Abstract Proceedings of

CCSN 2022

11th International Conference on

Computing, Communication and Sensor Networks

www.actsoft.org/ccsn2022

23rd to 24th of September, 2022

Organizer:
Department of CSA, Utkal University, Bhubaneswar, Odisha.

and
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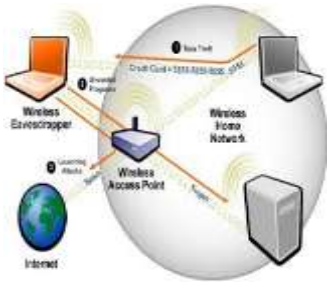
Website of conference: actsoft.org/ccsn2022



Proceeding Book with abstract of papers (this book is for only authors' reference and should not be linked with any server).
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Inaugural Song:

Prayer
Translated in English
By
Hillol Ray
http://www.iwvpa.net/rayh
http://www.iwvpa.net/rayh/index-hra.php

Desires are all yours,
You are the universal star-
You do your own works, mom,
People say, I do them from a far!!

You stuck elephant into clay,
And push a handicap to ascend hill-
To some, you offer “Brahmo” feet,
And make others descend downhill!!

I am a machine, you are the machinist,
I am the home, you are the homemaker-

I am the chariot, you are the charioteer,
You drive as you like, and I am a happy taker!!

“Milestone”
June 25, 2019
Garland, Texas, USA

Editorial

This abstract proceedings book contains abstracts of all registered papers, summary of keynote and invited talks, program schedule, list of speakers and session chairs etc.

In the light of current exceptional circumstances, CCSN2022 has been re-envisioned as a Hybrid mode of conference having facilities of online presentations that may not be present physically. The virtual format will provide an opportunity for our community to continue to present their research and collaborate with their peers across the globe.

About 75 papers were received and among those only 45 papers are selected for presentation. Papers are in the areas of wireless technology, application of IoT, algorithms, software engineering, Underground mine security, Artificial Intelligence Methods, Machine Learning, applications of various types of Sensor networks, VLSI design for wireless communication, antenna design etc.

The CCSN2022 conference will convene experts in the field of Computing, Communication and Sensor Networks for technical communications through presentations and discussions, providing a fantastic opportunity to network with like-minded professionals from around the world. The online conference will feature invited talks and keynotes, and will give you the opportunity to exchange efficiently.

We look forward for the active participation of all our delegates and participants in the CCSN2022.

With due thanks and best wishes to all our team including the Chief Guest, other invited speakers, Chair persons, Authors, participants etc. for sparing their valuable time in making the event a success.

These abstract proceedings are prepared with the abstracts of all papers for the delegates of the conference and for offline/online uses. After the conference, most of the papers will be forwarded for possible publication in a Special Issue of the Journal of Microsystem Technologies, SCI-indexed, published by Springer-Nature, or in different proceedings/books as book chapters according to the theme of the paper.

The Editors
CCSN2022

Index-CCSN2022

Technical Session-II: Paper IDs: 19, 13, 33, 42, 46

Technical Session-VIII: Paper IDs: **53, 10, 34, 62, 64**

Technical Parallel Session-VIII: Paper IDs: **44, 05, 17, 37, 39, 28**

Program Schedule of CCSN2022

23.9.2022: 10.30-11.30am : Inaugural Function :Venue: Lecture Gallery, PG Council, Utkal University.

***** TEA BREAK*****

Technical Session I: date:23.09.2022: Venue: Lecture Gallery, PG Dept. Of CSA, Utkal University.
Time: 11.45-12.30pm: Invited Talk by: Dr Manoranjan Satapathy, IIT, Bhubaneswar

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Technical Session II: 23/09/2022: Time: 12.30-1.30pm: Hall-01, PG Dept. Of CSA, Utkal University.
Session Chair: Dr. S.K. Chaulya, CSIR-CIMFR, Jharkhand
Paper Presentation:(Hall-1): Paper ID: 19,13,33,42,46

Parallel Session: 23/09/2022: Time: 12.30-1.30pm: (Hall-02), PG Dept. Of CSA, Utkal University.
Session Chair: Dr P K Behera, dept. of CSA, Utkal Uninersity.
Paper Presentation:(Hall-02): Paper ID: 26, 9,20,40,47

*****LUNCH BREAK ******

Technical Session III: 23/09/2022:Time: 2.00-3.00 pm: (Hall-01), PG Dept. Of CSA, Utkal University
Session Chair: Dr Bibhudendu Pati, RDWU, Bhubaneswar
Paper Presentation:(Hall-1): Paper ID: 45,15,23,58, 65

Parallel Session: 23/09/2022:Time: 2.00-3.00 pm: (Hall-02), PG Dept. Of CSA, Utkal University
Session Chair: Dr Jibitesh Mishra, OUTR, Bhubaneswar
Paper Presentation:(Hall-2): Paper ID: 51,16,36, 59, 56, 63

Invited Talk: 23/09/2022: Time: 3.00-3.45pm: Dr S. Jayanthu, NIT, Rourkela
Venue: Lecture Gallery, PG Dept. Of CSA, Utkal University.

**********TEA BREAK**********

Technical Session IV: 23/09/2022: Time: 04.00-5.00pm (Indian time)
Keynote Speaker: Dr. Francesco De Leonardis,Politecnico di Bari, Italy
Venue: Lecture Gallery, PG Dept. Of CSA, Utkal University.

==========END OF 1ST DAY ROGRAM==========

Date: 24.9.2022

Technical Session V: Time:10.30-11.30am: Venue: Lecture Gallery, PG Dept. Of CSA, Utkal University.
Invited Speaker: Dr P M Khillar, NIT Rourkela, Rourkela, Odisha, India.

******TEA BREAK********

Technical Session VI: 24.09.2022:Time:11.45-12.30pm: Venue: Lecture Gallery,PG Dept. Of CSA, Utkal University
Keynote Talk: Dr Szymanski Jerzy, KPUT&H, Poland.

******LUNCH BREAK******

Technical Session VII:date:24.09.2022:Time:2.00-3.00pm:Venue: (Hall-01): PG Dept. Of CSA, Utkal University
Session Chair: Dr Tapas Patra, OUTR, Bhubaneswar.
Paper Presentation(Hall-1): Paper ID: 57, 7, 14, 21,52, 55

Parallel Session: date:24.09.2022:Time:2.00-3.00pm:Venue: (Hall-02): PG Dept. Of CSA, Utkal University
Session Chair: Dr. Abhishek Das, Aliah University, Kolkata.
Paper Presentation(Hall-2): Paper ID: 27, 8, 18, 35, 43, 60

Technical Session VIII:date:24.09.2022:Time:3.00-4.00pm: Venue: (Hall-01): PG Dept. Of CSA, Utkal University
Session Chair: Dr S K Rath, BPUT, Odisha, Rourkela,
Paper Presentation(Hall-1): Paper ID: 53, 10, 34, 62, 64

Parallel Session: date:24.09.2022:Time:3.00-4.00pm: Venue: (Hall-02): PG Dept. Of CSA, Utkal University
Session Chair: Dr. Debasish De, MAKAUT, West Bengal
Paper Presentation(Hall-02): Paper ID: 44, 05, 17, 37, 39, 28

Tea Break

Valediction and Certificate Distribution: 4.00-5.00pm: Venue: Lecture Gallery, PG Dept. Of CSA, Utkal University.

Keynote Speaker: Francesco De Leonardis: Associate professor Electronics, IEEE Member, Associate Editor of Sensors (MDPI), Department of Electrical and Information Engineering, Politecnico di Bari, Italy.

The research interests of Francesco De Leonardis are in the field of the integrated Optoelectronics, Nanophotonics and Nonlinear Photonics. In particular he developed, giving significant and original improvements, the physical-mathematical modelling, the design and the simulations of both passive and active photonic devices for a large number of applications, such as communications, sensing, optical filtering, quantum and space applications. He mainly adopted semiconductor technological platforms such as GaAs and InP, or Group IV (Si, Ge, SiGe e GeSn alloy). Moreover, he developed physical-mathematical models in order to individuate the design rules of nonlinear photonic devices for applications such as: the all-optical signal processing, on-chip wavelength generation in both near and mid infrared, to quantum devices for high performance sensing and detection and generation of entangled photons in integrated platforms. Many activities are carried out in collaboration with prestigious national and international research groups: University of Massachusetts, Advanced Technology Institute, University of Surrey, Guildford (UK), Dept of Electronics and Electrical Engineering, University of Glasgow, UK, Department of Physics, University of Trento, Rzhanov Institute of Semiconductor Physics, Russian Academy of Sciences, Novosibirsk, Russia, National Institute of Optics.

Prof. dr. hab. inż. Jerzy Szymanski

Keynote Talk: lecture subject:

“ Industrial Scenario of Development of Renewable Energy and Electromobility "
Date 24 September 2022 at 11.45 AM IST - about 30 minutes period of the lecture.

