (FPGA) and Processing Subsystem (PS) (ARM Cortex-A9) make up the Xilinx ZYNQ-7000 SoC.. The data transfer arrangement between the PL and PS is an important part of the ZYNQ Architecture. In comparison to other existing solutions, the AXI Interconnect serves as a vital communication link between PL and PS for bi-directional data transfer. This paper explores configuration between the PL and PS with in the ZYNQ-7000 SoC. Implemented a logic with configuration of both PS and PL and only PL.

Keywords: Xilinx, Zynq 7000 Soc, FPGA, Arm Cortex-A9, AXI Interconnect

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12.Design of a High Performance 5 to 32 Address Decoder for SRAM

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Abstract: Static Random Access Memory (SRAM) is an utmost important building block of many digital applications like microprocessors and various levels of cache memories of which Address decoders are the significant peripheral component. They play a crucial part in decoding the addresses for selecting a particular bit from the entire memory array. Therefore, the SRAMs performance also depends on these address decoders. This paper implements a 5 to 32 Address decoder with the least number of transistors using the predecoder and replica concept. For achieving better performance than the existing techniques, pseudo nMOS logic is used. All the simulations are done in Cadence using CMOS 45nm technology.

13.Performance Efficient Multiple Scan-Chains BIST Using Weight-Based Segmentation with Domino Xor Logic

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Abstract – In this paper a new weighted based cell segmentation algorithm for multiple scan-chains BIST is presented. The main aim of the proposed structure is to reduce power consumption during the scan in of new test vectors, to reduce the test application time and to increase the speed of operation. The proposed technique is based on domino Xor gate that can drive the circuit with an enhanced speed by 14% when compared with the existing structures, thereby reduces the power delay product. The proposed structure mainly depends on the group of cells which are connected to the same scan-chain with a weighted logics of 1's and 0's. These weight-based cells can cover a specific test length. Each scanchain's input is given to an output of a logic circuit after the LFSR to produce biased test vectors according to the weights of segmented cells in a scan-chain. Using Verilog algorithm switch level abstraction of the proposed structure is simulated with Xilinx Vivado tools at 180nm technology node.

Keywords – XOR gate, domino XOR gate, multiple scan chains, weighted switching activity (WSA), built-in selftest(BIST), low power test, scan-based test, scan segments, scan cell order, Linear Feedback Shift Register (LFSR), dynamic logic, low power design

14.Q learning based Ant Colony Optimization approach for minimum Connected Dominating Set formation in MANET

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Abstract: Routing decisions in MANET are harder to resolve due to the constant movement of the nodes. The frequent broadcasting of route request packet creates broadcast storm due to multiple retransmission of the packets because of this nodes will receive multiple copies of same control message from various neighbours. Construction of virtual backbones in MANETs using the concept of Connected Dominating Set (CDS), is an efficient solution to this problem. In this paper, Q Learning algorithm is used to find the best dominating nodes towards the construction of CDS. Link stability and residual energy are the parameters used for estimating the Q values. Though construction of Q value based CDS is found to be efficient, construction of minimum CDS is essential to optimize the performance of the MANET. Hence, it is important to develop an algorithm to optimize the CDS with energy efficiency to improvise the performance metrics of the MANET. In this paper a novel Q learning based ACO approach is going to be proposed to construct energy efficient minimum CDS using ACO integrated with Q learning technique to optimize the MANET performance.

Keywords: Reinforcement Learning; Q Learning; Ant Colony Optimization; Pheromone Value; Learning Rate; Decay Factor; Connected Dominating Set.

