DEPARTMENT OF
ELECTRONIC ENGINEERING
MEHRAN UNIVERSITY OF ENGINEERING AND TECNOLOGY JAMSHORO

ABSTRACT BOOK

ICETECC-2022

INTERNATIONAL CONFERENCE ON EMERGING TECHNOLOGIES IN ELECTRONICS, COMPUTING AND COMMUNICATION

DECEMBER
07 - 09 2022

IEEE KARACHI SECTION

Conference Chair
Prof. Dr. Mukhtiar Ali Unar
Prof. Dr. Arbab Nighat

Conference Secretary
Engr. Azam Rafique

Publishing & Proceedings
Dr. Shoaib R. Soomro
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Contents

ABOUT ICETECC 2022

Modern era comes with very advanced technologies, and with time new technological advancements are emerging. This advancement of technologies has no boundaries, making it a must use in daily life, which includes the machines from a simple electric juicer or cell phones to Mars Curiosity Rover by Mars Science Laboratory, which is the most technological advanced rover ever built. These technological advancements have high impact on our daily life.

This conference aims to bring the ideas, simulations and implementations of such novel and innovative technological developments or logical possibilities to the knowledge of audience and industrial experts. This also gives an opportunity to authors to register their innovative ideas with their names.

ICETECC is an international forum for the researchers and industrial experts to exchange information regarding novel aspects of technologies, applications and service development in the various fields including Electronics, Computing, Communications, Signal Processing, Speech and Pattern Recognition, Computer Systems, Neural Networks, Artificial Intelligence, Computer Vision, Deep Learning, Machine Learning, Automation and Robotics, AR/ VR Technologies and Control Systems spanning, Power Electronics.

ICETECC brings together a wide spectrum of national and international participants, and experts from academia, R&D institutions and industries to facilitate a creative environment for the promotion of collaboration and knowledge transfer. In particular it will facilitate a dialogue between major industry players, entrepreneurs and academia to help create a roadmap for the development of tangible research environment in the country.

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CONFERENCE PROGRAM – DAY 1

December 07, 2022 (Wednesday)

Time	Program
08:30 AM	Registration Starts
08:40 AM	Guests to be Seated
09:00 AM	Event Starts
09:05 AM	Recitation of Holy Quran
09:10 AM	National Anthem of Pakistan
09:15 AM	Welcome Speech by Prof. Dr. Arbab Nighat (Conference Chair)
09:20 AM	Conference Briefing By Engr. Azam Rafique (Conference Secretary)
09:30 AM	Speech by Prof. Dr. Bhawani Shankar Chowdhry
09:40 AM	Speech by Prof. Dr. Aftab Ahmed Memon
09:45 AM	Speech by Prof. Dr. Mukhtiar Ali Unar (Conference Chair and Dean FEECE)
09:55 AM	Speech by Prof. Dr. Tauha Hussain Ali (Vice Chancellor)
10:05 AM	Celebration of 50 years Golden Jubilee of Department of Electronic Engineering

10:30 AM	TEA BREAK	
12:00 PM	**Keynote Talk:** Pushing Intelligence to the Edge of Internet of Things: A new Paradigm enabling Next-Generation Smart Systems of Systems **Prof. Dr. Giancarlo Fortino, University of Calabria, Italy**	
	SESSION-I: COMMUNICATION SYSTEMS AND IOT Session Chair(s): Prof. Dr. Wajiha Shah / Prof. Dr. Faisal Karim Shaikh	**Poster Session** Session Chair: Prof. Dr. Attiya Baqai
12:30 PM	**Paper ID 114:** Development of Software/Hardware platform For Wideband Antenna Measurement	
12:45 AM	**Paper ID 131:** Multirate FIR Filter Using Radix Sort Booth Algorithm In Xilinx System Generator	
01:00 PM	**Paper ID 149:** Multi-Active Multi-Datacenter Distributed Database Architecture Design based-on Secondary Development Zookeeper	
01:15 PM	**Paper ID 103:** Artificial Intelligence and IoT-Based Autonomous Hybrid Electric Vehicle with Self-Charging Infrastructure	

01:30 PM	**Paper ID 121:** Assessing Security Threats Perception of Layered Internet of Things using Multiple Linear Regression Model	
01:45 PM	**Paper ID 122:** Security Threats and Research Challenges of IoT - A Review	
02:00 PM	**Paper ID 155:** Implementation of Item Management Process and Food Recognition in a Fridge using Computer Vision and IoT	
02:15 PM	**Keynote Talk:** RISC-V State of the art and Future Prospects **Dr. Muhammad Yasir Qadri, National Electronics Complex of Pakistan (NECOP), Islamabad**	
03:00 PM	LUNCH, NAMAZ AND TEA BREAK	
	SESSION-II: AUTOMATION, CONTROL and ROBOTICS Session Chair(s): Prof. Dr. Arbab Nighat	
03:45 PM	**Paper ID 172:** CROPBot: Customized Rigid Organic Plantation Robot	
04:00 PM	**Paper ID 179:** Linearized 1-DoF Dynamic Model of an Underwater Vehicle Using CFD	

04:15 PM	**Paper ID 112:** Distributed Control Method for Power Sharing in an Islanded AC/DC Microgrid System
04:30 PM	**Paper ID 142:** Impact of Adopting Robots as Teachers: A Review Study
	CLOSING OF DAY 01

CONFERENCE PROGRAM – DAY 2

December 08, 2022 (Thursday)

Time	Program	
08:30 AM	Registration Starts	
08:40 AM	Guests to be Seated	
09:00 AM	Event Starts	
09:05 AM	**Keynote Talk:** Visual Servoing of Robots **Prof. Dr. Wang Hesheng, Shanghai Jiao Tong University, Shanghai, China**	
	SESSION-III: PV, EV, Batteries and Renewable Energy Session Chair(s): Dr. Irfan Halepoto / Dr. Zubair	**SESSION-IV: Computer Science** Session Chair(s): Prof. Dr. Farida Memon / Dr. Bushra
09:30 AM	**Paper ID 140:** Power Generating Shock Absorber for Vehicles Using Thermopile	**Paper ID 180:** Mutually Guided Image Dehazing

09:45 AM	**Paper ID 100:** The Development of Solar Powered Carport Canopies for the Charging Infrastructure of Electric Vehicles	**Paper ID 166:** Sentiment Analysis on Hydroponic Technology Application for Urban Farming Limitations
10:00 AM	**Paper ID 136:** Control and Coordination of Multiple PV Inverters in Power Distribution Network using Multi Agent Deep Reinforcement Learning	**Paper ID 137:** Serverless Video Analysis Pipeline for Autonomous Remote Monitoring System
10:15 AM	**Paper ID 98:** Technological, Financial and Ecological Analysis of Photovoltaic Power System using RETScreen	**Paper ID 181:** Lungs Fluid Accumulation Detection Using Microwave Imaging Technique
10:30 AM	**Paper ID 123:** Hybrid Charging Station for Multiple EVs through RES Performing V2G and G2V Operations	**Paper ID 148:** Advanced Audio Aid for Blind People
10:45 AM	**Paper ID 157:** Economic and environmental analysis for different scenarios of grid-connected Solar	**Paper ID 171:** Usability Evaluation of University Websites in Pakistan through User Testing

	PV-based EV charging Station facility using Homer Grid	
11:00 AM	**Paper ID 124:** Estimating State of Charge and State of Health of Electrified Vehicle Battery by Data Driven Approach: Machine Learning.	
11:15 AM	**Paper ID 159:** Techno-Economic Evaluation of On-Grid Battery Energy Storage System at Peshawar using Homer Pro	
11:30 AM	**TEA BREAK**	
12:00 PM	**Keynote Talk:** Innovations in Optical Signal Processing Technologies **Dr. Bhagwan Das, Quaid-e-AwamUniversity of Engineering, Science and Technology, Nawabshah**	
	SESSION-V: AI, ML and DL Session Chair(s): Dr. Zafi Shehran Shah/Dr. Sanam Narejo/Dr. Shoaib R. Soomro	**SESSION-VI: Health and Medical Related Devices** Session Chair(s): Dr. Amjad Shah

12:30 PM	**Paper ID106:** Data Dimension Reduction makes ML Algorithms efficient	**Paper ID 174:** Using 3D Printing Technology To Develop Electromyography Signals Based Prosthetic Arm
12:45 PM	**Paper ID 145:** Detecting Appropriate and Inappropriate COVID-19 Face Mask Wear in Controlled Environments Using Transfer Learning-Based Convolutional Neural Network	**Paper ID 151:** Identification of Philippine Therapeutic Leave using Deep Learning
01:00 PM	**Paper ID 146:** Deep Neural Network-Based Gender Identification for Surveillance Restroom Restriction System	**Paper ID 85:** Classification of Cardiovascular Disease Using 2D- Image Representations of Phonocardiogram Signals
01:15 PM	**Paper ID 150:** Implementation of Security Access Control using American Sign Language Recognition via Deep Learning Approach	**Paper ID 107:** Design and Fabrication of Force Augmenting Exoskeleton using Motion Intention Detection

01:30 PM	**Paper ID 126:** Regional Heatwave Prediction Using deep learning based Recurrent Neural Network	**Paper ID 169:** A Novel Approach to Predict and Classify the Mental State of Person using EEG-based Brain-Computer Interface
01:45 PM	**Keynote Talk:** Development of Nano hybrid materials for energy and environmental applications: An experimental perspective **Dr Zafar Hussain, University of Sindh, Jamshoro**	
02:00 PM	**Paper ID 170:** Smart Concrete Strength Measurement Device	
02:15 PM	**Paper ID 182:** Speech Emotion Recognition Using Deep Learning Hybrid Models	
02:30 PM	**Paper ID 168:** Classification and Prediction of Spam Emails Based on AI Enabling Models Using Deep and Machine Learning Techniques	
02:45 PM	**Paper ID 163:** 3D Human Reconstruction with Corresponding 3D Texture Model: A Comparison of Salient Approaches	