Prof. Hab. Dr Eng. Jerzy Szymanski is working on professor position in the Faculty of Transport, Electrical Engineering and Computer Science at University of Technology and Humanities in Radom (UTH Radom), Poland. His research areas include Power Electronics Converters in Drive Applications, Application of Power Converters in Renewable Sources and Battery Electric Vehicles, EMC Compatibility in Power Converters Systems, etc. He has about 100 scientific publications (papers and books). Member of Organizing an Program Committees of International Conferences. Member of the Doctoral Council of the UTH in Radom in the discipline of Automation, Electronics and Electrical Engineering. He has experiences of working in industry like technical expert of DANFOSS international company at Drive and Control Division.

Invited Speaker: Dr Manoranjan Satpathy, Associate Professor of Computer Science, IIT Bhubaneswar
Talk Title: Covid-19 Prediction in the Sensitive Districts of Odisha by Studying the Migrant Labourer Inflow

Talk Abstract:

Every year, a large number of people from Odisha migrate to financial and industrial centers in other states for their livelihood earning. Bulk of them returned to Odisha during the early stage of national lockdown (Mar-June 2020) due to the Covid-19 outbreak as their places of work became Covid hotspots while Odisha was much less affected. This triggered the Odisha government to take precautionary measures like mandatory quarantine of returning migrants, setting up of containment zones, and establishing temporary medical centres (TMC). Moreover, it was necessary for the government to devise a policy that could slow down the spread of Covid-19 in Odisha due to inflow of migrants. Being part of a task-force constituted by overnment to understand covid-19 spread dynamics in Odisha, we predicted the number of people who would get infected primarily due to reverse-migration using the Sequential Analysis approach of Abraham Wald. This helped the government to make timely resource mobilization. Use of a variant of SPRT for Covid-19 spread analysis is novel, particularly to predict the number of possible infections much ahead in time due to the sudden inflow of migrants

Invited Speaker:
Biodata: Dr Singam Jayanthu, FIE, C Engr
PhD, M Tech, BE (Mining) , MS(Counselling & Psychotherapy)
Former Scientist of CMRI & NIRM
Chief Editor, Indian Mining & Engg Journal
PROFESSOR, Dept of Mining Engineering, https://www.nitrkl.ac.in/FProfile.aspx?e=sjayanthu

Talk Ttle: Trans-Disciplinary Research Applications Of Communication and Sensor Networks For Improvement Of Safety in Mines

Talk summary:

This paper presents overview of a few innovations be the author as scientist of CSIR-CIMFR, NIRM-Ministry of Mines, and Professor of NIT Rourkela through various industry oriented trans-disciplinary research activates over 35 years to improve safety in mines. Various innovative attempts made including application of various tools of Communication and Sensor Networks through some of the industry/Ministry sponsored projects for development of new concepts, designs and implementation in the field of opencast and underground mines in India. Mining evolves the cycle of stages which is started from exploration continuing through production and ends with closure of the mine. In every stage of mining process, we face lots of risk, hazards to environment and mankind. So minimizing the riskiness of the job and hazards technological innovations are coming forward in the mining industry.

Renewal of the innovations is driven by the growth of the demands of the minerals with respect to communities and the environment. Adopting the technological innovations like geophysical methods for exploration of minerals, global positioning system, geographical information system, 3-D models using software etc makes the mining process more productive and reliable. So technological innovations shape the future. Attempts made on development and experimental trials of innovative systems for the first time in India for online-real-time slope stability monitoring with TDR, WSN, IoT, LoRa, Cloud/Fog computing etc for opencast mines is also presented with emphasize on urgent need of Trans-Disciplinary Translational industry oriented Research and Academics (TTIORA) for improving safety in mines, including fatigue monitoring.

Keywords: Mine Safety, WSN, TDR, IoT, LoRa, Cloud/Fog computing, Transdisciplinary research

Biodata: Prof Singam Jayanthu, born and brought up in mining community (Kothagudem collieries area of SCCL, Andhra Pradesh), completed BE (Mining Engineering) from Kothagudem School of Mines-Osmania University with first rank in 1986. M. Tech (Mine Planning & Design), from Banaras Hindu University in 1990. He was awarded OU, IDL, MGMI/SCCL Gold Medals. Dr Jayanthu worked as a scientist since 1989 in premier research institutes of India (Central Mining Research Institute-Dhanbad, and National Institute of Rock mechanics-Kolar Gold Fields). He was awarded Masters Degree in Counselling & Psychotherapy from Kuvempu University in 2006. At present guiding 18 PhD (including executive) Scholars from MCL, ECL, SCCL, CMPDIL, MOIL, IBM etc, (and two already awarded) on various aspects of transdisciplinary-ECE-CSE-EEE-EE etc applications to Mining industries. At present Dr Singam is working as Professor in Mining Engineering Department of National Institute of Technology, Rourkela. He is member of Technical Committee Environmental Appraisal for Mining Industries of Orissa State Pollution.

PID-19:

Heterogeneous Hierarchical Layer Balanced Clustering Protocol to protract network lifetime for WSNs

Ikkurthi Bhanu Prasad[1], Saumitra Gangwar[1], Satyendra Singh Yadav[2],
Yogita[1] and Second Vipin Pal[1]
[1] Department of CSE, National Institute of Technology Meghalaya, Shillong, India
[2] Department of ECE, National Institute of Technology Meghalaya, India

Abstract. This work presents an improved version of the Hierarchical Layer Balanced Clustering (HLBC) protocol. The HLBC protocol achieves balanced energy consumption among the nodes and eliminates the hotspots in the network for homogenous wireless sensor networks. Herein, the proposed heterogeneous HLBC protocol targets to improve network lifetime in the case of heterogeneous wireless sensor networks (HWSNs). In HLBC, its proficient clustering architecture assimilates the benefits of equal size and unequal size clustering architectures proposed in the literature to form a new clustering architecture. Additionally, Frame Forwarding Algorithm and Synchronized TDMA schedules are presented for forwarding the sensed data. The central point of our approach is to provide optimal placement of advanced nodes in the clustering architecture and to examine the effect of heterogeneity on the HLBC scheme. Finally, the simulation results prove that the proposed heterogeneous HLBC protocol achieves better energy consumption and improved network lifetime when compared to SEP, DEEC and HLBC protocols. The proposed heterogeneous HLBC scheme achieved a percentage improvement of 33.54% (FND), 15.57% (HND), 53.79% (LND), respectively, for het-MEQUEQ and 45.29% (FND), 28.73% (HND), 85.82% (LND), respectively, for het-PEQUEQ when compared with HLBC protocol in aspects of networks lifetime.

Keywords: WSNs, Energy Efficiency, Clustering.

PID-13:

Virtual Care Taker for Online Monitoring of patients based on IoT

Hasitha Yadavalli1,Vegina Pranathi 1,Pavuluri Hanusha 1,Thodeti Sai Kumar 1,Mohammed Inzammudin 1,

Mrs.A.Kalpana 2 1Faculty, Dept. of ECE, KG Reddy College of Engineering & Technology
2Assistant Professor, Dept. of ECE, KG Reddy College of Engineering & Technology

Abstract - The Internet of Things(IoT) is now-adays playing an important role in every sector. But it also plays a very important role in health sector for it being more accessible and affordable. This is also used for applications for easy usage. This work is based on building a prototype based on IoT for monitoring of patients who are in Intensive Care Unit and for the patients who needs to be monitored all the time.This prototype consists of three heath sensors: heart rate sensor,body temperature sensor and oxygen levels sensor.The above mentioned sensors are combined together using Arduino Uno and WiFi Module which are merged together for this project. This project is mainly based upon Photoplethysmography .This principle deliberates us to build a prototype and an application for monitoring patient's health. A patient's health is monitored using sensors.The gathered data from the sensors are stored in cloud storage. This gathered data is transferred using Raspberry Pi. This data can be accessed by authorized persons i.e., the designated doctors.

Keywords: Internet of Things,Raspberry Pi,Arduino Uno,Galvanic Skin Response, Photoplethysmography.

PID-33:

Recovery of Medical Image ROI using FRT Based Watermarking Method

Eswaraiah Rayachoti[1], Rajesh Duvvuru[2], Sudheer Mangalampalli[3] and Sudhir Tirumalasetty[4]
[1, 2, 3]SCOPE, VIT-AP University, Andhra Pradesh, India
[4] CSE, Vasireddy Venkatadri Institute of Technology, Guntur, A.P, India

Abstract. The recent evolutions in technology and globalization impacted a lot in the field of medicine. This evolved in communicating medical images among medical practitioners, patients and analysts through wired or remote networks for having better diagnosis medically. To accomplish this diagnosis as the best, the Region of Interest (ROI) of medical image is focused a lot by practitioners. This ROI may get affected by intruders during transmission of images. The receiver must recuperate the ROI of image when it gets tampered by an intruder. The ROI data is concealed into RONI (Region of Non-Interest) of image in order to recuperate the ROI when it gets tampered. More data has to be concealed in the RONI of the image when the size of the ROI is large. This paper proposes a watermarking scheme based on Finite Ridgelet Transform (FRT) which supports high embedding capacity. This proposed method recuperates ROI when it gets tampered by an intruder during transmission of medical image by concealing data of whole ROI in RONI.

