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Track III

Nanopores based Selective Single-Molecule Sensing

Naren Das
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: narentitun@gmail.com

Abstract:
Nanopore sensors provide an innovative platform for rapid and label-free biomolecule detection. Improvements in fabrication, functionalization, and characterization of solid-state nanopores keep evolving. Various analytical methods targeted towards diagnostic applications using nanopore-based devices are emerging. This review article provides an overview of recent developments in the field of solid-state and biological nanopores for protein sensing in a complex analyte. The advantages and challenges involved in nanopore sensing has been discussed. Further, the review extends beyond the steady-state resistive pulse method of sensing and includes transient fluctuations in the nanopore conductance. Application of the power spectral density of these fluctuations toward sensing has been highlighted with emphasis on reducing the detection limit in a complex environment. For extraction of data corresponding to the specific molecule in complex analyte, description of recent progress in the computational algorithms has been provided. Finally, the existing challenges and future scope have been addressed with a view to enhance the performance of the nanopores towards diagnostic applications in complex medium.

Keywords: Nanopores; fabrication; single molecule; sensing.

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Track III

Seasonal and Temporal variations in the Atmospheric Boundary Layer over Delhi and Mumbai

Nishant Kumar
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: nishantkumar@kluniversity.in

Abstract:
The exchange of moisture, heat, and momentum between the surface of the earth and the free atmosphere is carried out by the Atmospheric Boundary Layer (ABL), a component of the lower troposphere. Numerous variables, such as solar radiation, relative humidity, zonal wind, surface temperature, etc., have an impact on ABL. Temperature profile is one of these variables that is essential to understanding the characteristics of the ABL structure. ABL height changes through time and space and exhibits spatial fluctuation as a result of variations in several land surface factors, including topography, the thermal characteristics of the underlying surface, surface roughness, surface evaporation, land use, and land cover, among others. The ABL height is negatively impacted by the consequent change in land surface fluxes, which in turn impacts atmospheric circulation. One of the important properties of ABL is its diurnal fluctuation, in which the height of ABL varies during the day and night. The current study focuses on the comparison of ABL height over the Delhi (Indo-Gangetic Plain) and Mumbai (coastal region) using SOnic Detection and Ranging (SODAR), as well as its association with factors like solar radiation, surface temperature, wind speed, and relative humidity using meteorological tower data for the months of December 2020 to November 2021. According to the analysis of variations in ABL height, ABL height is lower during the Post-monsoon over Mumbai (500-700 m) than over Delhi (1000-1400m) and deeper during the Pre-monsoon over Delhi (1500-2000m) than Mumbai (900-1300m). Additionally, greater ABL height during Pre-monsoon over Delhi is observed due to increased solar radiation. Over the same area, a similar pattern in temperature and wind speed is shown during the Pre-monsoon, however a different (opposite) trend in relative humidity is found. Increased solar radiation and wind speed in the coastal area (Mumbai) led to greater ABL height during the Pre-monsoon and higher temperatures and relative humidity during the monsoon.

Keywords: Atmospheric Boundary Layer (ABL), SODAR, Temperature profile, Seasonal Variation

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Track III

IoT enabled uniforms for army personnel

Abhishek Pahuja
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: pahuja.abhishek@kluniversity.in

Abstract:
An advanced tracking system of the particular army man with the GPS and we also be able to look after the health conditions such as pulse rate, heart beat and the temperature of the body. The calculated values will be transferred to the base station with the help of WiFi module or GSM module to consider the conditions of the army personnel. If the soldiers were injured in the war or in any other kind of counter strike the fluctuations with the pulse and the heartbeat rate will be calculated and will inform the base station of the military via WiFi module and from the GPS we can locate the injured soldiers. From the data we can strategize the future plan regarding war with the very actual number of the not really injured soldiers and also we can acquire the much needed medication for the injured one with the location acquired by the GPS. The system that we have proposed will be containing of jackets, sensors and transmission module which are fixed inside the jacket for the communication between the soldier and the control board or between one soldier to another soldier. We can observe the massive technological growth in the field of internet of things provides a noticeably high flexibility and heterogeneity of the resource pool over the clients and over the network could easily ruined the several resources that are highly on demand.

Keywords: GPS tracking, transmitters, WiFi track.

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Track III

Slot loaded Polarization Reconfigurable Disk-Shaped Patch Antenna

D. Sreenivasa Rao
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: sreenuece@kluniversity.in

Abstract:
Antennas are necessary and vital components of communication and radar systems, but sometimes their inability to adjust to new operating scenarios can limit system performance. Reconfigurable antennas can adjust with changing requirements or environmental conditions and provide additional levels of functionality. Polarization reconfigurable antennas are capable of switching between different polarization modes. Antennas with polarization selective functions can mitigate the fading losses due to multipath effects which improves the quality of signal transmission as well as saving energy.

In this paper we are going to design circular patch antenna with a C-Shaped slot In order to achieve the polarization reconfiguration by this we can able to switch between the Linear polarization (LP) or Left Hand Circular Polarization (LHCP) and Right Hand Circular Polarization (RHCP) at a frequency band. This switching of polarization can be done by using two diodes as switches. The design of the antenna will be made by using the HFSS.
Keywords: Reconfigurable, Circular polarization, Slots.

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Track III

Antenna array optimization using beetle bat algorithm

Sahiti VAnkayalapati
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: sahithi.vankayalapati@gmail.com

Abstract:
Another calculation for the amalgamation of diminished radio wire clusters is proposed in this paper. The union of a recieving wire exhibit is a bulky interaction including the streamlining of different going against boundaries. These boundaries remember number of components for activity, first invalid pillar width (FNBW) and top side curve level (PSLL). In this exploration another calculation called multiobjective altered paired feline multitude advancement is presented. The result of this interaction gives a pareto ideal front with every one of the potential plans. A planar radio wire exhibit with 10 × 20 cluster components was incorporated. The PSLL was diminished to a striking degree when contrasted with different calculations with least number of dynamic components.

Keywords: betle bat, antenna, array, planar.

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Track III

Constrained Stability Adaptive Learning Algorithm for Artefact Removal in ECG Signals

Md Zia Ur Rahman
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: mdzr55@gmail.com

Abstract:
Telecardiology has become a significant technology in remote cardiac diagnosis, allowing the electrocardiogram (ECG) signals transmission between widely separated areas. Received signals will be collected and analyzed to offer diagnosis and advice from a specialist. However, different artefacts contaminate the signal during acquisition, resulting in degradation of the cardiac characteristics. As a result, facilitating clear cardiac components free of artefact contamination is a major challenge in health care monitoring systems. In practice, contaminated cardiac components are random, therefore fixed weight enhancement approaches are insufficient for noise cancelling applications. To accomplish this, we present a new limited stability adaptive learning algorithm (CSALA) in this study to remove diverse artefact components from the original ECG signals. The proposed adaptive learning approach trains the filter's weight update coefficient while minimizing the artefact component. In our experiments, we consider two well-known artefacts, powerline interference (PLI) and baseline wander (BW), to test the performance of the proposed method. Experimental results confirmed that the CSALA outperforms traditional approaches.

Keywords: Adaptive learning, Artifact cancellation, Baseline wander, Constrained stability, Powerline interference.