15.Design of Energy Efficient High-Speed 1-bit Hybrid Full Adder for IoT-Applications

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Abstract: This work deals with designing a novel XOR-cell for attain full swing voltage at high-speed operation. It is the basic building block for the design of any kind of full adder. The performance analysis and driving capability of the adder completely depend on XOR-cell only. Nevertheless, this XOR-cell is the major power consumption block in any kind of adder which achieves the full swing based on the CMOS-inverter and CMOS-

Pass Transistor Logic (C-PTL). Hybrid Full Adder(HFA) is designed using three modules i.e XOR-cell, Transmission gate(TG), and Level restorer (LR). Among these three designs, TG-gate has a superior quality of achieving high-speed operation and low short circuit power. Performance parameters such as power, delay, Power-delay Product (PDP), Energy- delay product (EDP) are calculated and the simulation results are performed at a frequency of 1GHz in cadence virtuoso tool - 45nm technology having a supply voltage (V_{dd}) of 0.8 V. This proposed Hybrid full adder is well suited for high-speed operation in IoT based-Applications.

Keywords: Hybrid Full Adder (HFA), Transmission gate(TG), Complementary- Metal Oxide Semiconductor (C-MOS), Level- Restorer(LR).

ABSTRACTS

IoT & EMBEDDED SYSTEMS

1.Design and Comparison of MEMS Inertial Sensors with Different Suspension Beam Structures

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Abstract:

This paper presents the design and comparison study of maximum displacement and analysis of eigen frequency for Micro Electromechanical Systems (MEMS) Inertial Sensors with various beam structures. In this work six different shapes of beams were designed and studied through simulation to find the best structure that exhibits the maximum displacement with less cross axis displacement and to observe the operating frequency. The momentum of the beams is directly proportional to the thickness and length, which provides the maximum flexibility to produce momentum on proof mass. The thickness of the beam used in the design is 5um for all proposed sensors and the momentum observed by changing different shapes of the beam structures. The momentum occurred on proof mass due to applied physical energy and same amount of physical energy was applied to all structures and measured the momentum and displacement for all structures. The measured values of momentum and displacement was compared for all six structures and tabulated.

Keywords: MEMS, Momentum, Beam, Sensor

2. IMPLEMENTATION OF WATER CONSUMPTION AND CONTAMINATION DETECTION SYSTEM USING ARDUINO

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Abstract :

Drinking water is a limited natural resource that should be utilized in an effective way for sustainability. Not only utilization but also monitoring the quality of water is equally important to avoid many diseases caused because of water pollution. In this paper, we propose a system that monitors the quality of water along with restricting household water consumption. We design a system that automatically controls the water consumption using a solenoidal valve and water quality using PH sensor and turbidity sensor using Arduino and Internet of Things. The result of using IoT reduces manpower and continuous monitoring is possible.

Keywords: Internet of Things (IoT), water pollution, water contamination

3.Smart Real Time Man-Hole Monitoring System

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Abstract: Water is most vital role within the regular life. For making a smart city one needs to consider many parameters such as smart water, smart electricity, smart transportation etc. As most of the cities in India have adopted underground drainage system, it is very important that this system should work in a proper manner to keep the city clean, safe and healthy. If they fail to maintain the drainage system the pure water may get contaminated with drainage water and can spread infectious diseases. This paper represents the implementation and design function of a smart real time for IOT applications. The proposed model provides a system of monitoring the water level and atmospheric temperature and detects the blockages in manhole and to check whether a manhole lid is open, it also determines the level of harmful gases. If there is any abrupt increasing change in any of the parameters, the sensors sense the information and that is send to ESP32 module and then the information sends to cloud, the authorities get messages and notifications using blynk app.

Keywords: Underground drainage system, Manhole monitoring system, Sensors, ESP32, Blynk app

4.An Implementation of Different High Speed Data Converters

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Abstract- Arduinos, Raspberry Pi, such as Microchip-controlled circuits and other Digital Logic Circuits need Analog to Digital Converters (ADCs) to interface with the outside world. Analog signals, on the other hand, have constantly changing variables that originate from many sources and sensors that may quantify sound, light, temperature, or any other physical characteristic, and numerous advanced frameworks interface with their current circumstance by estimating the analog signals from such transducers. The signal handling methodologies are propelling step by step as its requirements and in wired and wireless communication revolutions such as 2G/3G/4G/5G cellular communication innovation. In this environment, elite ADCs, or analogue to digital converters, have occupied a central place in the world of computational signal processing. The focus is mostly on low-force methods of dealing with circuits, computations, and designs that apply to distant frameworks. Various methods are utilized for lessening power utilization by utilizing reduced power, diminished limit voltage, scaling of semiconductors, and so on In this paper, we have consider about the various sorts and various methods utilized for analogue to digital transformation of signals on the whole about a few parameters.