Keywords: *Telemedicine, Watermarking, FRT, ROI, RONI*

PID-42

Neural Fuzzy System Design in Forest Fire Detection

Gudikandhula Narasimha Rao[1*], Peddada Jagadeeswara Rao[2], Rajesh Duvvuru[3], Kondapalli Beulah[4], E. Laxmi Lydia[5] , Prasanthi Rathanala[6], Bangaru Balakrishna[7]

[1, 5]Vignan's Institute of Information Technology (Autonomous), Visakhapatnam, Andhra Pradesh, India
[2] Rajiv Gandhi University of Knowledge Technologies (RGUKT), IIIT Srikakulam, Andhra Pradesh, India
[4]Gayatri Vidya Parishad College of Engineering (Autonomous), Kommadhi, Visakhapatnam, Andhra Pradesh, India
[5] GITAM deemed to be University, Visakhapatnam, Andhra Pradesh, India
[6]Guntur Engineering College, Guntur, Andhra Pradesh, India

Abstract: Wild fire showing in guarded scale is an ordinary perplexing and non-direct issue with the purpose is complicated to measure and predict. This assessment anticipated along with attempt a clever crossover smart representation, named as Element Swarm Optimized Neural Fuzzy (ESONF), intended for wild flames exhibiting next to the contextual analysis of Greater Visakhapatnam Municipal Corporation (GVMC). This region has been capable by many wildfires in ongoing seven
years, particularly in last decade. The projected representation was developed by the neural feathery surmising structure for request of couple of modules, non-fire and wild fire. The likelihood have a spot with the wild fire group of every pixel is used as flames feebleness record. Besides, the ESO is combined into the future representation to discover the for the most part desirable characteristics intended for the prelude and coming about boundaries. Also, GIS data based for the assessment
district was moreover evolved to get ready and endorse the proposed model.

Keywords: *Element Swarm Optimization, Neural Fuzzy, Remote Sensing, Geographic Information System, DisasterManagement*

PID-46

Hetero-Dielectric Macaroni Channel Cylindrical Gate All Around Field Effect Transistor (HD-MC CGAA FET) for Reduced Gate Leakage Analog Applications

Aapurva Kaul, Sonam Rewari, Deva Nand
Department of Electronics and Communication Engg.
Delhi Technological University
New Delhi, India

Abstract— In this paper a Hetero-Dielectric Macaroni Channel Cylindrical Gate All Around FET (HD-MC CGAA FET) is proposed and compared with a conventional Nanowire FET (NW-FET) and Dual Metal Hetero-Dielectric Gate All Around FET (DM-HD GAA FET). Both DM-HD GAA FET and HD-MC CGAA FET have a combined vacuum dielectric at the drain with a silicon dioxide (SiO_2) gate dielectric at the source. The structure is a symmetric gate oxide that is excellent for low power applications because of its considerably lower BTBT and OFF state gate leakages. The quantitatively obtained results from numerical simulations are compared. GIDL of the HD-MC CGAA FET is lower, suggesting that this device has better insulation against leakages and its I_{ON}/I_{OFF} ratio is higher. Based on the qualitatively obtained results, I_{ON}/I_{OFF} ratio of HD-MC CGAA FET is 856 times better than NW-FET and 309 times better than DM-HD GAA FET. GIDL current of HD-MC CGAA FET is measured to be 10^{-14} A as compared to 10^{-12} A of DM-HD GAA FET and 10^{-10} A of NW-FET. It has also been entrenched that HD-MC CGAA FET has more promising I_{DS}, g_m, g_d, GIDL and I_{ON}/I_{OFF} ratio than the existing NW-FET and DM-HD GAA FET.

Keywords— Band-to-band tunnelling (BTBT), cylindrical gate all around (CGAA), short channel effects (SCEs), ultra large-scale integrations (ULSI).

PID-26

Attack Of Malicious Codes in a Wireless Sensor Network Under Traditional Anti Virus Defenses: A Mathematical Model and Analysis

Swapnita Mohanty[1],Prasant Kumar Nayak[2] , Shaktiprasad Mohanty[3]

[1]School of applied sciences, KIIT University, Bhubaneswar, India 751024
[2, 3] Department of Mathematics, C.V. Raman Global University, Bhubaneswar, Orissa, India 752054

Abstract: Due to very limited resources and unreliable communication the conventional security techniques used in the Wireless Sensor Network (WSN) failed, so we propose a compartmental e-epidemic model inspired by biological model to understand the dynamics attack of malicious codes in WSN. Here we analyzed the stability and basic reproduction number R_0 of the model. It is shown that if $R_0<1$ then the malicious codes cannot infect the network capable but when $R_0>1$, the malicious codes can infect network. The equations of model are solved and simulated using MATLAB. These results allow us to gain a good understanding of the spread of malicious codes on the network.

Key words: Basic reproduction number, e- epidemic model, Stability, Wireless Sensor Network (WSN)

Pid-09

Gyro Based Self stabilising Robot

Aadimulam Sainath, Boodida Prashanth,M. Sai Krishna Reddy, Challakonda Sai Nitin,A.kalpana,

Electronics and Communication Engineering
KG REDDY College of Engineering &Technology, Hyderabad.

Abstract:

The design, building, as well as regulate of a 2 different level of study, compact there are ego androids discussed in this paper. In contrast to traditional there are 4 cyborgs and 2 different cyborgs are smaller and necessitate fewer locomotives and other components components. As a result, they present a challenging two-wheel balancing control system problem. The Microcontroller board Arduino Nano, DC motor, gyroscope, and gyroscopes make up the system architecture. It is controlled by a PID controller via an Arduino IDE software. A full explanation of the materials used in the robot's construction has been published. For better understanding of robot control, flow charts as well as closed loop control schematics provided. Hardware components have been connected step by step, and hardware assembly has been demonstrated.

PID-20

An Analysis on Spacing between Intelligent Reflecting Surface Elements for Beyond 5G Networks⋆

Vamsi Krishna Y[1], Goverdhan Reddy M[1], Satyendra Singh Yadav[1], Vipin Pal[2], Yogita[2], and Diptendu Singh Roy[2]
1 Department of Electronics and Communication Engineering, National Institute of Technology Meghalaya, India
2 Department of Computer Science and Engineering, National Institute of Technology Meghalaya, India
{b18ec022, b18ec021, satyendra, vipinpal, diptendu.sr}@nitm.ac.in
https://www.nitm.ac.in/

Abstract. As fifth generation (5G) communication network is now into commercialization, technologies for the next-generation sixth generation (6G) communications are also being explored to achieve faster and more reliable data transmissions. This paper presents an analytical study about the optimization of intelligent reflecting surface (IRS) for orthogonal frequency division multiplexing (OFDM) communications under mutual coupling. In this paper, we have considered an OFDM system with only two unbalanced states per IRS element and unknown coupling between the adjacent elements. This paper presents the IRS setup performance for OFDM system considering best pilot method and power method. Further, the performance of IRS setup is analysed for different number of IRS elements as 16, 256, 1024 and 4096 considering variable spacing between the elements of the IRS array. The presented setup is validated by the simulation results and discussed in detail.

Keywords: Orthogonal frequency division multiplexing (OFDM) · intelligent reflecting surface (IRS) · Frequency selective channels · Non-line of sight (NLOS).

PID-40

Development of asymmetric feed MIMO antenna for WiMAX, WiFi applications

Sushma Chowdary Polavarapu[1,4], Sampath Kumar Panda[2], V. Praveen Naidu[3]

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Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur District.
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[3] Assoc. Professor, Dept. of Electronics and Communications Engineering,
V.R. Siddhartha Engineering College, Vijayawada.
[4] Assistant Professor, Dept. of Electronics and Instrumentation Engineering,
V.R. Siddhartha Engineering College, Vijayawada.

Abstract. In this paper a CPW fed monopole radiating patch with two port MIMO network is presented. The triple band response of the antenna is ob-tained by embedding CSRR slots. The measurement findings of the proposed MIMO antenna are (-38dB at 2.02GHz) lower, (-11dB at 3.4GHz) middle, (-31dB at 5.69GHz) upper bands effectively cover wireless applications. The overall size of the proposed antenna is 30*30*1.6mm3. The proposed design of MIMO antenna is simulated and measured. The measurements are validated with the simulated results. Diversity parameters are evaluated for the proposed two element MIMO antenna. In this structure antenna port 1 covers. The ob-tained results are satisfactory for MIMO applications. The gain obtained varies from 2.56-7.26 dBi. The radiation efficiency is greater than 75% corresponding to the triple resonating bands.