03:00 PM	**Paper ID 153:** Object Detection from 3D Point Cloud using Deep Learning	
03:15 PM	LUNCH, NAMAZ AND TEA BREAK	
	SESSION-VII: Circuits, Power Systems and Smart Grids Session Chair(s): Dr. Irfan Ahmed Halepoto	
04:00 PM	**Paper ID 177:** Application of linear and nonlinear control schemes for the Stability of Smart Grid	
04:15 PM	**Paper ID 132:** Performance Comparison of Outer and Inner Rotor Flux Reversal Machine for Direct Drive Application	
04:30 PM	**Paper ID 97:** Adaptive Swarm Intelligence-Based Optimization Approach for Smart Grids Power Dispatch	
04:45 PM	**Paper ID 125:** Analysis and Optimal Synchronization of Two Small Power Systems Through Double Circuit Long Transmission Line with DG Penetration	
	CLOSING OF DAY 02	

CONFERENCE PROGRAM – DAY 3

December 09, 2022 (Friday)

Time	Program
08:30 AM	Registration Starts
08:40 AM	Guests to be Seated
09:00 AM	Event Starts
09:05 AM	**Keynote Talk:** Chaotic Map Based Image Encryption **Dr Jawad Ahmad, Edinburgh Napier University, UK**
	SESSION-VIII: DEVICES and Opto-Electronics Session Chair(s): Dr. Fahim Aziz Umrani, Dr. Kehkashan Fahim
09:30 AM	**Paper ID 86:** Age-Based Ranking of YouTube Videos for Improved Parental Controls in Smart TV Environment
09:45 AM	**Paper ID 93:** Improved Characteristics of Deep Ultraviolet Light-Emitting Diodes by Using Quaternary Layer
10:00 AM	Concluding Ceremony
11:00 AM	TEA BREAK

11:30 AM	**Paper ID 119:** Enhancement of The Optoelectronic Performance of Yellow Light Emitting Diodes
11:45 AM	**Paper ID 161:** An Optimization in Conventional Shift & Add Multiplier for Area-Efficient Implementation On FPGA
12:00 noon	**Paper ID 178**: Increasing SoS Dependability by DevSecOps
12:15 AM	**Keynote Talk:** Increasing SoS dependability by DevOpsSeq **Prof. Florin Popentiu, University Politehnica of Bucharest, Romania**
	CLOSING OF DAY 03 and CONFERENCE

INVITED KEYNOTE TALKS

Pushing Intelligence to the Edge of Internet of Things: A new Paradigm enabling Next-Generation Smart Systems of Systems

Prof. Dr. Giancarlo Fortino, University of Calabria, Italy

Abstract

Internet of Things will not be only a new worldwide network interconnecting trillions of (smart) devices but, most importantly, a platform (system of systems) where to develop a new wave of (cyber-physical) services for humans and machines. In this context, in order to build IoT systems, the so-called IoT-Edge-Cloud continuum paradigm is having tremendous focus from the research community as well as from the industry. This paradigm can therefore be an enabler to push intelligence from the core of the network to its edge: from centralized data mining to embedded machine learning in tiny IoT devices to federated machine learning involving networks of edge devices. Moreover, methodologies are emerging to support analysis, design, implementation and evaluation of solutions involving mining and machine learning at the IoT edge. In this talk, we will focus on IoT from both the architectural and machine learning at the edge perspectives. Finally, some use cases will be discussed related to mobile edge computing, ambient assisting living environments, and intelligent transportation systems.

RISC-V State of the art and Future Prospects

Dr. Muhammad Yasir Qadri, National Electronics Complex of Pakistan (NECOP), Islamabad

Abstract

RISC-V has been one of the most disruptive innovation in computer architecture community. Since its inception back in 2010, RISC-V has grown from Berkley labs to the mainstream industry. In first part of the talk, the evolution of computer architecture, RISC and CISC differences, the factors making one architecture more accepted than others will be discussed. In the later half, the birth of RISC-V to where we stand now and what future holds for it will be discussed. This talk is more focused towards students who want to know what is RISC-V to what opportunities it holds for future research.

Visual Servoing of Robots

Prof. Dr. Wang Hesheng, Shanghai Jiao Tong University, Shanghai, China

Abstract

Visual servoing is an important technique that uses visual information for the feedback control of robots. By directly incorporating visual feedback in the dynamic control loop, it is possible to enhance the system stability and the control performance. Many challenges appear when robots come to our daily life. Compare to industrial applications, the robot need deal with many unexpected situations in unstructured environments. The system should estimate the depth information, the target information and many other information online. In this talk, various visual servoing approaches will be presented to work in unstructured environments. These methods are also implemented in many robot systems such as manipulator, mobile robot, soft robot, quadrotor and so on.

Innovations in Optical Signal Processing Technologies

Dr. Bhagwan Das, Quaid-e-AwamUniversity of Engineering, Science and Technology, Nawabshah

Abstract

In modern age, many advances have been supported with developments in the materials used for photonic devices, including the high-precision engineering methods required to create them. This includes new ways of processing silicon, which is still one of the most widely used materials for the creation of fiber optic cables. The term optical is not only related to fiber, this is misconception to many reader. The mostly commonly spoken terms about optical are Optical Fibers and Telecommunications Lasers, High-Power Lasers, Fiber Optic and etc. However, recently the optical processing technologies and there innovations have transformed the every domain e.g. Next-Generation Camera Technology, Optical Imaging and Sensing, Light communication, devices and many more. In this talk, the recent research developments with sustainable solutions for the efficient communication using optical signal processing and implementation of these innovations will be delivered.

Development of Nano hybrid materials for energy and environmental applications: An experimental perspective

Dr Zafar Hussain, University of Sindh, Jamshoro

Abstract

In this talk, we will focus on the fabrication of Nano hybrids materials for energy and environmental applications. Especially, the hybrid systems of transition metal oxides/sulfides for photocatalytic and electrocatalytic applications will be briefly presented from our alreayd reported works. The center focus will be the challenges in the hybrid materials in terms of physical and functional characterization. We will connect applied approach with various materials by emphasizing their potential properties in the development of high performance future technologies based on the hybrid materials to sustain the clean energy and environment for sustainable societies.

Chaotic Map Based Image Encryption

Dr Jawad Ahmad, Edinburgh Napier University, UK

Abstract

Traditional algorithms, such as Rivest Shamir Algorithm (RSA), Data Encryption Standard (DES), International Data Encryption Algorithm (IDEA), and Advanced Encryption Standard (AES), are used for text encryption but cannot be utilised for multimedia encryption due to a number of reasons:

In general, multimedia data such as video, image, and audio are very vast in size, necessitating extensive computation times and expensive computer power when encrypting with typical algorithms. As a result, classical algorithms are unsuitable for real-time applications such as video conferencing and image surveillance, among others.

Due to their slow encryption and decryption speeds, traditional techniques may create significant latency in real-time applications.

Due to several intrinsic aspects of images, such as strong correlations among pixels and significant redundancy, video and image data encryption approaches differ from traditional algorithms.

Due to aforementioned issues, chaos-based lightweight encryption algorithms can be implemented to tackle the problems of multimedia encryption.

Increasing SoS dependability by DevOpsSeq

Prof. Florin Popentiu, University Politehnica of Bucharest, Romania

Abstract

Dependability plays an increasing role mainly for complex systems. A dependable system is one that perform as required from customer points of view related to its functionality, usability, performance, reliability, maintainability, safety, security and availability, even in the presence of faults. Systems of Systems (SoS) dependability is an important concern nowadays when systems' interconectivity is driven by Internet and cybersecurity aspects should be more important. The new DevOpsSeq approach provides incremental development and fast deployment of components in order to be tested by the customer before the whole integration of SoS. The presentation will cover DevOpsSeQ principles, SoS types and characteristics, and Dependability of new SoS developed in DevOpsSeq approach.

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SESSION-I: COMMUNICATION SYSTEMS AND IOT

Paper ID: 114: Development of Software/Hardware platform For Wideband Antenna Measurement

Engr. Hafsa Talpur[1]*, Dr. Badar Muneer[1], Dr. Bhawani Shankar Chowdhry[1], Engr. Muhammad Zakir Sheikh[1]
[1]Mehran University of Engineering and Technology Jamshoro

Abstract

In this paper, simple, low cost, and convenient automatic antenna measurement system is proposed to obtain the antenna measuring parameters such as, radiation pattern, gain, Half Power Beam Width (HPBW) and maximum power forRF/microwaves antennas and antenna arrays within the frequency range of 700MHz to 20 GHz. The system consists of nema-23 stepper motor, Arduino, and R&S ZVB20 Vector Network Analyzer (VNA). All the necessary hardware is synchronously controlled by LabVIEW. The stepper motor moves with the increment of 1.8 degree and cover 360-degree rotation using LabVIEW software and Arduino control system. The receiving AUT is connected to VNA and the VNA is linked to LabVIEW via GPIB interface. The VNA measures the power received by AUT after each rotation step and real time radiation pattern is plotted on the GUI of LabVIEW. The measured results of proposed system are in good agreement with the expected results. This portable system can be used in both commercial and education sector.

Paper ID 131: Multirate FIR Filter Using Radix Sort Booth Algorithm In Xilinx System Generator

Zulfiqar Ali[1], Syed Tahir Hussain Shah[1], Muhammad Ayaz[1]*, Sania Syed[1], Wesam Khalil[2]
[1]Department of Electronics Engineering University of Engineering & Technology Peshawar, Abbottabad Campus
[2]Intel Corporation, 2111 NE 25Th Ave Hillsboro, USA

Abstract

Multirate FIR filters are extensively used in digital signal processing in which different filter parts operate at different rates. It has applications in communication transmitters and receivers, and Up-sampling, which is increasing of the samples of frequency, before Digital/Analog conversion in order to meet the requirements of the analog low-pass antialiasing filter. The process of interpolation consists of two steps. In multirate signal processing interpolation and decimation are performed in two steps: In first step samples are increased in case of interpolation and decreased in decimation. In second step the low pass filter assigns required values to the zero values in the samples or in frequency domain it rejects the imaging frequencies created by the up-sampling process and down-sampling process. Multirate FIR filters when implemented use multipliers and accumulators. There are many different types of multipliers such as Combinational multiplier, Wallace Tree multiplier, Array multiplier and Sequential multiplier and Booth multiplier. Booth multipliers reduces the total number of partial products generated as a result of multiplication of two binary numbers. Mutlirate FIR filter has been implemented using with radix-2, 4, 8, 16 and 32 booth recoding algorithm. The multirate 23-tap FIR filter has been implemented using Xilinx System Generator 14.7 which is compatible with MATLAB 2013b. Booth multipliers using different radix sort has been done using Verilog in Xilinx 14.7 and then the

synthesized code is imported to Xilinx system generator (MATLAB). The concept of booth multipliers has been incorporated and that results in area efficient and reducing the delay offered by the multipliers and thereby enhancing the speed and power dissipation as compared to general signed multiplier.

