IMTIC '23

7th INTERNATIONAL MULTI-TOPIC ICT CONFERENCE 2023

AI Convergence towards Sustainable Communications

Abstract book

10-12 MAY,2023

MEHRAN UNIVESITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO

AND

SIR SYED UNIVESITY OF ENGINEERING AND TECHNOLOGY, KARACHI

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ABOUT IMTIC'23

Following the success of IMTIC series, 7th International Multi-Topic ICT Conference 2023 (IMTIC'23) will continue its tradition in the education and industrial hubs of Pakistan, respectively – Jamshoro and Karachi. This year, IMTIC'23 is jointly organized by Mehran University of Engineering & Technology (MUET), Jamshoro, and Sir Syed University of Engineering and Technology (SSUET), Karachi in technical Collaboration of EU Capacity Building in Higher Education ACTIVE and ICM projects.

IMTIC'23 is an international forum for researchers to exchange information regarding novel aspects of technology, applications, and service development within the multidisciplinary framework of Information and Communication Technologies. It indeed provides a forum for technical exchange amongst researchers from academia and industries in various emerging fields of Computing, Wireless Communication, Internet of Things, Signal Processing, Speech and Pattern Recognition, Computer Systems and Networks, Wireless Sensor Networks, Artificial Intelligence, and Power Electronics.

IMTIC'23 aims to bring together a wide spectrum of international experts to facilitate a creative environment for the promotion of research collaboration and knowledge transfer. It will facilitate a dialogue between major industry players, entrepreneurs, and academia for creating a road map to mutually solve scientific problems.

This year, IMTIC'23 received more than 150 submissions, which after author withdrawals and deleting only abstracts led to a total of 145 papers that were reviewed. A small subset of papers was classified as quick rejects based on their quality and likelihood of acceptance. All the other papers underwent a rigorous review process with each paper receiving at least 2 blind reviews. The review process included several stages including TPC member reviews, an on-line discussion among the reviewers, TPC lead summary recommendations, and additional reviews (as needed). IMTIC'23 received papers from United States of America, China, United Kingdom, Spain, Italy, Malaysia, Philippines, United Arab Emirates, Oman, Iraq, South Africa, and Uzbekistan.

The conference program consists of keynote speakers from both industry and academia, multi-track technical program, panel discussion and tutorials, and PhD symposium. There are interactive, high quality, peer reviewed sessions which provides detailed insights from forward thinkers working in the theme of the conference.

The conference proceedings will be submitted for inclusion to the IEEE Xplore Digital Library®.

Prof. Dr. Tauha Hussain Ali
Vice Chancellor
Mehran University of Engineering and Technology, Jamshoro
IMTIC'23 Patron

It gives me immense pleasure that Mehran University of Engineering and Technology is organizing the 7th International Multi-topic ICT Conference (IMTIC'23) in a row. I myself feel proud to be a part of it since first IMTIC held in 2008. It is a matter of contentment to mention that IMTIC'23 aims at providing occasions for national and international researchers and practitioners to present the most recent advances and future challenges in the field of ICT. IMTIC'23 aims to bring together a wide spectrum of international experts 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.

In addition, IMTIC'23 will:
- Raise awareness of state-of-the-art research, locally and internationally.
- Provide a platform for Pakistani researchers to express their ideas and research interest and effectively developing professional relations with the experts working in their areas.
- Offer opportunities for learning, discussion and set challenges.
- To develop the professionalism of ICT by considering quality standards, best practice, training and development and staff career development.
- Provides the opportunity to publish research in IEEE Xplore.

With the core of my heart, I congratulate all the researchers, organizers, collaborators and faculty members for their untiring efforts rendered for the Organizing the event in befitting manner. The conference support by the Sindh Higher Education Commission is highly appreciated.

Prof. Dr. Vali Uddin
Vice Chancellor,
Sir Syed University of Engineering and Technology,
Karachi
IMTIC'23 Patron

It gives me immense pleasure that Mehran University of Engineering and Technology (MUET), Jamshoro, and Sir Syed University of Engineering and Technology (SSUET), Karachi are jointly holding the 7th International Multi-Topic ICT Conference (IMTIC'23) at Jamshoro and Karachi.

I welcome eminent scientists and technologists from around the globe who shall be meeting at both venues of Sir Syed University of Engineering & Technology and Mehran University of Engineering & Technology to present their research finding in the emerging field of ICT. The conference is intended to share significant knowledge into the state-of-the-art advances and cutting edge technologies, which is expected to acquire tremendous interest with the anticipated enormous presence of quality audience.