Keywords: MIMO, ECC, Multiband, Radiation Patterns, Efficiency.

PID-47

Chaotic Krill Herd optimization based quality aware reward mechanism in Mobile Crowdsensing System

Sanjoy Mondal
Department of Computer Science & Information Technology, ITER
Siksha 'O' Anusandhan Deemed to be University, Bhubaneswar, India

Abhishek Das
Department of Computer Science and Engineering
Aliah University, Kolkata, West Bengal, India

Abstract. Mobile Crowdsensing has shown the greatest potential that allows smart devices to collect and share different sensing data in environmental monitoring. Mobile users (participants) provide the desired sensing data to the service providers and collect the reward for that. However, the reward should be given such as, it does not increase service costs. On the other hand, the unsatisfactory reward may reduce the interest of the participant to provide quality data. Therefore, increasing sensing data quality with constraint budget is a crucial challenge. In this paper, we
propose a quality-aware Chaotic Krill Herd (CKH) based optimized reward mechanism for Mobile Crowdsensing System (MCS), which reduces the platform cost and concomitantly it maximizes the data quality in a restricted budget. The extensive simulation results reveal that the proposed method outperforms the existing work by considerable margins.

Keywords Mobile Crowdsensing · Reward mechanism · Chaotic Krill Herd · Quality Aware

PID-45

Dual Metal Dual Layer GAA NWFET (DMDL-GAA-NWFET) Biosensor for Label Free SARS-CoV-2 Detection

Shivani Yadav, Sonam Rewari
Electronics & Communication Engg. Department
Delhi Technological University, Delhi, India

Abstract— The current Covid-19 epidemic has necessitated the design of a biosensor for the SARS-CoV-2 virus detection that is expected to be extraordinarily sensitive, rapid, precise, and economical. This paper proposes a novel structure named Dual Metal Dual Layer Gate-All-Around Nanowire Field Effect Transistor (DMDL-GAA-NWFET) Biosensor for detection of SARS-CoV-2 in terms of the S (Spike) protein and DNA of the virus using the concept of dielectric modulation and charge modulation. The SARS-CoV-2 viral detection has been validated using the Threshold Voltage Drift (ΔV_{TH}) and I_{ON} current drift (ΔI_{ON}), upon virus immobilization in the nanocavity. The effectiveness of the DMDL-GAA-NWFET biosensor in detecting SARS-CoV-2 is further highlighted by a comparison of the biosensor's threshold voltage and I_{ON} current sensitivities with those of a conventional Gate-All-Around Nanowire FET (GAA-NWFET) biosensor.

Keywords— DMDL-GAA-NWFET SARS-CoV-2, S-Protein, Dual Metal Dual Layer Gate

PID-15

Design and Analysis of Proximity Coupled Graphene Antenna for THz Applications

K. Vasu Babu[1] , P.Christina Shifali[2], J.Manisha[3] , G.Durga Bhavani.[4] , P.Nissi[5]

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ABSTRACT: The proximity coupled feeding technique is also called as electromagnetic coupling scheme which eliminates feed radiation and provides extremely high bandwidth, using this proximity coupled technique with graphene patch consist of two port multi-input-multi-output (MIMO) antenna, systems with pattern diversity has been carried out for THz applications. The MIMO systems is also known as multiple systems helps in increasing capacity and reliability of communication, MIMO performance of an antenna is calculated using diversity parameters like envelope correlation coefficient (ECC), diversity gain (DG. The acquired antenna provides the -10dB impedance bandwidths of dual frequencies at 4.8 THz and 8.6 THz the separation between the ports will be greater than 42dB to operate in the passband. The proportional relationship between graphene patch and physical entities of the proposed antenna are chosen in a manner to operate in single mode with resonance of TM_{12} (mode). This operation is quickened by the massive affability of graphene material in selecting the frequency of the antenna response.

Keywords: *Multi Input Multi Output (MIMO), return losses (S11, S12, S21, S22), Voltage Standing Wave Ratio (VSWR), Envelope Correlation Coefficient (ECC), Mean Effective Gain (MEG), Total Active Reflection Coefficient (TARC), Diversity Gain (DG).*

PID-23

A review on Dielectric Resonator Antennas-Past and Present

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Abstract - This review article has focused on the development of DRA from a bandwidth perspective. The objective of this review is to present antenna modelers with a promising strategy for increasing DRA performance in terms of bandwidth while minimizing the size of current antennas. The review report claims that DRA is superior to convectional antennas in handling almost all types of bandwidth characteristics. The huge quantity of study on bandwidth that has been done, as indicated by the large number of referenced publications, predicts that modern wireless communication will soon have extensive control over all bands.

Index Terms – Dielectric Resonator, Fractal, MIMO, Circularly Polarized, Wideband.

PID-58

Circuit-Level Technique to Design Robust SRAM Cell Against Radiation Strike

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ABSTRACT
In this paper, a 10-transistor radiation tolerant SRAM cell has been proposed using 16-nm CMOS technology. The proposed 10T SRAM cell offers higher immunity to soft error than all other compared cells. It consumes 0.68× lower hold power than QUCCE10T SRAM cell. It exhibits 0.94× shorter read delay compared to NS10T SRAM cell. The proposed circuit has higher RSNM than other comparison cells. The proposed SRAM cell proves its robustness against radiation strike by showing the largest amount (4.1 fC) of critical charge (Q_C) among all the comparison SRAM cells. However, these improvements are achieved at the cost of marginal degradation of write delay as compared to NS10T, QUCCE10T and 6T SRAM cells. Hence, the proposed 10T SRAM cell is a promising candidate for future highly reliable terrestrial applications.
Key words- Single Event Upset, Read Delay, Write Delay

PID-65

Parameter Extraction of Floating Solar PV System with War Strategy Optimization for sustainable cleaner generation

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Abstract: FSPV (Floating Solar Photovoltaic) is an emerging type of solar energy that aims to help the environment. Since the technology is new, it isn't easy to examine the long-term performance, effective control, and feasibility studies of FSPV facilities. The calculation of FSPV panel parameters is crucial in evaluating the actual performance, long-term operation, feasibility, and carbon-saving capacity of FSPV systems. The algorithm of war strategy optimization is used for the parameter estimation of the single diode model of FSPV. Furthermore, FSPV decreases the environmental impacts of land-based PV (LBPV) plants, such as deforestation for land clearance to install panels. The WSO method outperforms War gradient-based optimization (GBO) and Harris hawks optimization (HHO) in terms of effectiveness and accuracy. The WSO method is more effective and accurate than gradient-based optimization (GBO) and Harris hawks optimization (HHO), with a standard deviation of 3.74387E-17 and a mean of 7.729856712563354e-04.

PID-51

An Efficient Midpoint k-means Based Clustering Approach in Forest Fire

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Abstract: Forest fires destroy the ecological balance and increase global warming. To preserve wildlife and the ecological balance of our society, early prediction or detection of forest fires is required. For low-cost, low power, and portability of sensor nodes, Wireless Sensor Networks (WSN) are widely used to detect early forest fire. This paper proposed a novel technique using midpoint- k-means -based clustering to predict the High Active (HA) zone (which is fire prone zone), Medium Active (MA) zone, and Low Active (LA) zone of the forest. This approach detects the HA zones with higher (98%) Accuracy. The initiator sensor node of the High Active (HA) zone transmits the sensed data continuously to the Base Station (BS) for alert early before forest fire to the desired authority for taking the necessary measure. Whereas the initiator node of the Medium Active (MA) zone transmits the environmental data periodically and the sensor node of the Low Active (LA) zone never sends the data to the base station which saves the energy of the network. So, this approach is also energy efficient since increases network lifetime.

Keywords: Forest fire, Clustering, Wireless Sensor Networks (WSN), mid-point k-means, Sensor.

Pid-16

A Comparative Study of Various Classifiers for Driving Sentiment Analysis

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Abstract—More than 1 million people die each year because of road accidents. The major reason for most road accidents is rough and irresponsible driving behaviour. Nowadays, the traffic management system has grown a lot smarter than it was before. Earlier works were based on how to predict driving behaviour by the help of different sensors. In this paper, we studied different behaviour of different classifiers and neural networks in predicting dangerous driving behaviour. We have compared many models which requires low computation, easily implementable and have been trained for various datasets and tested for unseen datasets.