Keywords: Signal Conversion, High Performance Analog to Digital Conversion, System View, CMOS Technology, Threshold Voltage & etc.

5. Improvement of TS-LEACH Protocol for Wireless Sensor Networks

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Vignans Deemed to be University

Abstract:

This Article Presents a new version of the LEACH protocol called TS-LEACH which aims to reduce energy consumption and improve the network lifetime in wireless sensor networks. We evaluate both LEACH and TS-LEACH protocol through extensive simulations using MATLAB tool which shows that TS-LEACH performs better than LEACH and LEACH-C Protocol.

6. A HIGH RESOLUTION BASED ULTRA HIGH DEFINITION IMAGES WITH THE UTILIZATION OF HYBRID CONVOLUTIONAL NEURAL NETWORK AND CUCKOO SEARCH

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Abstract - The primary systems for transmitting, processing and tracking data are wireless sensor networks. The WSNs have an essential routing protocol. Routing protocol is the method of selecting the best route for data transportation from source to destination. There are different issues with selecting the direction based on the network, channel parameters. Routing issues include data flow, high energy consumption, storage space, latency, classic IP protocols that do not support certain sensor modes, deployment of nodes etc. We are proposing a trustworthy cluster-based, lifetime conscious routing (TCELR) protocol for WSN using a hybrid bird swarm differential search algorithm to solve these problems during the routing protocol process. First, a chaotic optimization bird swarm algorithm (CBSO) for cluster training is implemented in the TCELR protocol. Second, to quantify each client's belief level in the cluster, we demonstrate the enhanced differential search (IDS) algorithm. The higher confidence node in the cluster is known as the cluster head (CH) and is the sink node for intra-cluster routing of cluster members. Third, a Scatter-Based Decision making Algorithm (SSDM) is used for the inter-cluster routing for transmitting sensed data between clusters. The performance of the proposed TCELR protocol is measured in terms of throughput, packet loss, end to end time, network life, packet distribution ratios and jitter, relative to the current modern routing protocols.

Keywords: TCELR, Chaotic Bird Swarm Optimization, Improved Differential Search, SSDM, Routing protocols.

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7. Implementation of LoRa based Autonomous Agriculture Robot

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Abstract: Agriculture is the primary occupation in most of the developing country like India. In order to decrease the efforts of farmers, agricultural system should be facilitated with advanced techniques. Agriculture has obtained more awareness from researcher. Now a days, robotics in agriculture field with its performance is newly appearing technology. In this work, agriculture robot is specifically designed for seed sowing, grass cutting and pesticide spraying. There is necessary to upgrade the efficiency and agriculture products by put back laborers with intelligent machine-like robots. In recent years, due to the capability to execute agricultural tasks in systematic manner without human intervention, the use of robots in agriculture field has been increased rapidly. Here, it is presented about the design and development of agriculture robot which is simple in design and also a new technology called LORA is used for long distance communication in agriculture farming. So, that robot can operate using Lora which sends signal to robot for required mechanisms. Then efficiency of the operations like seed sowing, grass cutting and pesticide spraying will increase. It also decreases the problem occurred in manual planting. The main aim is to design a multipurpose agriculture robot that can run automatically and to increase the speed and accuracy of the work which also reduces manual work by mankind.

Index Terms: Agriculture, Autonomous, Robot, Lora, solar panel.