Paper ID 149: Multi-Active Multi-Datacenter Distributed Database Architecture Design based-on Secondary Development Zookeeper

Zhen Guang Yang[1], Alvin Sarraga Alon[2]
[1]Adamson University, Philippines
[2]Batangas State University, Batangas, Philippines

Abstract

Multi-Active Multi-Datacenter zookeeper is a very core basic component of Ele.me. It is equivalent to the database of basic components, including GZS (Global Zone Service, global state coordinator), DAL (Data Access Layer, database middleware software), Huskar (SOA framework that the online publishing system depends on), maxq (Ele.me message queue), Samaritan (load balancer with service discovery), abtest and other basic components. We are based on the apache official zookeeper for the secondary development to enable it to synchronize data in multiple IDCs. Such an important component must improve the stability and efficiency by the way of DevOps. For this reason, we have developed the EZK operation and maintenance management platform

Paper ID 103: Artificial Intelligence and IoT-Based Autonomous Hybrid Electric Vehicle with Self-Charging Infrastructure

Aaqib Raza[1]*, Mazhar H Baloch[2], Irfan Ali[1], Waqas Ali[1], Muhammad Hassan[1], Abdul Karim[1]
[1]Dept. of Electrical Engineering Mehran Uet SZAB Campus Khairpur Mir's, Pakistan
[2]Dept. of Electronics and Communication Engineering, College of Engineering, A' Sharqiyah University Ibra Sultanate Oman

Abstract

Electric vehicles (EVs) are increasing day by day across the world. Due to zero CO2 emission and being environmentally friendly, electric vehicles are steadily gaining in popularity. Energy storage and charging systems are one of the main issues that should be removed completely. This paper provides solutions to charging systems with hybrid sources, plug-in hybrid electric vehicles (PHEVs), and all-electric vehicles (EVs). The application of the Internet of things (IoT) and Artificial Intelligence in monitoring the performance of a charging system, and fully autonomous driving electric vehicles by using different sensors connected. A self-charging system can be implemented and the exchange of information between the vehicle and its surroundings. Artificial Intelligence (AI) refers to the human mind that can perform tasks and decision-making like human intelligence through different logic and programs. Artificial Intelligence (AI) accelerates electric vehicles towards automation. In the future, IoT and artificial intelligence-based complete autonomous driving vehicles enable us to reduce battery charging, parking, and traffic issues and change the infrastructure into smart cities.

Paper ID 121: Assessing Security Threats Perception of Layered Internet of Things using Multiple Linear Regression Model

Ahmad Bilal[1]*, Syed Jahania Shah[1], Manaal Khan[1]
[1]Habib University, Karachi, Pakistan

Abstract

In the past few years, the Internet of Things (IoT) has emerged as a promising paradigm that has enabled us to interconnect millions of devices to create smart networks. However, the consequences of an IoT failure can be severe, hence it becomes extremely critical to study and analyze the security threats related to the Internet of Things (IoT). In this study mathematical models are developed using a multiple linear regression approach that helps to gauge the perception of people regarding security threats related to the layered architecture model of IoT. The survey was conducted on students of Habib University. The developed model is based on eleven hypotheses and maps to four critical perception areas of IoT sustainability, trust, exploitation of resources, and threat awareness.

Paper ID 122: Security Threats and Research Challenges of IoT - A Review

Ahmad Bilal[1]*, Syed Jahania Shah[1], Muhammad Aqib Khan[1],
Manaal Khan[2], Arwa Hasnain Bharmal[3], Tariq Mumtaz[5]
[1]Habib University Karachi, Pakistan

Abstract

The Internet of Things (IoT) describes a communication network that enables different devices to connect and exchange data over the Internet. It enables machine-to-machine communication and coordination without human intervention. Its application has marked the beginning of a new era with everything smart, such as smart houses, smart cities, smart buildings, smart agriculture, and more. However, the security and privacy issues related to the IoT are crucial challenges. This study presents a descriptive analysis of the layered architecture of the IoT along with techniques on how security threats can be overcome by existing proposed methods. Furthermore, based on the literature review, a more secure layered architecture has been suggested that can easily be extended to improve security and privacy issues.

Paper ID 155: Implementation of Item Management Process and Food Recognition in a Fridge using Computer Vision and IoT.

Muhammad Hasan Shaikh[1], Fariha Rubab[1], Syed Asaad[1], Saifullah[2], Yawar Rehman[1]*
[1]NED University of Engineering and Technology
[2]Public Sector Organization, Karachi, Pakistan

Abstract

Several studies have reported the use of RFID Sensors in smart fridges, however, smart fridges using computer vision remains to be accomplished. Here we build a Smart Fridge using Computer Vision, and Internet of things. This required us to train our model on Google's Cloud Vision API, a solution for large-scale detection. The model is able to accurately predict what comes in front of the camera. The next step was to improve the Human-Fridge interaction. This was done with the help of Mobile Application, considering the growing demand of IoT Applications. The main focus of the App was to improve User Interface and functionality, by using React Native at Frontend. The main features included are, Inventory management, Recipe suggestion using OPEAN AI, Nutritional Information using food API, and Spoilage detection to limit the food wastage. Considering how fast life is today, we are building an enhanced Recipe suggestion engine based on the contents of the fridge. Our project implies the importance of Human-centric applications, where ease and comfort of end-user is the main priority, by enhancing User Interface and Functionality, and keeping the process simple yet efficient.

SESSION-II: AUTOMATION, CONTROL and ROBOTICS

Paper ID 172: CROPBot: Customized Rigid Organic Plantation Robot

Aaron Alcantara[1]*, Glenn V. Magwili[1]
[1]Mapua University, Manila, Philippines

Abstract

Philippines continues its plan for becoming industrialized country, despite that fact, it is still an agricultural country for most of its population lives in rural areas and rely on farming to support their needs and it still contributes to the gross domestic product of the country. Agricultural sector contributes 9.28% of the total GDP as of 2018. Though that sector contributes only close to 10%, its employment comprises to 24.3% of the total labor work force in the country. There are some pressing concerns in agricultural sector, obvious reduction of its essential elements -farmers and resources. There is a reduction of employment rate of farmers for the past years from 12, 030 in 2008 and dropped to 10,001 during 2018. Other concern are problems on resources- land, capital, machinery, seedlings, and the method used in farming. Farmlands degraded due to excessive use of inorganic compound for weeding and as fertilizer and other thing is the soil compaction due to use of heavy farm equipment. Significance of this study is it will offer land farming method more effective and provide a conservative approach to environment. The prototype will serve as an aid to farmers not to reduce them, in fact, with machine, some uncultivated land can be converted to plantation easier thus will result in an increase of farm land area. The prototype was fully custom built having its mechanical parts ease of replacements. Based on the results, the prototype can do the farming tasks even on the

compacted soil that has not been used for years for planting though the researcher recommends some design enhancement and modification to attain more precision in farming.

Paper ID 179: Linearized 1-DoF Dynamic Model of an Underwater Vehicle Using CFD

Ahsan Tanveer[1]*, Sarvat Mushtaq Ahmad[1]
[1]GIK Institute of Engineering Sciences and Technology Khyber Pakhtunkhwa, Pakistan

Abstract

The development of a dynamic model for yaw while considering the hydrodynamic forces acting on an underwater vehicle is inevitable if its performance during a mission like underwater structure inspection is to be examined. However, the high cost of underwater testing makes it impractical to obtain a model that adequately characterizes the vehicle dynamics. Therefore, this work suggests employing computational fluid dynamics (CFD) approach to develop a yaw model of the vehicle. Drag coefficient in the dynamic model is obtained using CFD analysis. On the other hand, the data from the thrust curve is used to compute the thrust coefficient. The resulting transfer function model is validated with experimental data of the vehicle. The model synthesised using the proposed approach is discovered to agree with the experimental results.

Paper ID 112: Distributed Control Method for Power Sharing in an Islanded AC/DC Microgrid System

Waseem Shehzad1*, Tahir Mahmood[1]
[1]University of Engineering and Technology Taxila

Abstract

The most essential and challenging task in an islanded AC/DC Microgrid is to achieve the proper power sharing because both AC sub-grid and DC sub-grid are present. In recent years, research in islanded AC/DC microgrid is widely emerging among researchers all around the world due to the availability of large number of distributed energy resources (DERs). The interlinking converters plays a very important role for balancing the power sharing in an islanded AC/DC microgrid system. The main aim of this paper is to achieve the proper power sharing among all the AC and DC distributed generators (DGs). This paper presents a consensus based distributed control method of interlinking converters (ILCs) for attaining a proper power sharing in an islanded AC/DC microgrid. The proposed control approach is also used to regulate the voltage of DC sub-grid and the frequency of AC sub-grid at their nominal values. In the end, MATLAB/Simulink Model is used for the implementation, analysis, and results verification of our system

Paper ID 142: Impact of Adopting Robots as Teachers: A Review Study

Muhammad Ali[1], Sehrish Munawar Cheema[2]*, Nasir Ayub[1], Ammerha Naz[3], Zaheer Aslam[1]
[1]The Superior University Lahore, Lahore, Pakistan
[2]University of Management and Technology, Sialkot, Pakistan
[3]University of Sialkot, Sialkot, Pakistan

Abstract

Robotic technologies have opened up hundreds of new limitless perspectives for educational reform. We have conducted a research to study the impact and outcomes of Robotic teaching in systematic studies, experimental studies and surveys. The conclusions of this study reveal that educational robots have impact on children, teachers, and students. We looked into how robots affect children's behavior, learning outcomes, perceptions, and human interactions. The learning efficacy of educational Robot teachers is determined by a variety of factors, including learning outcome, student behavior and mood during class sessions, student reaction, and student involvement during workshops/class participation/quizzes/Q&A sessions. The majority of the research articles we chose were experimental studies, and they all met their objectives, which included teaching mathematical problems, unit conversion problems, teaching English/secondary language, developing analytical, computational skills, behavior, and attitude development, critical thinking, and improving communication skills.