PID-36

An Improved Multiobjective Eagle Algorithm for Virtual Machine Placement in Cloud Environment

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Abstract. A large pool of systems is connected in public or private networks via the cloud computing paradigm to provide need-based scalable infrastructure for file storage, data, and applications. The benefits of using cloud computing technologies include lower application hosting costs, multimodal content storage, lower power consumption, less resource waste, and so on. Businesses or organizations don't have to expand hardware resources and infrastructure due to the usage of cloud computing technologies. In cloud environment, the optimal placement of virtual machines on available physical machines is challenging task. The available resources can be properly managed and the resource wastage can be reduced with the help of optimal placement of virtual machines. This paper presents algorithms namely multi resource alignment, first fit, two stage best fit, EAGLE and EAGLE modified, for optimal placement of virtual machines in cloud computing. These algorithms are simulated using the designed simulator for different sets of workloads. The presented algorithms are compared on the basis of central processing unit (CPU) utilization, memory utilization, failure tasks, and resource fragmentation evaluation parameters.

Keywords: Cloud Computing, Cloud Resource Management, Multi Resource Alignment, Optimal Placement, Virtual Machine Placement.

PID-59

A Novel Test Case Prioritization Framework using Clustering Techniques

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Abstract- Software engineering is referred as a systematic development process with all feasible operations and maintenance of the software. Better quality of software can be achieved by following appropriate software test process. The testing of Software has utmost importance in the lifecycle of development of software, i.e., in SDLC. It is a complete set of activities that are carried out with the aim of detecting errors in the component or software. It is a chief activity of the software development process that aims to evaluate or examine the software as, a system, components and functionality. In addition, software testing is a process of verification and validation of the correct operation of a program. The crucial and influential phase in developing the software is software testing and requires important resources in terms of time, effort and cost. However, testing a component or system is an expensive process because it takes more time. Many authors have claimed that time and cost required for performing software testing is around 40-70%. In software testing, regression testing plays an important role. Regression testing is the process of test cases minimization, selection and prioritization. Test Case Prioritization is defined as a method of ordering the test cases with the motive to gain an early optimization based on specified priorities. There are number of techniques for prioritizing the test cases. The search based, code coverage, fault based, risk based are the different techniques of Test Case Prioritization. This research studies proposed a Novel framework based on Fuzzy Classifier and using Machine Learning.

Keywords—Test Case, Clustering, Software Engineering, Test Case Prioritization, Regression Testing, Software.

PID-56

Application of Wireless Technology for Enhancing Safety and Productivity in Underground Mines

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Abstract
For smooth and safe underground (UG) mining operation work-space, ceaseless flow of information is required to handle the intricate dynamics from many diverse perspectives to enabled effective activity control and operation management. The harsh work environment of underground mines is a major factor that contributes significantly towards the accident fatalities, injuries to miners and loss of mining equipment. Deployment of wireless technology in underground mine environment has a vast scope of enhancing the safety of the mine personnel and mining machineries. Wireless communication in real-time, therefore can benefit in mitigating degree of possible catastrophes due to occurrences unforeseen events. However, the research themes in the said domain are entirely fragmented and the application of WSN is not fully understood in the mining industry. The paper presents an explorative review of how wireless technology have been applied and how it can be applied to successfully monitor and manage different causes of accidents and injuries involved in the underground mining domain.

Keywords: Wireless Technology, Wireless Sensor Network (WSN), Underground Mine, Mining Safety

PID-63

Features Selection Based Machine Learning Approaches for Sudden Cardiac Arrest Prediction

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Abstract
The poor survival rate of Sudden cardiac arrest(SCA) patients is one of the most pervasive problems in contemporary medicine. If it will be intervening clinically then it is possible to estimates the probability and timing of sudden cardiac death in patients with heart disease using the machine-learning algorithms. In this paper, a variety of classifiers, including the Random Forest Classifier, Gradient Boosting Classifier, Logistic Regression, SGD Classifier, and XGB Classifier has been used for predicting Sudden cardiac arrest. Classifiers are compared using different criteria, such as accuracy and precision. The identification of important features is essential for enhancing classifier performance. Here, the feature selection method has been used in machine learning algorithm. It shows that the random forest and the decision tree classifiers' performance are better than other algorithms. Experimental results are found to be encouraging for decision trees and random forest classifiers.
Keywords: Machine Learning, Cardiac Arrest, Decision Tree, Random Forest, Logistic regression, XGBoost classifier, Gradient Boosting Classifier, Precision, Accuracy

PID-57

Overview of Radiation-Hardened SRAM Cell Design Techniques

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Abstract— In deep space high-energy particles and fluctuation in temperature lead to single-event upsets (SEUs) in SRAM. It is difficult for traditional 6T SRAM cell to withstand this space environment. Therefore, we use different types of SRAM cells such as RHMD10T, QUCCE 10T, QUCCE 12T, HRRT 13T SRAM, NS10T, PS10T, RHBD10T, RHRD 12T, SRRD12T and QUATRO 12T. Moreover, there is a brief description of each SRAM cell with their respective advantages and disadvantages in comparison to other SRAM cells used in this harsh environment.
It is essential to select materials that can tolerate this extreme environment and operate as radiation resistant materials. It includes HfO2 and GaN. Alternatively, materials having larger permittivity, which are known as high-k materials such as Al2O3, ZrO2, and La2O3, which can replace SiO2 as the gate dielectric.

Keywords—SRAM; SEU; Radiation Hardened.

PID-07

Power Monitoring & Energy Conservation IIOT System

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Abstract—Internet of Things (IoT) is generally used in clever electricity pursuit, business automation, and an entire ton of applications. At various degrees of sensible Grid (SG), IoT gadgets square measure deployed to reveal and manipulate grid facts for dependable and inexperienced shipping of strength. Though IoT integration withinside the SG space provides manifold benefits, the gainsays in IoT-integration needs to be solved for the inexperienced operation of the grid. during this paper, first off, an overview of SG and IoT primarily completely primarily based SG widget is provided with.This endeavor describes the IoT{primarily based completely} totally strength pursuit widget this can be thriving to degree and examine the electrical parameters that embody voltage, contemporary-day, spirited strength, and electricity intake of a whole lot. IoT primarily completely primarily based software package program utility 'Blynk' is employed to attain the time period electrical facts of purchasers. primarily based in these facts, the patron and electrical supercharged strength teams withinside the SG paradigm will higher management their intake to minimize request prices.

Keywords-Smart homes, Power pursuit, IoT motor-assisted SG, Blynk.

PID-14

Design and Analysis Wearable MIMO Antenna for WBAN Applications

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ABSTRACT: An Ultra-wideband (UWB) wearable two port Multiple Input Multiple Output (MIMO) antenna I with overall dimensions of 40 × 70 mm is presented for on-arm wearable Wireless Body Area Network applications. 100% cotton cloth substrate is used in design of antenna. This MIMO antenna configuration comprises of dual spinning wheel shape like radiators with partial ground and microstrip feedings. To have common ground, partial grounds are attached to a rectangular strip. In comparison with recently published papers in research area, the two port MIMO provides good isolation, wide bandwidth and decupling structure. The main advantage of Ultra-wideband (UWB) technology provide broad capacity, short range communications at a relatively low level of energy usage, which is very desirable for Wireless Body Area Network (WBAN). The two port UWB wearable MIMO antenna on flat case evaluates parameters like S-parameters, gain, efficiency, and diversity parameters like channel capacity loss (CCL) and Envelope Correlation Coefficient (ECC) for entire UWB bandwidth.

Keywords: multiple input multiple output (MIMO); specific absorption rate (SAR): (UWB); wearable antenna; wireless body area network (WBAN).

PID-21

Mitigating L-BTBT-induced Leakage current in Nanosheet Junctionless Accumulation FETs

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Abstract— Nanosheet (NS) Junctionless Accumulation Mode FETs (JLAMFETs) offer an increased ON-state current due to their promising gate control over the channel. However, lateral band-to-band-tunnelling (L-BTBT) increases their OFF-state leakage due to enhanced lateral electric field. This BTBT-induced leakage deteriorates the ION/IOFF ratio, leading to an inefficient switching performance. Therefore, this work is focused on mitigating the BTBT leakage mechanism in emerging NS-JLAMFETs to achieve efficient switching performance. We demonstrate the use of a p^+ pocket in the nanosheet JLAMFETs results in a reduced L-BTBT and hence, an enhanced ION/IOFF ratio compared to a conventional NS JLAMFET for a contact poly pitch (CPP) of 44 nm can be achieved. The role of individual pockets at the source-channel and drain-channel interface in reducing the leakage mechanisms in NS JLAMFET has also been explored. Furthermore, we also investigated the scalability of the proposed device at a 7 nm gate length. Our results show that the proposed device exhibits a high ION/IOFF ratio > 10^4 at 7 nm gate length, with a subthreshold swing of ~76 mV/dec. Therefore, the proposed device exhibits an outstanding performance for the scaled gate lengths, and hence, the proposed NS- JLAMFETs with pockets can be a promising candidate for the advanced technology nodes.