It desired that Science, Technology and Engineering professional within our country find indigenous solution of the local industry problems. In order to encourage our youth, a poster competition, and a Ph.D. Symposium have made part of the events.

I heartily welcome and extend my best wishes to all the delegates and wish the Conference and organizers a grand success. Further, I myself feel proud to be a part of IMTIC'23.

Prof. Dr. Anil Kumar
Pro-Vice Chancellor,
Mehran University of Engineering and Technology,
Jamshoro.

It is our great pleasure to warmly invite you to the 7th International Multi-Topic ICT Conference (IMTIC'23). The IMTIC'23 is one of the most informative and subject pertinent conferences this year.

This year the IMTIC'23 is jointly organized by Mehran University of Engineering and Technology (MUET), Jamshoro and Sir Syed University of Engineering and Technology (SSUET), Karachi Pakistan along with technical Collaboration of IEEE USA, EU Capacity Building in Higher Education ACTIVE project.

The participation from industry and academia is very much encouraging. In addition, participation of students in tutorials, expert's exposure to students and their face to face interaction will enhance their technical growth and vision at much higher level that will create a deep thrust in students for acquiring technical advancement. Ultimately, they will be utilizing their skills needed for reducing digital divide gap.

Lastly, I welcome you to exciting IMTIC'23 and to meeting all of you in person.

Prof. Dr. Aftab Ahmed Memon
Dean,
Faculty of Electrical Electronics & Computer Engg.
Mehran University of Engineering and Technology,
Jamshoro.

It gives me immense pleasure to be part of 7th International Multi-topic ICT Conference (IMTIC'23). As this conference is organized in jointly by Mehran University of Engineering and Technology (MUET), Jamshoro and Sir Syed University of Engineering and Technology (SSUET), Karachi, I congratulate the organizing committee, steering committee of both Universities as well as to technical collaborators.

It is really pride for MUET and SSUET that IMTIC'23 proceeding will be published by IEEE in its digital Library. I believe that the conference will help in disseminating knowledge and latest developments, research and market trends to students, professionals, practitioners and academicians. It will also support in conducting collaborative research projects as per requirements of local ICT and telecom sector needs and exchange of academia, faculty staff, exchange of undergraduate students, joint supervision of master's and PhD projects.

I wish inspiring and successful ideas to be discussed during the conference. We welcome you to this conference and look forward to your participation.

Prof. Dr. Bhawani Shankar Chowdhry
Professor Emeritus & Advisor
Mehran University of Engineering and Technology,
Jamshoro
Chief Organizer

Information and Communication Technology (ICT) is widely accepted as the foremost tool with which government, researcher, industry, and business organizations can meet the demands placed on them. Thanks to the rapidly emerging global economy, growing population and others. Worldwide research shows that those organizations who are unable or unwilling to understand, use, adapt or implement most innovative information and communication technology will have little chance of survival. The mega international conference event IMTIC'23 brings together researcher, industry professionals and academics in a pleasant environment to exchange information on advances in IT Applications, Networking, Databases, Mobile, Web Services, IT Security, Wireless, Energy Management, Smart Grid, Antenna design, Big Data, Simulation and Modeling etc. With so many papers to choose from, providing a conference program with a high level of technical excellence became a task that was challenging and time consuming, but ultimately a very rewarding one for the Technical Program Committee. The Technical program Committee focused on two aspects while selecting the technical paper first to provide forum for bigger number of participants from Pakistan and all over the world through presentation and discussion of the relevant areas from vast range of Information and Communication Technologies (ICT) disciplines reflecting the rapidly evolving technology we are witnessing today. Second to maintain a reasonable technical standard by selection of around 40 technical papers which represents acceptance rate of approximately 27%. All the papers underwent a rigorous review process with each paper receiving at least 2 blind reviews. The review process included several stages including TPC member reviews, an on-line discussion among the reviewers, TPC lead summary recommendations, and additional reviews (as needed).

The conference program has been structured with several parallel-track sessions for presentation of papers, Tutorial Sessions, Symposium Session and a PhD Symposium. The program also includes keynote invited speakers and guest speakers renowned experts in the field, and several parallel technical tutorials, and a PhD symposium. This event would not have been possible without the enthusiastic and hard work of a number of colleagues would like to express our gratitude to the General Chairs, for their assistance through the whole process, and Steering Committee members for their supportive guidance.