8.REINFORCEMENT LEARNING BASED ENERGY CONSOLIDATION MODEL FOR EFFICIENT CLOUD COMPUTING SYSTEM

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ABSTRACT

Cloud Computing offers significant deployment services to the end-users by using various network & software resources which consumes enormous energy. Energy plays a key factor in the ubiquitous cloud system because it involves financial investment for the hardware infrastructure and also contributes for service quality. There are numerous models available the consumption of cloud data center energy. In the prevailing cloud models certain count of resources were experimented which are not providing significant energy consumption due to wide set of applications actively running in the data center. One of the classifications of Machine Learning model is Reinforcement Learning (RL) model which gives maximum support to minimizing the application energy through learning model and reward points. The Data Center (DC) in the cloud consists of a host with multiple Virtual Machines (VMs), so the energy consolidation technique is needed for minimizing energy. RL based Multi agent model is proposed for minimizing the energy in VM level to DC level by implementing three agent's levels namely VM agent, Host Agent and DC agent. The reward points are analyzed based on these agent's responses with corresponding resource level parameters. Based on the resource action, the policy determines in finding energy efficient resources and terminate the idle VM on the host which is also contributing to the considerable amount of energy. The consolidation of energy efficient virtual machine which provides a salient model for cloud data center and dynamically prevents host shutdowns have been proposed in the RL model.

KEYWORDS: Cloud Computing, Data Center, Energy Consumption, Virtualization, Machine Learning, Reinforcement Learning.

9. IoT Multihopping Mechanism for Smart Agriculture Applications

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Abstract

The Internet provides the communication infrastructure for interfacing PCs, processing gadgets, and individuals. The Internet is itself an interconnection of an exceptionally enormous number of networks are interconnected, all utilizing a similar bundle of networking protocols.

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The enormous number of sensor nodes are connected to the sink, if the distance is more, at that point there will lead to collisions and interference. In this article, the authors decrease collisions and interference by placing multiple routers in transit from the sensor to the sink.

Keywords:

WSNs, IoT Multihopping, Routing Protocols, Sink

10. Design and Implementation of Voice Automated Android based M-App for Women Rescue

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Abstract: Internet of things is playing a prominent role in the development of areas like smart home, healthcare, smart building and industrial related applications. Transmission of data in IoT applications requires light weight protocol as Normal TCP protocol will consume more transaction charges. Here, MQTT is the best protocol for these purpose but still it will not be the best security protocol. MQTT mainly presents the Transport layer security on behalf of Transmission control protocol. As TCP/IP protocol is suitable for IoT applications with light weight requirement. This paper mainly presents the Secure data acquisition using ESP 8266 processor, Raspberry pi and Node Red. The secure identification of devices is mainly done based on the unique Id assigned for each Node MCU device sensors and mobile node.

11. IoT Based Light Weight Secure Data Acquisition Protocol using MQTT

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ABSTRACT: Internet of things is playing a prominent role in the development of areas like smart home, healthcare, smart building and industrial related applications. Transmission of data in IoT applications requires light weight protocol as Normal TCP protocol will consume more transaction charges. Here, MQTT is the best protocol for these purpose

but still it will not best security protocol. MQTT mainly presents the Transport layer security on behalf of Transmission control protocol. As TCP/IP protocol is suitable for IoT applications with light weight requirement. This paper mainly presents the Secure data acquisition using ESP 8266 processor, Raspberry pi and Node Red. The secure identification of devices on mainly done based on the unique Id assigned for the each Node MCU device sensors and mobile node. This will provide high latency and low bandwidth for light weight devices.

KEYWORDS: Internet of things, lightweight, MQTT, Data acquisition, Security.

ABSTRACTS

AI & ML

1. Deep Learning Technique In Steganography With Multimedia Network Security For Health Care

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Abstract: Information breach in today's world has become major setback in technological advancements. To secure such confidential information steganography is used. In this experiment, the secret image is covered by cover image which involves hiding process of the information and in the later stage the secret image is separated from the cover image which involves the recovery process of the information. Three deep learning models namely Preparation Network, Hiding Network and Reveal Network were designed to perform as a pair and are simultaneously trained on images randomly selected from Tiny Image Net Database and it performs well on natural images from a variety of sources. This paper blends image-into-image steganography with recent deep convolutional neural network methods

Keywords: Steganography, Deep Convolution Neural Network, Image based Analysis, Audio based Analysis, Video based Analysis, Network Security.