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SESSION-III: PV, EV, Batteries and Renewable Energy

Paper ID 140: Power Generating Shock Absorber for Vehicles Using Thermopile

Shouaib Hussain,[1]*, Zhan YueDong[1], Asif Raza[2]
[1]Department of Information Engineering and Automation Kunming University of Science and Technology, China
[2]University of Electronic, Science & Technology of China, Chengdu, Sichuan, China

Abstract

When it comes to the transport sector, fossil fuel consumption is one of the major pressing concerns in today's globe. Due to the usage of the huge amount of fuel consumption in recent years that creates pollution. To reduce pollution, various technologies are introduced in vehicles to reduce fuel consumption like fuel cells, photovoltaic cell, regenerative braking, dynamo, super-capacitor, batteries, etc. Therefore, environmentally friendly and new energy technologies are needed to overcome fossil fuel consumption in the transport sector. The aim of this research to design an energy system is to charge the vehicle battery when the internal oil of the shock absorber is heated during vehicle bumping on roads. This research contains the thermopile installed in the shock absorber for the vehicle suspension system, to generate and save power in the battery with the help of power electronics (Ultra Low Power DC-DC Converter). The simulation results suggested that thermopile with Ultra Low Power DC-DC Converter has the potential to harvest low power as 0-20mV and boosted up to 13.7-13.9V and 4-6mA current is generated. This is further regulated to 12V for storing in the battery and enhances the vehicle battery efficiency.

Paper ID 100: The Development of Solar Powered Carport Canopies for the Charging Infrastructure of Electric Vehicles

Aaqib Raza[1]*, Mazhar H Baloch[2], Awais Ali Khoso[3], Irfan Ali[1], M Zubair Shaikh[3]
[1]Dept. of Electrical Engineering Mehran Uet SZAB Campus Khairpur Mir's, Pakistan
[2]Dept. of Electronics and Communication Engineering, College of Engineering, A' Sharqiyah University Ibra Sultanate Oman
[3]Dept. of Electrical Engineering Mehran Uet SZAB Campus Khairpur Mir's, Pakistan

Abstract

This paper provides a modern charging infrastructure for electric vehicles. Recently, different networks are being built to charge electric vehicles as the demand for electric vehicles is increasing worldwide, severely impacting grids. The proposed system with the smart grid environment will provide an economical and convenient charging system for the electric vehicle to avoid environmental and grid impacts to ensure charging stations' availability. Carport canopies are used to provide a variety of alternatives to electric vehicles. There are different types of carport canopies to generate maximum power. Detailed optimization and canopy selection are performed at various standard tilt degrees to create maximum solar photovoltaic energy, and the results are compared. This paper designs solar-based carport canopies for the electric vehicle charging system to accomplish a sustainable system for the Performance of different types of canopies and a Comparison of Photovoltaic generation on Mono-pitch, Duo-pitch, and Barrel-Arch Canopies is presented.

Paper ID 136: Control and Coordination of Multiple PV Inverters in Power Distribution Network using Multi Agent Deep Reinforcement Learning

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Abstract

The growing demand of power can be realized with the increased penetration of PVs in the power distribution network (PDN). Moreover, low-cost energy with less emission of polluted gases can be achieved. Along with these advantages, it has some disadvantages as well. The integration of high number of PVs in PDN causes voltage deviation, which is undesirable. Real-time control and coordination among the agents (PVs) are required to minimize the voltage deviation and to maintain the voltage in a certain range. This real-time control and coordination are achieved through a multi-agent deep reinforcement learning algorithm. Each PV inverter is considered an agent and its action can be divided into actor and critic network. Actor-network of each PV-inverter produces or absorbs reactive power according to the requirement. The critic network evaluates the performance of the actor-network and produces a Q-value according to the action. Each agent tries to maximize its Q-value. Moreover, all the agents are arranged in distributed and decentralized scheme to achieve real-time coordination among them. The proposed framework is tested on the PV-integrated IEEE-33 bus system. Reactive power control of all the PVs collectively maintains the voltage in a certain range of ±5%.

Paper ID 98: Technological, Financial and Ecological Analysis of Photovoltaic Power System using RETScreen

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Abstract

Green energy projects can benefit greatly from using RETScreen as a preliminary estimate for financial analysis and technology assessment. Energy shortages and climate change are wreaking havoc in Pakistan at the present time. In this study, we examine green energy sources to meet the country energy needs while keeping environmental concerns in mind. The NASA climate information is used to conduct a comprehensive technical, economical, and environmental analysis of the intended green plant. In addition, the statistical indications demonstrate that the project is feasible in terms of cost-emission-savings. It is anticipated that this strategy will make it easier to start new renewable energy projects in developing countries that are having difficulty developing renewable energy projects. The study will also encourage the investor and corporate sector to join national grid from a business perspective. Furthermore, the scheme will also assist government institutions in reducing their reliance on fuel based plants, so bolstering the state economy and provide clean and cost effective energy.

Paper ID 123: Hybrid Charging Station for Multiple EVs through RES Performing V2G and G2V Operations*

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Abstract

The Electric Power crisis and environmental aspects promoted the choice of electric vehicles (EVs) as a substitute transportation option over typical internal combustion engine vehicles (ICEV). Now a viable source of modernizing the advancement of the Electric vehicles charging stations is the integration of renewable energy sources such as PV with battery bank to perform both charging of vehicles and interchange of power between vehicle to grid (V2G) and grid to vehicle. The proposed model optimizes a two-way energy interchange between EVs and the grid by providing a V2G and G2V operations, which provides various benefits such as peak load reduction, backup power, and load balancing to the grid. Furthermore, an increase in eco-friendly renewable energy sources (RES) i.e., photovoltaic (PV) and wind energy, is rising the power network and their infrequent power output is the source of various difficulties in the functioning, control, and planning of power system infrastructure. The proposed model successfully demonstrates the utilization of all available sources that are being used in the designing of electric vehicle charging station.

Paper ID 157: Economic and environmental analysis for different scenarios of grid-connected Solar PV-based EV charging Station facility using Homer Grid

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Abstract

For a variety of reasons, electric vehicles (EVs) are becoming more popular. One of the primary advantages of EVs is reduced pollution from gas emissions. Other challenges that must be addressed include rising fuel prices and dwindling energy resources such as fossil fuels. These factors have a bigger influence on a clean and green Pakistan. Electric vehicles (EVs) are gaining popularity as a means of reducing CO2 emissions from road travel as well as worldwide fossil fuel usage. The grid is regularly used to provide the electricity required to charge an electric vehicle's battery. There are significant power issues in the system when EVs are charged by the electrical grid. Consideration of EV charging by particular solar photovoltaic (PV) systems could be helpful to further encourage renewable energy consumption and reduce CO2 emissions. This paper will look at a financial and environmental feasibility analysis for the construction of an electric bike charging station powered by solar photovoltaic. Various system design plans are explored in this study, along with their impact on GHS gas emissions and economically significant metrics. The proposed approach's results are compared to those of a charging station that receives a single charge from the grid. Greenhouse gas (GHG) emissions, such as CO2, CO, SO2, and NOX, have been greatly reduced when compared to other current approaches. The study should benefit environmentally friendly and commercially profitable renewable energy-based EV charging options.

Paper ID 124: Estimating State of Charge and State of Health of Electrified Vehicle Battery by Data Driven Approach: Machine Learning.

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Abstract

The recent development, increased interest and achievements in artificial intelligence and Machine Learning (ML) have facilitated the development of novel methods for estimating State of charge (SoC) and State of heath (SoH) of electrified car batteries. SoC and SoH are critical to the performance, passenger comfort, and safety of electric vehicles (EVs), as well as minimizing costs associated with overdesign or oversizing of the battery pack. Two methods of ML techniques: Feedforward Back Propagation Neural Network (FBPNN) and Cascaded Feedforward Neural Network (CFNN) for estimation of SoC and SoH for electrified car batteries have been proposed using real time sample data retrieved from NASA Ames Prognostics and Panasonic 18650PF Li-Ion Battery Data Repository. The input Data set contains discharging current, ambient temperature and battery voltage. The ML algorithms have been trained using three inputs and battery states (SoH and SoC) of electrified car batteries as targets. The MATLAB based nntool toolbox has been utilized for estimation purpose. The results demonstrated that proposed CFNN has better performance in estimation and have smaller overshoots and undershoots from the actual value than the FBPNN.

Paper ID 159: Techno-Economic Evaluation of On-Grid Battery Energy Storage System at Peshawar using Homer Pro

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Abstract

The shortfall of electrical energy has been a major concern of developing countries like Pakistan which has been addressed mostly by means of temporary solutions like rental power plants and independent power producing plants most of which are expensive solutions along with a lot of emission of harmful gasses and pollute the atmosphere. Grid connected renewable energy based power generation near the load centers can resolve the above issues but at the same time these RE based generation plants are considered to be unpredictable as the renewable energy is variable in nature. Therefore, introduction of battery energy storage systems in these RE based systems can be a possible solution to the problem. In this research work a grid connected hybrid renewable energy system consisting of solar panels and wind turbine with BESSS to generate and store electricity is proposed. The rating of all the components has been optimized using HOMER Pro software to enable optimal renewable penetration in the grid at Levelized Cost of Energy. Technical and Economic analysis of system with various battery technologies has been performed and the most feasible solution for the selected site has been proposed.