We also thank to all the other members of the organizing committees for the fruitful cooperation. A special vote of thanks goes to the TPC members, and all the referees, for their invaluable help in reviewing the papers. We wish to acknowledge all the authors for their overwhelming support in submitting their papers to IMTIC. Also, we are grateful to Sindh Higher Education Commission (SHEC), and other sponsors form the industry for providing financial support for the event. Last but not least, we wish to thank all the participants for attending the conference and sincerely hope that you will admire IMTIC'23.

Prof. Dr. Muhammad Aamir
Dean,
Faculty of Electrical and Computer Engineering,
Sir Syed University of Engineering and Technology,
Karachi
Chief Organizer

IMTIC'23 is a celebration of achieving academic and research goals. Being Alumni of MUET where from I did my PhD, I really feel honoured that my alma mater Sir Syed University of Engineering and Technology is being part of this flagship event IMTIC'23. It is a great pleasure and honour for me to extend this message on the auspicious occasion of the IMTIC'23. It is a matter of rejoicing and great satisfaction that IMTIC has become a regular feature of Mehran University of Engineering and Technology and its visibility is enhanced by joining hands with Sir Syed University of Engineering & Technology. In fact, it has become an auspicious and prestigious event for researchers, professionals, and academia. The conference is bringing industry-academia collaboration; a phenomenon that is vital for the technological development of our beloved country.

IMTIC'23 aims to unite a multidisciplinary gathering of researchers and engineers not only at the National Level but the International collaboration would help to break through in the ideas relating to Information & Communication Technologies (ICTs). It also promotes quality level research and globalizes the quality exploration and spotlight on the new remarkable accomplishments in the respective fields with future trends and alignment with Sustainable Development Goals (SDGs).

As the conference will provide an avenue to all participants in the physical mode (although online option will also remain available). Therefore, we are anticipating a fantastic meet up for sharing new and energizing thoughts.

With the core of my heart, I welcome and congratulate all the researchers, organizers, collaborators, and faculty for their untiring efforts rendered for the realization of the conference.

Prof. Dr. Faisal Karim Shaikh
Professor
Dept. of Telecommunication Engineering
Mehran University of Engineering and Technology, Jamshoro
Chief Organizer

A warm welcome to the 7th International Multi-Topic ICT Conference held on 10th – 12th MAY 2023.

This conference is yet another milestone achieved after the success of IMTIC'08, IMTIC'12, IMTIC'13, IMTIC'15, IMTIC'18, and IMTIC'21 making it a highly popular and productive event for researchers and students working in the interdisciplinary and application rich topics related specifically to ICT.

The program chairs and the rest of the program committee deserve deep appreciation and commendation for their exceptional work throughout the paper review process. The technical program has been prepared with great care and understanding of the complex dynamics associated with the variety of events. I take this opportunity to thank the people who have been behind the success of this conference.

I am grateful to IEEE Inc USA Karachi section, Sindh Higher Education Commission Pakistan, and Industry sponsors for their support in organizing this conference.

In summary, the conference program is rich and diverse in terms of quality of the technical sessions, and provides opportunities for interactions and collaborations. I wish all participants a very enjoyable and professional fruitful experience at IMTIC'23 at Jamshoro.

Thanks to you all for your participation, it has been our distinct privilege to be with you all.

Dr. Umair Ahmed Korai,
Assistant Professor,
Dept. of Telecommunication Engineering
Mehran University of Engineering and Technology,
Jamshoro
Organizer & Chair, Technical Program Committee

ICT is having a profound impact on the lives of people around the world. The drive for innovations in this field has never been so intense and as a result we continue to witness the development of all kinds of software, hardware, and communication technologies in various sectors. The 21st century is also facing many ICT challenges that must be addressed by cutting edge research both in academia and the industry sector. I am pleased to see that the 7th International Multi-Topic Conference (IMTIC'23) is being jointly organized Mehran University of Engineering and Technology, Jamshoro and Sir Syed University of Engineering and Technology, Karachi Pakistan to provide a platform for researchers, engineers, designers, developers, policy makers as well as academics to share their latest results to address some of the 21st century ICT challenges.

The final program we have put together covers this theme quite well. I am confident that, the final program, along with the impressive list of keynote speakers, will be of great interest to all attendees of the conference and will provide a great platform for everybody to freely exchange their ideas, research results, useful lessons obtained during their research activities. They also have interesting social programs throughout the 3-days event to keep all attendees entertained.