2. Automated Defect Detection in Consumer Grade Knives using Active Planning

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Abstract: The fourth industrial revolution has changed the world like never before with the advancement in automation, machine learning, and artificial intelligence. The increased level of automation across a broad spectrum of procedures have begged the need to detect the defects in automated processes. Our research spotlights automated defect detection in manufacturing and offering optimal replacements for manual inspection. We attempt to minimize the errors associated with manual inspection while maximizing quality control. This research sheds light on the supremacy of computer vision in conjunction with relevant adaptive view planning methods to identify defects in consumer grade knives to support decision making and making the process both cost-effective and time-efficient.

Keywords: Quality control, defect detection, consumer-grade knives, automated defect detection.

3. Retinal Prostheses for Retinitis Pigmentosa Patient.

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Abstract. Many implantable devices are developed and are available for particular replacement of impaired body parts furthermore these devices' functionality mimics regular body part physiological activity and are intended for biomedical device developments. Retinitis pigmentosa causes the loss of photoreceptors degeneration leads to rod-cone dystrophy ultimately affect the person vision with early symptom as night blindness, partial vision loss in day-light, progressively make the person as a blind patient. In this research paper, the different retina prostheses with their functions are discussed to stimulate vision sensation in retinitis pigmentosa patients by placing them inside the retina membranes like epiretinal, subretinal, choroidal vasculature regions including electrode arrays. Henceforth these retina prostheses are configured only for a patient with photoreceptors loss having active optic nerve and ganglion nerve cells.

Keywords: Retina Prostheses, Epiretinal, Subretinal, Choroidal Vasculature region

4.Dental image Segmentation Using Fuzzy C-Means Clustering

Algorithm

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Abstract: Dental image segmentation is used to detect periodontitis, chronic periapical periodontitis and bone loss that typically cannot be seen during a visual dental examination. Periodontitis is a dental disorder that results from the progression of gingivitis, which involves the inflammation and infection of the ligaments and bones that support the teeth. Dental image segmentation is classified in to three categories: pixel based, boundary based and region based. In pixel based there are thresholds and clusters for dental image segmentation. In our project we proposed a dental image segmentation using different variants of fuzzy clustering. The fuzzy clustering variants are fuzzy-c-means (FCM), Semi-Supervised Standard Fuzzy Clustering algorithm (SSFC), Semi-Supervised Fuzzy C-Mean algorithm of Bouchachia and Pedrycz (SSFCMBP), Enhanced Spatial Fuzzy C-Means Algorithm (eSFCM) and for all these methods objective function is otsu entropy. The performance of the algorithms measured with the measuring parameters such as Davies–Bouldin(DB) and Simplified Silhouette Width Criterion(SSWC).

Keywords: Fuzzy C-Means Algorithm; Enhanced Spatial Fuzzy C-Means Algorithm;

ABSTRACTS

5.Fault diagnosis of bearings using discrete wavelettransform integrated with multi-scale dispersion entropy approach

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Abstract—The vibration signal analysis of bearings is an excellent tool for the condition monitoring of rolling element bearings. The analysis through joint time-frequency domain techniques of signal processing is a broad area of research interest. Besides, the feature extraction of the processed signals is also a major concern during diagnosis. Various entropy-based approaches are being used for feature extraction from denoised signals. A proper combination of signal processing techniques with a feature extraction method is not yet recognized for fault diagnosis of the bearings. Aiming at this, the present study proposes a methodology that combines prominent signal denoising technique, discrete wavelet transform (DWT) with multi-scale dispersion entropy (MDE) as a feature extraction measure for fault diagnosis of rolling element bearings. Faults are induced on different elements of rolling element bearings with three severity levels. The data is obtained for all faulty and healthy conditions at four different speeds of the shaft through varying the load applied. Two stateof-

art classifiers multilayer perceptron (MLP) and random forest (RF) is used for fault classification for validating the effectiveness of the present study. The multi-scale entropy values are used as the feature vectors for classification. The efficacy of the proposed methodology is validated by comparing it with the multi-scale permutation entropy (MPE) based feature extraction approach. Finally, promising results are obtained that assure the effectiveness of the proposed methodology for diagnosing rolling bearing faults. Multi-scale values of dispersion entropy have shown more capability over permutation entropy to distinguish different types of fault. The classification accuracy results validate the potential of multi-scale dispersion entropy as a feature vector for vibrational analysis of bearings.