SESSION-IV: Computer Science

Paper ID 180: Mutually Guided Image Dehazing

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Abstract

This paper presents an efficient regularization scheme for the single image dehazing. The transmission map has been reguarlized to retrieve a dehazed image. Usually, conventional methods try to improve the initial transmission through guided filtering without considering the potential advantage of improving the guidance as well. We have proposed an efficient regularization scheme that jointly optimizes the transmission map and the guidance. Nonconvex energy function is solved by iterative reweighed least squares. As a result, an improved transmission map is obtained that has edges concurrent with the iteratively updated guidance. The regularized transmission map results in better-quality dehazed image which has improved color fidelity and fine details as demonstrated by the experimental results.

Paper ID 166: Sentiment Analysis on Hydroponic Technology Application for Urban Farming Limitations

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Abstract

The world is undergoing rapid change due to current events. The internet has become a fundamental necessity for everyone, with Web use in virtually every area. With the growth of social networking, people use these platforms to express their views on daily topics. Hydroponics can help urban agriculture operations when residents have limited land. Despite the benefits of a hydroponic technology, it is not widely used, even in urban areas. The researchers used Twitter to analyze hydroponic farmers' product sentiment. The data was gathered and evaluated using qualitative research methods and sentiment analysis. The tweets were gathered using the Tweepy Module and the keyword hydroponics. The gathered English tweets underwent tokenization, filtering, standardization, and segmentation. Valence Aware Dictionary for Sentiment Reasoning (VADER) was used to categorize the corpus. After scraping 6429 tweets, 5181 cleaned tweets were categorized as positive, negative, or neutral. Researchers used a pie chart and violin plot for output. Five hundred fifty-three tweets are negative, 2922 are positive, and 1706 are neutral. This result showed 56% liked hydroponic technology. 33% of neutrals liked hydroponics, while 11% disliked it. The hydroponic system has several advantages over conventional farming and

some disadvantages. It is recommended that modern farmers be given hydroponic technology application awareness programs to maximize their benefits. Additional studies on hydroponic applications in different agricultural settings and crops are also needed to improve the technology's success rate.

Paper ID 137: Serverless Video Analysis Pipeline for Autonomous Remote Monitoring System

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Abstract

Cloud computing is the delivery of computing services including servers, storage, databases, networking, software, and analytics over the Internet. The businesses can store the data and run applications in the cloud with a high availability, accessibility from anywhere with a web browser, and on pay-per-use basis. Public cloud platforms make it possible for anyone to deploy end-to-end applications easily and economically. The cloud hosting for business applications provides the additional benefits of security, elasticity, and logging compared to an in-house private cloud. In this paper, we describe the implementation of a serverless remote video monitoring solution on the Amazon Web Services (AWS) cloud. It can provide surveillance of an area against unauthorized access, identification of objects in the scene, and investigating security incidents. This autonomous prototype application provides a frame-by-frame object detection of the live video. A Short Message Service (SMS) notification alert is generated and sent to the third-party on detecting an object of interest. It provides a flexible and economical solution for remote monitoring.

Paper ID 181: Lungs Fluid Accumulation Detection Using Microwave Imaging Technique

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Abstract

The accumulation of fluid in the lungs is known as pulmonary oedema. The excess fluid that is trapped in the organs of body tissues cause swelling and this is known as Oedema. A model is designed in this research that detects the existence of fluid in the lungs. A wideband antenna beam is used for transmission and reception of the signals, which are then further processed using signal processing techniques to detect the fluid accumulation in the lungs. Detection of fluid can be achieved by detecting the change in the amplitude of transmitted and received signals, detecting phase change of the signals, or using a digital processing technique on the received spectrum or else. But these are either sensitive to the environment and positioning of the setup, or very sensitive to phase change. In this research, scattering profile is processed to detect fluid accumulation in the lungs.

Paper ID 148: Advanced Audio Aid for Blind People

Savera Sarwar[1], Muhammad Turab[2], Aisha Chandio[1], Danish Channa[1], M. Uzair Sohu[1], Vikram Kumar[5]*
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Abstract

One of the most important senses in human life is vision, without it one's life is totally filled with darkness. According to WHO globally millions of people are visually impaired estimated there are 285 million of whom some millions are blind. Unfortunately, there are around 2.4 million people are blind in our beloved country Pakistan. Humans are a crucial part of society, and the blind community is a main part of society. The technologies are grown so far to make the life of humans easier more comfortable and more reliable for. However, this disability of the blind community would reduce their chance of using such innovative products. Therefore, the visually impaired community believe that they are burden to other societies, and they do not capture in normal activities separates the blind people from society and because of this believe did not participate in the normally tasks of society. The visual impair people mainly face most of the problems in this real-time. The aim of this work is to turn the real time world into an audio world by telling blind person about the objects in their way and can read printed text. This will enable blind persons to identify the things and read the text without any external help just by using the object detection and reading system in real time. Objective of this work:i) Object detection ii) Read printed text, using state-of-the-art (SOTA) technology.

Paper ID 171: Usability Evaluation of University Websites in Pakistan through User Testing

Sehrish Nizamani[1]*, Saad Nizamani[1], Sarwat Nizamani[1], Nazish Basir[1], Khalil Khoumbati[1], Shahzad Memon[1]
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Abstract

University websites are important mediums of communication that make important information accessible to the stakeholders of university websites. A good user experience of these websites brings the broader population to these websites. Evaluating the usability of university websites is important because it finds possible usability problems. In this regard, this research discusses the experience of the usability evaluation of three official websites of the universities of Pakistan i.e., Lahore University of Management Sciences (LUMS), University of Karachi (UoK), and Islamia University, Bahawalpur (IUB) by employing user testing method using thinking aloud approach. The findings of the usability tests are summarized using three measures named effectiveness, efficiency, and satisfaction. The results reflect that the LUMS website scores higher in all three discussed measures. UoK and IUB both have the same effectiveness rating. The UoK website is less efficient than the IUB website, though. Finally, in satisfaction scores, users of the UoK website scored higher as compared to the IUB website.

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SESSION-V: AI, ML and DL

Paper ID 106: Data Dimension Reduction makes ML Algorithms efficient

Wisal Khan[1], Muhammad Turab[2], Waqas Ahmad[1], Syed Hasnat Ahmad[3], Kelash Kumar[4], Bin Luo[1]*
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Abstract

Data dimension reduction (DDR) is all about mapping data from high dimensions to low dimensions, various techniques of DDR are being used for image dimension reduction like Random Projections, Principal Component Analysis (PCA), the Variance approach, LSA-Transform, the Combined and Direct approaches, and the New Random Approach. Auto-encoders (AE) are used to learn end-to-end mapping. In this paper, we demonstrate that pre-processing not only speeds up the algorithms but also improves accuracy in both supervised and unsupervised learning. In pre-processing of DDR, first PCA based DDR is used for supervised learning, then we explore AE based DDR for unsupervised learning. In PCA based DDR, we first compare supervised learning algorithms accuracy and time before and after applying PCA. Similarly, in AE based DDR, we compare unsupervised learning algorithm accuracy and time before and after AE representation learning. Supervised learning algorithms including support-vector machines (SVM), Decision Tree with GINI index, Decision Tree with entropy and Stochastic Gradient Descent classifier (SGDC) and unsupervised learning algorithm including K-means clustering,

are used for classification purpose. We used two datasets MNIST and FashionMNIST Our experiment shows that there is massive improvement in accuracy and time reduction after pre-processing in both supervised and unsupervised learning.

Paper ID 145: Detecting Appropriate and Inappropriate COVID-19 Face Mask Wear in Controlled Environments Using Transfer Learning-Based Convolutional Neural Network

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Abstract

The most recent epidemic of coronavirus disease (COVID-19) was brought on by a coronavirus subsequently found. The general population was still required to wear surgical face masks, sometimes known as medical masks, to safeguard against the coronavirus disease and monkeypox disease as well brought on by COVID-19 and monkeypox virus. In the majority of regulated conditions, it might be challenging to see if someone is wearing their mask properly. The researchers imply a COVID-19 detection of correct and improper wearing of surgical face masks in regulated areas as a way to help with the ongoing development of identification of facemask wearing to limit the spread of the virus. Models generated using deep learning to identify persons' proper wearing of masks were used. The model with the lowest performance in this study's model evaluation, Model 3, has an mAP of 0.0777. With an mAP of 0.9668 (96.68%) and 3.31 training loss, the model produced the best results in model 42. The said model obtained the highest mAP, which was used for testing and inferencing as a result. This study showed promising results and might be used to reliably identify appropriate mask wear in public by using proper detection of facemask technology.

Paper ID 146: Deep Neural Network-Based Gender Identification for Surveillance Restroom Restriction System

Julie Ann B. Susa[1], Jo Ann D. Doculan[2]
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[2]Ifugao State University, Ifugao, Philippines

Abstract

Everyone is generally aware that there is sex separation in restrooms. This emphasizes the significance of sex-based toilet restrictions. Student's behavior and ability to learn decency will be impacted by a system that identifies a person's sex. This study offers a detecting mechanism that distinguishes between males and females. To categorize both sexes in schools, sex identification utilizing image processing was developed. The implementation of the sex identification system used the YOLOv3 technology. The study's conclusions state that the detection model used has an mAP value of 95.28 %. The implementation of the Sex Identification for Restroom Restrictions is successful since the chosen model is advised in sex identification for both males and females.

Paper ID 150: Implementation of Security Access Control using American Sign Language Recognition via Deep Learning Approach

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[2]Technological University of the Philippines Metro Manila, Philippines

Abstract

Sign language is a kind of conversation that consists of a set of gestures or postures used to converse with the deaf and mute. It is usually accomplished with hands, which implies profound signals, especially when both the receiver and sender are well-versed in the subject. Signals generated by hand gestures can also be used in a variety of applications such as augmented reality (AR), gaming, robotics, and vision-based applications. However, sign language interpretation via computer vision has yet to be implemented as a security access control, which could provide a significantly greater authentication method and better statutory provisions. The trained model's use as a security access control system was also taken into consideration. It is done by creating a Python-based GUI that takes a single frame from a camera. A layer loss of 2.803 and an mAP of 98.69 % were the final results after 14 epochs. The study shows that when compared to earlier comparable research pursuing the same objective, this study's validation accuracy is the highest.