Keywords— Lateral Band to Band Tunneling, Drain Induced Barrier Lowering, Nanosheet Junctionless Accumulation Mode FET (NS-JLAMFET), Short-channel effects

PID-55

An Overview and Outlook of Materials for Shielding Spacecrafts and Space Electronics

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Abstract: There is continuous research effort in the direction to develop new materials for space structures and especially the exterior of those structures, which can withstand harsh environmental conditions in deep space. One goal of this research is to invent lightweight materials for reducing the weight of the satellite and spacecraft. Consequently, this will reduce the launching cost of the satellite and spacecraft. To achieve this goal there is a need to integrate fiber reinforced polymers in the structure of satellite and spacecraft. There are two requirements that must be fulfilled by the shielding materials. One requirement is that the material must be able to prevent various galactic cosmic rays and solar particles so that they do not ionize the electronic devices and integrated circuits of the space electronics equipment. The energetic particles must not damage human tissues of the astronauts (crews of satellite or spacecraft). Another requirement is that the material must be insensitive to temperature variation. Its thermal expansion and contraction should be minimum. Moreover, it should be as thermal insulator as possible. In deep space due to high energy radiation, electronics devices can be damaged. High density shield material (such as tungsten and tantalum) and low-density material (such as polyethylene) can be considered as an ideal shield to protect the spacecrafts, which orbit especially in the thermosphere (86 to 372 miles) and exosphere (beyond 372 miles).

Keywords: space radiations, high energy interactions, radiation protection, shield material.

PID-27

Parameter Estimation and Prediction of E-Virus in a Computer Network: A Illustration by Using Covid -19 Epidimilogical Data

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Abstract
Since the attacking nature of computer virus in a computer network is just like virus in population, hence to know the attacking behaviour of computer virus in a computer network we proposed a compartmental e-epidemic model of SEIRI (Susceptible–Exposed–Infected–Recovered–Infected).Once computer virus enter into the network then virus propagate as per the model assumption. To measure the transmission capacity of computer virus in the network, we calculated the R_0. We tested the model stability at the equilibrium points by using basic reproduction number. It has been shown that if R0<1 the model is stable at the disease free equilibrium points and unstable if R_0>1. We used the observed data of COVID- 2019 during the first wave in India for validity of proposed model. We used nonlinear regression method with COVID-2019 case for predict of future infection. We used Minimize nonlinear least squares algorithm to estimate the parameters of the model from observed data.

Keywords- SEIRI e-Model, Basic reproduction number, local and global Stability, Curve fitting, Model parameters.

PID-08

Mid Marks Automation System

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Abstract— All the graduation colleges conduct the internal examinations, in the simpler terms every college conduct mid exams for every semester for considering the performance of the students and on based on it they award the final marks. To perform all these things a proper system is developed to design a particular question paper. The paper which is prepared should fulfil all the outcomes prescribed by the higher authority. Each question represents an individual outcome and all the outcomes should be obtained by the end. These outcomes are called are course outcomes and mid exams are conducted twice in every in every semester so first half of the outcomes are fulfilled in mid-1 and rest in other one. By this student become familiar with all outcomes and it becomes easier to concerned faculty to the know in which area student needs to improve. For the final examination student are prepared perfectly by seeing the mid term results. Some of the course outcomes are understanding, implementing, problem solving. All these outcomes bring an equal understanding in all aspects of the subject

PID-18

Prevention of DDoS Attack in IoT Devices

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Abstract. The "Internet of Things (IoT)" is now being perceived as an emerging technology that has revolutionized the way to connect to different devices spread over different geographical locations and retrieve information from those devices. It has the capability to extensively rework the overall client experience as it can seamlessly improve things ranging from everyday mundane things to complex industrial automations. Such wide-range deployment of connection devices creates a demanding situation in terms of the amount of information generated, network scalability and network heterogeneity issues along with privacy and security concerns. In current years, "Distributed Denial-of-Service (DDoS)" attacks in the IoT networks are perceived as one of the areas which pose a threat to the development of such networks and need to be addressed properly in order to leverage benefits out of IoT networks. The limited storage and processing capability of IoT devices make them vulnerable to different network attacks. This paper carries out a comprehensive evaluation of the attacks that may account for DDoS in IoT networks. Additionally, this paper investigates the available measured that are used to defend those attacks and discover their barriers from the perspective of limited device capability. The current work has proposed an algorithm for DDoS prevention in IoT networks and implemented the same through a simulated environment.

Keywords: IoT, network heterogeneity, privacy, DDoS Attack, storage limitations, limited device capability

PID-35

Predictive Spatial Correlation Analysis of Snake Bites of Krishna District of India

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Abstract. Globally every year high fatality of farmers reported due to Snake bites of envenomation. Currently, there is a need to identify the snake bite regions that causes severe damage in the Indian farmer's family, especially in study area. The study area i.e., Krishna district of India is highly prone to snake bites and floods. It suites best for high yield of agriculture crops due to fertile lands and rich water resources. Present research focus on the identification of the snake bites prone areas using geospatial analytics based on the Area Land(AL), Rainfall (RF), Flood Zone (FZ), Snake Bite (SB), River Side (RS) and Locality (L). A novel Snake Bite Impacted Area (SBIA) method is proposed and implemented to find the Geospatial predictive correlation analysis of snake bites. To the measure the performance of SBIA, various popular data classification methods are tested such as multi-class SVM, Decision Trees(DT), Boosted Trees (BT), Linear Discriminate (LD) and KNN. Among all popular techniques, the SBIA performance is high with an accuracy of 94.12, whereas accuracy of LD is 76.5, then both SVM and KNN is 82.4, whereas DT and BT is 94.1. Overall the performance of SBIA is good which combines spatial and non-spatial data to predict the snake bite prone areas.

Keywords: co-relation, snake,Geo-Engineering

PID-43

Low Cost Smart Things Flood Pole – A Disaster Risk Reduction IoT Tool

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Abstract.Currently there is a need for the development of advanced early warning smart systems for the risk reduction in floods. Based on the National Crime Records Bureau (NCRB) 2019, drowning is the third leading cause for the loss of death in the Indian rivers. This work designed and implemented a novel self-sustained and cost effective Smart Things Flood Pole (STFP), which serves as the one of the best flood data acquisition IoT tool that reduces the risks in the rescue operations by the local administration. The STFP comprises mainly Air Quality, Weather and Wi-Fi enabled Closed Circuit (CC) camera to acquire flood and boat capsize hazard information. The Smart Things Flood Pole is also a self-sustaining device that was built on solar powered. The performance and cost analysis was compared with the GVMC Smart Pole and t is observed that the cost of GVMC smart pole is almost 206% higher than the STFP.
Keywords: *Smart, Krishna, Godavari, Flood, Boat capsize*

PID-60

HABC-MD: A Novel Routing Algorithm for Wireless Sensor Network

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Abstract: Wireless sensor network comprises up a collection of tiny wireless sensors that are constraint to energy and have limited processing capabilities. Better quality service from wireless sensor network-based system can only be expected only when the available network energy is optimally used. A no. of models proposed so far for optimal energy usage in wireless sensor network but no model guarantees optimal usage and hence it has drawn the attention of the researchers worldwide. This paper proposes an energy efficient Hybrid Artificial Bee Colony-Modified Dijkstra(HABC-MD) algorithm for optimum usage of energy during routing of packet. This algorithm is proposed for cluster based wireless sensor network. It uses metaheuristic approach based artificial bee colony algorithm for cluster head selection in each round and heuristic approach-based Dijkstra algorithm for selection of optimum route between source node and sink for packet transmission. Modified Dijkstra algorithm considers both distance between source & destination and energy of the source node for determination of optimum route to sink. The performance of the algorithm is compared with existing hybrid LEACH-Dijkstra algorithm and is found that our algorithm performs better in comparison to later algorithm.
Keywords: - *Wireless Sensor Network, Clustering, Routing, Cluster head selection*

PID-53

Studies on Voltaic Efficiency of a PKL Electrochemical Cell Using Greenhouse Gas (CO_2)

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Abstract
The efficiency of a voltaic cell is an important parameter to design and fabricate an electrochemical cell. During the load shading, renewable energy might play an important role to face the energy crisis. To keep it in mind, we have studied the voltaic efficiency for a green electrochemical cell, where PKL juice with green-house gas CO_2 was used as environmentally benign hybrid biofuel to improve the voltaic efficiency of PKL electrochemical cell. In this investigation, the period of study was 1500 minutes. It has been found that the change of voltaic efficiency, η_V(%) has been decreased up to 70 minutes and then decreased steadily for the next 500 minutes. After that the voltaic efficiency has remained almost constant until 1500 minutes. The maximum value of open circuit voltage, V_{oc} was found as5.86 V and that of the minimum value was 4.95 V when CO_2 was passed through the PKL juice. Whereas in absence of CO_2,the maximum and minimum value of V_{oc} was found as 6.05 V and 5.96 V respectively. The calculated voltaic efficiency in presence of CO_2,$_V$(%) is between 74.45% and 92.66%, while the maximum and minimum value ofη_V(%) in absence of $CO_2$is found as 96.03 % and 85.57 % respectively. The maximum value of change of η_V(%) is 11.12% and that of the minimum change is 4.63%including the voltage difference of 6.49 %.
Keywords: Voltaic efficiency, PKL module, Greenhouse gas, Open circuit voltage, Load voltage.