Putting together such an international refereed conference is not possible without the dedication and support of many people including the Mehran University of Engineering and Technology and Sir Syed University of Engineering and Technology administrative staff, the organizing committee members, the technical program committee members from around the world, and all the sponsors of the conference.

Finally, I would particularly like to express my sincere gratitude to all the students at Mehran University of Engineering and Technology and Sir Syed University of Engineering and Technology who have spent so much of their time volunteering to make this event a success.

I hope every one of us will all have a wonderful time during this exciting conference in Jamshoro – The Education City and Karachi – The city of lights!

Dr. Muhammad Ibrar ul Haque,
Associate Professor & Chairman,
Electrical Engineering Department.
Sir Syed University of Engineering and Technology,
Karachi.
Chair, Technical Program Committee

It's my excessive pleasure to welcome all of the national and international researchers and scholars to the IEEE and EU supported, 7th International Multi-Topic ICT Conference 2023 (IMTIC 2023) at Jamshoro and Karachi, Pakistan. The IMTIC is a conference that provides an opportunity for multidisciplinary collaboration between Electrical, Electronics, Telecommunication and Computer professionals, faculty and students in number of research areas of interest.

I am very much pleased to see the awesome response on the invite, from the authors for this much-awaited Conference after the success of IMTIC 2021 Conference. The number of authors from national and different countries have submitted the research articles, which were reviewed by the independent reviewers and based on their critical reviews, the papers, were selected for oral presentation in the conference.

I, as the TPC Chair of this IMTIC'23, frankly, hope that this conference will influence on all the contributors through a one-to-one communications during the technical sessions, tutorial sessions, PhD Symposium, Poster session and keynote talks. I am sure that this conference will provide a place for the information interchange on new skills, standards and ideas. I wish all the participants to have an enjoyable visit at Mehran University of Engineering & Technology, Jamshoro and Sir Syed University of Engineering & Technology, Karachi, Pakistan.

KEYNOTE SPEAKER ABSTRACT

1. Title: Food-based sensors and their applications in biomedicine

   Speaker: *Prof. Goran Stojanović, University of Novi Sad, Serbia*

   Abstract: With the growth of the global economy, and the development of science and technology, a massive assortment of electronic devices has been widely used in human society, which plays an important role in many fields of our life particularly in healthcare sector. Mov ing towards a more circular economy is essential to create and test new types of materials and sensors. This will push the development of the concept of green or food-based electronics, which means that materials which we used comes from sustainable sources, and that they do not impact the environment at its end of life. The progress in this emerging field of electronics may benefit from development of bioresorbable and edible electronic materials derived from nature or food-based materials as substrates in flexible or wearable electronics. LC passive edible sensors will be presented. Sensors for detecting human bite force as well as temperature sensors in oral cavity will be shown. Different electronic components manufactured on chewing gums as a substrate will be presented, as well.

2. Title: Leveraging Intelligent Fog/Edge Computing for Delay-sensitive Applications: Advantages and Limitations

   Speaker: *Dr Mithun Mukherjee, Nanjing University of Information Science and Technology, China*

   Abstract: We are witnessing the unprecedented growth of mobile devices with seamless connectivity and high-speed mobile broadband Internet in almost every aspect of the digitalized world. In the coming years, we envision the next form of cyber-physical systems with an advanced and sophisticated tele-operation, termed as zero-latency and hundred percent reliable internet, Tactile Internet. The Tactile Internet aims to enable the skill delivery and thereafter democratize the specialized skills for many emerging applications (e.g., remote medical, industrial machinery, remote robotics, autonomous driving). We are now familiar with ultra-reliable and low-latency, massive connectivity, and machine-type communications in 5G communication systems. Tactile Internet will take a step forward to perform nearly real-time tele-operation and manipulation of remote physical or virtual objects while delivering human and machine skills.

3. Title: 6G and sustainability – who needs to act and how?

   Speaker: *Prof. Marja Matinmikko-Blue, University of Oulu, Finland*

   Abstract: 6G R&D has identified sustainability as the key driver. Concrete actions that translate the triple bottom line of social, economic and environmental sustainability into 6G R&D criteria and re-quirements on the systems and services are not yet clearly defined. Reducing the environmental footprint of the mobile communication sector and other sectors while improving social sustainabil-ity in an economically feasible manner presents many new interrelated challenges to be tackled in the 6G R&D. Global 6G vision building work is on-going and sustainability considerations face chal-lenges from conflicting stakeholders' agendas. This talk presents a connection between 6G and sustainable development and highlight open topics and required actions for different stakehold-ers towards realizing sustainable 6G that can contribute to solving major sustainability challenges.