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Paper ID 126: Regional Heatwave Prediction Using deep learning based Recurrent Neural Network

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Abstract

The increased frequency and severity of heatwaves are a result of global warming's increasing temperatures. The performance of various reliable prediction models has decreased as a result of changes in the world environment. LSTM neural networks, among other deep learning-based recurrent neural network algorithms, are used to develop a reliable model for the prediction of heatwave maximum temperature. In this research, We have developed a percentile-based threshold over the predicted maximum temperature to forecast heatwaves using LSTM based predictive model. The LSTM algorithm was applied in this study to determine the approximate maximum temperature for a severe heatwave.

Paper ID 170: Smart Concrete Strength Measurement Device

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Abstract

The measurement of compressive strength is the most important in construction industries. Conventionally used devices such as UTM (Universal Testing Machine) are costly, time consuming, produce a lot of waste material, and produce environmental pollution. In addition, hectic processes used to be carried out, such as standard cubes were cast and tested at varying curing ages (7,14,21,28 days). In this research, we designed a smart prototype device that can measure the strength of concrete mix based on ANN (Artificial Neural Network). Using the designed system, it is possible to measure concrete's fixed compressive strength by varying the ingredients' proportions (cement, coarse aggregates, fine aggregates, and water). Historical concrete mix data (50) is collected from the Concrete and Structural Laboratory, Mehran University of Engineering and Technology Jamshoro, and sorted out as per ANN requirements. The system used 80% of data for training purposes and 20% for testing and validation using high accuracy (96%) historical data and further connected to a cloud storage network to collect measurement data. This device will help the construction industry make quick project choices and save material waste.

Paper ID 182: SPEECH EMOTION RECOGNITION USING DEEP LEARNING HYBRID MODELS

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Abstract

Speech Emotion Recognition (SER) has been essential to Human-Computer Interaction (HCI) and other complex speech processing systems over the past decade. Due to the emotive differences between different speakers, SER is a complex and challenging process. The features retrieved from speech signals are crucial to SER systems' performance. It is still challenging to develop efficient feature extracting and classification models. This study suggested hybrid deep learning models for accurately extracting crucial features and enhancing predictions with higher probabilities. Initially, the Mel spectrogram's temporal features are trained using a combination of stacked Convolutional Neural Networks (CNN) & Long-term short memory (LSTM). The said model performs well. For enhancing the speech, samples are initially preprocessed using data improvement and dataset balancing techniques. The RAVDNESS dataset is used in this study which contains 1440 samples of audio in North American English accent. The strength of the CNN algorithm is used for obtaining spatial features and sequence encoding conversion, which generates accuracy above 93.9% for the model on mentioned data set when classifying emotions into one of eight categories. The model is generalized using Additive white Gaussian noise (AWGN) and Dropout techniques.

Paper ID 168: Classification and Prediction of Spam Emails Based on AI Enabling Models Using Deep and Machine Learning Techniques

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Abstract

The increasing volume of unwanted/unsolicited bulk emails, also known as "SPAM," is a devastating issue that provokes a multitude of problems in communication systems. Over the past few years, the work on spam classification has been tremendously enhanced to a greater extent. In this paper, we present an approach that encompasses machine and deep neural network such as Gaussian Naive Bayes (GNB), Convolution Neural Networks (CNN) network, Long Short Term Memory (LSTM) network and a customised model developed with the combination of CNN and LSTM to classify and predict the widely used open source spam assassin dataset that contains around 6000 real email samples. The models are trained and tested, and the results are presented in the paper. Overall, CNN-LSTM attained a predication score of 98.68% on the spam dataset.

Paper ID 163:3D Human Reconstruction with Corresponding 3D Texture Model: A Comparison of Salient Approaches

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Abstract

It is the texture for materials development and the technology selected that determines the realism of the finished 3D model. An in-depth literature review is presented on approaches to producing textures for 3D models and reconstructing 3D humans. The process of texture mapping on a 3D model is one of the key steps. Making a model more realistic requires specific properties to be applied to the modeled object. Through reconstruction, insight into qualities of an object could be gained that aren't apparent from a single perspective like its relative position and volume in relation to others in the scene. Human surface geometry is reconstructed, including invisible areas, and multiple image scales are combined into one 3D space. An extensive review of experimentation on datasets like Market-1501, DeepFashion and SURREAL shows that different analytical approaches work both qualitatively and quantitatively, as measured by evaluation metrics like SSIM and LPIPS. We aimed to estimate the current level of development and potential of these techniques so that there could be further improvements and a wider range of applications for texture generation and 3D human reconstruction.

Paper ID 153: Object Detection from 3D Point Cloud using Deep Learning

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Abstract

This paper proposes a cost-effective way for the object detection and classification of objects modeled as 3D renders, via Deep Learning. 3D modeling is the process of manipulating edges, vertices, and polygons in artificial 3D space that creates mathematical coordinated representations of the surface. In this research, we propose to use a stereo camera and a 2D laser scanner (LiDAR) for the construction of 3D object models. We created a 3D model of an object using a stereo camera. Video of objects was captured maintaining the right angles all the time. Then with the help of Intel Real Sense Viewer, a 3D polygon mesh was created, which was converted to a point cloud. A two-dimensional (2D) laser scanner was used to make several chunks of 2D scans from various sides of the object. We then fused the point cloud of the obtained chunks to build a 3D model. We then combined the point clouds obtained from both sources using the Iterative Closest Point (ICP) algorithm. The fused point cloud resulted in the formation of a denser and crispier dataset to be used for Deep Learning. The aforementioned deep learning algorithm, Point Net, encodes sparse point cloud data efficiently and shows very strong performance on par with the state of the art. We have formed a dataset using a stereo camera, LIDAR, and ICP among which we have obtained the highest accuracy results from the ICP algorithm dataset.

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SESSION-VI: Health and Medical Related Devices

Paper ID 174: Using 3D Printing Technology to Develop Electromyography Signals Based Prosthetic Arm

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Abstract
Electromyography (EMG) which is one of the most common biomedical signals recorded from the human body muscle. It is used to detect the movements in the muscles using an algorithm known as human- machine interfacing (HMI), EMG is widely used in prosthetic arms by amputee individuals. However, both the prosthetic arm and the EMG signal recorders available in the market are costly. As in developing countries, more than 22% of people are below the poverty line and starting price of the commercial prosthetic arm is 500,000/-PKR which is very expensive for the people living in Pakistan who need an affordable prosthetic arm, in this project, the prosthetic arm design was designed and modified on -Computer- aided design (CAD) software and 3D printed using PLA (Polylactic Acid). The prosthetic arm was interfaced with EMG sensor by Arduino microcontroller. It was tested on an individual who was able to generate the movements through muscle contraction, which was detected by an EMG sensor. Therefore, the basic objective of developing a low-cost arm is achieved with the total expense of approx. Rs. 20,000/- (PKR) and the people who lost their limbs can use this 3D Printed prosthetic arm to improve their quality of life.

Paper ID 151: Identification of Philippine Therapeutic Leave using Deep Learning

Julie Ann B. Susa[1]
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Abstract

Despite the advancements in many chemical medications used to treat diseases, medicinal plants have also been very effective in doing so. The global use of herbal products is increasing due to the growing contribution of science and technology to its ethical and scientific growth. In the Philippines, medicinal plants or herbs are popular in treating illness. Although the traditional identification method is effective and requires the expertise of skilled practitioners, it is time-consuming and prone to mistakes. Studies identifying the therapeutic use of naturally occurring plant chemicals have now been publicly disclosed that automatically detect the species of medicinal plants and leaves using machine vision and deep learning. With transfer learning using YOLOv3, this study seeks to identify Philippine medicinal plants in real-time. Only segmented leaves of Basella alba (alugbati), Mentha (mint), Moringa oleifera (malungay), Nerium oleander (adelfa), and Psidium guajava (bayabas) are used in the identification of medicinal leaves. The identification of the images utilized an inference approach in the real-time application based on the extracted features using YOLOv3. The result of the test performed illustrates an optimal outcome in the detection of different medicinal leaves. The optimal model performance results to mAP 98.63%. The test summary demonstrates a high detection accuracy and produces results at a fast speed. Thus, various model inferences using input images, live feed, and video inputs exemplify the model's effectiveness in detecting the inputs medical leaves classes.

Paper ID 85: Classification of Cardiovascular Disease Using 2D- Image Representations of Phonocardiogram Signals

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Abstract

Auscultation of the heart is a process that refers to listening to heart sounds to detect abnormalities. It is a good way to diagnose multiple cardiac problems. However, this process requires experienced professionals. The waveforms of a phonocardiogram (PCG) are useful in identifying disorders like these. This work employs self-acquired PCG recordings to develop an intelligent classification model that will serve as an objective diagnostic tool for physicians diagnosing heart disorders based on sound. Our model uses spectrograms and scalograms representations of PCG signals and uses a convolutional neural network to learn suitable features for PCG classification into normal and abnormal recordings. Performance comparison with similar studies reflects the efficacy of our model.

Paper ID 107: Design and Fabrication of Force Augmenting Exoskeleton using Motion Intention Detection

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Abstract

The design, fabrication and evaluation of the knee exoskeleton to assist sit-to-stand (STS) motion are presented. The mathematical, CAD and Simscape/MATLAB modeling for the estimation of exoskeleton torque, the factor of safety (FOS) and controller gains are also included. The knee exoskeleton is equipped with two motion sensors. One sensor is meant to detect the intention of motion. This signal is used as a reference trajectory to derive the actuation system. The 2nd sensor is to measure the actual knee joint position which is used as a feedback element to carry out the control mechanism. The exoskeleton is primarily meant for force augmentation by supplementing 20% of knee joint torque required, specifically for elderlies and those under rehabilitation. To reduce the total mass to approximately 7 kg, the device frame is made of light-weight aluminum alloy and a worm-gear DC motor is used as the sole actuator. The exoskeleton is low-cost and easy to use and maintain. It has been tested on able-bodied subjects and has shown the reliability of operation and user comfort. It is expected that its performance for target users, i.e., people with limited sit-to-stand motion capability will produce good results as well. This device can be modified to carry out support for gait and running tasks.