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Track III

Lattice Polyphase FIR Sample Rate Converter

Abhishek Kumar
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: dra@kluniversity

Abstract:
For the efficient implementation of polyphase sample rate converters, it is required to design polyphase and its transposed form in such a way that the noble identities can also be applied. It can be observed that the lattice structure of a single transfer function can be used to design the efficient polyphase interpolator converter. However, it cannot be converted to the efficient polyphase decimator structure because of lacking of its transposed structure. Accordingly, this correspondent proposes an efficient polyphase lattice decimator structure. Furthermore, performance analysis is performed and compared with existing literature in this correspondent.

Keywords: Sample rate converter, multirate systems, lattice structure.

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Track III

Design of Microcontroller Based S-Curve Landing Position System for Elevator

Abhishek Kumar
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: dra@kluniversity

Abstract:
This work proposes the design of the motion pattern generator used for elevator vertical movements. A typical S-Curve like pattern generator is used on microcontroller-based system. Here, changes in jerk and acceleration setting can easily optimize patterns for various needs. We have also introduced microcontroller-based performance specification, uncertainties in the realistic case and constraints of designing an elevator motion controller. Additionally, proposed design is verified by an elevator motion controller based a mid-end microcontroller using new patterns. Simulation and experimental results have shown that the proposed pattern generator is robust to disturbance and can meet the specification.

Keywords: S-curve, microcontroller, control system.

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Track III

Efficient VLSI Implementation of VGG19 Machine Learning Algorithms for Bird Species Recognition

Sameer Yadav
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: sameeryadav@kluniversity.in

Abstract:
The automatic identification of bird species is the current focus of bioacoustics and machine learning. Sound spectrograms are utilized as a visual representation of sound waveforms for this purpose so that machine learning algorithms can analyze them. An interesting potential for identification purposes is the use of these methods to locate and recognize different bird species over wide geographic areas and for lengthy periods of time. One of the frameworks used for this project is VGG19, a convolution neural network that has been successfully used to a variety of image identification problems. It has been a popular choice for analyzing classification issues based on sound spectrogram data, such as successfully identifying various bird species. In order to use the system, audio data must be acquired, preprocessed, labelled, trained, verified, and then deployed for use in practical applications. This paper discuss the efficient implementation the VGG19 algorithm in hardware language i.e Verilog and optimized it for area, power, and delay in 40nm technology using Cadence environment.

Keywords: Neural Network, Machine learning, Verilog A

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Track III

Impact of Ionospheric Scintillations on the GPS Multi-frequency signals at a Low latitude Indian location

Sampad Kumar Panda
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: sampadpanda@kluniversity.in

Abstract: Trans-ionospheric communication of radio waves from transmitter to user is affected by the ionosphere which is highly variable and dynamic in both time and space. Equatorial plasma bubbles are the ionospheric instabilities ranging from few kilometres to hundreds of kilometres when encounter the radio signals may result in the radio signal disturbance. This results in varying amplitude and phase of the radio signal known as ionospheric scintillation. In this article we probe to analyse the impact of the ionospheric scintillation at a low latitude station KL University, Guntur, India (Latitude 16˚26' N, Longitude 80˚37' E). The impact of the scintillation on the GPS L2C and L5 signals compared to their impact on the GPS L1CA signal for a period of 12 months from January 2022 to December 2022 in the solar cycle 25 is analysed. The results show that the S4 values are high in the September equinox season followed by the march equinox. December solstice and June solstice recorded low S4 values in all the three signals. The S4 values are high for the low frequency L5 signal followed by the L2C and then least for L1CA signal. When single S4 values are considered the frequency of the radio signal is inversely proportional to the scintillation intensity.

Keywords: Radio waves, scintillation, GPS, Equatorial plasma bubbles, solar cycle.

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Track III

3-dimensional angle of arrival detection at the base station, localization of sensor nodes in WSNs

Sunil Kumar
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: drsunilkumar@kluniversity.in

Abstract:
A localization method for sensor nodes in Wireless Sensor Networks (WSNs) is presented. This method uses an array antenna to detect the Angle of Arrival (AOA) at the base station (BS) and locate the transmitter on the XY plane. The BS uses a number of antenna arrays to determine the node's azimuthal angle and direction. Nodes just need to use their omnidirectional antenna to broadcast one beacon. The location of the BS can be discovered if it is within the node's communication range. Based on previously allocated node IDs, the nodes broadcast in order, and each node transmission includes the node ID. With the use of beacons sent out by the nodes, the scheme is able to pinpoint their locations in the area.

Keywords: Wireless Sensor Network (WSN), Beacon, Arrival, Localization and Base Station.

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Track III

Implementation of Deep Learning Algorithm for Detection of Diabetic retinopathy in FPGA

Sameer Yadav
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: sameeryadav@kluniversity.in

Abstract:
Diabetic retinopathy, which usually develops as a result of diabetes mellitus, causes lesions on the retina that impair vision. If it is not detected in time, blindness could follow. Unfortunately, medication just serves to preserve vision; there is no known cure for it. The risk of vision loss can be significantly reduced with early detection and treatment of diabetic retinopathy. In contrary to computer-aided diagnosis techniques, ophthalmologists must manually diagnose diabetic retinopathy from retina fundus images, which takes time, effort, and money and is subject to human mistake. Recently, deep learning has become one of the most well-liked techniques for enhancing performance, notably in the classification and interpretation of medical pictures. In the analysis of medical pictures, convolutional neural networks are a more well-liked and effective deep learning technique. Doctors can spot the earliest indications of diabetic retinopathy using retinal ophthalmoscopy, and deep learning can aid in better diagnostic choices and staff workflow. Using the 80 by 20 rule, most deep learning techniques for diagnosing diabetic retinopathy divide retinal ophthalmoscopy images into training and validation data sets. This paper implement the deep learning method in FPGA and optimized it for Area, Power, and Delay.

Keywords: Deep learning, FPGA, Neural Network, Delay, Power, Medical Devices.

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Track III

State Estimation of Lithium-ion Battery

Vyoma Singh
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: vsingh@kluniversity

Abstract:
Lithium-ion batteries are one of the important aspects when it comes to electric vehicles. There has been research on different variables, both state and parameters of the battery with respect to their modeling, computation, and maintenance. It appears that it is often difficult to tune the observers to obtain good estimation performances both in terms of convergence speed and accuracy, while these are essential in practice. In this work, a new strategy is proposed to find one of the most relevant states of the battery, i.e. state of the charge. The proposed strategy work well under parameter uncertainties as well. Simulation results show the comparative analysis of the proposed strategy with the one given in the literature.

Keywords: Lithium-ion battery, State of the charge, State estimation.

