

ICNEWS - 2024

B.M.S. College of Engineering
Bull Temple Road, Bangalore-19
Department of Electronics and Communication Engineering



ICNEWS -2024

2nd INTERNATIONAL CONFERENCE ON NETWORKING, EMBEDDED AND WIRELESS SYSTEMS

"Wireless Technology - Building a Digital World"

August 22nd- 23rd 2024



ICNEWS - 2024

PROCEEDINGS

ICNEWS -2024

**2nd INTERNATIONAL CONFERENCE ON
NETWORKING, EMBEDDED AND WIRELESS SYSTEMS**

“Wireless Technology - Building a Digital World”

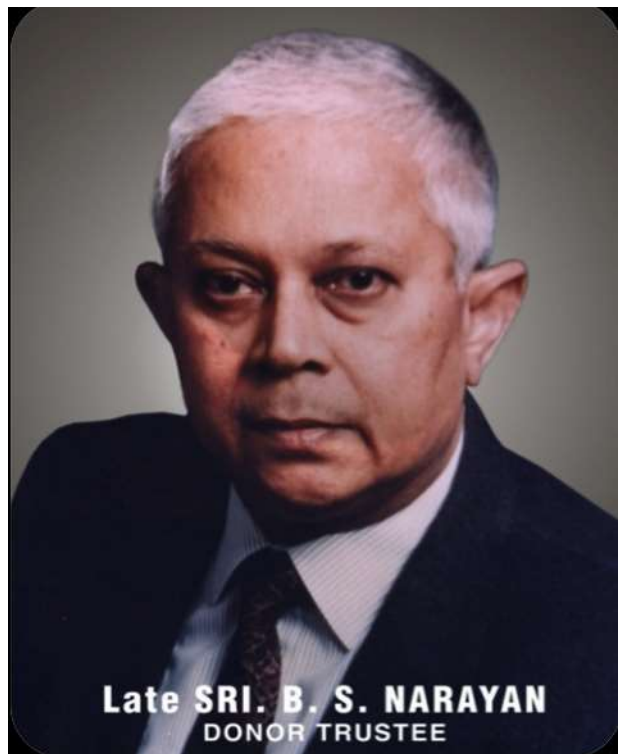
**August 22nd- 23rd 2024
Bangalore, India**

Organized by

**Department of Electronics and Communication Engineering
B.M.S. College of Engineering
Bangalore-19**

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About College

INSTITUTE VISION

Promoting Prosperity of mankind by augmenting human resource capital through Quality Technical Education & Training

INSTITUTE MISSION

Accomplish excellence in the field of Technical Education through Education, Research, and Service needs of society

B.M.S. College of Engineering, Bangalore has the unique distinction of being the first private engineering college established in the country in 1946. The institution owes its existence to the foresight and vision of its beloved founders Sri. B. M. Sreenivasaiah and his illustrious son Sri. B. S. Narayan. Imparting quality education and training was the founder's vision for the development of skilled and competent engineers, and the workforce for the benefit of national prosperity. This vision of the founders has inspired the institution to take right steps in meeting its objectives ever since its inception. BMSCE has completed the 76th year of its journey of promoting engineering education. The college, initially started with 3 undergraduate programs in 1946, and currently offers 14 undergraduate and 12 postgraduate programs in conventional and emerging fields. In addition, the college also offers PhD programs in 15 of its departments which are recognized as research centers by the University and is also approved as QIP Centers in Engineering & Technology by AICTE. The college maintains high academic quality standards; the certification by the National Assessment and Accreditation Council (NAAC) and National Board of Accreditation (NBA) is the testimony of the same. It is the first few Institutions in India to be bestowed with NBA in Tier I Format (Washington Accord) in the year 2013. The College has been effectively practicing Outcome-Based Education and is recognized as a mentor institution under TEQIP III. BMSCE is the only Partner institution in the country with the Melton Foundation, USA which promotes cross-cultural learning for the selected students along with peers from five other countries and is one of the most preferred higher educational destinations for students all across the country and also attracts students from South Asian & African countries.

About Department

PROGRAM VISION

To emerge as a Centre of Academic Excellence in Electronics, Communication, and related domains through Knowledge acquisition and Knowledge dissemination and Knowledge generation meeting the global needs and standards

PROGRAM MISSION

Imparting quality education through state of art curriculum, conducive learning environment, and Research with scope for continuous improvement leading to overall Professional Success.

The Department of Electronics and Communication Engineering was established in 1971 with an initial intake of 60 students to the UG program and enhanced to 420. The department offers three PG programs in the field of Electronics, Digital Communication Engineering, and VLSI Design & Embedded Systems and is recognized as a Research Centre by Visveswaraya Technological University and for the QIP Research programs from AICTE. The department has been accredited by NBA for a period of 3 years under Tier-I (Cycle II) in 2023. With these, various programs are being offered at the UG, PG and the doctoral level. The overall objective of the department is to contribute significantly to the realization of the Vision and Mission of BMSCE. The Department has made progressive strides during the last four decades in all spheres of education and research with its streamlined methodology. The department strives to equip students to be life-long learners, to develop the technical, analytical, and critical skills necessary to meet real-world developmental needs and contribute to social betterment. The Department offers a comprehensive education, thereby preparing the students to emphasize the role of engineers to find innovative solutions to some of the development challenges through applied research; graduates, who are better prepared to meet the needs of industry, government, and their communities.

ABOUT THE BOOK

We successfully hosted our first international conference, ICNEWS-2018, and are excited to announce our second international conference, ICNEWS-2024. Building on the tremendous success of NEWS (Networking, Embedded, and Wireless Systems) since its inception in 2010 at the national level, we are now expanding our reach to a larger international research community. Continuing the tradition of ICNEWS-2018, ICNEWS-2024 aptly themed the conference “Wireless Technology - Building a Digital World.” This conference serves as an interdisciplinary forum for researchers, practitioners, and educators to present and discuss the latest innovations, trends, challenges, and solutions in the fields of Networking, Embedded, and Wireless Systems.

The conference has invited and collected scientific and technical research submissions across all major conference tracks. All submitted paper abstracts in the proceedings have undergone peer review by reviewers from the scientific and technical program committee, external reviewers, and the editorial board, depending on the subject matter. After a rigorous peer review process, papers were selected based on originality, significance, and clarity for presentation at the conference.

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ICNEWS - 2024



I am pleased to know that the Department of Electronics & Communication Engineering of BMS College of Engineering, Bangalore, is organizing 2nd International Conference on “Networking Embedded and Wireless Systems (ICNEWS-2024) on 22nd and 23rd August -2024.

I am sure with a theme “Wireless Technology – Building a Digital World”, the ICNEWS – 2024 will reach out a large research community at international level. This conference will provide an interdisciplinary forum for researchers, practitioners, and educators to present and discuss the most recent innovations, trends and concerns, practical challenges and solutions adopted in this field.

I wish all the very best to the college and the Department of Electronics & Communication Engineering, in this endeavour and wish them a grand success.

Dr. S. Vidyashankar

Vice Chancellor

Visvesvaraya Technological University
Jnana Sangama, Belagavi – 590018



International conferences serve to be not only a platform for researchers to present their individual research work but also prove to be rich ground for exchange of intellectual thoughts and concerns. This conference promotes knowledge and enhancement in technological innovation. It's my privilege to propose my message for the 2nd International Conference on “Networking Embedded and Wireless Systems (ICNEWS-2024) hosted by the Department of Electronics & Communication Engineering.

I hope Department of ECE continues this academic exercise in the years to come to embrace new technologies and set the pace for research orientation. My hearty congratulations and best wishes to the entire ECE team for ICNEWS-2024 and participants.

Dr. B.S. Ragini Narayan
Donor Trustee and Chairperson, BMSET



I am glad to know that the Department of Electronics & Communication Engineering is organizing the 2nd International Conference on “Networking Embedded and Wireless Systems (ICNEWS-2024). I am sure that it proves to be an enriching and rewarding experience for both the institute and the participants.

My best wishes to organizers and participants.

Dr. P. Dayananda Pai
Chairman, BMSCE & Life Trustee, B.M.S. Educational Trust



I am happy to learn that the Department of Electronics & Communication is hosting 2nd International Conference on “Networking Embedded and Wireless Systems (ICNEWS-2024). Which provides an opportunity to the students and researchers to enrich their knowledge in the current scenario. Many experts are expected to share their views in the conference and discuss the recent trends.

I would like to congratulate the efforts of the organizers in providing a platform for knowledge sharing. I wish the event a grand success.

Sri. Aviram Sharma

Trustee, B.M.S. Educational Trust



I am pleased to know that the Department of Electronics & Communication is hosting **2nd International Conference on Networking, Embedded and Wireless Systems (ICNEWS-2024)**. At the outset, my appreciation, and congratulations for successfully organizing the International Conference. Education in general and technical education in particular, must be relevant to rapidly changing needs of the society, industry and business houses. The educational environment must be dynamic and quickly adaptable, so that professionals are capable of shouldering all-encompassing global responsibilities. I am confident that this event will be useful to researchers and academicians to enhance their knowledge on the research topics of their chosen field.

I express my wishes and great success to the conference.

Sri. Ravi Venkatesam

Trustee, B.M.S. Educational Trust

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It gives me immense pleasure to express that the Department of Electronics and Communication Engineering is organizing the 2nd International Conference on Networking, Embedded and Wireless Systems (ICNEWS-2024) on 22nd & 23rd August 2024. The conference is a biennial event successfully conducted since 2010 at the national and international level. I would like to thank all the delegates for accepting our invitation to participate in this conference. The conference features eminent speakers from industry, academia, researchers, and students. The topics related to embedded and wireless systems is the main focus area. I believe that the conference will prove to be of immense value in bringing out the best of thoughts and ideas.

I am thankful to our benevolent management for providing needed support and guidance.

I congratulate the HOD, faculty, staff, and students of the department for their efforts in organizing the conference. I would also like to take this opportunity to thank the organizing committee and all those associated with the event, for their planning and efforts in making the conference a grand success.

Wishing ICNEWS 2024 a grand success.

Dr. Bheemsha

Principal, BMSCE

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I would like to congratulate Department of Electronics and Communication Engineering, BMSCE for facilitating knowledge sharing among various researchers, academicians and students. I hope that ICNEWS-2024 will encourage establishment of joint research collaborations with Industry and Academia.

I thank all the delegates for accepting our invitation to participate in this conference. I also thank the participants for joining us and sharing your valuable experiences and ideas. I wish you all a pleasant stay during the conference. I also take this opportunity to thank the organizing committee and everyone involved in the event for their efforts in making the conference a grand success.

Dr. Seshachalam D

Vice Principal - Admin, BMSCE



It gives me immense pleasure to know that the Department of Electronics & Communication Engineering is organizing the 2nd International Conference on “Networking Embedded and Wireless Systems (ICNEWS-2024) on 22nd & 23rd August 2024. I am sure that this conference will provide a forum to national and international students, academicians, researchers and industrialists to interact and involve in Research and Innovation. Such academic events benefit the students, teachers and researchers immensely and widen the horizons of their knowledge and work experience in the field of Networking, Embedded and Wireless Systems.

I sincerely appreciate the humble efforts of the Institute in providing a platform for students, academicians, researchers and industrialists to share their ideas and research outcome through the forum of this Conference.

I give my best wishes to all delegates and the organizing committee to make this event a grand success.

Dr. L. Ravikumar

Vice Principal –Academic, B.M.S.C.E

ECE, BMSCE



It gives me immense pleasure to share my words about the **2nd International Conference on Networking, Embedded and Wireless Systems (ICNEWS-2024)** organized on 22nd & 23rd August 2024 at BMSCE, Bangalore. This two-day conference includes keynote sessions and paper presentations. It provides a vast scope for discussion between academicians, researchers, and scientific communities.

In the era of rapid advancement of technology, this conference would serve as an effective platform for the intellectual exchange of ideas in the field of Electronics, Communication, and its allied domains.

I would like to thank the management of BMSCE, Principal and Vice Principals for their extended support in smooth conduction of the conference. I express my sincere thanks to the sponsors of the event and professional body IEEE for collaborating with ICNEWS-2024.