Paper ID 169: A Novel Approach to Predict and Classify the Mental State of Person using EEG-based Brain-Computer Interface

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Abstract

A person's present state of mind is determined by a complex collection of brain activities that make up their mental state. It is influenced by several internal and external aspects of the brain. By examining an individual's EEG patterns, one can ascertain their mental state. In order to recognise and alter harmful or troubling thinking patterns that have a detrimental impact on behaviour and emotions, we classified three different states as: relaxed, neutral, and focused. To classify and predict the behaviour of a person based on certain mental states, we deployed popular machine learning models like k-NN, RF, XGBOOST, and EL to classify different mental states. Moreover, to predict the mental states, we implemented deep learning models like CNN, RNN, and LSTM. XGBoost achieves the highest classification accuracy (97.29%) with 5-fold cross validation. For the prediction, RNN achieved the highest prediction accuracy of 97.84%.

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SESSION-VII: Circuits, Power Systems and Smart Grids

Paper ID 177: Application of linear and nonlinear control schemes for the Stability of Smart Grid

Rafiq Asghar[1], Mohd Herwan Sulaiman[1], Sarmad Saeed[2], Hamid Wadood[3], Taimoor Khan Mehmand[4], Zahid Ullah[5]*
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Abstract

Reliability and controls are essential for preventing outages, load disparity, and synchronization mismatch in a power system. Smart Grid (SG) is a cost-effective solution for minimizing inter-regional variations, optimizing load demand, stabilizing equipment operations, and managing conventional and renewable power sources. However, SGs are still in their infancy, and abrupt changes in demand, grid disruptions, and weather-related variations in renewable energy have a significant impact on their stability. Various hardware and software controls are designed to preserve the stability of SG systems during disturbances and uncertainty. This paper examines the various forms of power system disturbances and their impacts on SG stability. In addition, an overview of the most common linear and nonlinear control strategies applied to SG systems is provided. Finally, advantages, disadvantages, and applications are discussed to highlight the need for more robust.

Paper ID 132: Performance Comparison of Outer and Inner Rotor Flux Reversal Machine for Direct Drive Application

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Abstract

The outer and inner rotor flux reversal permanent magnet machines (FRPMMs) Electromagnetic performance investigation is carried out using 2D finite element analysis(2D-FEA). The analysis is done under same condition, materials, and parameters. After analysis it is concluded that outer rotor FRPMM has better torque density, more stability and lesser noise in comparison to inner rotor FRPMM. The open circuit flux of outer rotor FRPMM has a 295.78% higher peak value than the inner rotor FRPMM. The average electro-magnetic torque and power at 400 rpm of the outer rotor machine is 281.39% that of the inner rotor machine.

Paper ID 97: Adaptive Swarm Intelligence-Based Optimization Approach for Smart Grids Power Dispatch

Um-E-Habiba Alvi[1], Ijaz Ahmed[1]*, Syed Rizwan Hasan[1], Babar Ashfaq[2], Muhammad Raza[3], Sana Mukhtar[4]
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Abstract

Approximately 70–90 percent of today's energy usage is derived from fossil fuels. Due to global warming and countless air pollutants, the atmosphere is polluted, compelling us to use new computer paradigms for efficient dispatching of smart energy grids. In order to solve the difficult nonlinear, non-convex, and constrained confined EEDs, a new whale optimization algorithm (WOA) is devised for the minimization of total cost and emission. The proposed method takes into account the social behavior of humpback whales, with an emphasis on the nature of suggested meta-heuristic optimization algorithms. The proposed optimization paradigm generated data demonstrating AWSOA superiority to other advanced approaches. To ensure the efficacy of the proposed method, we compare it to other approaches and consider a number of technological constraints, the findings demonstrate that our approach is both cost-effective and accurate. In addition, the research assists electric energy firms in controlling emissions as required by emission regulatory agencies and saving the annual operational cost of thermal plants.

Paper ID 125: Analysis and Optimal Synchronization of Two Small Power Systems Through Double Circuit Long Transmission Line with DG Penetration

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Abstract

The increasing consumption of electrical power due to an increment in the number of industries compelled the service providers to increase the generation of electrical energy. Electrical power suppliers prioritize the generation of energy from renewable sources such as wind and PV. The integration of electrical power into the existing system increases the magnitude of the faulty current. Power providers also consider supplying energy from neighboring power networks. Energy in bulk from the nearest power system requires up-gradation of existing transmission line or installation of double circuit long transmission line to carry a huge amount of electrical energy. This paper is regarding the analysis of fault current magnitude and power losses after installing distributed generators using PSS/E. The analysis also covers the optimal placement of double circuit long transmission lines in order to know about minimum power losses and the minimum threat of short circuit current. Optimal placement adds a feature for the power providers to know the economical placement and installation of the long transmission line.

SESSION-VIII: Devices and Opto-Electronics

Paper ID 86: Age-Based Ranking of YouTube Videos for Improved Parental Controls in Smart TV Environment

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Abstract

YouTube is a popular social media networking site that contains billions of videos. Many YouTube videos target children of different ages with offensive, inappropriate, violent, etc. Numerous one-size-fits-all countermeasures and research work have been deployed and suggested. However, these solutions are ineffective in accurately detecting inappropriate content for a diverse audience of different needs and requirements. In this research work, instead of one-size-fits-all, we consider a mutable age-based context, where different Age-Groups (AG) have different choices and needs. A novel and real-time approach have been proposed to prevent and allow the audience of varying AG towards the diverse content of YouTube, specifically in a smart TV-watching scenario. The proposed system analyses the running video through its metadata for teenagers, children, and adults. In parallel with data, the proposed model captures the viewers in real-time, detects their age, and checks the displayed video against the detected AG for appropriateness. The same system responds to parental consent and overrides its stop/play policies according to the direct input provided by parents/guardians with a diverse psychological setup, developed by their beliefs, religion, and cultural sensitivities. The proposed solution leverages Random Forest Classifier –a supervised text classification approach with 80% accuracy and Convolutional Neural Network for age determination using the Caffe model.

Paper ID 93: Improved characteristics of deep ultraviolet light-emitting diodes by using quaternary layer

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Abstract

We sandwich thin aluminum indium gallium nitride (AlInGaN) layer for increasing the optoelectronic properties of AlGaN-based light-emitting diodes (LEDs). The effect of the quaternary layer (QL) on different properties of the device has been investigated. In comparison to the reference structure (LED 1), simulation finding shows that proposed structure (LED 2) has a high internal quantum efficiency (IQE) peak of 58%. The rate of recombination in the multiquantum wells (MQWs) of LED 2 is improved by ~48%, which can be attributed to the enhanced carrier density in the multiquantum wells of LED 2.

Paper ID 119: Enhancement of the optoelectronic performance of Yellow light emitting diodes

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Abstract

The performance of Indium Gallium Nitride (InGaN) yellow light emitting diodes (LEDs) is improved by special designed graded-EBL in the conventional LED design. The use of graded-EBL in the light-emitting diodes significantly increases the concentration of holes, resulting in a 33% increase in radiative recombination rate. Additionally, the efficiency droop is significantly reduced from 57% to 50% in light-emitting diodes with. As a result, the light-emitting diode with graded-EBL has better optoelectronic properties than conventional AlGaN-EBL. Internal quantum efficiency is increased by 17% in suggested LED. This study demonstrates high-efficiency InGaN-based yellow LEDs with high radiative recombination and intensity

Paper ID 161: An Optimization in Conventional Shift & Add Multiplier for Area-Efficient Implementation on FPGA

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Abstract

FPGA is familiar with prototyping and implementing simple to complex DSP systems. The three main factors that play an essential role in FPGA-based design are the targeted FPGA architecture, electronic design automation (EDA) tools, and design techniques employed at the algorithmic level using hardware description languages. The algorithm-level optimization results in overall resource optimization and performance in achieved frequency. In DSP algorithms optimization, the major bottleneck is the multiplier complexity evident in, for example - FIR, IIR, FFT, and others. Research shows much work on multiplier optimization. However, despite all proposed optimization techniques, multiplier implementations still take more area, consume more power, and exhibit more delay. The novelty of this work is to bring resources optimization in familiar shift and add multiplier algorithm by implementing the design in FPGA and comparing the results with existing shift and add a multiplier. The FPGA selected is Xilinx Vertex -7, and the EDA tool is Xilinx ISE 14.2. The parameters to compare are the Lookup tables (Logic element of FPGA), built-in adder/subtractor cores, and multiplexer primitives, along with performance characters, mainly delay observed, achieved frequency, and logic levels (path traveled by the signal in register transfer level). The results indicate that the proposed design is an excellent alternative to the conventional shift and add algorithm.

Paper ID 178: Increasing SoS dependability by DevSecOps

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[2]Department of Engineering and Computer Science"Spiru Haret" University Bucharest, Romania

Abstract

Dependability plays an increasing role mainly for complex systems. A dependable system is one that perform as required from customer points of view related to its functionality, usability, performance, reliability, maintainability, safety, security, and availability, even in the presence of faults. Systems of Systems (SoS) dependability is an important concern nowadays when systems' interconnectivity is driven by Internet and cybersecurity aspects should be more important. The new DevSecOps approach provides incremental development and fast deployment of components to be tested by the customer before the whole integration of SoS. The presentation will cover DevSecOps principles, SoS types and characteristics, and Dependability of new SoS developed in DevSecOps approach.