4. Title: The 6G Wireless Networks: What to Expect and How to Incept?

   Speaker: *Prof. Syed Ali Hassan, National University of Sciences and Technology, Pakistan*

Abstract: The demand for wireless capacity is continuously growing with the advent of the Internet-of-Everything system, connecting millions of people and billions of machines. To date, the fifth generation (5G) wireless networks are being rolled out in the world, providing a new vision to mobile communication. While 5G is still in its commercialization phase, the research on Beyond 5G (B5G) and sixth generation (6G) communication has already started ground work on innovative technologies that support the capacity growth of future networks with lower cost, energy consumption, and hardware complexity. In order to meet the stringent demands on spectral and energy efficiency, B5G and 6G will rely on new and advanced technologies ranging from cell-free massive MIMO, Terahertz band communication, pervasive artificial intelligence, ambient backscatter communications, to smart radio environments. In this talk, we discuss the basic concept of these technologies, covering the "expectations" part, and then overview the research challenges that are seen to address their "inception".

5. Title: Industry 5.0 and Self-Adaptive Software Systems

Speaker: *Dr Nadeem Abbas, Linnaeus University, Sweden*

Abstract: Industry 5.0, the fifth industrial revolution, is a European vision to integrate digital and physical worlds through technologies such as the Internet of Things, artificial intelligence, and cyber-physical systems. It complements the existing "Industry 4.0" approach by putting research and innovation at the center to transit to sustainable, human-centric, and robust industrial manufacturing and production. Self-adaptive software systems, systems with abilities to adapt at runtime with minimal or no human intervention, can play a critical role in achieving the vision of Industry 5.0. The keynote will highlight and discuss how the vision can be realized using self-adaptive software systems. The speaker will present results from a recent study that systematically surveys the current state of use of self-adaptive software systems in the industry, identify gaps to emphasize what more is needed to exploit the use of self-adaptation in the industry. The presented results will be based on data collected from 184 practitioners from 21 countries. Overall, the keynote aims to discuss possibilities of collaboration and working together to transform Industry 5.0 into a reality.

6. Title: Renewable Energy: The Whole Education Process

Speaker: *Prof. Dil Muhammad Akbar Hussain, Aalborg University, Denmark*

Abstract: There is always some part of the society in every corner of the globe, some how does not complete their education. The reason cloud be simple, student not interested or the focus of the student is some where else, could be family issues, single parent case similarly, there could be more reasons. Most countries have some kind adult education, for example vocational program, but they are generally given to students with more or less the same background. One could imagine that the adult education is very important and Denmark is very fortunate that the government put lots of effort and facilitation and with the major difference that these courses templates for very diverse background.
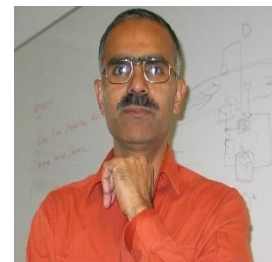
The Danish education system gives high priority to adult education and has established a "folkeuniversity" for the management of these courses, Tutorial and Training, it is infact a Non Governmental Organization (NGO). Round the clock courses are offered by the "folkeuniversity" and professors from entire Denmark are invited for such courses. The teachers every year give lectures, seminars, workshops at all levels and it could be some time targeted training to some individual, for example a very basic programming to build an AI Robot. Some time it is demanded by the customers to have a course whose topics are fixed.

The whole agenda regarding my presentation is providing a kind of template for such courses. I am very fortunate that I have given some lectures in this context and today I have selected Renewable Energy Template. It is a copy write material, copy or modification of the phrases are also not allowed.

7. Title: Some ideas about 3D digital image processing.

   Speaker: *Dr. Enrique Nava Baro, University of Malaga, Spain*

   Abstract: 3D digital image processing techniques are now routinely used in many applications: medical imaging, environmental assessment, remote sensing, etc. In this paper, we will present some new trends, involving the use of new technology depth cameras with a very broad range of new applications, including gesture recognition and hand tracking, 3d modeling, metaverse, underwater video processing and hyperspectral remote sensing.
   The aim of this talk is to present some basic and new ideas to inspire new research in this area, as well to present actual research projects in this field.