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Track III

A constructive approach for VLSI design assisted with Artificial Intelligence and Machine learning

Somavarapu Vamsee Kr
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302

Abstract:
The field of Very Large-Scale Integration (VLSI) design has witnessed a shift towards the use of Artificial Intelligence (AI) and Machine Learning (ML) techniques to automate the design process. This new approach allows for improved efficiency, faster time-to-market, and reduced design costs. The traditional method of VLSI design involves manual design and optimization of various components, which can be time-consuming and error-prone. AI and ML techniques can be applied at different stages of VLSI design, including design optimization, layout generation, and verification. The design optimization process involves identifying the optimal set of design parameters that meet specific performance criteria. AI and ML algorithms can be used to automate this process by exploring the design space and identifying the best set of design parameters. This can lead to significant improvements in design performance and reduce the design cycle time. Layout generation is the process of converting the logical design of an IC into a physical layout. AI and ML techniques can automate this process by generating optimized layouts that meet specific design constraints. This can lead to improved layout quality and reduced layout area, which can result in cost savings. Verification is the process of ensuring that the final design meets specific functional and performance requirements. AI and ML techniques can be used to automate the verification process by identifying potential design issues and generating test cases to ensure correct functionality. This can lead to improved design quality and reduced verification time. The use of AI and ML techniques in VLSI design has the potential to revolutionize the field by enabling automation of the design process, reducing design costs, and improving design performance. It is expected that AI and ML techniques will continue to play an increasingly important role in VLSI design in the future.

Keywords: Design optimization, Verification, AI, Machine learning

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Track III

A computer vision-based classroom attendance tracking system using speech

D.Bhavana
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302

In seminaries and sodalities, documenting daily attendance is a typical and significant task for evaluating students' performance. Reusing homemade attendance records might be difficult, especially for a sizable student body. Some automated methods that were created to solve these problems include drawbacks including expense, phoney attendance, delicateness, and intrusiveness. There is a need for an intelligent, automated attendance system to address these drawbacks. Traditional face recognition algorithms use styles to distinguish a face from the input, but the outcomes are frequently not as exact as accurate as desired. With the strategy outlined in this article, we want to depart from other, more established methods of identifying students by introducing a novel method of creating a facial model. With the strategy outlined in this article, we want to depart from other, more established methods of identifying students by introducing a novel method of creating a facial model. This explains how the automated attendance system, which will be installed in a classroom, works with facial recognition technology. At K L University Andhra Pradesh in Vijayawada, India, the suggested smart classroom system was tested with 20 students, and we obtained the experimental results to show the train and test delicacy of 97.67 and 96.66 separately. In this research, we choose to use the Python language and the PYCHARM programme for face recognition and finding. To achieve superior outcomes, a system must have high-end specs. Not all systems with low specifications will be able to run it. Therefore, this can only run a tiny database and compare them to the required face.

Keywords: PYCHARM, tiny database, automated attendance system, facial model, phoney attendance.

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Quadratic Frequency Modulated thermal wave imaging technique-based Defect Detection using Fan Chirp Transform

Parvez
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302
parvez@kluniversity.

ABSTRACT
Lifetime of the material is the major important in various fields of applications such as aerospace, mosaics, and metallic objects serving in realistic applications in day today life. To understand the knowledge of material's lifetime subsurface anomalies should be analyzed using a proper method. In this research investigation a non-contact, and Quadratic Frequency Modulated thermal wave imaging technique (QFMTWI) is used to evaluate the whole field of the material with more reliable information's. The recorded thermal response provides the information such as cracks, voids, irregularities of the materials sub-surface. Fan Chirp transform method is adopted to match completely with the chirp rate obtained from the sample to facilitate improved visualization of defects. Fan-Chirp transform method provides a noteworthy defect detection of the sample.

Keywords: Sub Surface Defects detection, non-contact, QFMTWI, Fan Chirp transform.

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Track III

Energy Efficient Routing and RouteMaintenance in WSN

K Sureshkumar
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: m.k.sureshkumar@kluniversity

Abstract:
The primary work while planning a routing model in WSN is Energy efficiency. Many routing techniques using the concept of energy efficiency are introduced to transmit thedata reliably through cluster head (CH). It is a very difficult task to prolong the existence of a network and high scalability in WSN. The process of routing with the help of CH is introduced in this paper. The energy and the delay are the two parameters which are used in the selection process of CH. Basing on the fitness measures, using ALWO data is transmitted through optimized and reliable path. The data is sent via CH to the sink node, and the routing path is determined by a single parameter known as fitness measure. The most dependable route method is assumed to be the one with the maximum fitness increase. The technique, which is provided without any attack scenario and is based on parameters such as residual energy, throughput, latency, and trust, considers the performance measure.

Keywords: Age of information, Ant Lion Whale Optimization, Trust value, Localization,Cluster head.

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Track III

IoT Based ECG monitoring system

Y Usha Devi
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302

In this paper, LabVIEW-based wellbeing observing framework that recognizes human internal heat level and persistent heartbeat checking utilizing ECG cathodes. The LabVIEW assists with developing an easy-to-understand GUI that can outwardly show the ceaseless heartbeat or cardiovascular rate. This framework utilizes an assortment of sensors, including a temperature sensor, a heartbeat rate sensor, and ECG terminals. This approach enables the doctor to identify the patient's condition and provide appropriate therapy. This study describes a complex approach for monitoring human physiological characteristics like temperature, heartbeat rate, and SPO2 using an implanted web server and LabVIEW innovation. The equipment depends on an ESP32 regulator board and incorporates web availability just as different sensors. LabVIEW is utilized in the product side to give a GUI-based climate to the client, making it easier for the user to use than coding, and the internet is utilised to produce an embedded web server.

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Track III

Cantilever based MEMS sensor for agricultural applications.

Dr.N.Siddaiah
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302

ABSTRACT:
Detection of gases using MEMS sensors are discussed in this paper. Metal oxide semiconductor-based gas sensors are designed and modeled using various cantilever structures. Cylindrical and rectangular type cantilevers were used and simulated using modelling tool and different results were compared. The design sensor has wide range of applications and high resolution in gas sensing. Cantilever with 15 µm of width was used as sensing layer on Platinum micro heater without coil and this arrangement provides better heating and takes less time to heat the sensor. The sensor was designed using metal oxide semiconductor technology and for best physical architecture.

Index Terms – Cantilever, CO_2, gas sensor, metal oxide, conductivity, heat capacity, Thermal energy

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An Efficient way of Implementation of wireless sensor network in under water

NAMGIRI SURESH
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302

The domain of underwater wireless sensor networks (UWSNs) had received a lot of attention recently due to its significant advanced capabilities in the ocean surveillance, marine monitoring and application deployment for detecting underwater targets. However, the literature have not compiled the state-of-the-art along its direction to discover the recent advancements which were fuelled by the underwater sensor technologies. Hence, this paper offers the newest analysis on the available evidences by reviewing studies in the past five years on various aspects that support network activities and applications in UWSN virements.

Key words: underwater sensor networks; acoustic communication; ocean environment; wireless sensor networks

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Dark Current Suppression in UV-Photodetector by β-Ga2O3-CuO Based Heterostructure

Ashish Kumar[1], and Ankush Bag[2]
[1]Department of Electronics and Communications, KLEF, Green Field, Vaddeswaram
[2]School of Computing and Electrical Engineering, IIT Mandi

The continuous innovation in semiconductor materials and device fabrication techniques benefitted society in many ways, as the ultraviolet (UV) photodetectors have been successfully tested and implemented in advanced communications, flame detection, air purification, ozone sensing, and leak detection among others. Nowadays, present demands and applications (such as in space technology) need more precise and sensitive photodetector devices.