Dr. Siddappaji
Professor & Head of the Department

Conference Organization

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Chief Guest







Dr. T Srinivas

Professor, Department of Electrical Communication Engineering,
IISc, Bangalore.
Chairman, IEEE Bangalore section

Keynote Speakers:

Day -1 22/08/2024	
 A portrait of Mr. Nataraj Kumar, a man in a dark suit and blue tie, with his arms crossed. He is looking slightly to the left of the camera.	<p>Topic: Healthcare of the future and significance of speed and quality of service through wireless communications</p> <p>Mr. Nataraj Kumar Department Head - Senior Director - Philips Research, Bangalore</p>
 A portrait of Dr. Rahul Shrestha, a man with glasses wearing a dark suit and tie. He is looking directly at the camera.	<p>Topic: VLSI Algorithms to ASIC Chip Fabrications of Spectrum Sensors for Cognitive Radio Network</p> <p>Dr. Rahul Shrestha, PhD, SMIEEE Associate Professor School of Computing and Electrical Engineering Indian Institute of Technology Mandi</p>
 A portrait of Mr. Chandrashekar B U, a man with glasses and a mustache, wearing a light-colored shirt. He is looking directly at the camera.	<p>Topic: VLSI in the Age of AI</p> <p>Mr. Chandrashekar B U Senior Architect, R&D, Solutions Group, Synposys India Pvt. Ltd.</p>

Day -2 23/08/2024	
	<p>Topic: Advances in Wireless Communications & role of AI in 5G, 6G & WiFi 7</p> <p>Dr. M.H.Kori IETE Distinguished Fellow, Technology Advisor, SAGE USA, Former Technical Director, Alcatel-Lucent Technologies, Former Consultant - Telecom Standards Development Society India (TSDSI) Technology Consultant, Former Co-Chair, IEEE ED & MTT Society India, Former Chairman IMAPS India.</p>
	<p>Topic: Impact of Artificial Intelligence in the Industry & AI Ethics</p> <p>Mr. Saurabh Suman Choudhuri Vice President, Global Head of Digital Modalities, SAP America Inc. USA</p>
	<p>Topic: Differential Geometry for neural network analysis</p> <p>Dr. Suhas Sreehari R&D Scientist, Oak Ridge National Lab, USA</p>
	<p>Topic: 5G Advanced and Motivation for 6G</p> <p>Mr. Anindya Saha Chair, IEEE Communication Society, Bangalore Section VP, Wireless Group (CTO Office), TEJAS NETWORKS</p>

Schedule

Track-1	
Research Area: VLSI	
Venue: Seminar Hall , 22 nd Aug'24 3 rd Floor, New Academic Block, 3.30 to 5 PM	
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13	VLSI Design for Error Correcting Codes For Communication Systems
78	Near Memory Computation on Basys 3 FPGA
184	Exploring energy efficient area optimized one-bit full Subtractor circuit for Signal processing application using CMOS and FinFET Technology
231	Novel Design of Unified Re-Configurable Multi-Channel Memory Controller Architecture supporting Standard IO Interfaces for Multi-Memory Management
365	Designing of Robust, Energy Efficient Hybrid Approach for Implementing a 1-Bit Adder
369	Low Power Design and Formal Verification of POSIT Arithmetic Block
370	CAN security acceleration and its verification
373	Label Switched based 2DNoC for streaming platform

Track-2	
Research Area: VLSI	
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376	Performance Analysis of an Energy Efficient 1-Bit Hybrid Full Adder
388	Design and Implementation of LDPC Decoder using VHDL for Space application
402	Low Power Hardware Accelerator for Hash Operations in Modern Processors

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411	Implementation of efficient low power SHA-256 algorithm
422	Quantum-dot Cellular Automata technology to implement digital circuits
427	Design and Synthesis of State Transition Graph Based Area Efficient Sequential Multiplier
429	Energy-Efficient D-Flipflop Circuit using Novel Sleep Transistor in 45nm Technology Node

Track-3	
Research Area: Signal Processing	
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42	Advancements in fECG: Employing Adaptive Noise Cancellation Algorithms for Signal Enhancement
240	Yolo model-based license plate extraction and toll generation for smart parking systems
244	Vision aid for blind people using YOLOV8
259	Role of Hardware Accelerator in Wireless Body Sensor Network: A review
331	Animal detection and recognition in day light videos using deep learning
332	Animal detection in night light videos using deep learning
333	Real-time Snake Detection and Recognition System in Videos using Deep Learning
334	Animal detection and classification: a similarity measure in realtime videos
340	Development of hybrid algorithms for the detection of Infectious Diseases from the X-Ray s images of the Chest Structure of Human Beings
119	Autism Disease Prediction Using Deep Learning & Transfer Learning
358	Image Segmentation for MRI Brain Tumor Detection Using Advance AI algorithm

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118	Next Generation Alcohol Testing Device for Safer Living
123	AWS server less luggage tracking system Integrating IOT
130	Attitude Determination and Control Subsystem for an IoST CubeSat
164	IoT-based Smart Parking System: Hardware-Centric Approach for Addressing Urban Parking Challenges
193	Smart Jacket for Yoga Posture Correction
228	Recent Developments in IoT-Based Air Quality Monitoring and Control

Track-5	
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292	Streamline Your Drive: Pre-Booking & Pre-Paid Parking slots, Locating CNG Stations & EV Charging Stations
387	a data-driven market analysis and prototype development of an assistive device
396	Exploring Sustainable Practices for Energy Conservation in IoT Systems- An Extensive Overview
418	Advanced Solar-Powered Oceanic Environmental Monitoring Buoy: A Comprehensive System for Real-Time Data Collection of Sea Weather Patterns and Pollution Levels
423	IoT-Based Waste Management Devices: A Comprehensive Analysis

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442	SAHARA: A Cloud-based Remote Health-Vitals Monitoring System
452	Non-Invasive Blood Glucose Measurement using NIR Spectroscopy

Track-6	
<p style="text-align: center;">Research Area: Embedded Systems and Communications</p> <p style="text-align: center;">Venue: Seminar Hall , 23rd Aug'24 3rd Floor, New Academic Block, 2.30 to 4 PM</p>	
Paper ID	Title
283	Alcohol Sensing with Engine Locking System and Communication Using GPS GSM Technology
346	Design and Development of a Real-time Monitoring System for ACL Injury Prevention
125	Revolutionizing Post-Conflict Landmine Clearance with UAV Technology
145	SLM-based ABC and PSO implementation for PAPR reduction in FBMC/OQAM System
347	Deep Learning Enhanced RIS Configuration for Urban Scenario
440	Sustainable Piezoelectric Energy Harvesting for Device Charging with RFID Authorization

Track-7	
<p style="text-align: center;">Research Area: Embedded Systems and Communications</p> <p style="text-align: center;">Venue: L-301 , 23rd Aug'24 3rd Floor, New Academic Block, 2.30 to 4 PM</p>	
Paper ID	Title
408	Comparative Analysis of FOPID and PD+PID Controllers for Two-Area LFC in a Thermal Power System with Wind Generation and Battery Energy Storage System
142	Smart LPG Monitoring System: Enhanced Safety with Leakage Detection
165	Elevating Industrial Picker Arm through Software Mechanic Fusion

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180	A deep learning based stream cipher generator for medical image encryption and decryption
339	A Probabilistic Approach on Localization In Wireless Sensor Networks
392	Cloud-Infused AWS Services: Automobile Database Management System
230	Triple Band Monopole Antenna for RFID, Energy Harvesting and Data Communication
398	Viability Analysis of Liquid Metals for Planar Antenna Design at mm-wave 5G Applications

Track-8	
Research Area: AI/ML	
Venue: L-302 , 23 rd Aug'24 3 rd Floor, New Academic Block, 2.30 to 4 PM	
Paper ID	Title
129	Application of Convolutional Neural Networks for Cervical Cancer Detection in Women's Uterus
143	Advancements in AI-Driven Dentistry: Tooth GenAI's Impact on Dental Diagnosis and Treatment Planning
172	Exploring the Integration of Centroid and Deep Sort Algorithms with YOLOv8 Detector for Passenger Counting in Smart Railway Systems
234	Analysis on Utilization of Learning Model In-place of Traditional Demodulation Block
248	Evaluating Public Opinion Through Twitter Sentiment Analysis
277	Enhanced Skin Cancer Detection Through Deep Learning and Random Search Optimization
229	Vision-Guided Pick and Place Systems Using Raspberry Pi and YOLO
441	An Approach for XAI Visualizations for Explainability of Alzheimer's Detection

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Track-9	
Research Area: AI/ML Venue: L-303 , 23 rd Aug'24 3 rd Floor, New Academic Block, 2.30 to 4 PM	
Paper ID	Title
350	Harnessing Machine Learning Approaches for Accurate Energy Demand Forecasting in the Power Sector
351	Utilizing Machine Learning Techniques for Enhanced Predictive Maintenance in the Manufacturing Sector
361	KisanConnect: Reshaping Agricultural Trade with Dynamic Pricing Model
389	A comprehensive step of XAI for Bengali and English text detection and recognition from natural scene images
391	Analysis of Mental Health Disorders from Survey Reports using Time Series based Linear Regression
414	Medical Chatbot
417	Modified Chaotic Map Approach for Medical Record Security
446	Psychometric Precision: ML-Driven Learning Strategies Informed on Big Five Traits
448	Virtual Posture Assistant - Body Posture Assistant using Machine Learning Models and Ergonomics
451	Deep Learning in Semiconductor Devices for Drone Based Wind Turbine Inspections
453	Fine-Tuning Large Language Models for Task Specific Data

Track – 1

Research Area: **VLSI**

Venue: Seminar Hall , 22nd Aug'24 3rd Floor, New Academic Block

paper-id: 13

Title: VLSI Design for Error Correcting Codes For Communication Systems

Authors:Amith S (BMS College Of Engineering); Vrushank Jagadeesh (BMS COLlegeOf Engineering); Chaitanya Deepak V (BMS College Of Engineering); Raees Irfan (BMS College Of Engineering); Anantha Sunil Maligi (BMS College of Engineering)

Abstract:

Bringing sophisticated technology into communication systems requires effective methods to correct errors and ensure reliable data transmission. This project focuses on the design and implementation of error-correcting codes for communication across an Additive White Gaussian Noise (AWGN) channel. We explore various coding techniques including Low-Density Parity-Check (LDPC), Hamming, and Turbo codes. The primary objective is to optimize hardware performance to achieve high efficiency, low power consumption, and high data throughput. Additionally, we evaluate the performance of these error-correcting codes under diverse communication scenarios. Our research aims to enhance the reliability and efficiency of communication systems by employing intelligent design strategies for error correction.

paper-id: 78

Title: Near Memory Computation on Basys 3 FPGA

Authors:Ananya S Bhat (B.M.S. College Of Engineering); Shrisha M R (BMSCE); Anushree J (BMSCE); Imran S (BMSCE); K Nandan Srinivaas (BMSCE)

Abstract: This work focuses on the implementation of an alternative computation architecture- Near Memory Computation to build power and area-efficient processors. The architecture has been implemented on a BASYS-3 FPGA board, with the integration of a RAM module with an N.M.C. module. The power consumption, junction temperature, and LUTs report of both traditional and Near Memory architectures were compared. Near Memory computation was shown to consume eleven times less power than traditional architecture.

paper-id: 184

Title: Exploring energy efficient area optimized one-bit full Subtractor circuit for Signal processing application using CMOS and FinFET Technology

Authors:Srinivasulu Gundala (Lakireddy Bali Reddy College of Engineering); Mohammed Mahaboob Basha (Sreenidhi Institute of Science and Technology); Krishna Samalla (Department of ECE, Sreenidhi Institute of Science and Technology); Nouchu Rahul (Sreenidhi Institute of Science and Technology); Dadapak Sriya (Department of ECE, Sreenidhi Institute of Science and Technology,); Salluri Deepika (Department of ECE, Sreenidhi Institute of Science and Technology)

Abstract: Today's VLSI design places a great deal of importance on static or leaky power usage as technology advances into the nanoscale realm. Energy efficiency is a significant key factor for several

integrated circuits. In the world of modern integrated circuits (ICs) that operate in near-threshold voltage (NTV) is gaining much attention because of its potential for high-performance and energy-efficient designs. In this brief, a 1-bit full subtractor (FS) cell with reduced transistor count is suggested for lower power application by employing C-CMOS and FINFET schemes at different supply voltages for achieving full swing difference and borrows output. A number of metrics, including delay, power consumption, PDP and EDP have been ascertained from the 45nm and 18nm feature size technology node for the implemented circuits both in CMOS and FinFET. The outcomes demonstrate how efficient the FS cell can serve as an arithmetic circuit for unconventional signal processing computing applications

paper-id: 231

Title: Novel Design of Unified Re-Configurable Multi-Channel Memory Controller Architecture supporting Standard IO Interfaces for Multi-Memory Management

Authors: B P Pradeep Varna (Analog Devices Inc.); Jeeru Dinesh Reddy (BMS College of Engineering)