PID-10

Automated Motor Control and Water Quality Monitoring System

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Abstract: This control mechanism is what our project is about. The automatic control, as the name suggests, is used to regulate the motor from afar, monitor its operating parameters, and get input from the motor. Our goal is to use a mobile device to operate the motor from afar and receive feedback via SMS while it is turned on or off. We also assure the motor's safe operation by sensing the source's voltage and ensuring that the system provides feedback when it is over or under voltage. Again, we receive this information by SMS, and operating the motor and providing it with protection is effective. We can monitor water quality data in real time, prevent pollution, lessen its effects, and fulfil the requirements for effective and intelligent water quality monitoring thanks to the system's effective initiatives, proposed monitoring features, and collection of numerous parametric statistics that affect water quality. The work adds to the current body of knowledge about the use of IoT for water quality control.
Index words: Gsm modem, sensor systems, real-time monitoring, automatic control, water quality, WSN.

PID-34

A Case Study of 5W+1H Automated Testing in Health Care

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Abstract. This paper contains the solution of any Software while in the testing phase for better usability and deployment. Industries seek these type of software testing research and development that would enable them to identify applications and technologies. Those help clients from avoiding software bugs and risks may be mitigated. Hence, software may be developed in an efficient way. The paper also tries to identify factors that affect the evolution of software in an innovative way. We have subsequently conducted a mapping study to identify the key features of this specific type of co-innovation activities. In this study, we have developed a systematic mapping guide that will categorize, classify and extract conceptual models about the 5W+1H mapping process. The mapping process begins with the Health care research where the study is being conducted and initially asks specific questions about that field. In this stage, the investigator formulates a list of research questions that can provide an overarching framework for research into a particular research topic. Investigators must decide the minimum number of key questions they need to answer in order to generate a unique research question. We have given the minimum number of key questions that need to be asked to get a better development of software testing in the Health care domain.

Keywords: 5W+1H Pattern; Cloud Software Testing; Systematic Mapping; Health Care; Usage Rate.

PID-62

Investigation of Performance for Optimal BIPV Arrays (SP, TT, QT and TCT) to Improve Maximum Power with low Mismatch Loss under Severe Partial Shading Scenarios

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Abstract: Global electricity demand is increasing with rising population and rapid urbanization. Building Integrated photovoltaic (BIPV) system is a new method of renewable energy generation where solar photovoltaic (PV) modules are integrated to the building surfaces such as façade, shades, windows, roof and tiles. BIPV systems reduce the urban energy demand. Utilization of vertical surfaces makes BIPV system a preferable choice where land scarcity affects the implementation of large PV systems. However, the economic viability depends on the maximum power generated by the BIPV array. In urban environment the BIPV arrays experience severe partial shading conditions (PSCs) due to clouds, dust and smoke, nearby trees and buildings. The PSCs cause mismatch losses, reduce global maximum power of BIPV array and efficiency. Different fixed array configurations such as series-parallel (SP), total-cross-tied (TCT), triple-Tied (TT) and quarter-tied (QT) are designed to solve this issue. The cross ties across the rows of BIPV array improves the performance at the expense of more wiring. This paper investigates the performance of SP, TT, QT and TCT configurations with a BIPV array design algorithm. A 9×8 BIPV array with DC power rating of 3.6 kW_p is designed. The performance is evaluated for each configuration under four different shading conditions. QT configuration reduces the wiring requirement by 10.45% compared to TCT and improves up to 8.43% maximum power than SP. The fill factor is improved to 48.49% and the mismatch loss is limited to 34.10%. Therefore QT is considered as a favorable configuration for BIPV array design.

Keywords: BIPV, Solar Photovoltaics, Renewable Energy, Efficiency, Mismatch Loss, Partial Shading condition, Array Configuration

PID-64

Radial Basis Function Network Based PV and Wind System Using Maximum Power Point Tracking

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Abstract- This paper presents the MPPT algorithm for the proposed hybrid energy i.e., PV and wind system and is tested for grid connected and standalone utilities. The main focus of this study is to extract the maximum power and to improve the power quality of the designed hybrid sustainable power systems. In the literature, many Research Scholars have worked in the field of MPPT calculation for PV and wind systems, which increases the number of publications in the field of control calculations for hybrid power systems. This study pays attention to designing a controller based on MPPT for extracting maximum energy from wind and PV energy systems. The suggested algorithm is tested for grid and standalone modes considering variable weather conditions. The proposed system is designed for 500 W solar and wind plants with the usual step-up converter and tested in MATLAB software to judge the efficacy of the suggested controller designed for MPPT.
Keywords- MPPT, ANN, RBFN, hybrid sustainable power system.

PID-44

An Air Quality Forecasting Method usingFuzzy Time Series with Butterfly Optimization Algorithm

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Abstract: Air quality forecasting is an important application area of the time series forecasting problem. The successful prediction of the air quality of a place well in advance can able to help the administrators to take the necessary steps to control the air pollution. They can also warn the citizens about the adverse effect of air pollution in advance. In this study, an air quality forecasting method is proposed to successfully forecast the air quality of a place. Here the type-2 fuzzy time series (FTS) forecasting method is applied to predict the air quality. The performance of any FTS heavily depends on the selection of its hyperparameters. Here the butterfly optimization (BO) algorithm is applied to select the optimal values of the hyperparameters of FTS. In this work, the performance of the proposed forecasting method is also compared to the well-known forecasting methods. The simulation results established that the proposed forecasting method produces satisfactory performance and its performance is better in comparison to other well-known forecasting methods.

Keywords: Air Quality Forecasting, AQI, Fuzzy Time Series, Butterfly Optimization

PID-05

Smart Crop Protection and Monitoring System:

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Abstract: The Study attempts to build and implement the sophisticated connection for crop monitoring and crop protection against creatures such as cows, goats, pigs and others animals. Farmers cannot block entire fields for 24 hours a day to defend them. As a result, a system is designed using microcontroller-based Arduino uno in which the Ultrasonic sensor is retained in the field to monitor creatures movements. It detects the movement of animals by the Ultrasonic sensor. It starts beginning alarm. On the other hand, the monitoring system is used for monitoring various conditions in farm, the soil moisture sensor monitors the moist, humidity sensor used for sensing the humidity and also rain sensor for sensing the amount of rain in field.
Keywords: Ultrasonic sensor, Soil moisture sensor, Motion sensor, Humidity sensor, Rain sensor.

PID-17

Analysis of psychological impacts of COVID-19 second wave on Indian students due to school closure

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Abstract

The ongoing COVID-19 pandemic resulted in the closure of schools and colleges for the past one and a half years. As a result, there has been significant stress and anxiety among children due to online education, especially in developing countries like India. This study investigates the impact of the second wave of COVID-19 on mental health levels in terms of stress and anxiety between different age groups of students in India. An online survey with questions on socio-demographic factors, academic stress, personal stress, and anxiety was conducted amongst the students 5-17 years of age. A comprehensive anxiety score was coined, and K-means clustering was employed to group the children into moderate and severe categories based on the measured anxiety score. The results reveal a significant impact of socio-demographic factors such as parents' literacy rate and household financial conditions on the stress and anxiety levels of the students in different age groups.
Keywords: Second wave COVID-19, Mental health, Anxiety, K-means clustering

PID-37

Deep learning-based ensemble model for computer-aided diagnosis of breast cancer

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Chitkara University School of Engineering and Technology, Chitkara University, Himachal Pradesh, India[2]

Abstract: Computer-aided diagnosis (CAD) techniques used deep learning based categorization and detection methods for correct diagnosis of breast cancer through medical images. In this work two ensemble models of deep learning techniques were proposed to enhance the diagnostic performance of the system. The proposed system is evaluated on mammogram datasets: mammography dataset (DDSM and CBIS DDSM). In order to improve the classification performance of breast lesions from mammographic scans, we used three base classifiers that are pre-trained CNN models: VGG16, InceptionV3 and VGG19. First ensemble model called Ensemble Model1 uses linear meta learner as logistic regression for classification. Second ensemble model called Ensemble Model2 uses neural net as meta learner for classification. This model helps to classify mammogram correctly into positive and negative classes. Ensemble Model1 achieved accuracy; sensitivity and specificity are 98.02%, 97.17% and 98.87 respectively, and similarly Ensemble Model2 achieved 98.10%, 97.01% and 99.12% respectively. The performance of the suggested approach is compared with methods that are considered to be state-of-the-art on same dataset. The proposed models have the potential to serve as a second opinion for medical professionals when classifying breast lesions.