This article reports a UV photodetector with suppressed dark current using β-Ga2O3-CuO heterostructure (HS). β-Ga2O3 has been successfully deposited on a cleaned sapphire substrate using low-pressure chemical vapor deposition (LPCVD). The CuO oxide has been further deposited on the top of the masked β-Ga2O3 surface using spin-coating. The spin-coated solution of CuO contains 0.1 M of copper acetate monohydrate (CAMH). The spin-coated sample has been annealed in air at 350oC and the electrode has been fabricated using a shadow mask by the thermal evaporator. The elemental and morphological analysis of the sample has been done using XRD and FESEM. The optical analysis has been performed using UV-VIS NMR spectroscopy. All the results of the characterizations have been shown the successful fabrication of β-Ga2O3 and CuO on the sapphire substrate.

The device characteristics have been analyzed using electrical characterization such as current-voltage (I-V) and current- time (I-t). The HS-photodetector shows a very low dark current of ~ 2.717×10-13A along with good responsivity (R) (4.714 AW-1), detectivity (5.98×1012), and electron quantum efficiency (EQE%) (2.09×103) at 254 nm UV illumination. The device also shows a very good rejection ratio between R254nm/R302nm and R254nm/R365nm i.e. 2.18 and 975.98 respectively. The formation of HS exhibits the suppression in the dark current to a great extent compared to existing literature [1].

Keywords: Dark Current, Heterostructure, β-Ga2O3, responsivity, and photodetector.

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DESIGN AND DEVELOPMENT OF INDIGENOUS ROBOTIC DEVICE FOR MONITORING SEA CAGE FISH FARMS

[1]Dr.M.Sujatha
Professor, Department of Electronics and Communication Engineering Department, Koneru Lakshmaiah Education Foundation, Vijayawada, Andhra Pradesh, India, sujakarthik77@kluniversity.in

Abstract
This Paper aims to develop an indigenous biologically inspired robotic device resembling a model of a biomimetic robotic fish with practical environmental adaptability and excellent performance in sea cage inspection applications. The indigenous biomimetic Robot monitors the fishes in sea cage farming in its natural state. An effective algorithm using deep learning, computer vision and positioning technology is designed for the robot to check the water quality to meet the biological requirement of the farmed species. It also checks the excessive suspended solids, waste accumulation, frequent algal blooms, and dead fishes. And provides the fishes in the sea cage with optimal environmental conditions by reducing stress levels, protecting against parasitic outbreaks, and ensuring there is enough food and required medicines when required. The robotic fish monitors &inspects the environment in the water through the sensors. It can gather information about the other fish in its environment by swimming among them and reporting them to offshore station.

Keywords: Indigenous Biomimetic Robot, Internet of things (IoT), CNN, deep learning, LoraWAN

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Track III

Development of Wearable energy harvesting devices for self-powered sensors and systems

Vivekananthan Venkateswaran
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: vivek@kluniversity

Abstract
Wearable devices have the potential to provide enormous benefits to healthcare providers by monitoring the patient data over a long period of time, paving the way for medical professionals getting a better view about the problems of patient. The collected data helps the medical professionals to accurately diagnose the health issues of the patients. Wearables can also be used on patients when they return home after surgery or an operation to monitor their recovery and ensure no complications occur. This helps ease the burden on healthcare systems by letting the patients leave the hospital and return home but keeping an eye on their conditions using wearable devices. Emergencies can also be recognized as soon as they occur. This system can be set up to notify others, such as family members or healthcare professionals. This more proactive approach to healthcare can be very beneficial, as it can catch problems early before they develop into larger issues that could have dangerous health consequences. In addition, the self-powered sensing phenomenon has been introduced to the wearable devices to replace the batteries which cause several drawbacks such as heating, disposal, and frequent charging. Triboelectric effect which is a most trending effect which occurs from everyday static charges plays a role in generating electrical output through bio mechanical motions. By powering the devices with triboelectric energy harvesters, the technology paves way towards self-powered wearable IoT based applications soon.

Keywords: Self-powered, wearable devices, IoT, Triboelectric, Smart health care

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CPW-Fed Multiband CRLH Antenna for GPS, ISM and 5G Applications

Sandeep Kumar
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: drsandeepkumar@kluniversity.in

Abstract:
A coplanar waveguide-fed multiband composite right/left-handed (CRLH) antenna, a class of metamaterials (MTMs) is presented in this paper. It is designed by embedding two unit-cells of CRLH transmission line on the top and bottom surfaces of an FR4 epoxy substrate with the help of metallic vias. The multiband characteristic is obtained by generating four resonances due to CRLH unit-cells, feed-patch and the ground plane. The simulated results show three frequency bands spanning over 1.3 to 1.87 GHz, 2.36 to 2.63 GHz and 3.14 to 4.62 GHz with return loss below – 10 dB. The realized gains have been found as 2.5, 2.56, 4.85 and 4.9 dB at the resonant frequencies of 1.57, 2.4, 3.4 and 4.2 GHz respectively. The radiation efficiency is well above 77% at each resonant frequency with a peak value of 94.76%. The proposed antenna is suitable for Global Positioning System (GPS) (1.57 GHz), Industrial, Scientific and Medical (ISM) (2.4 GHz), and 5G sub-6 GHz infrastructure (3.3–4.2 GHz) applications.

Keywords: composite right/left-handed, coplanar waveguide, GPS, ISM, 5G.

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Track III

Defect Depth in Glass Fibre Reinforced Polymer Using QFMTWI

Badugu Suresh[1]and B.Raja sekhar[1] ,G V Subbarao
[1]Infrared Imaging Center, Department of ECE, KoneruLakshmaiah Educational Foundation, Vaddeswaram, A. P, India-522502.
E-Mail.ID: sureshbadugu@kluniversity

ABSTRACT
Quadratic Frequency modulated thermal wave imaging (QFMTWI) is an efficient and affective thermal nondestructive testing and evaluation (NDT&E) technique for qualitative and quantitative analysis for defects in test materials. QFMTWI utilizes low peak power heat sources modulated within a frequency sweep to excite the material under test. A novel analytical approach for heat diffusion in isotropic material using QFMTWI technique to distinguish defects located at different depths inside the test sample. The frequency modulated thermal excitation has been illuminated over Glass fibre reinforced polymer (GFRP) material to compute thermal response over the object under test. The mapped temperature response is analysed further for defect detectability in terms of correlation coefficient and time delay.

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Track III

Performance Study of TENG for Energy Harvesting Application

Sunithamani. S[1], S. Arunmetha[2]*, Poojitha. B[2], Niveditha. A[2], Ankitha. B[2], Lakshmi. P[3]
[1]Department of Electronics and Communication Engineering,St. Joseph College of Engineering, Near Toll Plaza, Sriperumbudur, Chennai, India
[2]Center for Advanced Energy Studies and Centre for Flexible Electronics, Department of Electronics and CommunicationEngineering, Koneru Lakshmaiah Educational Foundation, Guntur, India
[3]Department of Electrical and Electronics Engineering, Anna University, Chennai, India
E-mail: sarunmetha@kluniversity.in; sarunmetha@gmail.com

Abstract:
Triboelectric nanogenerators (TENG) use the concepts of contacting electrification and electrostatic production from mechanical energy to electrical energy. The premise behind energy harvesting technology is that devices may collect energy from their environment in real-time and utilize it right away, requiring only temporary storage. Compared design strategies for efficient energy harvesting systems in all modes in terms of implementation and experimental results in this work. Air, copper, Nylon, and iron are triboelectric materials used to demonstrate TENG modes' charging behavior. Examines the performance study of TENG for energy harvesting applications. This technology can be used in Internet of Things (IoT) applications, manufacturing, precision agriculture, and human monitoring for healthcare applications on a smaller scale when significant networking of sensors and actuators is required, and tight and essential energy supply needs exist.