Abstract: Prime capabilities of electronic system handling voluminous incoming data are its ability to collect, interpret, process and store or transmit data. Primary requirement at all these phases is memory devices. Memory controllers are required to access memories of various memory technologies with device specific interfaces. However, coordination of access request by multiple processing elements becomes a challenge when various memories are used in a SOC. Though many software approaches and system architectures have been proposed and explored earlier, there is a necessity to have a dedicated configurable hardware to control and manage memory access and usage. It also acts as hardware accelerator. In this paper, a new novel unified Re-Configurable Memory Controller architecture to support simultaneous operation of multiple memories through different input channels with standard interfaces and protocols for data transfer is proposed. The approach for implementation of the same is provided.

paper-id: 365

Title: Designing of Robust, Energy Efficient Hybrid Approach for Implementing a 1-Bit Adder

Authors: Bynaboyina Aiswarya (VFSTR); Yangalasetty Sai Kumar (Vignan's Foundation for Science, Technology and Research); CH. Bhavana Naga Jyothi (Vignan's Foundation for Science, Technology and Research); Satyajeet Sahoo (Vignan's Foundation for Science, Technology and Research); Aswini Kumar Samantaray (Vignan Foundation for Science, Technology and Research)

Abstract: Hybrid logic is a popular approach for designing full adders (FAs), balancing factors like speed, power, and driving capability. This work proposes a novel 4-transistor (4T) XOR-XNOR circuit for hybrid FAs. It delivers both full swing outputs, crucial for signal integrity, and improved delay performance for faster operation. Circuit performance is evaluated through Cadence Virtuoso simulations using 90nm CMOS technology with a 1.2V supply voltage. Metrics include power consumption and propagation delay, combined to calculate the (PDP). The key innovation of optimized 4T XOR-XNOR design, which significantly reduces PDP compared to conventional circuits. This translates to a more efficient FA, enabling faster computations with lower power consumption. This research not only presents a high-performance XOR-XNOR circuit but also highlights optimization strategies for hybrid FAs, paving the way for advancements in digital arithmetic circuits.

paper-id: 369

Title: Low Power Design and Formal Verification of POSIT Arithmetic Block

Authors: Veena M Hunagund (PES University); Sudeendra K Kumar (PES University, Bangalore)

Abstract: The study is a comprehensive verification of the POSIT arithmetic unit employing formal verification techniques to ensure correctness across diverse input ranges and edge cases. It also includes the conversion techniques from POSIT to Decimal and vice versa. By implementing clock gating effectively, there is a significant reduction in the power consumption of POSIT arithmetic block. To ensure the correctness and reliability of POSIT arithmetic block formal verification is very important. Our formal verification checks the corner cases of the design which could not be done by the simulation-based methods. This work presented is a first formal verification framework for a POSIT arithmetic block, addressing the growing interest in POSIT's potential for efficient and accurate computing. By mathematically guaranteeing correctness and robustness, it paves the way for increased confidence in POSIT-based systems and promotes its broader adoption in various application domains.

paper-id: 370

Title: CAN SECURITY ACCELERATION AND ITS VERIFICATION

Authors: Sunidhi Kulkarni (PES UNIVERSITY); Sudeendra K Kumar (PES University, Bangalore)

Abstract: Recently, Controller Area Network (CAN) has served as the leading communication standard for Embedded Network Protocol (ENP) in the automotive industry. Although the CAN bus is configured for safe communication, it is not efficiently designed for secure communication in automobiles. To overcome this problem, Simon Block Cipher (SBC) based on CAN bus architecture design is introduced. This research focuses on enhancing the efficiency of CAN bus architecture by using the Simon Cipher authentication method. Initially, data is decrypted, and the last 8 bits are checked using a key for authentication. If the authentication is successful, the data is encrypted and forwarded to further CAN modules. This process aims to ensure secure communication within the CAN bus system while optimizing its design for efficiency. The proposed method is named SBC-CAN bus design. This paper discusses the efficient criteria for implementing security solutions for the Controller Area Network system.

paper-id: 373

Title: Label Switched based 2DNoC for streaming platform

Authors: Sridevi S (Cmrit); Indumathi G (Cambridge Institute of Technology)

Abstract: A Network-on-Chip (NoC) is a communication architecture that can be used to facilitate the exchange of data between different components in a System-on-Chip. NoCs primary requirements revolve around Low Latency, Bandwidth Management, Energy Efficiency, Quality of Service. The Label Switching with Bit transition encoder decoder technique enhances power utilization and, at the same time, ensures both guaranteed throughput and conservation of available bandwidth. For a 8 x 8 mesh topology, the LS-based NoC operates on Max flow algorithm, where path is identified with labels provided with actual data. The complete design has been synthesized utilizing Xilinx Design Suite 14.7, delivering a maximum frequency of 360.345 megahertz, latency is 1135 nanoseconds, and the throughput is 5×10^{15} bits per second. The anticipated power is 8.2 mW for binary data, while it increases to 82 mW for processing ECG signals representing a significant reduction compared to the state-of-the-art work.

Track – 2

Research Area: **VLSI**

Venue: L301, 22nd Aug'24 ,3rd Floor, New Academic Block

paper-id: 375

Title: Design of a 10-bit Potentiometric DAC using sky130nm technology using xschem&Ngspice

Authors:Santosh Kumar R (Dayananda Sagar College of Engineering); Kumar P (Dayananda Sagar College of Engineering); Ravikumar S (Dayananda Sagar College of Engineering); Ashwini Gowda H B (Dayananda Sagar College of Engineering); Akshay Nayak (Dayananda Sagar College of Engineering Bangalore); Chetan Patil (Dayananda Sagar College of Engineering)

Abstract: This project details the design and implementation of a 10-bit Digital-to-Analog Converter (DAC) using Sky130nm technology with a binary-weighted structure for high resolution and accuracy. The design process includes specification, circuit topology, transistor-level design, layout, and simulation verification. Digital systems need to interface with the analog world by converting analog signals to digital with ADCs and back to analog with DACs. An n-bit DAC converts a digital word into an analog voltage based on a 3.3 V reference, using a voltage divider with 2N resistors and switches. Hierarchical modelling reduces design complexity and enhances manageability.

paper-id: 376

Title: Performance Analysis of an Energy Efficient 1-Bit Hybrid Full Adder

Authors: Borra Devika (VFSTR); N. Dhathri (Vignan's Foundation for Science,Technology and Research); D. Priya darshini (Vignan's Foundation for Science,Technology and Research); T. Sarayu (Vignan's Foundation for Science,Technology and Research); Satyajeeet Sahoo (Vignan's Foundation for Science,Technology and Research); Aswini Kumar Samantaray (Vignan Foundation for Science, Technology and Research)

Abstract: This paper presents the design and analysis of hybrid adders utilizing transmission gate, CMOS logic, and pass transistor logic. In this work, simulation is conducted using 45nm technology. The adder architecture comprises three main modules: XOR, sum, and carry. The XOR module employs transmission gate logic and CMOS logic, while the sum module integrates transmission gate logic and XOR/XNOR operations. The carry module is built using pass transistor logic. The results demonstrate the effectiveness of the hybrid adder architecture in meeting the demands of modern digital systems while leveraging the benefits of advanced semiconductor manufacturing processes.

paper-id: 388

Title: Design and Implementation of LDPC Decoder using VHDL for Space application

Authors: B P SWATHI (BMS College of Engineering, Bengaluru); Amulya K (B.M.S COLLEGE OF ENGINEERING); Divya Shree K V (BMS College of Engineering, Bengaluru); M N Suma (BMS College of Engineering); Keerthi K (U R Rao Satellite Centre, ISRO)

Abstract: With increase in demand for higher data rates and more complex satellite missions, the need for advanced channel coding techniques has become essential to establish robust and efficient communication links. Given the significant challenges posed by long distances and low signal power levels in deep space communication, the Consultative Committee for Space Data Systems (CCSDS) standard recommends Low Density Parity Check (LDPC) codes for robust error-correcting capabilities and efficiency. The design and Implementation details of Normalized min-sum based LDPC Decoder using VHSIC Hardware Description Language (VHDL) for Space application are provided in the paper. The future work is also identified in the paper.

paper-id: 402

Title: Low Power Hardware Accelerator for Hash Operations in Modern Processors

Authors: Alekhya Raghunath (PES University); Rekha S S (PES University, Bangalore); Sudeendra K Kumar (PES University, Bangalore)

Abstract: Hashing is vital because of its numerous applications in image processing, blockchain technology, cryptographic computing, networking applications, and other domains. One of the most common non-cryptographic applications is the use of hash tables as data structures for data querying, storage, and retrieval. Hashing can reduce the complexity of search and lookup while prioritizing speed and efficiency. Integrating a Hardware-Accelerated Hashing Module into Modern Microprocessors can significantly boost the system performance. A 5-stage 32-bit microprocessor architecture along with hash unit as a special functional unit has been proposed in this paper. The objective of this work is to reduce the power consumption of the microarchitectural design by utilizing the clock gating technique. The experiment conducted on the hardware accelerator achieved a power reduction of 30.96% using this technique.

paper-id: 411

Title: IMPLEMENTATION OF EFFICIENT LOW POWER SHA-256 ALGORITHM

Authors: Komal S Kulkarni (PES University); Sudeendra K Kumar (PES University, Bangalore); Rekha S S (PES University, Bangalore)

Abstract: Secure Hash Algorithm-256 (SHA-256) is widely used in many applications for its high level of security. Many authors have worked on increasing the frequency and throughput of SHA -256 using carry save adder, variable pre-computation and loop unrolling. But applications like RFID and IoT require low power design of SHA-256 where there is constraint on the power. Also, most of the authors have focused on the usage of one type of adder that is Carry Save Adder(CSA). In proposed design, Carry Look Ahead adder(CLA) and Carry Skip Adder(CSkA) are used in the SHA-256 hardware design. Experiment results show that SHA-256 using CLA and CSkA in the critical computational path reduces power, area and delay compared to the CSA. However, in case of CSA, the power is further reduced by using clock gating and power gating techniques to 4.05074mW. Considering the previous works on SHA-256 algorithm, this is the least power achieved in ASIC.

paper-id: 422

Title: Quantum-dot Cellular Automata technology to implement digital circuits

Authors: Sudha K.L. (DSCE); Nandini S M (Dayananda Sagar College of Engineering)

Abstract: Quantum-dot Cellular Automata (QCA) presents an innovative approach to computing, utilizing quantum dots for binary operations instead of traditional transistors. The inherent properties of QCA, including low power dissipation and its efficient cell count, make it a promising candidate for next-generation computing. This paper explores the fundamental principles, recent advancements, and future potential of QCA technology by reviewing recent developments in the field. Additionally, this work explains the implementation of a few basic logic gates and a combinational circuit using QCA Designer software to evaluate performance. The simulated gates and combinational circuits adhere to their functionality and gain benefits from the inherent characteristics of QCA.

paper-id: 427

Title: Design and Synthesis of State Transition Graph Based Area Efficient Sequential Multiplier

Authors: Satyanarayan Padhy (Centurion University of Technology and Management); Prabhat Patnaik (Centurion University of Technology and Management); Abinash Rath (Centurion University of Technology and Management); Sandipan Pine (Centurion University of Technology and Management); Rajesh Kumar Misra (Centurion University of Technology and Management)

Abstract: Combinational multipliers offer speed but demand more silicon area. Thus, sub-operation scheduling with multiple clock cycles can be used for area efficiency. The area required by the combinational multiplier grows geometrically with the word length. Still, the area of a sequential multiplier does not grow significantly with the word length, and the number of clock cycles required to complete multiplication also grows linearly rather than exponentially with the word length. The paper presents the design and synthesis of a sequential multiplier using a state transition graph controller. The proposed multiplier is designed and synthesized using Verilog programming in Xilinx ISE and cadence tool. Simulation results and RTL diagrams are presented in comparison to different size multipliers to validate that the area of the sequential multiplier does not increase exponentially with the multiplier's size increase. FPGA implementation validates its functionality.

paper-id: 429

Title: Energy-Efficient D-Flipflop Circuit using Novel Sleep Transistor in 45nm Technology Node

Authors: Ashish Rathore (National Institute of Technology Jalandhar); Neetu Sood (Dr BR Ambedkar National Institute of Technology, Jalandhar)

Abstract: Many analog, digital, and mixed signals are designed using D-Flipflops. The voltage applied to the circuit during sleep operation must be lowered to prolong battery life and lower power consumption. This study presents the design of D-Flipflops utilizing a novel sleep transistor approach. Also studied the results of D-Flipflop using a novel sleep transistor technique with a D-Flipflop using NAND gate topology. The designs are compared with respect to power, delay, and leakage power. Cadence Virtuoso with 45nm technology is used to help design and simulate the designs. The D-Flipflop using NAND gate topology uses 5.458 μ W power consumption and D-Flipflop using novel sleep transistor uses 196.9 pW power consumption, according to the simulation findings.