Index Terms—Rolling bearings, condition monitoring, discrete wavelet transform, dispersion entropy, multilayer perceptron, random forest

6.DEVELOPMENT OF WATERMARKING BY USING DISCRETE TCHEBICHEF TRANSFORM

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ABSTRACT - Watermarking technique is a method for protection of copyrights of digital multimedia like photos, videos etc., Most of the Watermarking techniques improves the factors like robustness, security, imperceptibility. The challenges like quality of an image, resistance with less computation time motivates us to work on new watermarking schemes. Robustness against noise attacks and JPEG2000 compression needs to be improved with mid frequency level. In this project, we present a block-based Tchebichef watermarking technique for protection of ownership. In this process, the input image is divided into non-overlapping blocks and we calculate the entropy at each block. We consider the lower visual entropies of the image and calculate Discrete Tchebichef Transform for each block. The watermark image is scrambled by Arnold transform before embedding into the Tchebichef moments of the selected image blocks. The proposed watermarking scheme has been evaluated with various measures like peak signal to noise ratio, structural similarity and normalized coefficient. The obtained these results are encouraging even with some noise attacks.

Keywords: Watermarking, DCT, Robustness, Imperceptibility, Arnold Transform, JPEG 2000 Compression, DTT.

7.A Review on Various Artificial Intelligence Based Techniques for Geometric and Semantic Task in Photogrammetry

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Abstract

Photogrammetry is the technology of extracting relevant information about an object using the

photograph to determine the measurable characteristics of that object. The goal of photogrammetry is to extract geometric and semantic information from imagery. In the last few years, photogrammetry has been widely supported by artificial intelligence techniques to perform semantic and geometric tasks. Semantic tasks involve extracting the meaning of a geographic entity while geometric tasks in photogrammetry include 3D reconstruction, 3D geometric modelling of the environment, urban development planning or 3D city planning, road extraction, 3D scanning of physical objects etc. Our objective is to present all the artificial intelligence based techniques which were used previously by various researchers to automate the process of semantic and geometric tasks in photogrammetry and remote sensing. We intend to use this effort to advocate for impending and necessary paradigm shifts in photogrammetry research and earning.

Keywords: Photogrammetry; Artificial Intelligence, Geometric Tasks, Semantic Photogrammetry.

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8.RELIABLE MULTIPLE OBJECT DETECTION ON NOISY IMAGES BY USING YOLOV

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ABSTRACT

Object detection achieved very good performance by using deep learning models but there is a problem with noisy images. Due to the presence of noise in images, it is difficult to detect the object accurately. The main objective is to detect multiple objects in noisy images by using YOLOV3 approach. Generally, the CNN and R-CNN family algorithms extract the feature maps by using convolution operation with the striding method and objects detected by using neural network. But YOLOV3 algorithm directly applied on entire image and predict the bounding boxes along with labels and scores. In this article, the input noisy images smoothed by using median filter then YOLOV3 performs detection operation on entire image. Hence, YOLOV3 detects the object faster as compared with the other deep learning algorithms.