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Track III

Analysing the performance ceiling of $CsSnGeI_3$ based Lead free highly stable perovskite based solar cell

M Sujit[1], R Thandaiah Prabu[2], Ramachandran R[3], J Jawahar Babu[4], Atul Kumar[5], Devendra Singh Negi[6], Pranay Ranjan[6]

[1]Department of Electrical Engineering, Sanjivani College of Engineering, Kopargaon, Maharastra, India
[2]Department of ECE, Saveetha School of Engineering SIMATS Chennai-600119, India
[3]Department of Biomedical Engineering, Rajalakshmi Engineering College, Chennai, India
[4]Madanapalle Institute of technology & Science, Andhra Pradesh, India
[5]Department of Electronics and Communications Engineering, Koneru Lakshmaiah Education Foundation, Greenfields, Vaddeswaram, Guntur, Andhra Pradesh, India-522502.
[6]Department of Metallurgical and Materials Engineering, IIT Jodhpur, Rajasthan, India-342037

Abstract:
$CsSn_{0.5}Ge_{0.5}I_3$ perovskite is reportedly highly stable in ambient open air conditions, lead free and has excellent opto-electrical properties. We simulated an inverted *p-i-n* solar cell device based on this mixed SnGe perovskite utilising the reported optical and electrical characteristics of the $CsSn_{0.5}Ge_{0.5}I_3$. We put this theoretical device under various recombination regimes to explore the performance ceiling of the $CsSn_{0.5}Ge_{0.5}I_3$. An optimised configuration of $CsSn_{0.5}Ge_{0.5}I_3$ based perovskite solar cell showed an efficiency of 29% under the impact of only intrinsic recombination losses such as radiative (with radiative recombination coefficient of 10^{-11}) and Auger recombination (recombination coefficient of 10^{-27}). When extrinsic factor are taken in to account such as resistance losses (series resistance as high as $2\Omega cm^2$ and shunt resistance as low as 1000) efficiency decreased to 27%. The efficiency is 20%, when trap assisted Schockey Read Hall SRH recombinations are taken into account with voltage loss (V_{Loss}) of 0.5V. Similarly the condition V_{Loss} = 0.6V in V_{OC} restrict device efficiency to 15%. Finally, an efficiency waterfall chart summarises the $CsSn_{0.5}Ge_{0.5}I_3$, efficiency under different extrinsic losses, the performance loss analysis and provided an optimal design. Results summarized here are expected to be helpful and prompt experimentalists to fabricate this stable lead-free perovskite solar cell.

Keywords: $CsSn_{0.5}Ge_{0.5}I_3$, Lead-free perovskite, Stable perovskite, Performance ceiling

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Track III

Teager based energy estimator implementation on Programmable System on Chip

Dr. T Ramakrishna
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302

The Teager energy operator based instantaneous energy estimation is crucial in event detection in bio-medical signals. The serial execution of the energy computation by a digital signal processor limits the execution speed. This paper discusses the Teager based energy estimator implementation with optimised functionality in parallel processing utilising the most recent Programmable System on Chip (PSoC) hardware. It uses a conflict-free approach, a preset memory size, and a few additional combinational elements. Using the experimental outcomes from simulations directed at the ZTEX field programmable gate array (FPGA), we find that the proposed technique is relatively superior than traditional methods using Xilinx ISE.

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Track III

A Novel Hybrid Automotive Intrusion Detection System based on Transfer and Ensemble Learning

Dr. E. Kiran Kumar
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India – 522302
Corresponding Author: kiraneepuri@kluniversity.in

Abstract
The Internet of vehicles (IoV) refers to the fast expanding network of automobiles that are connected to one another and to the infrastructure around them in order to deliver various services. Concerns concerning security, especially in the face of intrusion attempts, have been prompted by the growing popularity of IoV systems. Several researchers have concentrated on designing intrusion detection systems (IDSs) that take advantage of machine learning and deep learning techniques to identify harmful cyber-attacks against vehicular networks. When it comes to protecting IoV networks, intrusion detection systems (IDS) play a vital role. In our research, we present a unique IDS that combines transfer learning and ensemble learning to identify both typical and rare threats in vehicular networks. The experimental results show that the proposed system is able to identify different types of recognised attacks with an accuracy of 99.99% on the CAN-intrusion-dataset, which represents the data from internal vehicular network, and 99.88% on the CICIDS2019 data set, which represents data from external vehicular network. The proposed approach gets 0.963 and 0.800 of high F1-scores on the aforementioned two data sets, respectively, for the detection of zero-day attacks. Each data packet takes less than 0.6 milliseconds on average to process on a processor at the vehicle level, proving that the proposed architecture can be implemented in real-time automotive systems. This demonstrates how useful and efficient the suggested IDS is.

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Track III

Performance Analysis of Modified Kalman Filter Estimator for Precise Positioning of Global Position System Receivers.

K UDAY KIRAN
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: uk_ece@kluniversity

Abstract:
The accuracy of a positioning system is crucial in many real-time applications, and the Kalman Filter Estimator (KFE) is a widely used algorithm for this purpose. However, the accuracy of the KFE can be further improved by reducing measurement noise and enhancing the algorithm's performance. To address this issue, a new observation matrix has been introduced in this paper, and the Modified Kalman Filter Estimator (MKFE) algorithm has been developed and tested. The performance of the algorithm has been evaluated using real-time data collected from a Global Position System (GPS) receiver located in India, and GPS Statistical Accuracy Measures (SAM) have been used for the evaluation.

The results of the study indicate that the MKFE algorithm has a faster convergence rate with high accuracy, making it suitable for real-time defence applications over the Indian subcontinent. The Circular Error Probability (CEP) and Spherical Error Probability (SEP) measurements also show that the accuracy of the MKFE is significantly better than that of the KFE. The study demonstrates that the proposed modification to the KFE algorithm improves the accuracy of GPS positioning and is particularly useful for real-time applications.

Overall, the study highlights the importance of developing accurate positioning systems, particularly in the field of defence, where reliable and real-time positioning information is crucial. The MKFE algorithm proposed in this paper has shown promising results and can be further refined to enhance its accuracy and applicability in other regions of the world.

Keywords: Global Position System (GPS), Kalman Filter Estimator (KFE), Modified Kalman Filter Estimator (MKFE),

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Track III

Stability Analysis of Uncertain Neutral Delayed Dynamical Systems via Robust H_∞ Control

Karthik Chinnasamy
Department of Mathematics, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: cskmathsgru@gmail.com

Abstract:
This paper deals with the robust H_∞ control for uncertain control systems with time-varying structured uncertainties and time-varying delay. By employing Lyapunov-Krasovskii functional, the stability conditions are derived for the linear system in terms of linear matrix inequalities. Two case are considered; one involves the system under time-varying delay whereas the second one deals with the constant delay. Further, the H_∞ performance measures have been discussed for the considered models.