Track – 3

Research Area: Signal Processing

Venue: L302, 3rd Floor, 22nd Aug'24, New Academic Block

paper-id: 42

Title: Advancements in fECG: Employing Adaptive Noise Cancellation Algorithms for Signal Enhancement

Authors: Ananya Kiran (BMSCE); Sreevidya M S (BMSCE); Suprith Kumar K S (BMSCE)

Abstract: Monitoring the fetus during pregnancy is crucial for identifying factors that could adversely affect fetal health, preventing intrauterine deaths or causing permanent harm to the fetus. Diverse approaches including fetal electrocardiography (fECG), fetal phonocardiography (fPCG), fetal echocardiography (fECHO), fetal magnetocardiography (fMCG) and cardiotocography (CTG) utilizing Doppler ultrasound are utilized in the surveillance of fetal well-being. The fECG method has been employed for extracting fetal signals. However, proper signal processing is imperative during pregnancy due to contamination by maternal components and disturbances encompassing biological elements such as maternal and fetal movements, breathing, muscle activity, uterine contractions, and technical interferences like electrostatic potentials and network disruptions contribute to the overall noise. This study focuses on the technique of extracting fetal electrocardiogram (fECG) using Active Noise Cancellation.

paper-id:240

Title:Yolo model-based license plate extraction and toll generation for smart parking systems

Authors: Mala S (Siddaganga Institute of technology); Vidyashree H R (Siddaganga Institute of Technology); Kunal Chanda (Siddaganga Institute of Technology)

Abstract: Urbanization has increased vehicular density, worsening parking difficulties and straining infrastructure. Traditional parking systems often face inefficiencies, limited accessibility, and labor-intensive processes, causing congestion and driver frustration. The Smart Car Parking System using image processing techniques alleviate urban parking challenges. By leveraging advanced image processing, the system ensures a seamless and efficient parking experience for drivers and facility operators. Strategically placed cameras capture vehicle images, process using the YOLOv3 model for accurate and secure license plate recognition. The system transmits data to a dynamic database that records vehicle numbers parked within the facility. This innovative approach enhances parking management efficiency and improves overall user experience.

paper-id: 244

Title: VISION AID FOR BLIND PEOPLE USING YOLOV8

Authors:Satvik Sangamkar (Vishwakarma Institute of Information Technology , Pune.); Priyanka D More (Vishwakarma Institute of Information Technology Pune)

Abstract: This assistive system for the visually impaired integrates real-time YOLOv8 object detection with distance estimation and text-to-speech conversion, empowering users with enriched environmental awareness. Leveraging robust datasets and architectures, it identifies over 90 everyday objects amidst clutter while concurrently approximating object proximity through trigonometric translations of size metrics. Audio cues enunciate recognized items and distances in real time for accessibility. This combination of precise visual recognition, spatial metrics, and assistive feedback holds promise for enhanced mobility, independence, and safety during navigation for visually impaired individuals.

paper-id: 259

Title: Role of Hardware Accelerator in Wireless Body Sensor Network: A review

Authors: Swati Mavinkattimath (KLE Dr. M S S C E T, Belagavi); RajashriKhanai (KLE's Dr. M.S.S.C.E.T., Belagavi); Ankita Dattatreya Jogalekar (KLE Dr. M. S Sheshgiri college of engineering and technology); Chandani Lotlekar (KLE's Dr. M.S.S.C.E.T., Belagavi); Madhura V Bhasme (Kle dr.ms SHESHGIRI COLLEGE OF ENGINEERING AND TECHNOLOGY)

Abstract: Although biomedical sensors, low-power wireless communications, and embedded computing have made great strides recently, they still cannot be integrated into critical care environments without a flexible and robust communications infrastructure. To improve healthcare, wireless communication boards for medical devices must support ad-hoc or fixed networks, naming and detection, security, authentication, and vital signs collection and analysis. Advances in wireless communication technology have enabled sensor nodes to be implanted, worn, and implanted throughout the body. Signals captured by the human body can be processed by these tiny devices. The data is then sent to an appropriate destination, where it can be used for research or other diagnostic purposes. This paper describes wireless body sensor networks, their architecture, and protocol stacks. In addition, we discussed security and privacy issues, speed issues, and improvement in the speed using Hardware Accelerator.

paper-id: 331

Title: ANIMAL DETECTION AND RECOGNITION IN DAY LIGHT VIDEOS USING DEEP LEARNING

Authors: Sudharshan Duth P (Amrita Vishwa Vidyapeetham Amrita School of Computing Mysore, India); Chandana P (Amrita Vishwa Vidyapeetham Amrita School of Computing Mysore, India); Dhanyashree AN (Amrita Vishwa Vidyapeetham Amrita School of Computing Mysore, India)

Abstract: Understanding animal movements, their ecological behaviors, and interactions during various time intervals of a day is essential for detecting and recognizing animals. This research focuses on animal detection and recognition in different time intervals of a day to address the challenges posed by varied backgrounds, shadows, illuminations, and blurriness in animal videos. In this study, a set of 10 animals were chosen as classes, and experiments were conducted using the YOLOv5 model to enhance the efficiency and accuracy of animal detection during the day compared to other models. Additionally, various deep learning models such as VGG16, VGG19, Faster R-CNN, and YOLOv5 were employed for experimentation to assess their real-time processing capabilities and accuracy. The results showed that the YOLOv5 model outperformed other models, achieving an 85% accuracy rate for detecting and recognizing animals.

paper-id: 332

Title: ANIMAL DETECTION IN NIGHT LIGHT VIDEOS USING DEEP LEARNING

Authors: Sudharshan Duth P (Amrita Vishwa Vidyapeetham Amrita School of Computing Mysore, India); Maneesha Shibu (Amrita Vishwa Vidyapeetham Amrita School of Computing Mysore, India); Nithyashree M (Amrita Vishwa Vidyapeetham Amrita School of Computing Mysore, India)

Abstract: Nighttime surveillance and monitoring of wildlife are critical for various applications, including conservation efforts, ecological research, and security purposes. Understanding the behavior of animals makes it difficult to predict the presence of animals on roadsides, potentially resulting in human-animal conflicts. This research work provides a novel approach for detecting animals in night time videos using deep learning algorithms. The main aim is to effectively detect and recognize the nocturnal presence of the animal by which surveillance at night and animal wellbeing can be improved by contributing to SDG 3, 11 and 12. In this scenario, a set of 10 animals were taken as classes, and the experimental was carried out for animal detection and recognition utilizing the YOLO v8 model which enhances the efficiency and accuracy of animal detection at night overcoming the challenges of low- light images, blur images and occlusions. 87.49% detection accuracy was obtained.

paper-id: 333

Title: Real-time Snake Detection and Recognition System in Videos using Deep Learning

Authors: Sudharshan Duth P (Amrita Vishwa Vidyapeetham Amrita School of Computing Mysore, India); VARUN K N (AMRITA SCHOOL OF COMPUTING MYSURU); Hemanth Gowda TN (Amrita Vishwa Vidyapeetham Amrita School of Computing Mysore, India); Jeevan Yadav C R (Amrita Vishwa Vidyapeetham Amrita School of Computing Mysore, India); Vinay AP (Amrita Vishwa Vidyapeetham Amrita School of Computing Mysore, India)

Abstract: Snake species identification in videos is paramount for wildlife conservation, sustainable biodiversity, and effective snakebite management, particularly in regions prone to human-snake conflicts. Deep learning presents a promising avenue for automated recognition but faces challenges in generalizability and accuracy, particularly across diverse species and habitats. This research work proposes a novel deep learning framework for snake recognition in videos, emphasizing sustainability and human-snake conflict mitigation. Utilizing YOLO models YOLOv6, YOLOv7, YOLOv8, and YOLOv9 for detection and segmentation, the framework is trained on a meticulously annotated video dataset sourced from snake rescuers in the Mysuru region, India. Validation results demonstrate robust performance, with mean Average Precision (mAP) exceeding 0.85 for detection and 0.94 for segmentation across various snakes.

paper-id: 334

Title: ANIMAL DETECTION AND CLASSIFICATION: A SIMILARITY MEASURE IN REALTIME VIDEOS

Authors: Sudharshan Duth P (Amrita Vishwa Vidyapeetham Amrita School of Computing Mysore, India); Tharun HP (Amrita Vishwa Vidyapeetham Amrita School of Computing Mysore, India); Srikanta Swamy N (Amrita Vishwa Vidyapeetham Amrita School of Computing Mysore, India); Prajwal Nagaraj Bhat (Amrita Vishwa Vidyapeetham Amrita School of Computing Mysore, India); Archith Suresh (Amrita Vishwa Vidyapeetham Amrita School of Computing Mysore, India)

Abstract: Real-time video animal identification has several practical uses in areas including agriculture, security, and wildlife preservation. The purpose of this work is to create a YOLO (You Only Look Once) algorithm-based system for real-time animal recognition and segmentation. The technology will examine footage gathered by cameras placed in natural settings in order to identify and isolate individual animals. The YOLO algorithm is a real-time, high-accuracy object recognition system built on deep learning. To recognize and segment animals, the system will use YOLO models that have already been trained and then fine-tune them through transfer learning. Instant segmentation is utilized for pixel-level animal localization and segmentation in images and videos. In order to examine animal properties including color, texture, and form, similarity measures are distance-based (cosine, jaccard), and feature extraction (imagehash) techniques are used for similarity-based image retrieval.

paper-id: 340

Title: Development of hybrid algorithms for the detection of Infectious Diseases from the X-Ray s images of the Chest Structure of Human Beings

Authors: Manjunath TC (Dayananda Sagar College of Engineering, Bangalore, Karnataka); Pavithra G (Dayananda Sagar College of Engineering)

Abstract: In this paper, the development of hybrid algorithms for the detection of Pneumonia Disease from the human X-Ray s images of the Chest Structure is presented along with the simulated & experimental results. A potentially fatal lung infection caused by many viral infections called pneumonia. Due to its similarities to other lung disorders, pneumonia can be challenging to diagnose and treat on chest s X-Ray s pictures. Chest X-ray pictures is essential to their early diagnoses of pneumonia because they allow for prompt intervention, prevention of complications, and shorter hospital stays. This work proposes a novel approach to pneumonia detection using CNN, VGG16, ResNet152V2 and Gradient Descent optimization deep learning techniques. The system automatically extracts feature using the chest s X-ray s image using CNNs, then uses Gradient Descent optimization to enhance its ability to discriminate between pneumonia patients and healthy cases.

paper-id: 119

Title: Autism Disease Prediction Using Deep Learning & Transfer Learning

Authors: Abhishek Das (North South University); Towhidul Alam (North South University); Md. Zihad Hossain (North South University); Habiba Rashid Lamiya (North South University)

Abstract: The neurological disease known as autism spectrum disorder (ASD) is characterized by impaired social interaction, communication issues, and constrained and repetitive behavior patterns, where timely and accurate ASD prognosis is essential. This study shows the use of deep learning and transfer learning to forecast ASD using a large dataset of clinical and behavioral variables. A sizable dataset with a variety of ASD-related variables, such as demographic data, medical histories, and behavioral assessments, is used to train the models. To make use of pre-learned weights from models trained on generic image recognition tasks. With accuracy rates of 97%, the results show remarkable performance for VGG16 and DenseNet121. Indicating that models like VGG16 and DenseNet121 capture the details of the input data. Overall, the study emphasizes how well deep learning and transfer learning methodologies work to forecast ASD.

paper-id: 358

Title: Image Segmentation for MRI Brain Tumor Detection Using Advance AI algorithm

Authors: Roselinmary S (Anand Institute of Higher Technology); Devadharshini Y (Anand Institute of Higher Technology)

Abstract: Artificial Intelligence (AI) plays a crucial role in detecting and diagnosing brain tumors, primarily utilizing medical imaging techniques such as Magnetic Resonance Imaging (MRI). This initiative aims to employ Roboflow for data annotation and model training, utilizing the YOLOv8 algorithm to precisely handle the detection of brain tumors in MRI scans through image segmentation. The dataset utilized in this project encompasses annotated MRI scans illustrating tumor regions, meticulously prepared and enhanced through the application of Roboflow. YOLOv8, renowned for its expeditious and accurate object detection capabilities, is implemented and fine-tuned utilizing the annotated dataset. Model evaluation incorporates metrics such as Mean Average Precision (MAP), Recall, and Precision. Although YOLOv8 is inherently designed for object detection, this study explores adaptations for image segmentation, treating tumors as distinct classes.