KEYWORDS

CNN, object detection, deep learning, YOLOV3, bounding box

9. CURVE-LET TRANSFORM BASED ‘TEXT-IN-IMAGE STEGANOGRAPHY’ BY USING HUFFMAN CODING

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ABSTRACT

The idea of text-in-image steganography is to embed the confidential text data into an image and to produce a high quality of stego image. Nowadays the stego image generated from text-in-image steganography process has been used majorly in surveillance and remote sensing applications. It plays a crucial role in improving security and remote sensing applications. This paper is introducing a text-in-image steganography framework. In this algorithm, a unique hiding rule is constructed by using huffman coding, curve-let transform and RPE techniques. The huffman coding technique helps to generate the “ciphertext” from the confidential data. The curve-let transform is used to generate the “detailed” and “approximation” coefficients. The hiding of confidential data in “detail” coefficient is done with using RPE technique. Stego image reconstruction is done with using inverse curve-let transform. The proposed framework has produced superior results in terms of metric values, visual quality and payload capacity.

Keywords: Huffman coding, Steganography, Curve-let coefficients, cryptography, Stego image.

10. Estimation of Adverse Drug Effect in Autism Children through Repetitive behavior Analysis from Thermal Video Process and Machine Learning Algorithms

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Abstract

In this review paper, the adverse drug effect in autism children is studied after consuming the prescribed drug dosage level suggested by Physicians through computer vision-based physiological monitoring. The prescription of drug and dosage level for the autism children is done after clinical signs such as repetitive behaviour analysis. The continuous and effective monitoring of autism children for the clinical sign is a challenging task for any physician. In this review paper, the above problem-solve through the Drug Based Autism Child Repetitive Behaviour Estimation (DARBE) method, which is continuous monitoring of the autistic child by a thermal imaging system. Thermal imaging captures the autistic child repetitive behaviour analysis, spatial temperature levels are recorded for measurements such as Mood assessment, heart rate, and variability, finger temperature, and the temperature of the skin. The thermal imaging and logistic regression predicts the clinical signs of autistic children through thermal video processing for accurate dosage level perception and avoids adverse drug effects because of over/under dosage level of drugs.

Keywords: Autism Disorder, Machine-Learning, Thermal Image Camera, Adverse Drug Effect.

11. Secure Home entry with Face Recognition and Notification via Telegram

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ABSTRACT – Secure home entry using Internet of things is an attempt to construct a smart innovative and secure entry by using raspberry Pi controller and camera and various types of sensors associated with that like IR sensor Notification via telegram is used due to flexibility of using current social network for all types of generations. Face-recognition is a computer technology which can make use of visual characteristic information of human for identification. Since it has many characteristics, such as direct, friendly and convenient, face recognition technology has become a hot research topic in

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the field of pattern recognition and artificial intelligence currently. The advantage of using telegram app for this user as it to send notification to the user as it provides an instance secure communication between the user and home automation system. Nowadays, there is a growing interest in the smart home system using Internet of Things. In this project, we proposed a face recognition security system using Raspberry Pi and notification via telegram which can be connected to the smart home system. Face is captured and compares with the images present in the data base. The output of face recognition algorithm is then connected to the relay circuit, in which it will compare the images of the person with the database images and if there is a match with the database image and the person image captured by the camera. The door opens and if not, it will send a notification to the owner that some unknown person is entering into the home through the telegram app. Notifications are sent to the person who has the access to the telegram account. Moreover, we can create various expressions of the person and store them in separate data base and likewise we can create any number of databases in our app we are using particularly face terminals app for face recognition.

12. Deep Learning- Cross Domain Engineering Applications

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Abstract- Deep learning (DL) is one of the main center on data analysis. DL contributes much to indulge the solution for problems such as image classification, feature extraction, feature recognition, feature classification and feature learning. It is best suitable for unfeasible processes that require a progressive learning in different layers of neural network. With DL algorithms hundreds of features can be extracted, and it is recommended for unstructured data sets. In this study we have mainly focused on transfer learning method that can be applied in various fields, where a solution to a specific problem can be incorporated for similar tasks. DL is utilized in Deep Neural Network (DNN) where incomplete or missing data can also be reframed and optimized. Analysis and Study about DL algorithms contribute wider information regarding health care systems, Agriculture, addressing regressing problems and other pre-processing techniques.

Keywords- DL, DTW, transfer learning, DNN, ECLAD-Net.