PID-39

Designing of Intellectual Hybrid Machine Learning Model for Effective Breast Cancer Diagnosis

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Abstract. Cancer was characterized as an illness brought about by an uncon-trolled division of irregular cells in a piece of the body. Breast Cancer is charac-terized as a harmful development or tumor coming about because of an uncon-trolled division of cells in the breast. Breast cancer is one of the most dangerous types of cancer after the lung cancer. The breast cancer is also considering as critical one like as skin cancer. Since, decades, women are suffering due to this breast cancer and also most of times majority percentage of them are dying due to non-identification at early stages and with the severity of the disease. There-fore, most of the doctors, scientists, researchers are did a major research and contributed for diagnosing the breast cancer at early stages and also curing process of the breast cancer. Here, in our research, we are also going to be di-agnosing the breast cancer at early stages with the available less symptoms or data sets in an effective way to serve the needy people and finally trying to de-crease the mortality rate by recovering them from the breast cancer. In this work, we have taken the most popular breast cancer datasets, i.e. Wisconsin Breast Cancer Datasets (i.e. Original and Diagnostic) as input to our proposed classifier to obtain the effective accuracy of classification which is nearly 98.97% and 97.73% respectively.

Keywords: Breast Cancer, Classification, Data Mining, Diagnosis, Hybrid Model, Machine Learning, WBCD

PID-28

Retinal Vessel Structure Segmentation using Bel-Hat Transformation

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Abstract: An automatic unsupervised Retinal Vessel Structure (RVS) segmentation technique is proposed in this paper, which can separate the RVS with minimal distortion of the anatomy of the vessels from the noisy background. The method involves three main phases: pre-processing, where the local information is used to enhance the color image of the fundus, and the noises adjacent to the vessels are disconnected. A novel *Bel–Hat transformation technique* is proposed in the second phase. Using two classes of Structuring Elements named Neighborhood Adaptive Line Structuring Element (NALSE) and 2D Gaussian Structuring Element (2DGSE), simultaneously acts on the enhanced image with respective size and orientation and can accurately separate vessel structure from its background. Lastly, artifacts and residual binary noises appear in the image during the binarization process. To segment the accurate noise-free RSV, a statistical distribution of the *circularity measure* of the isolated objects is calculated, and a threshold is decided to separate noise and vessel class, depending on a Statistical Mixture Distribution (SMD) model. This method achieves greater accuracy than the recently proposed unsupervised and supervised methods.

Keywords: Retinal Vessel Structure, Diabetic retinopathy, Hypertensive retinopathy, Adaptive Line Structuring Elements, Mathematical Morphology.

Invited Talk:

On-chip group-IV Heisenberg-limited Quantum Sensors

Francesco De Leonardis

Francesco De Leonardis: Associate professor Electronics, IEEE Senior Member, Associate Editor of Sensors (MDPI), Department of Electrical and Information Engineering, Politecnico di Bari, Italy

Constructing quantum photonic chips using a group-IV approach is becoming recognized as a highly capable way to build a quantum photonic system-on-a-chip, that is, a quantum photonic integrated circuit (QPIC). Classical and quantum group IV PICs are built upon a silicon substrate, but there are actually several useful silicon-based photonic “platforms” available today, notably silicon-on-insulator (SOI), silicon-on-sapphire (SOS), and silicon nitride-on-SiO2-on Si (SiN). In this context, photonic chips for quantum metrology and quantum sensing are also quite feasible. However, quantum photonic sensing has been less explored than the quantum photonic computing applications.

Considerable researches based on bulk approaches have been focused on the use of quantum phenomena within the field of quantum sensing for a broad range of applications. While for static signals the main figure-of-merit is the sensitivity, for time-dependent signals it is the spectral resolution, i.e. the ability to resolve two different frequencies. In this context, new super-sensitive and super-resolution methods that rely on quantum features, have been recently developed. In this sense, the aim of Quantum Metrology is to find schemes and methods that reach the ultimate fundamental bounds on estimation precision. Thus in the Quantum Metrology context, we obtain phase super-resolution if the phase derivative of the measured output is larger than the case of classical light. Moreover, phase super-sensitivity is reached if the phase uncertainty in the phase measurement is lower than the classical limit induced by the central limit theorem.

Although several physical quantum systems have been developed and proposed in literature based on discrete optics in order to induce super-sensitivity and super-resolution, the present open issue is the implementation of

quantum integrated photonic sensors with quantum-enhanced performances in the presence of noise. In this scenario, we propose recent advances towards on-chip gyroscope and chem/bio quantum photonic sensors. In particular, the quantum gyroscope chip is a new frontier. Looking at the prior art, optical gyroscopes based on the Sagnac effect and optical interference have proven to be an invaluable tool in sensing and navigation. The Sagnac effect refers to the relative phase $\varphi(\Omega)$ experienced by counter-propagating light waves in a rotating interferometer. The most recent research efforts in the field of optical gyros are concerned with the reduction of noise components to improve the device resolution. However even under ideal conditions, where all error sources can be compensated, the uncertainty in the measurement of φS is limited by the shot noise, which is caused by the quantization of the electromagnetic field itself. In this context, the phase resolution can obviously be enhanced by increasing the average photon rate at the detector. However, large values of optical power could induce additional phase noise induced bu nonlinear effects. We demonstrate that the sensitivity of the Sagnac interferometer could be considerably improved by using path-entangled NOON-states, resulting in a reduction of the de-Broglie wavelength. In particular, two-photon and four-photon coincidences increases the sensitivity by a factor of two and four, respectively.

To the contrary, in the chemical/bio sensing scenario, exceptional sensitivity is required. Indeed, the development of ultra-sensitive and ideally label-free detection schemes are crucial for analyzing the aggregation state of proteins, fundamental for neurodegenerative disease. In this context, any measurement consists of three parts: the preparation of a probe, its interaction with the system to be measured, and the probe readout. This process is affected by statistical or systematic errors. In particular, the statistical error source can have an accidental or fundamental nature. The former depends on the imperfections of the probes or measurement system, while the latter derives from the Heisenberg uncertainty relations. The Standard Quantum Limit (SQL) is not a fundamental quantum mechanical bound as it can be surpassed by using “non-classical” strategies. Thus, the ultimate limit on estimation precision is called Heisenberg Limit (HL). We demonstrate that the one-chip co-integration of a coherent source input, a squeezed vacuum source (i.e racetrack microring resonator in which signal photons are generated by means of the SFWM process), leads to realize bio-chemical sensor operating in super-sensitivity condition. The proposed sensor chips consists of three waveguide-connected sections for: i) generation of quantum state, ii) the interferometric transducers and iii) high-efficiency detection and analysis.

CCSN2022

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List of Invited Speakers/ Session Chairs

	**Keynote Speaker** **Francesco De Leonardis** Associate professor Electronics, IEEE Member, Associate Editor of Sensors (MDPI), Department of Electrical and Information Engineering, Politecnico di Bari, Italy.
	**Keynote Speaker** Dr.Manoranjan Satpathy Associate Professor School of Electrical Sciences (Computer Science & Engineering), IIT, Bhubaneswar, Odisha.
	**Invited Speaker** **Prof.(Dr.) Singam Jayanthu, FIE, C Engr** Professor, Dept of Mining Engineering, (*Former Scientist of CMRI & NIRM)* National Institute of Technology, Rourkela, Orissa,
	**Invited Speaker** Dr.P.M Khillar Department of CSE, National Institute of Technology, Rourkela, Orissa,
	**Invited Speaker** **Dr. Debashis De** Professor, CSE, Maulana Abul Kalam Azad University of Technology (former WBUT), Haringhata, Nadia, West Bengal.
	Session Chair **Dr. Abhishek Das** General Chair, CCSN2022, and Associate Professor Department of CSE Aliah University, New Town, Kolkata West Bengal, India.
	**Keynote Speaker** **Prof. Jerzy Szymanski** University Professor, Faculty of Transport, Electrical Engineering and Informatics, Kazimierz Pulaski University of Technology and Humanities, Radom- 26-000, POLAND.

	Session Chair Dr P K Behera Associate Professor, PG Dept of CSA, Utkal University, Bhubaneswar, Odisha
	**Prof. Dulal Acharjee** Chairman, CCSN2022 and Director, Applied Computer Technology, Kolkata http://actsoft.org, dulal@actsoft.org, dulalacharjee@gmail.com and President, International Association of Science, Technology and Management
	Invited Speaker **Prof.(Dr.) Md. Kamrul Alam Khan** Professor, Department of Physics, & Ex-Chairman (Department of Physics), & Ex - Dean (Faculty of Science) Jagannath University, Dhaka-1100, Bangladesh.
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