Track – 4

Research Area: **IoT**

Venue: L303, 3rd Floor, 22nd Aug'24, New Academic Block

paper-id: 106

Title: Advanced IoT and Machine Learning Solutions for Railway Safety

Authors: Rashmi Rani Samantaray (HKBK College Of Engineering); Abdul Azeez (HKBK College of Engineering)

Abstract: Railway Track Tracer technology for Creature Detection is a technology that detects cracks in railway tracks. This method will assist to prevent numerous rail accidents. This device frequently checks the railway tracks with a camera to detect cracks and take appropriate precautions to prevent accidents. This technology is used to update the platform availability for the approaching train in order to prevent accidents. To detect a fire and shut down the engine automatically. In this project, we created the train track security and monitoring application. In which we monitor the rails, i.e. train tracks, with an automated robot that we pass through this track, detecting and inspecting the track status such as curves and damages, and we control this bot remotely, so we get all of this data via an android app, allowing us to monitor the track in real time with track fault detection. So, with this information, we can avoid problems such as accidents and train delays caused by poor tracks.

paper-id: 118

Title: Next Generation Alcohol Testing Device for Safer Living

Authors: JVN RAMESH (KL UNIVERSITY); Prakasa Rao Yallamati (konerulakshmaiah education foundation); .Sabitha Kumari Francis (Malla Reddy Engineering College); John Samuel Babu G (MLR Institute of Technology); Vikram Neerugatti (Jain (Deemed - to - be University)); Sayujaya Sharma (Jain University)

Abstract:

In today's transportation landscape, road travel remains a dominant mode due to its accessibility and affordability. However, the prevalence of road accidents poses a significant risk, often attributed to human error or vehicle malfunctions, with alcohol consumption being a contributing factor. To address this, a proposed system utilizing a microcontroller (Arduino), an alcohol sensor (MQ-3), and a Buzzer aims to augment road safety for both drivers and passengers. The system's core relies on the alcohol sensor's capability to detect intoxicated individuals—whether drivers or passengers. If the sensor detects alcohol in the driver, it triggers an engine lock mechanism (designed for electric vehicles), preventing operation. Similarly, should an intoxicated individual attempt to board as a passenger, access is denied, particularly safeguarding vulnerable passengers such as women.

paper-id: 123

Title: AWS server less luggage tracking system Integrating IOT

Authors: PRABHESH YADAV (Jain University); Aditi Maharjan (Jain University); Chulindra Rai (Jain University); Ajay Kumar Mandal (Jain University); BASAVARAJU D R (JAIN UNIVERSITY)

Abstract:

With an annual global air travel population exceeding two billion passengers, the escalating issues of lost luggage and the environmental impact of disposable paper adhesive tags have prompted the aviation industry to enhance luggage tracking mechanisms. This study examines the existing implementation of Amazon Web Server (AWS), Radio Frequency Identification (RFID) in luggage handling systems and advocates for the adoption of Internet of Things (IoT) technology to develop reusable luggage tags, aiming to streamline aviation luggage processes, bolster tracking efficiency, and contribute to environmental conservation. Although the occurrence of such cases is found to be about 5%, it is important to note that regular traffic of air services is in millions. This proposed system can be installed in baggage through which user can track their baggage and chances of losing them reduces to greater extent.

paper-id: 130

Title: Attitude Determination and Control Subsystem for an IoST CubeSat

Authors: Amaresh S (Government Engineering College, Bartonhill); Anaswara B S (GECBH); Aleeta Albert (Government Engineering College, Bartonhill); Abhirami S S (GEC Barton Hill, Thiruvananthapuram); Sanil K Daniel (College of Engineering, Trivandrum)

Abstract:

This paper discusses the design and development of a hardware prototype for the Attitude Determination and Control Subsystem (ADCS) of a CubeSat. The prototype developed is based on the design and structure of a (1U) CubeSat which are widely used in the IoST domain. It encompasses several subsystems, out of them ADCS holds significant importance. The ADCS must be designed within stringent mass, size, and energy constraints. Additionally, CubeSat typically has limited sensing, computing capabilities, highlighting the necessity for minimal design and efficient algorithms. In such cases developing an effective ADCS presents a significant challenge. The attitude determination phase utilizes sensor data as inputs to compute an optimal Quaternion estimator. Attitude control relies on actuation with magnetorquers. The selection of hardware and algorithms takes into account system requirements, limitations and both theoretical and practical considerations and this paper discusses it.

paper-id: 164

Title: IoT-based Smart Parking System: Hardware-Centric Approach for Addressing Urban Parking Challenges

Authors: Jenila C (Kalasalingam Academy of Research and Education); Harshan K (Kalasalingam Academy of Research and Education)

Abstract:

In densely populated urban areas, the scarcity of parking spaces poses a significant challenge, leading to congestion, increased traffic, and unauthorized parking. Our solution leverages a sophisticated combination of advanced hardware components, including highly sensitive infrared sensors for precise vehicle detection, an Arduino UNO microcontroller for seamless control, a servo motor for automated

vehicle entry, and an LCD display for providing real-time parking status updates to users. By automating the process of parking slot recognition, our system aims to not only alleviate congestion and traffic woes but also deter illegal parking practices, thereby enhancing the overall parking experience for urban commuters. This paper meticulously details the design, implementation, and outcomes of our innovative approach, underscoring its efficiency and affordability.

paper-id: 193

Title: Smart Jacket for Yoga Posture Correction

Authors: Akash G (Dayananda Sagar University); Aman Kumar (Dayananda Sagar University); Dheeraj A (Dayananda Sagar University); Hemanth M N (Dayananda Sagar University); SuprajaEduuru (Dayananda Sagar University)

Abstract:

Yoga is becoming increasingly popular, and people all around the world are starting to practice it. Practicing Yoga with the right postures is advantageous. However, finding an instructor to monitor the appropriateness of yoga poses can be challenging at all the times. Hence, a smart jacket is designed for yoga posture correction that integrates various components including an ESP32 Microcontroller, MPU6050 Angle Sensor, Organic Light Emitting Diode (OLED) displays, flex sensors, and a touch sensor. PCB design is facilitated by EasyEDA, simulation by Wokwi, coding by Arduino Uno, and cloud data processing by ThingSpeak. This paper elucidates the design process, system architecture, implementation specifications and potential applications of the smart jacket, providing insights into its efficacy in aiding yoga poses. This innovative approach enhances user experience and ensures proper posture alignment, catering to the rising demand for real-time posture correction during yoga.

paper-id: 228

Title: Recent Developments in IoT-Based Air Quality Monitoring and Control

Authors: Sanjeev Kushal Pendekanti (Manipal Institute of Technology); SudikshaKottachery Kamath (Manipal Institute of Technology); Rashmi Naveen Raj (MIT,Manipal)

Abstract:

Addressing global air pollution, a critical public health and environmental challenge, this study explores how Internet of Things (IoT) technology can transform air quality monitoring and control. It details the progress of IoT systems across urban, industrial, and agricultural sectors, featuring the integration of 5G, artificial intelligence, machine learning, and blockchain. The paper highlights IoT platforms designed for air quality assessment and strategies to enhance air management in indoor spaces, emissions, and waste processes. It also emphasizes the role of data in policy-making, enhancing public engagement, and developing smarter infrastructure. Looking forward, the study suggests merging satellite and drone technologies with terrestrial monitoring to advance air quality management, offering a sustainable, tech-driven solution to combat air pollution for healthier communities.

Track – 5

Research Area: **IoT**

Venue: L308, 3rd Floor, 22nd Aug'24, New Academic Block

paper-id: 282

Title: A Unified Vista and Juxtaposed Study on k -ary Search Algorithms

Authors: Anurag Dutta (Government College of Engineering and Textile Technology, Serampore); Samrat Ray (IIMS Pune); Pijush Kanti Kumar (Government College of Engineering and Textile Technology, Serampore); Ramamoorthy A (Velammal Engineering College); Chandrasekar Pradeep (MVJ College of Engineering, Visvesvaraya Technological University, Bangalore); Sharmistha Gayen (Modern Institute of Engineering and Technology, Bandel)

Abstract:

With the surge in global development accompanied by adverse improvements in technology, data aspects have caught a great height these days. In this research, we have worked out a unified inequality relating to the generic version of the class of Binary Search, i.e., k-ary Search Algorithms. A detailed comparative study is done on the average case computational complexity k-ary search for different parities of 'k'. As per the studies conducted in the research, the summation of all computational complexities for even values of k is greater than the summation of all those for odd values of k. Further, a relation between the average case computational complexity and the partitional parameter k is derived with mathematical rigor; As per the results obtained in the research, they follow an inverse relationship, which have been established mathematically and graphically in the research.

Paper-id: 292

Title: Streamline Your Drive: Pre-Booking & Pre-Paid Parking slots, Locating CNG Stations & EV Charging Stations

Authors: Sagar R Kalaburgi (Reva University); Dr.Prameela N Kumari N (REVA University); JYOTHI SWAROOP B (Reva University); Sakshi Patil (Reva University)

Abstract:

Urbanization has led to the increase in Commercial places frequently visited by people. Having so many options for travelling, humans usually prefer their own vehicles when commuting to these areas. Due to the availability of limited parking slots in malls and public places, parking of vehicles is one of the major concerns in the existing scenario. Also, transformation from petroleum-based vehicle to ecofriendly Electrical and CNG vehicles demands for dynamic location of EV Charging points and CNG stations. The need of the hour is to develop an application to streamline the parking and location of nearby charging stations. "Streamline your drive" revolutionizes urban mobility by helping users effortlessly locate nearby parking spaces, including pre-booking and pre-paid options for both free and paid spots in crowded public spaces. It also assists in finding nearby EV charging points and CNG stations, promoting sustainable transportation.

paper-id: 387

Title: a data-driven market analysis and prototype development of an assistive device

Authors: Santhosh B. Jkumar (Amrita Vishwa Vidyapeetham); Shrutha P (Amrita Vishwa Vidyapeetham); Shobha Mary Varghese (Amrita Vishwa Vidyapeetham); Thrisha Das (Researcher); Sayantika Sarkar (Amrita Vishwa Vidyapeetham)

Abstract:

The proposed work landscape of assistive devices available for differently-abled individuals in India. The study encompasses a comprehensive market analysis of existing assistive devices based on their import and export details for the current year with offering insights into the growth in the usage of assistive devices for the current year 2024. Work investigates the wide knowledge of the existence of such devices in the society by carrying out a manual survey and comparing the obtained results which aids in identifying patterns within this critical domain along with the prototype development of an assistive device “Smart Stick” for the visually impaired. Showcasing the market growth of various assistive devices purchased across various countries like India, Vietnam, US etc through implementation of one such robust machine learning technique like ARIMA integrated auto regressive moving average (ARIMA) for predicting time series data. The entire work for dying need for differently abled.

paper-id: 396

Title: Exploring Sustainable Practices for Energy Conservation in IoT Systems- An Extensive Overview

Authors: Kavita Agrawal (Integral University); Shish Ahmad (Integral University)

Abstract:

The Internet of Things (IoT) is emerging as a concept enabling seamless communication and data exchange among devices. This paper addresses the imperative of energy-saving techniques in IoT, aiming to provide a comprehensive understanding of methodologies to mitigate power consumption challenges. This review identifies various relevant papers aiming at energy conservation, energy harvesting, and energy efficiency. It was identified that among all the energy consuming parameters, data transmission is the prominent consumer of energy. Therefore, to reduce energy usage, we have to downsize the data to be transmitted. Techniques explored include data compression, aggregation, low-power hardware, duty cycling, energy-efficient protocols, energy harvesting, offloading computations, and computational intelligence-based methods. Key answers reveal a diverse landscape of research contributions, with significant emphasis on data aggregation and computational intelligence.

paper-id: 418

Title: Advanced Solar-Powered Oceanic Environmental Monitoring Buoy: A Comprehensive System for Real-Time Data Collection of Sea Weather Patterns and Pollution Levels

Authors: Preethi Prabhu.k (Sahyadri College Of Engineering and Management); Deeksha D Shetty (Sahyadri College Of Engineering and Management); Kartik Maruti Shetti (Sahyadri College Of Engineering and Management); Zhenkar T M (Sahyadri College Of Engineering and Management); Babitha Hemanth (Sahyadri College Of Engineering and Management)

Abstract:

With its integration of sustainability and real-time data collection, the Solar Sea Weather and Pollution Transmitter Buoy marks a significant development in ocean monitoring technology. It uses solar energy to run effectively and independently, reducing the requirement for outside power sources and its environmental impact. With the help of its extensive sensor suite, which continuously analyzes important factors including air quality, pollutant levels, and water quality. With strong communication capabilities, it sends this data in real time, allowing for prompt reactions to new risks and promoting teamwork in

ocean management and conservation. By providing stakeholders with the necessary information, this buoy acts as a beacon of innovation in the battle against marine pollution and climate change giving interested parties the information they need to safeguard our oceans for coming generations.