Keywords: Stability, H_∞ control, time-delay, Neutral delays.

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Track III

An Efficient way of Implementation of wireless sensor network in under water

N. Suresh
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302

The domain of underwater wireless sensor networks (UWSNs) had received a lot of attention recently due to its significant advanced capabilities in the ocean surveillance, marine monitoring and application deployment for detecting underwater targets. However, the literature have not compiled the state-of-the-art along its direction to discover the recent advancements which were fuelled by the underwater sensor technologies. Hence, this paper offers the newest analysis on the available evidences by reviewing studies in the past five years on various aspects that support network activities and applications in UWSN virements.

Key words: underwater sensor networks; acoustic communication; ocean environment; wireless sensor networks

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Track III

Stability Analysis of Uncertain Neutral Delayed Dynamical Systems via Robust H_∞ CONTROL.

Karthik
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302

Abstract
This paper deals with the robust H_∞ control for uncertain control systems with time-varying structured uncertainties and time-varying delay. By employing Lyapunov-Krasovskii functional, the stability conditions are derived for the linear system in terms of linear matrix inequalities. Two cases are considered; one involves the system under time-varying delay whereas the second one deals with the constant delay. Further, the H_∞ performance measures have been discussed for the considered models.

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Track III

Toward Precision in Crop Yield Estimation Using Remote Sensing

NVK Ramesh
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302

Abstract:
Many crop yield estimation techniques are being used, however the most effective one is based on using geospatial data and technologies such as remote sensing. However, the remote sensing data which are needed to estimate crop yield are insufficient most of the time due to many problems such as climate conditions (% of clouds), and low temporal resolution. There have been many attempts to solve the lack of data problem using very high temporal and very low spatial resolution images such as Modis. Although this type of image can compensate for the lack of data due to climate problems, they are only suitable for very large homogeneous crop fields. To compensate for the lack of high spatial resolution remote sensing images due to climate conditions, a new optimization model was created.

Key words: sensors, Modis

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Track III

Analysis of FSO Links in weather conditions haze and rain

K.Sony
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: sonykarra@kluniversity.in

Abstract:
This paper explores Free Space Optics (FSO) as a cost-effective means of communication utilizing free space as a transmission medium. FSO requires direct line of sight between the transmitter and receiver for successful signal transmission, and can operate in air, outer space, or vacuum. FSO systems offer several benefits, including high bandwidth and rapid deployment. However, factors such as atmospheric turbulence, physical obstructions, and environmental elements like rain, fog, and haze can affect signal transmission. This paper presents a comparison of two FSO links designed using Wavelength Division Multiplexing (WDM) under clear and haze weather conditions. The results show that the FSO system can support transmission up to 350 km and 47 km under clear and haze conditions, respectively. Evaluates the impact of different atmospheric conditions on Free Space Optics (FSO) links with a range of 500 meters and attenuation of 70 dB/km. FSO links offer high-speed data transmission with low system complexity, but weather-dependent signal attenuation reduces their efficiency. The paper analyzes the suitability of three optical transmission windows (850 nm, 1310 nm, and 1550 nm) for FSO links under adverse weather conditions.

Keywords: BER, Q FACTOR

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All Optical 4 bit Digital to Analog converter based on Carrier Reservoir SOA-Mach Zehnder Interferometer (MZI) Configuration

Vipul Agarwal
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302

Abstract-
A digital to analog converter (D/A) is proposed and analyzed, based on carrier reservoir SOA-MZI configuration at 120 Gb/s. D/A converter is realized by generating optical intensity based on weights of bit positions and adding to get the corresponding analog output. A Carrier reservoir semiconductor (CR-SOA) optical amplifier has been used as a nonlinear element implemented in Mach-Zehnder interferometer (MZIs) configuration. CR-SOA is a modified form of conventional SOA in which a wetting layer is grown in the vicinity of the active layer whose dedicated role is to replenish carriers in the active region after stimulated emission depletes available carriers. Due to this feature, CR-SOA overcomes the drawback of inherent slow carrier recovery in conventional SOA and therefore can be operated beyond 80 Gb/s. The proposed DAC has a resolution of 4 bits, with extinction ratio of more than 16 dB and absolute error of 1.58% only.

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Track III

Investigation on Optically Tunable Electron Spin Transport across magnetic/nonmagnetic heterojunctions

debajitdeb
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302

Spin filtering at spinterfaces plays a significant role to achieve considerable magnetoresistance (MR) in magnetic/nonmagnetic heterojunctions. Hence efficient spin filtering at magnetic/nonmagnetic heterojunctions will be performed so that spin polarized transport can be introduced across the devices. Application of external magnetic field modulates width of magnetic space charge region which leads to spin filter effect and hence negative MR for the devices. However, light illumination over the nonmagnetic active region may lead to modulation of both magnetic and nonmagnetic space charge regions across the heterojunction. Therefore, the extent of negative MR may get reduced and finally result in sign change of MR for the devices. Defect states at non-magnetic layer play a major role in both magnetic and non-magnetic space charge width modulation with light illumination. The objectives of the project include successful synthesis of magnetic and nonmagnetic nanomaterials that will be single phase polycrystalline and devoid of any secondary defect states. Magnetic/nonmagnetic heterojunctions will be fabricated using the synthesized nanomaterials. The objective also includes attainment of strong magnetoresistance (MR) signal across the heterojunction at room temperature. The experiment will be performed in presence of both light and magnetic field to ensure observation of strong MR signal across the heterojunction.

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Track III

INVESTIGATION OF MEMRISTIVE NEURAL NETWORK FOR PATTERN RECOGNITION APPLICATION ON LITHOGRAPHY

Npsingh
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302

ABSTRACT
It was observed that a well-trained ANN can recognize images with a precision of over 98%. Although traditional two terminals memristors like phase-changing memory (PCM) are already used to build ANNs[1][2]. But those devices typically suffer from nonlinear,[1] asymmetric conductance tuning problems. Since the advancement of the ANN study significantly depends on the expansion of networks in-depth, a massive amount of vector-matrix multiplication is required. The novel memristive device Ionic Floating Gate memory (IFG)[1] could potentially solve those problems. This proposal presents a compact Cadence model of fully connected ANN using IFG. The devices are tuned to an optimized state and formed a well-trained network. The Cadence Verilog A model of the memristive device Ionic floating gate (IFG) memory is proposed,[1][2] which combined a redox transistor and a volatile conductive bridge memory to make a non-volatile synaptic memory[1]. The IFG device will be utilized in other deep neural networks as synaptic memory to increase recognition accuracy. ReLu function will be employed to reduce the vanishing gradients.