13. AN EFFECTIVE MRI IMAGE SEGMENTATION BY AN IMPROVED GABOR WAVELET TRANSFORM AND ROUGH K-MEANS CLUSTERING ALGORITHM

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Abstract: In the medical industry, image processing is critical and offers accurate information on medical photographs, image segmentation an integral component of medical image

processing. Different techniques have been used in the medical industry as X-ray, CT and MRI scans. As for other methods, MRI produces correct outcomes. Using MRI image segmentation, our suggested strategy is strongly focused on tumour detection. The technique suggested consists five phases: pre-processing, extraction of features, collection of features, grouping, and segmentation. Initially, to match the images for further processing, input MRI images given to preprocessing point. With aid of the Enhanced Gabor Wavelet Transform (IGWT), the input images transformed to transform domain in this preprocessing step. Then the aid of Oppositional fruitfly algorithm (OFFA), GLCM characteristics extracted and essential characteristics chosen. The chosen features are then given to help the classification of the vector machine (SVM) classify image as normal/abnormal. After classification, abnormal images picked and given to segmentation process. For segmentation, we used efficient rough k-means algorithm. In terms sensitivity, accuracy, precision, efficiency of proposed technique measured. The experimental findings indicate that, relative to current work, our proposed approach obtained better results.

Index: Segmentation of images, Preprocessing, Extraction of characteristics, Wavelet Gabor Transform, Oppositional Algorithm of Fruit Fly, RoughK-means means.

14.Image Denoising Using Autoencoders

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Abstract— Denoising of image is an applicable and a primary step in analysis of image. In present scenario, deep learning models have been showing great results in denoising images. In this paper, we constructed a Autoencoder architecture to remove noise from images which are taken from different datasets like MNIST, FMNIST, KMNIST and CIFAR 10. This architecture is designed to remove salt & pepper, gaussian and poisson noises. Also we calculate image quality parameters like MSE, PSNR and SSIM to measure the performance of denoised image using different activation functions of autoencoder. We also compare the performance by using the low pass filters such as median and gaussian filters which are used to remove salt & pepper, poisson and Gaussian noises.

15. Digitization, Preservation and Character Recognition in Ancient Documents Using Image Processing Techniques – A Review

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ABSTRACTS

Abstract

Historical documents are considered a significant source of national heritage and societal development. It is an essential feature of society and a reference to their culture, tradition, and civilization. An imagebased information management system for the restoration of cultural heritages has been developed. Precise records of the status of a cultural heritage are necessary to preserve or restore it. The precise records of the object have been available by photogrammetric technique, but there are too few expensive photogrammetric instruments and experienced photogrammetrists at a heritage site.

Keywords: Historical Documents, restoration, cultural heritage, photogrammetric instruments, photogrammetrists, OCR.

16.Multi Stage MR-SPECT Brain Image Fusion

Shehanaz, ECE, VFSTR

Abstract

Medical image fusion is a technique that merges anatomical and functional information from multiple imaging modalities into a single image. Several image fusion frameworks are being developed by various researchers, despite the fact that the lack of robustness to data is a challenging task. In this study, we developed an efficient fusion framework that is robust even for the source images. Wavelet thresholding is the first step in detecting wavelet coefficients of MRI and SPECT images, which are generated by discrete wavelet transform (DWT). A logarithmic and Fourier transform-based internal fusion strategy is developed to enhance MR image quality. Finally, DWT-based fusion is used to combine the intermediate MRI and SPECT images. The proposed models performance is evaluated using qualitative evaluation metrics such as structural similarity index measure (SSIM), peak signal to noise ratio (PSNR), and Edge-based similarity metric (QAB/F) are used to evaluate the performance of the proposed model. The proposed method showed better performance than existing conventional fusion approaches in terms of structural information mapping, edge quality, and structural similarity in MR/SPECT images.

Keywords: Discrete wavelet transform, Edge-based similarity metric, Image fusion MR-SPECT, Logarithmic transform, Structural Similarity Index.