paper-id: 423

Title: IoT-Based Waste Management Devices: A Comprehensive Analysis

Authors: Neha Gupta (Manav Rachna International Institute of Research and Studies Faridabad, India); Mridula Batra (Manav Rachna International Institute of Research and Studies Faridabad, India); Kavita Arora (Manav Rachna International Institute of Research and Studies, Faridabad); Rashmi Aggarwal (Manav Rachna University, Faridabad, India)

Abstract:

Waste management has become an important challenge that threatens biodiversity, puts public and environmental health at risk, and slows down economic efficiency. The paper provides a comprehensive description of IoT-based waste management devices, including their technology components and potential utility in a waste management role. A review of the effectiveness of a range of IoT waste management systems is being conducted, and the functional differences and pros and cons of each system are also being analyzed. Furthermore, we discuss the acceptance of these devices by cloud computing and data analytics for improved decision-making and resource use optimization. The results demonstrate the high performance achievement in increasing waste collection efficiency, recycling rates, and sustainability strengthening through the application of internet of things (IoT)-based waste management solutions.

paper-id: 442

Title: SAHARA: A Cloud-based Remote Health-Vitals Monitoring System

Authors:ChennagiriRajarao Padma (Dayananda Sagar College of Engineering); Arbind Gupta (Dayananda Sagar College of Engineering); Roopa MS (Dayananda Sagar College of Engineering); J Nagaraja (Dayananda Sagar College of Engineering); Mahesh N (Dayananda Sagar College of Engineering)

Abstract:

We present a novel system model “Sahara”, integrating temperature and pulse sensors to record patient health vitals. Portable devices equipped with sensors collect patient data, wirelessly transmitted to the cloud. Doctors can access this data through a secure web interface for remote diagnosis and treatment. The system ensures a simple user interface, independence from electricity, and low-cost data aggregation. By leveraging readily available technology, this system could significantly improve healthcare access in rural India. Data is transferred to the cloud using a WiFi module and stored in Amazon Web Services (AWS), accessible to authorized doctors via a web interface. Implementation details include user registration, appointment scheduling, and data integration. Finally, it discusses the system's results and potential impact on rural healthcare, highlighting telemedicine's role in improving accessibility, reducing costs, and enhancing healthcare delivery in remote areas.

paper-id: 452

Title: Non-Invasive Blood Glucose Measurement using NIR Spectroscopy

Authors:Dr. Hema Priyadarshini (Dayananda Sagar College of Engineering); Vrinda G Bhat (Dayananda Sagar College of Engineering); Lavanya B M (Dayananda Sagar College of Engineering); Naveen T S (Dayananda Sagar College of Engineering); Praveen B S (Dayananda Sagar College of Engineering)

Abstract:

Diabetes, marked by insufficient insulin or ineffective utilization, leads to hyperglycemia, causing severe organ damage and increasing complications like heart disease. To improve glucose monitoring, this project develops a low-cost, non-invasive device using near-infrared (NIR) spectroscopy. The prototype includes a light source, receiver, and processor. NIR light at 1550 nm is directed through the finger, with the attenuated light converted into a voltage signal, and processed to display glucose levels. Linear regression establishes a relationship between voltages and glucose concentrations, validated through comparative analysis. This approach enhances diabetes monitoring, promoting better patient compliance and healthcare outcomes.

Track – 6

Research Area: **Embedded systems and Communications**

Venue: Seminar Hall , Date:23/08/2024 , 3rd Floor, New Academic Block

paper-id: 283

Title: Alcohol Sensing with Engine Locking System and Communication Using GPS GSM Technology

Authors: Akash R Hebsur (CMR Institute of Technology); MadhusriEedara (CMR Institute of Technology); Manjunath V Gudur (CMR Institute of Technology); Ranjit Vitthal Pawar (Borgwarner)

Abstract: This research presents the design and implementation of an integrated safety system for vehicles aimed at enhancing road safety, deterring impaired driving, mitigating rash driving behaviors, and preventing vehicle theft. The alcohol detection component utilizes an MQ3 sensor to accurately measure alcohol concentration in the driver's breath. When the concentration exceeds predefined thresholds, the system triggers appropriate responses, including engine immobilization and alerts. Rash driving behaviors are detected using accelerometers and gyroscopes, which analyze vehicle motion data in real-time. An engine locking mechanism immobilizes the vehicle's engine in response to detected alcohol presence or rash driving behaviors, enhancing safety and preventing further operation of the vehicle. GPS tracking enables real-time monitoring of the vehicle's location and transmission of location data to designated contacts or authorities in emergencies, accidents.

paper-id: 346

Title: Design and Development of a Real-time Monitoring System for ACL Injury Prevention

Authors: R Harinandan (Dayananda Sagar College Of Engineering); Mahesh Kumar N (Dayananda Sagar College of Engineering); Pratyush . (Student); Vamshi Puram (Student); ChennagiriRajarao Padma (Dayananda Sagar College of Engineering); KruthikaHirebasur Krishnappa (Southern University and A&M College); Jahnavi Rohini Raghunandan (Student)

Abstract: Anterior Cruciate Ligament (ACL) injuries are common in sports and can have long-term effects, often requiring intensive rehabilitation. This work presents the creation, assessment, and proof of concept of an electronic monitoring tool designed to identify and prevent ACL injuries. Using the analysis of biomechanical data in real-time, providing immediate feedback on movement patterns, such as slowing walking pace or restricting certain angles to avoid injury risks. The device employs wearable sensors like the MPU6050 (accelerometer/gyroscope) and Electromyography (EMG) sensors. Laboratory tests and field trials assessed its effectiveness and usability, showing its potential to improve athlete performance, prevent injuries, and enhance rehabilitation outcomes. The findings suggest that using an electronic monitoring device could reduce ACL injury risks and improve sports training regimens.

paper-id: 125

Title: Revolutionizing Post-Conflict Landmine Clearance with UAV Technology

Authors: sufiabanu (HKBK CE)

Abstract: In regions devastated by war, landmines and explosive remnants of conflict pose a persistent threat to civilian safety and well-being. These hidden dangers, buried beneath the ground or concealed within rubble and debris, are grim reminders of past conflicts, continuing to cause harm long after hostilities have ended. The pervasive fear of accidental detonations, injuries, and fatalities hinders the return of displaced communities, access to essential services, and efforts to rebuild shattered infrastructures and economies. Humanitarian demining using Unmanned Aerial Vehicles (UAVs), also known as drones, has emerged as a revolutionary approach in the fight against landmines. These remotely piloted or autonomous flying machines offer a safer, faster, and potentially more cost-effective method for demining compared to traditional techniques. This paper explores the latest advancements in UAV technology specifically designed for humanitarian demining.

paper-id: 145

Title: SLM-based ABC and PSO implementation for PAPR reduction in FBMC/OQAM System

Authors: Rashmi Rani Samantaray (HKBK College Of Engineering)

Abstract: This paper compares two approaches, ABC-SLM and PSO-SLM, leveraging Artificial Bee Colony (ABC) and Particle Swarm Optimization (PSO) optimization techniques to address the challenge of high Peak-to-Average Power Ratio (PAPR) in Filter Bank Multicarrier (FBMC) systems. High PAPR poses a significant hurdle in multi-carrier systems, impacting efficiency and performance. Traditionally, the Selective Mapping (SLM) technique has been employed to mitigate PAPR issues. When compared to the conventional SLM-based FBMC signal, both ABC-SLM and PSO-SLM exhibit substantial PAPR reduction. Simulation results show that original SLM alone achieves a PAPR of 5.19 dB. ABC-SLM achieves a PAPR of 5.16 dB and ABC-PSO achieves 4.97 dB, at a complementary cumulative distribution function value of 10^{-3} , the FBMC signal incorporating ABC-SLM and PSO-SLM achieves a remarkable reduction in PAPR

paper-id: 347

Title: Deep Learning Enhanced RIS Configuration for Urban Scenario

Authors: Aravindan SM (Madras Institute of Technology , Anna University); Ramana Srivats Suresh (Madras Institute of Technology, Anna University); Shri Harish S (Madras Institute of Technology, Anna University); Prakash P (Madras Institute of Technology); Kasthuri P (Madras Institute of Technology)

Abstract: This work introduces a significant advancement in Reconfigurable Intelligent Surfaces (RIS) to optimize wireless systems. Our RIS architecture integrates sparse channel sensors and a deep learning model inspired by AlexNet, addressing the challenge of channel estimation efficiently. With most elements passive and only a few actively connected to the baseband, our approach requires just 4000 data points to achieve performance close to the upper bound, outperforming existing methods. Utilizing the DeepMIMO dataset enhances data efficiency, minimizing training overhead while achieving high accuracy and efficiency gains. Specifically, our method attains the maximum achievable data rate with a significantly reduced dataset size. Traditional methods required over 30,000 samples for similar performance, but our model achieves comparable results with only 4000 data points. This represents a

significant advancement in data efficiency, reducing the required dataset size by more than 86%.

paper-id: 440

Title:Sustainable Piezoelectric Energy Harvesting for Device Charging with RFID Authorization

Authors:Prajeet Kulkarni (BMS college of engineering); Sanjana A Hoskote (BMS college of Engineering); Shreyas S (BMS College of Engineering); Radha R C (BMS COLLEGE OF ENGINEERING)

Abstract:This paper explores the development of a footstep based power generation system utilizing piezoelectric sensors for the secure charging of devices, such as mobile phones, through RFID technology. The rapid increase in carbon footprint due to the extensive use of non-renewable energy sources necessitates the adoption of alternative renewable energy solutions. The system harnesses mechanical energy from human footsteps, converting it into electrical energy via piezoelectric sensors embedded in walkways or flooring. The proposed system with 20 piezoelectric sensors generates an average voltage of 2.4 V and an average power output of 3.6 mW. The generated power is stored in batteries, which can then be used to charge mobile devices. Additionally, RFID technology is integrated to ensure secure and authorized access to the charging stations, preventing unauthorized usage and enhancing user security.

Track – 7

Research Area: **Embedded systems and Communications**

Venue: L301, Date:23/08/2024,3rd Floor, New Academic Block

paper-id: 408

Title: Comparative Analysis of FOPID and PD+PID Controllers for Two-Area LFC in a Thermal Power System with Wind Generation and Battery Energy Storage System

Authors: Nishant Saxena (Tula's Institute Dehradun); Pawan Agarwal (Graphic Era Hill University, Bhimtal Campus); nagendrakumar (GLBITM, Greater Noida); shwetagoyal (graphic era deemed to be university); Sunil Semwal (Tula's Institute, Dehradun); Isasar Ahamad (Integral University Lucknow)

Abstract: The objective of this study is to assess the efficiency of a PID controller in load control (LFC) within the context of mining operations. Enables load frequency control for thermal power systems in two area. This study aims to compare the performance of FOPID and proportional-derivative (PD) plus proportional-integral-derivative (PID) controllers. The first location utilizes wind energy, whereas the second site employs BESS. In this study, the efficacy of control technology and dynamic reaction is assessed by conducting simulations of system operation and impact. The grid frequency and voltage can be influenced by an imbalanced load-voltage ratio. According to the statistics, the FOPID controller demonstrates superior performance in reducing drift and enhancing stability compared to the PD+PID controller.

paper-id: 142

Title: Smart LPG Monitoring System: Enhanced Safety with Leakage Detection

Authors:VARSHA P HOTUR (MVJCE); Lynsha Helena Pratheeba HP (CMR Institute of Technology); Prianka R R (New Horizon college of Engineering); Padmavathi M (Dayananda Sagar college of engineering); KottaimalaiRamaraj (Kalasalingam Academy of Research and Education); ThilagarajMaiman Singh (MVJ College of Engineering)

Abstract: Gas leaks can lead to significant accidents causing both material damage and harm to individuals. Two significant factors that contribute to gas leaks are inadequate upkeep of systems and inadequate public awareness. Therefore, the detection of Liquefied Petroleum Gas (LPG) leaks is crucial in order to prevent accidents and safeguard human lives. LPG cylinders are so important to our everyday existence, making it essential for users to keep track of their gas levels to manage consumption effectively. Monitoring usage not only helps users stay informed about their LPG levels but also ensures timely booking of a new cylinder when needed. Given the high flammability of LPG, gas leakage poses serious risks, leading to accidents with potential loss of lives and property damage. To address these concerns, this project introduces a comprehensive LPG level monitoring system with leakage detection.

paper-id: 165

Title: Elevating Industrial Picker Arm through Software Mechanic Fusion

Authors:rupalisachinpatil (bharatividyapeeth college of engineering,navimumbai); Aniket Apraj (Bharati Vidyapeeth College of Engineering, Belpada, Navi Mumbai,); Sahil Suresh Bhosale (Bharati Vidyapeeth College of Engineering, Belpada, Navi Mumbai,); SrushtiBorikar (Bharati Vidyapeeth College of Engineering, Belpada, Navi Mumbai,); Anushka Chauhan (Bharati Vidyapeeth College of Engineering, Belpada, Navi Mumbai,)

Abstract: The manual operations that are performed in logistic warehouses like the separation of packages from clusters and their placement in the appropriate drop zones require immense human effort. Existing large production facilities use robotic arms for segregation, but because they can only pick up packages from predefined positions and drop them in designated zones, they are unable to manage packages that are stacked randomly. Our project presents an industrial robotic arm with sophisticated weight and dimension based sensing capabilities in order to get over this restriction. This robotic arm locates desired products in clusters that are randomly placed and drops them precisely in the right spots on the conveyor belt. The arm, which uses computer vision and machine learning algorithms, provides a workable way to expedite the process of segregation in a variety of industries, such as food and beverage, medical, and more.