Index words: Memristive device, Ionic Floating Gate (IFG), Artificial neural network (ANN), ReLu function

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Generation of regional Ionospheric Total Electron Content Maps using ground based GNSS observation over India

D.Venkata Ratnam[1]
[1] Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur District, 522502, Andhra Pradesh, India
dvratnam@kluniversity.in

Abstract:-
In navigation range accuracy plays a major role but this accuracy degraded by ionosphere propagation errors, for improving accuracy need to estimate TEC values and correct errors properly. For this estimation we have different models in that Nequick G model is one. For low latitude India region correction of the ionospheric propagation error according to GPS coefficients is not accurate because of the large gradients and complex dynamic ionospheric behavior**.** In this paper, we propose a model to determine the ionospheric error by using the only 3 coefficients of NequickG In low cost,the performance of NequickG model evaluated by comparing with IRI(international reference ionosphere)2016 and ASHF models. NeQuick model is able to show day-to-day variations in the range delay corrections due to its dependence on daily values of average sun spot number. The ground based Global Positioning System (GPS) Total Electron Content (TEC) observations collected from the 26 GPS Aided GEO Augmented Navigation (GAGAN) stations over low latitude Indian region (the range of geographic longitude (65° to 100°) and geographic latitude (5° to 40°)). The accuracy of ASHF, IRI-2016 and NequickG models are evaluated over both ground and sea regions for 3 years with respect to the different forcing like the solar activity, seasons, geomagnetic disturbance etc. We have compared the results for these mentioned contrasting conditions for two main purposes to evaluate how the NequickG performs in estimating TEC over india and to have a comprehensive understanding of the quantitative improvement needed in the model to make it useful for daily predictions for navigation receivers over India.

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Track III

Investigation of of ionospheric irregularities to Solar flares during September 2017 using ground and space based GNSS observations

D.Venkata Ratnam[1]
[1] Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur District, 522502, Andhra Pradesh, India
dvratnam@kluniversity.in

Abstract
Solar flares (SFs) are sudden bursts of high energy radiations from the Sun travelling outwards in all directions in accordance with the speed of light. Although solar flares do not affect humans directly, the electromagnetic radiations increase the ionization of the upper atmospheric region leading to disruption of radio signals thus affecting the radio communication and navigation applications. Solar flares during September 6-10, 2017 are the strongest flares occurred in 24th Solar cycle. Ground-based Total Electron Content (TEC) measurements alone are insufficient to investigate the structural behavior of ionospheric region, since both ocean and polar regions cannot be covered completely. Taking this in to consideration, data assimilation technique is being proposed. GNSS Earth Observation Network System (GEONET), a nation-wide receiver network operated by Geospatial Information Authority of Japan, is used as background model to obtain ionospheric TEC. The present work demonstrates the ionospheric TEC response to the two classes (X-class and M-class) of solar flares using data assimilation of multi-source observations –GEONET TEC, JASON altimetry, COSMIC radio occultation and SWARM mini-satellite mission. The accessibility of TEC variations from multi-constellation data holds the ability of monitoring the structural and dynamic behavior of ionospheric region. In view of this, Spherical Harmonics Function (SHF) model using weighted least square method is implemented to illustrate the TEC structural variability during the study period. The obtained results would be helpful to GNSS user community in understanding the effects of solar flares on ionospheric region, and to provide better prediction for improving the positional accuracy of satellite and navigation applications during adverse space weather environment.

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Track III

Image Segmentation Techniques for Land Cover Mapping Using Remote Sensing Data

Ravi Kumar Kallakunt
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302

Abstract:
Remote sensing provides a valuable source of data for mapping land cover changes over large areas. Image segmentation is a powerful technique that can be used to extract useful information from remote sensing images. In this study, we evaluated the performance of four image segmentation algorithms for mapping land cover changes using Landsat data.

The four image segmentation algorithms were: (1) Mean Shift segmentation, (2) Quickshift segmentation, (3) Felzenszwalb segmentation, and (4) SLIC (Simple Linear Iterative Clustering) segmentation. The segmentation results were compared with manually delineated reference data for accuracy assessment.

Our results show that the SLIC algorithm performed the best, with an overall accuracy of 92% and a Kappa coefficient of 0.88. The other three algorithms had overall accuracies ranging from 85% to 90%, with Kappa coefficients ranging from 0.76 to 0.83. The SLIC algorithm was particularly effective in delineating small patches of land cover changes, such as urban areas, while preserving the spatial context of the larger features.

Our study demonstrates the potential of image segmentation techniques for mapping land cover changes using remote sensing data. The results of this study can be used to inform land management decisions and policies in the study area, and can be applied to other regions with similar land cover characteristics.

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Electrochemical Monitoring of sulfadiazine through La@CeO incorporated with Reduced Graphene Oxide based electrodes

Don Disouza Francis Packiaraj[a], Ruspika Sundaresan[a], Shen-Ming Chen[a,*], and Ramachandran Balaji[b,*]

[a]Department of Chemical Engineering and Biotechnology, National Taipei University of Technology, No.1, Section 3, Chung-Hsiao East Road, Taipei 106, Taiwan.

[b] Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Andhra Pradesh, 522302, India.

*Corresponding author:

Dr. Ramachandran Balaji, **email**: rbalaji@kluniversity.in

Prof. Dr. S. M. Chen, Email: smchen1957@gmail.com, smchen78@ms15.hinet.net, Tel: +886 2270 17147, Fax: +886 2270 25

Abstract:

In recent years, indiscriminate consumption and dumping of antibiotics are destructive to human health and also ecotoxicological pollution. Here, the irregular particle nano-sized dendrite structure of Lanthanum doped Cerium oxide (LCO) decorated with sheet-like reduced graphene oxide (LCO@RGO) composite was utilized to detect sulfonamide-based sulfadiazine (SZ) drug. LCO@RGO nanocomposite was prepared by hydrothermal method and also the sheets-like structure (RGO) that covered irregular particles nano-sized dendrite structure of (LCO) the synergistic effect between LCO and RGO facilitate electron transferability, conductivity, and also stimulates the electrochemical property toward the detection of SZ. The detection of SZ expressed a lower detection limit (0.005 µM) and linear range (0.01-265 µM) of the fabricated LCO@RGO/GCE electrode towards SZ analyzed in highly sensitive DPV technique. Also, DPV was utilized to determine the extraordinary performance of repeatability, reproducibility, and storage stability of fabricated LCO@RGO/GCE. Moreover, the synthesized and fabricated LCO@RGO/GCE detection was effectively proved in human blood serum and river water samples and also attain great recovery results. All the above probes the synthesized LCO@RGO thriving outstanding electrocatalytic performance of this nanocomposite highly sensitive detection of SZ in biological and environmental real samples.

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Track III

SMART HOME AUTOMATION USING RASPBERRY PI AND TELEGRAM

Aswin Kumer S V
Associate Professor, Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Vaddeswaram, AP, India

ABSTRACT
In this paper, we are going to discuss about smart home control of our home appliances using telegram bot. As technology arises, we are going into smarter world and daily new technologies are invented Smart home automation can be done through so many ways like webservers and websites but now we are trying it using telegram application which is available in windows and android mobile phones. In this project, we are going to use both manual and automated controls for our home appliances to control anywhere form world. We will install a package in raspberry pi through that we can run our home appliances anywhere form world. This can be done using raspberry pi, we can also use other microcontrollers, but we are performing the home automation in raspberry pi version 3 board. This decreases manpower to manually switching the appliances and it also helps people saving electricity as through an application we can control whole home appliances in our homes.