Profiles of Invited Keynote Speakers

Prof. Giancarlo Fortino
University of Calabria, Italy

Giancarlo Fortino (IEEE Fellow 2022) is Full Professor of Computer Engineering at the Dept of Informatics, Modeling, Electronics, and Systems of the University of Calabria (Unical), Italy. He received a PhD in Systems and Computer Engineering from Unical in 2000. He is also distinguished professor at Wuhan University of Technology, Huazhong Agricultural University, and Shanghai Maritime University (China), high-end expert at HUST (China), senior research fellow at the Italian ICAR-CNR Institute, CAS PIFI visiting scientist at SIAT – Shenzhen, High-end Expert of the Province of Henai, and Distinguished Lecturer for IEEE Sensors Council. He is the chair of the PhD School in ICT, the director of the Postgraduate Master course in INTER-IoT, and the director of the SPEME lab at Unical as well as co-chair of Joint labs on IoT established between Unical and WUT, SMU and HZAU Chinese universities, respectively. He is Web of Science Highly Cited Researcher 2020 and 2021 by Clarivate. Currently he has 19 highly cited papers in WoS, and h-index=67 with 16000+ citations in Google Scholar. His research interests include wearable computing systems, e-Health, AI and Internet of Things, and agent-based computing. Fortino is currently the scientific responsible of the Digital Health group of the Italian CINI National Laboratory at Unical. He is author of 550+ papers in int'l journals, conferences and books. He is (founding) series editor of IEEE Press Book Series on Human-Machine Systems and EiC of Springer Internet of Things series and AE of premier int'l journals such as IEEE TAFFC-CS,

IEEE THMS, IEEE TAI, IEEE IoTJ, IEEE SJ, IEEE JBHI, IEEE SMCM, IEEE OJEMB, IEEE OJCS, Information Fusion, JNCA, EAAI, etc. He organized as chair many int'l workshops and conferences (120+), was involved in a huge number of int'l conferences/workshops (500+) as IPC member, is/was guest-editor of many special issues (75+). He is co-founder and CEO of SenSysCal S.r.l., a Unical spinoff focused on innovative IoT systems, and co-fouder of Bigtech S.r.l, a startup focused on the intersection among AI, Big Data and IoT. Fortino is currently member of the IEEE SMCS BoG and of the IEEE Press BoG, and chair of the IEEE SMCS Italian Chapter.

Dr. Muhammad Yasir Qadri
National Electronics Complex of Pakistan (NECOP), Islamabad

Dr. Muhammad Yasir Qadri has obtained his PhD in Electronic Systems Engineering from University of Essex, UK. He has over eighteen years of practical experience in the development of high-end embedded systems and FPGA based designs. He is an Approved PhD Supervisor by the Higher Education Commission of Pakistan, and is currently working as Project Director at National Electronics Complex of Pakistan (NECOP), Pakistan. He is the editor of a book on Multicore Technology by CRC Press, USA, and a US patent granted in the area of computer architecture. He is also the recipient of research grant of PKR. 27.16 Million, and PKR 8.3 Million by National ICT R&D Fund (currently known as Ignite National Technology Fund), and HEC Technology Development Fund respectively for projects in the area of computer architecture. His area of specialization is Microprocessor design, hardware security and energy/performance optimization in reconfigurable MPSoC architectures.

Prof Dr Hesheng Wang
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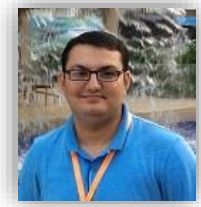
Hesheng Wang received the Ph.D. degree in Automation & Computer-Aided Engineering from the Chinese University of Hong Kong. Currently, he is a Professor of Department of Automation, Shanghai Jiao Tong University, China. He has published more than 200 papers in refereed journals and conferences. He is an associate editor of IEEE Transactions on Automation Science Engineering, IEEE Robotics and Automation Letters, Assembly Automation and International Journal of Humanoid Robotics, a Technical Editor of IEEE/ASME Transactions on Mechatronics. He served as an associate editor for IEEE Transactions on Robotics from 2015 to 2019. He was the general chair of IEEE RCAR2016 and IEEE ROBIO2022, and program chair of IEEE AIM2019 and IEEE ROBIO2014. He was a recipient of Shanghai Rising Star Award in 2014, The National Science Fund for Outstanding Young Scholars in 2017 and Shanghai Shuguang Scholar in 2019. He is a Senior Member of IEEE. He will be the General Chair of IEEE/RSJ IROS2025.

Dr. Bhagwan Das
Quaid-e-Awam University of Engineering, Science and Technology, Nawabshah



Dr. Bahgwan Das is working as Associate Professor, Department of Automation and Control, QUEST, Pakistan. Dr. Bhagwan Das succeed in filing a patent and achieved 8 copyrights for his research and innovation. Dr. Bhagwan Das is the recipient of BEST MAN INVENTOR 2016 award given by International Federation of Inventors Associations (IFIA), Geneva, Switzerland. He won COMMERCIAL AWARD given by Universiti Tun Hussein Onn Malaysia (UTHM) in 2016. He also received SPECIAL AWARD from Malaysian Research & Innovation Society (MyRIS) in iMIT SIC 2017 at UUM, Kadeh, Malaysia. He won eight gold medals in international innovative competitions for his research work. He has presented his research and innovation work in Denmark, Sweden, Spain, France, Italy, Switzerland, Turkey, Dubia (UAE), Singapore, Malaysia, China, Cambodia, and in Vietnam. Dr. Bhagwan Das has more than 14 years combined experiences of teaching and industry. He has published three book chapters with world's well-known publisher i.e. Springer and IGI Global and more than 100 articles were published in international journals and conferences. He has published more than 46 articles in reputed ISI impact factor journals and in conferences having indexing in SCOPUS, ISI (Thomson Reuters), EI compendex (Elsevier) and etc. He is member of professional bodies such as Pakistan Engineering Council, Pakistan Engineering Congress, IEEE (USA), IFIA (Switzerland), SCIEI (Hong Kong), IAENG (Hong Kong), Internet Society (USA). Dr. Bhagwan Das

appointed as International Program Committee member for more than 30 international conferences around the world and reviewer of more than 50 Scopus, Springer and ISI (Thomson Reuters) indexed journals. He delivered more than 20 keynote speeches in National and International events and remained the resource person of more than 15 workshops and webinars organized by universities and technical organizations. He is also Chair, IEEE Computer Society, Karachi Section. His area of research includes IoT, optical signal processing, and Data Science.

Dr. Zafar Hussain Ibupoto
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Dr. Zafar Ibupoto was awarded a doctoral degree on the topic "Synthesis of metal oxide nanostructures, their characterization and chemical sensing applications" from Linköping University Sweden under the supervision of Prof. Magnus Willander. His first postdoctoral training Institute of Applied Chemistry of Chinese Academy of Sciences Changchun China and second postdoc with Prof. Alberto Vomiero, at the Luleå University of Technology Sweden. Currently, he is a leading researcher and supervising several PhD students in the field of nanostructured materials especially hybrid metal oxides for energy, environmental and biomedical applications at the University of Sindh Jamshoro.

Dr Jawad Ahmad
Edinburgh Napier University, UK

Dr Jawad Ahmad is an experienced teacher with more than 10 years of cutting-edge teaching and research experience in prestigious institutes including Edinburgh Napier University (UK), Glasgow Caledonian University (UK), Hongik University (South Korea) and HITEC University Taxila (Pakistan). During his professional career in the UK, South Korea, and Pakistan, he has taught numerous industry-relevant courses such as Programming for Cyber Security, Cryptography, Operating Systems, Computer Systems and Mathematics for Computing. He has supervised several PhD, MSc and undergraduate students in their dissertations. He was a postgraduate student coordinator and curriculum development committee member at HITEC University Taxila Pakistan. He has co-authored more than 100+ research papers (2000+ Google Citations), including in leading international journals and peer-reviewed international conference proceedings. In 2020, he was recognised as a Global Talent in the area of Cyber Security by the UK Research and Innovation Body and Royal Academy of Engineering. His name was included in World's Top 2% highly cited scientists. He earned a gold medal and bronze medal for best performance in MS (Electrical Engineering) and BS (Electronics Engineering), respectively.

Prof Dr Florin Popenţiu

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Professor Florin Popenţiu Vlădicescu, was born on 17 September 1950, graduated in Electronics and Telecommunications from University POLITEHNICA of Bucharest in 1974, holds a PhD in Reliability since 1981. He has been appointed Director of the "UNESCO Chair in Information Technologies Department" at University of Oradea. Also, he is UNESCO Professor to University "Politehnica" of Bucharest, Faculty of Automatic Control and Computer Science. Professor Florin Popenţiu Vlădicescu is the founder of the first "UNESCO Chair of Information Engineering" , in UK, established at City University London, in 1998. Dr. Florin POPENTIU VLÃDICESCU is at present a Phd Supervisor at the Military Technical Academy " Ferdinand I ". Prof. Florin POPENTIU VLÃDICESCU has published over 200 papers in International Journals and Conference Proceedings is author of one book and co-author of 4 books and co-editor of 4 books published by Springer. Also he is IEEE Senior member.

He has worked for many years on problems associated with software reliability and has been Co-Director of two NATO Research Projects. Also he is on advisory board of several international journals, Reliability: Theory & Applications , IJCS , ARIV , Microelectronics and Reliability (1988-1996) published by Pergamon Press/Elsevier and Sukkur IBA Journal of Computing and Mathematical Sciences (SJCMS) published by Sukkur IBA University. He is reviewer for ACM Computing Reviews, Neural Computing and Applications , IJCSIS, and Associated Editor to IJICT Guest Editor for International Journal of Distributed Systems and Technologies (IJDST),

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He is an independent expert to the European Commission - H2020 programme, for Net Services – Software and Services, Cloud.

Prof. Florin POPENTIU VLÃDICESCU is currently Visiting Professor at "ParisTech" which includes the "Grandes Ecoles", the ATHENS Programme , where he teaches courses on Software Reliability.

Prof. Florin POPENTIU has been Keynote Speaker to IMTIC '15 , Mehran University, Jamshoro, Pakistan, ICCRT 2017 Karachi, IEMIS 2018 , Kolkata and iCOMET 2019 , Sukkur IBA University, Pakistan , ICCD 2018 in Guangzhou, China, , WICT 2018 in Kochi , ICIC 2018 in Mohali, Punjab, India. He was elected Fellow of the Academy of Romanian Scientists in 2008.

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