*paper-id:*180

Title: A DEEP LEARNING BASED STREAM CIPHER GENERATOR FOR MEDICAL IMAGE ENCRYPTION AND DECRYPTION

Authors:KEERTHANA P (IFET COLLEGE OF ENGINEERING); THIRUMALAI VASAN N (IFET college of engineering); Vigneshwari K (IFET COLLEGE OF ENGINEERING)

Abstract: In particular, the necessity for medical image encryption is becoming more and more important to protect patient privacy about their medical imaging data. The private key that is generated by this unique deep learning-based key generation network (Deep-KeyGen) stream cipher generator might be used to encrypt and de-crypt medical images. The sort of learning network used in Deep-KeyGen to produce the private key is the generative adversarial network (GAN). Moreover, the learning network is intended to be guided in realizing the private key generation process by the trans-formation domain, which stands for the "style" of the private key to be generated. DeepKeyGen's goal is to locate the mapping link between the original image and the private key. DeepKeyGen is evaluated using three distinct data sets: the Montgomery Township chest X-ray, the BraTS18, and the Ultrasonic Brachial Plexus.

*Paper-id:*339

Title: A Probabilistic Approach on Localization In Wireless Sensor Networks

Authors:sean laurel rex bashyamronnie (Vellore Institute of Technology); Renuga Devi S (Vellore Institute of Technology)

Abstract: Wireless Sensor Networks (WSNs) consist of small sensor nodes designed for monitoring physical parameters in surveillance and other applications. Accurate node deployment and location are crucial for effective monitoring. Localization methods like range-free, range-based, and angle-based

techniques determine node coordinates. Techniques such as triangulation, trilateration, multi-lateration, Angle of Arrival (AoA), Time Difference of Arrival (TDoA), etc., are employed to locate unknown nodes. Factors affecting node localization accuracy are explored, alongside mathematical models for probabilistic estimation of single and multiple node positions. This paper offers insights into enhancing traditional localization models and improving future research in the field.

Paper-id:392

Title:Cloud-Infused AWS Services: Automobile Database Management System

Authors:UthejKaramalapudi (Amrita School Of Computing, Amrita Vishwa Vidyapeeth, Bengaluru); Nagandla Krishna Sai Keerthan (Amrita School of Engineering - Bengaluru); Nikhil Kumar (Amrita School of engineering); Beena B M (Amrita School Of Computing)

Abstract:Cloud-based Automobile Database Management System serves as specialized software application dedicated efficiency managing databases hosted on cloud infrastructure,encompassing both system hard drives and network servers.In context of organizing

paper-id: 230

Title: Triple Band Monopole Antenna for RFID, Energy Harvesting and Data Communication

Authors:Thuppathi Rahul (Amrita Viswa Vidyapeetham); Devisowjanya P (Amrita school of engineering chennai)

Abstract:

A growing amount of attention has been placed on the effective use of radio frequency (RF) waves for energy harvesting integrations of RFID with wireless communication systems and Internet of Things (IoT) applications. This work investigates multi-band energy harvesting utilizing a monopole antenna, with a specific concentration on three different frequency bands. The monopole antenna provides adjustable performance in a variety of frequency ranges. A wide range of wireless communication applications are supported by the antenna's ability to transmit and receive data across long distances, as evidenced by the higher frequency band [4 - 4.7 GHz] that is set aside for data communication. The radiation pattern and the antenna's gain at frequencies of 2.4 GHz and 4.3 GHz is 3.040 dB and 3.464 dB. To evaluate the antenna's performance in RFID applications, the power conversion efficiency is calculated. With the use of a rectifier, the designed antenna has produced a 50% efficiency.

paper-id: 398

Title: Viability Analysis of Liquid Metals for Planar Antenna Design at mm-wave 5G Applications

Authors:ChetlapalliKrishna Shreyanth (Supply chain analytics, Rutgers university, USA); Karthikeya G.S (BMSCE); Arpan H Desai (Pandit Deendayal Energy University); Yi-Fan Tsao (National Yang Ming Chiao Tung University); FerozMorab (BMS College of Engineering); Heng Tung Hsu (International College of Semiconductor Technology National Yang Ming Chiao Tung University Hsinchu, Taiwan)

Abstract:

This paper presents a comprehensive viability analysis of using liquid metals in planar antenna design for mm-wave 5G applications. The study explores the unique properties of liquid metals, such as their high

conductivity and flexibility, which make them promising candidates for next-generation antenna materials. Firstly, the transmission line model is analysed using liquid metals like mercury, gallium, indium, and tin (Galinstan), and EGaIn nanoparticles. Later, an inset-fed antenna was realized, and the performance in terms of reflection coefficient, radiation patterns, gain, and efficiency was observed. Our findings demonstrate that liquid metals show similar trends to copper material with decent results. This research underscores the potential of liquid metals to revolutionize planar antenna design, paving the way for advanced, high-performance mm-wave 5G communication systems.

Track – 8

Research Area: **AI/ML**

Venue: L302, 3rd Floor, Date:23/08/2024,New Academic Block

paper-id: 129

Title: Application of Convolutional Neural Networks for Cervical Cancer Detection in Women's Uterus

Authors: JVN RAMESH (KL UNIVERSITY); Visalakshi j (CMR Institute of Technology); Uday Kishore Ganjikuntla (CMR College of Engineering & Technology); John Samuel Babu G (MLR Institute of Technology); Vikram Neerugatti (Jain (Deemed - to - be University)); Yashika S (Jain (Deemed - to - be University))

Abstract:

An HPV infection is frequently the cause of cervical cancer, the fourth most prevalent type of cancer that mostly affects women's cervixes. Early vaccination of women may be the key to its eradication, but this effort is fraught with difficulties, particularly in middle-class or lower-income nations where access to healthcare is scarce. In this paper, a novel method for detecting cervical cancer using medical image processing techniques and Convolutional Neural Networks (CNNs) is presented. A serious health risk is cervical cancer, especially in areas with poor access to medical facilities. By using CNNs to analyse medical pictures, such as pap smears and cervical scans, the suggested approach seeks to overcome this difficulty by enabling the early identification of abnormalities in the cervical region that may be signs of cancer or precancerous lesions.

paper-id: 143

Title: Advancements in AI-Driven Dentistry: Tooth GenAI's Impact on Dental Diagnosis and Treatment Planning

Authors:Anirudh Shankar (Ramaiah University of Applied Sciences); Dr. Jyothi A P (Ramaiah University of Applied Sciences); Ashwath Narayan JR (Ramaiah University of Applied Sciences); MONISHA T R (ramaiah university of applied sciences); Skanda S Kumar (Ramaiah University of Applied Sciences); Aishwary Anurag (MS Ramaiah University of Applied Sciences)

Abstract:

Tooth GenAI is a groundbreaking dental diagnosis and treatment planning system that utilizes artificial intelligence (AI) to analyze dental images and patient records, aiming to enhance the efficiency and accuracy of dental care. Through sophisticated algorithms, Tooth GenAI detects bone growth, bone loss, and tooth cavities, providing timely and precise diagnosis and treatment recommendations. The system features a user-friendly interface that enables seamless interaction between dental practitioners and the AI system, facilitating real-time diagnosis and treatment planning. Comprehensive testing and evaluation validate Tooth GenAI's accuracy and reliability, positioning it as a promising tool for improving clinical practice and patient outcomes in dentistry. By leveraging AI technologies, Tooth GenAI offers a transformative approach to dental care delivery, minimizing subjective interpretation and manual analysis while maximizing precision and efficiency.

paper-id: 172

Title: Exploring the Integration of Centroid and Deep Sort Algorithms with YOLOv8 Detector for Passenger Counting in Smart Railway Systems

Authors: Amaresh S (Government Engineering College, Bartonhill); Amal P (Government Engineering College, Trivandrum); Reshmi J (Government Engineering College, Trivandrum); Shahnaz Hashim (Government Engineering College, Trivandrum); Abhishek R (Government Engineering College, Trivandrum); Sanil K Daniel (College of Engineering, Trivandrum)

Abstract:

The proposed Enhanced Passenger Counting System represents a significant advancement in optimizing public transportation. By integrating computer vision technology with sophisticated algorithms like the centroid tracking and DeepSORT, it provides accurate and efficient passenger counting. Leveraging deep learning techniques such as YOLOv8 for object detection ensures robust identification, while DeepSORT enhances tracking accuracy. This approach combines object detection and tracking algorithms to monitor individual movements and accurately count passengers entering and exiting. Experimental results demonstrate a 92.3% accuracy rate in real-time scenarios, showcasing its effectiveness for crowd management in public transportation systems.

paper-id: 234

Title: Analysis on Utilization of Learning Model In-place of Traditional Demodulation Block

Authors: Sahana Kolar (KLE Technological university); Bhargav Hegde (KLE Technological University); Sumati Javalagi (KLE Technological University); Akash Kulkarni (KLE Technological University)

Abstract:

The need for adaptable modules in the communication system is ever-high in this computationally advancing time. Great efforts are being made to advance the modulation technique to achieve a higher rate of error-free data transfer. Advancements in using learning models in the modulation-demodulation blocks are limited. Here, our study to achieve the demodulation block with a sampler and CNN model is analysed, and results are presented. The model works almost similarly to the expected theoretical values of probability of error. The model aligns with its function compared to the theoretical model as seen for the SNR between -5 and 0dB. However, if trained and built to achieve an extensive range of SNRs and different modulation schemes simultaneously, it functions as an adaptive demodulation block all in one learning module block. This module is observed to demodulate and detect the received bits better than a traditional demodulation block.

paper-id: 248

Title: Evaluating Public Opinion Through Twitter Sentiment Analysis

Authors: Narendra S Jadhav (BRAC's Vishwakarma Institute of Information Technology, Pune); Akhilesh V Dixit (VIIT); Akshay Sharma (BRAC's Vishwakarma Institute of Information Technology, Pune); Priyanka D More (Vishwakarma Institute of Information Technology Pune)

Abstract:

In the digital age, social media platforms like Twitter have become a central forum for public discourse, reflecting diverse opinions on various topics. This paper explores the application of sentiment analysis to

Twitter data to extract and quantify these opinions. This work processes and analyzes a large dataset of tweets using machine-learning techniques to identify underlying attitudes and divide them into positive, negative, and neutral categories. The methodology comprises preprocessing such as text normalization and noise removal, sentiment categorization using a model based on Natural Language Processing (NLP) techniques, and data gathering via the Twitter API. The results reveal patterns and trends in public sentiment on key issues, providing insights that can benefit businesses, policymakers, and researchers. This paper discusses the potential real-world applications of this technology in marketing, political science, and public relations.

paper-id: 277

Title: Enhanced Skin Cancer Detection Through Deep Learning and Random Search Optimization

Authors: Saravanan Parthasarathy (Medyaan Healthcare Private Limited)

Abstract:

Conventional diagnostic approaches often depend on subjective evaluation through traditional means, which can be laborious, expensive, and time-consuming. The objective of this research endeavor is to present an innovative method for the automated classification of skin cancer by utilizing deep learning methods, specifically the EfficientNetB0 model. Initially, the default model produced a 66% testing accuracy rate on the dataset. After balancing the data and fine-tuning the EfficientNetB0 model by using the Random Search optimization method the final training accuracy of 98.98% and a test accuracy of 96.73% were attained. In addition, the model's dependable performance on unknown data along with low training and testing losses indicated that there was minimal overfitting. The model performed exceptionally well across all classes of skin cancer lesions, with a weighted average performance of 97%, according to a thorough examination that used precision, recall, and F1-score criteria.

paper-id: 229

Title: Vision-Guided Pick and Place Systems Using Raspberry Pi and YOLO

Authors: Hemanth Kumar G (REVA University); Sharon Suresh (REVA University)

Abstract:

Vision-guided pick-and-place systems have revolutionized various industrial and robotic applications by enabling efficient automation and enhancing productivity. This paper introduces a vision-guided pick and place system merging Raspberry Pi and the YOLO (You Only Look Once) algorithm. By integrating Raspberry Pi's affordability and versatility with YOLO's real-time object detection, the system achieves accurate and prompt identification of objects for manipulation. The architecture incorporates Raspberry Pi with cameras and robotic arms, enabling seamless object detection and manipulation. Implementation details encompass software development and hardware setup to ensure smooth integration and optimal performance. Experimental validation confirms robust object detection capabilities, even under challenging conditions. Real-time performance analysis underscores the system's suitability for dynamic industrial environments necessitating swift decision-making and precise manipulation

paper-id: 441

Title: An Approach for XAI Visualizations for Explainability of Alzheimer's Detection

Authors: Shraddha Khanapur (BMS College of Engineering); Chirag G Bharadwaj (BMS College Of Engineering); Raghav Bhardwaj (BMS College of Engineering); Jyothi S Nayak (BMS College of Engineering)

Abstract:

In the field of medical image analysis, the integration of machine learning (ML) models has significantly enhanced the process of identifying and diagnosing Alzheimer's disease. However, the opacity of these models, often termed as "black boxes," raises concerns regarding their interpretability and reliability in clinical settings. Explainable artificial intelligence (XAI) techniques have emerged as crucial tools to address these challenges by clarifying the reasoning behind model outputs. This paper offers an extensive review of literature concerning the employment of Explainable Artificial Intelligence (XAI) methodologies, such as SHAP, LIME, GradCAM, DeepLIFT, Saliency Maps, and LRP to augment the comprehensibility of ML models applied in the detection of Alzheimer's disease.