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Track III

Localization using RSSI (Received Signal Strength Indicator)

Sreevardhan Cheerla
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302

Abstract
Localization using RSSI (Received Signal Strength Indicator) is a widely used technique in indoor positioning systems. The RSSI values of signals transmitted by wireless devices, such as Wi-Fi access points, are used to estimate the location of a target device. In this technique, the distance between the target device and the access points is estimated using the inverse square law of radio propagation. The distance estimates are then used to determine the location of the target device. In recent years, many researchers have proposed various algorithms for RSSI-based localization. Some of these algorithms use fingerprinting techniques to map the RSSI values to locations in the indoor environment. Others use machine learning techniques to learn the relationship between the RSSI values and the locations. Despite the popularity of RSSI-based localization, there are several challenges associated with this technique. The accuracy of RSSI-based localization is affected by various factors, such as multipath fading, interference, and environmental changes. Moreover, the accuracy of RSSI-based localization decreases as the distance between the target device and the access points increases. In conclusion, localization using RSSI is a promising technique for indoor positioning systems. However, it is important to consider the challenges associated with this technique and to develop robust algorithms that can overcome these challenges. Further research is needed to improve the accuracy and reliability of RSSI-based localization.

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Track III

SsMap: A unique Application Mapping for Application-Aware NoC Architecture

drarvindhan
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302

Application mapping in a Network-on-Chip (NoC) refers to the process of assigning tasks or processing elements of an application to different nodes in the NoC. There are several approaches to application mapping in networks-on-chip (NoC), including heuristic-based, optimization-based, and machine learning-based methods. In this paper, we adopt the salp swarm algorithm (SSA) as a unique approach for an effective mapping of cores against the regular and irregular architectures of NoC. SSA is a computational technique inspired by the behavior of birds, that work together to solve complex problems. In this proposed SSA, a population of simple agents (e.g., birds) interacts with each other and their environment to find an optimal solution to a problem. To analyze the effectiveness of the proposed mapping approach, a number of experiments were conducted over real-time NoC benchmarks of NoC.

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Track III

Electromagnetically Induced Transparency in Rubidium Atoms in Vapour Cell

Sumit Bhushan
Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur, India-522302
Corresponding Author: bhushan.sumit@kluniversity.in

Abstract:
Electromagnetically Induced Transparency (EIT) is a light-matter interaction phenomenon which modifies the optical response of a medium to make the later transparent to an incident resonant light field. Moreover, the group velocity with which the light propagates through the medium is drastically reduced as well. This paves way for storage, and on-demand retrieval of the light pulse. It has applications in the fields of quantum communications, quantum computing, quantum information, quantum metrology, etc. Alkali metals such as rubidium are very popular medium both in room temperature (vapour cell) as well as ultracold systems to implement EIT and later on quantum memory. In this work, we present theoretical study on EIT in room temperature Rb atoms and we present estimates of various parameters related to quantum memory such as efficiency, Delay Bandwidth Product (DBP), etc. Our results are promising and we are working towards setting up an experimental facility in which we can realize EIT with Rb atoms in a vapour cell and later on proceed towards the realization of an efficient quantum memory as well.

Keywords: Electromagnetically Induced Transparency (EIT), Quantum Memory

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Track III

Antenna performance changes under the influence of dielectric-filled metamaterials in the frequency range up to 50 GHz are being studied.

SALEEM AKRAM PATAN
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302

Abstract:
In this paper, we design a Metasurface to replace ground plane of the rectangular patch antenna. The Metasurface structure is capable of guiding energy in unpredictable way and it became very useful factor in working with EM energy and light energy. When subjected to changes in its designing parameters it exhibits significance change in the way it is manipulating the waves and the materials used also causes changes in its way of working and the di-electric filled or all di-electric thin Metasurfaces are considered in this work a coaxial fed rectangular patch antenna which operate at 10GHz is considered for analysis. And metasurface having 0.2cm pin height and 0.2cm gap between plates will fill with different dielectric substrates with dielectric constants 2.2, 2.94 and 6.15 and comparative performance analysis is illustrated.

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Track III

Toward Precision in Crop Yield Estimation Using Remote Sensing

RAMESH NVK
koneru lakshmaiah education foundation, Green Fields, Vaddeswaram, Andhra Pradesh 522302

Abstract:
Many crop yield estimation techniques are being used, however the most effective one is based on using geospatial data and technologies such as remote sensing. However, the remote sensing data which are needed to estimate crop yield are insufficient most of the time due to many problems such as climate conditions (% of clouds), and low temporal resolution. There have been many attempts to solve the lack of data problem using very high temporal and very low spatial resolution images such as Modis. Although this type of image can compensate for the lack of data due to climate problems, they are only suitable for very large homogeneous crop fields. To compensate for the lack of high spatial resolution remote sensing images due to climate conditions, a new optimization model was created.

Key words: sensors, Modis

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Track III

Verification/Identification of Speaker in Variable Conditions

Kasiprasad Mannepalli, G M Neeharika, G S V Raviteja, Seeram Jahnavi
Dept of ECE, K L Deemed to be University, Vaddeswaram, Guntur (district), Vijayawada Andhra Pradesh. India.

ABSTRACT –
This work makes a verification concerning person identification (PI) in variable conditions from the perspective on practical frameworks. Less amount of information is enough for client comfortableness to verify speaker. Moreover, decrease in speech information influences the PI execution that turns into a worry for user usage. Here, varied information situations for PI are investigated by using a method by collecting data set of a particular language alphabets and they are formed into sentences and enough data with restricted test information is displayed as an ideal structure for the real time frameworks. Various investigations have been produced using in the point of view of improving execution in varied conditions. These investigations incorporate vocal tract narrowing element to incorporate person-specific acoustic–phonetic information, varied characteristics of speech source include that convey elective/integral data from that conveyed by common mel-frequency cepstral coefficient highlights. At last, a structure is proposed in mixture with the expressed investigations to have a better person verified in varied health conditions, which is an important point if there is sufficient data and constrained test information situations.

Index terms - BLOCKING, CROSSCORRELATION, IDENTIFICATION, FRAMING, MFCC, APPENDING, WINDOWING, ZCR.

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Track III

An Efficient Ciphertext-Policy Attribute-Based Encryption with Attribute and User Revocation Scheme in Cloud Environment

P. Prathap Nayudu[1] and Krovi Raja Sekhar[2,*]
Department of Computer Science and Engineering Koneru Lakshmaiah Education Foundation, Vaddeswaram, AP, India[1, 2]
*Corresponding Author: KroviRajaSekhar. Email: rajasekhar_cse@kluniversity.in

Abstract
In cloud environment, ciphertext-policy attribute-based encryption (CP-ABE) has the important role to attain fine-grained data access control and confidentiality. In CP-ABE, since each attribute can be shared by number of users and each user can maintain multiple attributes, the attribute will not be deleted for other users with the same attribute in practice, which may affect other users. Thus, how to revoke attributes is a significant and complex issue with CP-ABE schemes.To solve these issues, we present a novel CP-ABE with an efficient user or attribute revocation model. In this approach, the attribute revocation problem is effectively solved using the attribute group concept. The attribute controller (AC) in the proposed model updates the non-revoked user's secret key if a user or attribute revoked from the group. Besides, the proposed revocation model enhances the security against the cooperation between revoked and non-revoked users. Simulation results depict that the proposed revocation model attained better key update time, ciphertext update time, encryption time and decryption time.

Keywords: CP-ABE, attribute revocation, user revocation, key update time

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