Track – 9

Research Area: **AI/ML**

Venue: L303, 3rd Floor, Date:23/08/2024, New Academic Block

paper-id: 350

Title: Harnessing Machine Learning Approaches for Accurate Energy Demand Forecasting in the Power Sector

Authors: Swaraj Satish Kadam (Dr. D Y Patil Institute of Technology); Karthick L (Hindusthan College of Engineering and Technology); Khasimbee shaik (Aditya College of Engineering and Technology); yashwant A waykar (Department of Management Science, Dr.B.A.M.University, Aurangabad); Vikram G (Karunya Institute of Technology and Sciences); Srikanth Salyan (Dayananda Sagar College of Engineering)

Abstract:

This paper addresses crucial factors that enable the practical implementation of machine learning models, including feature engineering, data pre-processing, and model evaluation metrics. The efficacy of machine learning (ML) in improving the precision of forecasts and facilitating more informed decision-making for energy providers and policymakers is substantiated utilizing case studies and empirical data. In addition to addressing challenges such as data quality, model interpretability, and scalability, the paper investigates future directions and emergent trends in the field. In its entirety, this study makes a valuable contribution to the progression of knowledge and implementation of machine learning in the domain of energy demand forecasting. As a result, it facilitates the development of power systems that are more robust and environmentally sustainable

paper-id: 351

Title: Utilizing Machine Learning Techniques for Enhanced Predictive Maintenance in the Manufacturing Sector

Authors: Rashmi N Wadibhasme (YCCE Nagpur); NARESH MALLIREDDY (ADITYA COLLEGE OF ENGINEERING); Vikram G (Karunya Institute of Technology and Sciences); Arun Sankar V V (Karpagam College of Engineering); Suresh P (Muthayammal Engineering College); Jermina F (Karpagam College of Engineering)

Abstract:

By applying machine learning (ML) methodologies, this article critically examines the progress made in the field of predictive maintenance specifically concerning manufacturing environments. The document outlines the critical importance of feature extraction, preprocessing, and data collection, underscoring the need for precise data representation to implement predictive models effectively. The contributions of machine learning algorithms to predictive maintenance systems, such as classification, regression, and anomaly detection, are investigated to clarify their functions in forecasting equipment malfunctions and optimizing maintenance schedules.

paper-id: 361

Title: Kisan Connect: Reshaping Agricultural Trade with Dynamic Pricing Model

Authors: Bikash Mr. Sadhukhan (Techno International New Town)

Abstract:

Agricultural markets in India face challenges due to middlemen exploiting farmers, depriving them of fair prices. To address this, "KisanConnect," an innovative Android app, empowers farmers by enabling direct sales to retailers through an auction-based platform. This eliminates middlemen, providing farmers better market access and earnings. Farmers upload product details, verified and approved by administrators. Using machine learning-based dynamic pricing, optimal base prices are set based on historical data, ensuring competitive pricing. Approved products are listed on the auction page, notifying retailers of available quantities, auction duration, and base prices. Retailers bid, fostering transparent transactions. The app's Dynamic Pricing Module optimizes prices using real-time data, with Linear Regression, Decision Tree Regression, and Random Forest Regression models enhancing pricing accuracy.

paper-id: 389

Title: A comprehensive step of XAI for Bengali and English text detection and recognition from natural scene images

Authors: MITHUN DUTTA (Rangamati Science & Technology University); Utpol Kanti Das (Rangamati Science and Technology University, Bangladesh); Jugal Krishna Das (Jahangirnagar University)

Abstract:

A critical first step in many applications, including augmented reality, document analysis, and scene comprehension, is text detection from images. There are particular difficulties when applying these methods to Bengali languages because of variations in script, morphology, and typographic characteristics. This article offers a wonderful method for leveraging the Faster R-CNN framework to identify and categorize text from images that contain Bengali and English sentences. The study utilizes a dataset named "Bengali and English text image dataset (BETID)" that consists of images with text in both scripts, taken from a variety of sources such as books, documents, natural scenes, internet images, and landscapes. Pre-processing methods are used to improve the resilience and generalization of the model, including image scaling, normalization, and augmentation. The proposed model achieved an average of 97.90% accuracy, which is better than other deep learning models.

paper-id: 391

Title: Analysis of Mental Health Disorders from Survey Reports using Time Series based Linear Regression

Authors: Anurag Mishra (KIET Group of Institutions); Ankit Singh (KIET Group of Institutions); Anupam Singh (KIET Group of Institutions); Minakshi Chauhan (KIET Group of Institutions); Deepika Kamboj (KIET Group of Institutions)

Abstract:

In today's fast-paced world, mental health has emerged as a critical concern affecting people of all age groups. The complexities of modern life, coupled with various socio-economic factors, have contributed to the rise in mental health issues worldwide. Current growing rate of mental health disorders provides substantial proof of the same. This research paper tries to provide a comprehensive analysis of mental health disorders using related data published through reports by the Substance Abuse and Mental Health Services Administration. Using machine learning technique such as linear regression along with time

series data analysis provides an opportunity to gain insight from data and investigate the predictive capabilities of age-related factors on prevalence of mental disorders. This paper aims to explore the prevalence of certain disorders in a specific age-group using time series based linear regression.

paper-id: 414

Title: Medical Chatbot

Authors: Manumohan Arambakkam Jai Venkatesh (BMS College of Engineering); Dr. Sowmya Lakshmi B.S (B.M.S College of Engineering); Nanditha M (B.M.S College of Engineering); Mayank H M (B.M.S College of Engineering)

Abstract:

This paper explores the implementation and impact of a healthcare chatbot designed to provide 24/7 services, including symptom evaluation, medication information, and appointment scheduling. According to early testing, the chatbot offers instant support and information, which boosts patient engagement and experience and considerably raises patient happiness. Furthermore, by taking care of ordinary questions and duties, the chatbot has been demonstrated to lessen the workload for healthcare providers, freeing them up to concentrate on more challenging cases. The article also addresses future improvements, such using cutting-edge AI for more precise diagnosis and increasing language support to serve a larger patient base. According to the study's findings overall, healthcare chatbots may be extremely important for updating patient care and simplifying healthcare services.

paper-id: 417

Title: Modified Chaotic Map Approach for Medical Record Security

Authors: Uma S Hombal (KSIT); Dr. Dayananda R B (MSRIT Bengaluru); Ashwini Shivdas Shinde (Nutan Maharashtra Institute of Engineering and Technology); Manjusha N. Chavan (Sanjeevan Engineering and Technology Institute, Panhala)

Abstract:

Security is main concern in the context of medical images. In this study, Tuned Henon Chaotic encryption system is proposed. Performance of Tuned Henon Chaotic scheme is effective in terms of complexity and chaotic enhancing overall security. Metrics to evaluate quality of image encryption are Pixels Mean Squared Error, Signal to Noise Ratio, Pixels Change Rate, and Average Changing Intensity. Proposed strategy achieved near-optimum results, with UACI at 33.47% and NPCR at 99.60%. PSNR values should be less than 8.38, while MSE values should exceed 9,555. The Tuned Henon Chaotic algorithm meets these criteria. We conducted Histogram analysis and key sensitivity tests. The results of the Tuned Henon Chaotic algorithm were compared with original Henon Chaotic Map algorithm, the Blowfish algorithm, and the Fully Homomorphic Encryption algorithm. The study demonstrates Tuned Henon Chaotic algorithm offers improved security for images.

paper-id: 446

Title: Psychometric Precision: ML-Driven Learning Strategies Informed on Big Five Traits

Authors: Rushil Bindroo (BMSCE); Shana Diya Sujit (BMSCE); Ananth Seshadri (RVITM); Mala Sathyanarayan (Sri Aurobindo College)

Abstract:

Individual learning preferences and strategies are significantly influenced by personality traits. This research seeks to forecast an individual's personality and recommend customized learning methods tailored to their specific personality traits. Information gathered from an open questionnaire was categorized into the five OCEAN personality traits, and data processing methods were utilized to refine analysis. Various classification machine learning algorithms were assessed to find the most accurate model for forecasting personality traits. Our findings highlight the capability to identify an individual's personality and subsequently offer learning techniques tailored to that particular personality type to improve learning results.

paper-id: 448

Title: Virtual Posture Assistant - Body Posture Assistant using Machine Learning Models and Ergonomics

Authors: Jyothi S Nayak (BMS College of Engineering); Amarnath Kotturu (B.M.S. College of Engineering); Pranav Kaushik N G (B.M.S. College of Engineering); M Udaya Raj (B.M.S. College of Engineering); Om Bhandankar (B.M.S. College of Engineering)

Abstract:

To Solve the issue of posture-related problems during activities like sleep, standing, and sitting, This work introduces a robust body posture assistant. Widespread use of technology and sedentary lifestyles has led to a rise in health issues linked to poor posture. Our solution leverages real-time video analysis and advanced pose estimation techniques to identify and categorize postures. Employing machine learning algorithms, like Support Vector Machines, our model discerns between beneficial and detrimental postures. When suboptimal posture is detected, the system integrates ergonomic concepts to evaluate associated risks and discomfort levels. The overarching objective is to furnish users with insights into their posture habits, offering corrective guidance to reduce the health risks associated with sustained poor positioning.

paper-id: 451

Title: Deep Learning in Semiconductor Devices for Drone Based Wind Turbine Inspections

Authors: Vijay Kumar K (Wipro Limited)

Abstract:

Drones have gained wide spread popularity for many applications including that of wind turbines inspection. And, deep learning has become more popular these days for various applications including that of anomaly detection in inspections. In many applications, running deep learning inferencing in cloud on the data collected is adequate. However, there are other applications, where having first level of deep learning real-time inferencing in semiconductor edge devices on drones is desirable. Especially, there are merits in deploying first level deep learning real-time inferencing on the drone. The main reasons are to minimize the memory requirement on drones and high-speed wireless link to upload the data collected to cloud. In this paper, presented deep learning training system for object detection of wind turbine inspection images. Also presented deep learning real-time inferencing results, where first level inferencing runs on drone.

paper-id: 453

Title: Fine-Tuning Large Language Models for Task Specific Data

Authors: Sandeep Varma Nadimpalli (B.M.S. College Of Engineering); Rishab Ramesh (B.M.S. College Of Engineering); Akarshthejasvi Raju M (B.M.S. College Of Engineering); Harsha Vardhan Reddy (B.M.S. College Of Engineering)

Abstract:

Large Language Models (LLMs) have demonstrated exceptional capabilities in natural language processing tasks. Fine-tuning techniques can improve their efficiency even more for domain-specific applications. In particular, an ecommerce dataset sourced from Wayfair is used in this study to investigate the fine-tuning of LLaMA 2 and Falcon 7B models utilizing Parameter-Efficient Fine-Tuning (PEFT) and Quantized Low-Rank Adaptation (QLoRA) techniques. Comparing the performance of these models and assessing their efficacy with Claude 3 is the main goal. Our method entails the construction of bespoke datasets, sophisticated pre-processing, and the use of fine-tuning approaches to optimize the models for the demands of certain tasks. This study emphasizes how crucial customized fine-tuning methods are to improving LLM performance in particular fields.

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