8. Title: Swarm Robotics and AI-on-the-Edge

   Speaker: *Prof. Muhammad Haroon Yousaf, University of Engineering & Technology Taxila, Pakistan*

   Abstract: Swarm robotics and AI-on-the-edge are two emerging technologies that can revolutionize the way robots are designed and operated. Swarm robotics aims to coordinate a large group of robots to perform tasks collaboratively, while AI-on-the-edge refers to the deployment of artificial intelligence algorithms on edge devices such as robots. In this talk, we will explore how these two fields can complement each other and enable new capabilities in robotic systems. I will discuss the challenges associated with integrating swarm robotics and AI-on-the-edge and present some recent advances that have enabled the seamless combination of these technologies. Various real-world applications of swarm robotics and AI-on-the-edge, including environmental monitoring, agriculture, and disaster response will also be discussed in the talk. Through this talk, the audience will gain an understanding of the potential of swarm robotics and AI-on-the-edge, and how they can be used to create more intelligent, efficient, and adaptable robotic systems

TUTORIAL
ABSTRACT

1. Title: Embedded Internet of Things in the Era of 6G Networks

   Speaker: *Dr Waleed Ejaz, Lakehead University, Canada*

   Description: This tutorial covers technical knowledge and skills to develop Internet of Things (IoT) systems in the era of 6G networks. The tutorial focuses on the sensors, embedded systems, networking and communications, cloud computing, and cybersecurity aspects of the IoT systems. Attendees will learn about evolving wireless technologies including 6G networks, reconfigurable wireless networks, WiFi, Bluetooth, and protocols for IoT.

   Tutorial Objectives:

   - Describe different components of an IoT system.
   - Describe the concept of hardware, software, and interfacing for IoT systems.
   - Develop programs for embedded sensors and IoT devices.
   - Categorize and compare modern wireless networks for IoT systems.
   - Analyse the real-time performance of IoT protocols for connectivity.

   Topics to be covered:

   - Introduction to the Internet of Things
   - Sensors and Embedded systems
   - Evolving wireless technologies for IoT systems
   - Cloud computing platforms for IoT Systems
   - Analytics and application design
   - Cybersecurity, safety, privacy and reliability.

2. Title: Internet of Things (IoT): The Key Enabler of a Smart Quality Life

   Speaker: *Wafeeq Ajoor, National Health Regularity Authority, Bahrain*

   Abstract: With the Internet of Things (IoT) revolution, over 75 billion connected things in the world are expected by year 2025 and 50% of all world data will come from IoT devices and sensors (expected to generate a total of 150 yottabytes) – nearly reaching 90% of the world's data created in the last 3 years. IoT brings up great requirements in terms of types and volume of connected devices, generated data from these devices, different environments coverage, battery-operated devices, form factors, and multiple communication ranges, communication protocols for real-time and mission critical applications, and diversity of traffic ranging from 3 bytes of data for telemetry to HD video streams for surveillance. IoT presents unique challenges such as efficient service discovery between devices, sleep mode management, communication between devices, radio to use, application requirement, and power constraint. The tutorial will present a comprehensive introduction of the IoT ecosystem including an IoT overview (what/why, challenges, markets, services/applications, standards & regulations), wireless IoT technologies, 3GPP mobile IoT technologies, IoT platforms, IoT analytics, IoT security, and IoT business.

   Tutorial Objectives:

   - List the motivating factors, key goals and requirements of IoT
   - Deep understanding of the IoT ecosystem and its capabilities
   - Comprehension of various IoT connectivity technologies, their pros and cons, features and impacts on IoT architecture
   - Appreciate the important of IoT standards & regulations
   - Awareness of the IoT data platforms and IoT data value chain
   - Discuss IoT data security and privacy
   - Explain IoT market, business models, and how-to be an IoT entrepreneur

3. Title: Cybersecurity Challenges Unveiled: A Practical Demonstration of Digital Threats and Solution

Speaker: *Dr. Muhammad Asad Arfeen, NED University of Engineering & Technology, Pakistan.*

Abstract: In this talk Dr. Asad Arfeen and his team of National Centre of Cyber Security will present theory and practical aspects and implications of digital threats to end point and server systems running various types of operating systems and application layer software. Both offensive and defensive aspects of digital threat shall be covered. In addition, a demo of safeguarding mechanism will also be presented.

4. Title: The Sound of Wellness: A Centralized Dashboard and Music Therapy Prototype for Enhanced Healthcare Management

Speaker: *Dr. Shama Siddiqui, DHA Suffa University Karachi, Pakistan*

Abstract: The use of Internet of Medical Things (IoMT) has expanded to encompass innovative techniques of alternative medicine, which are integrated with IoT and mobile applications to reduce the burden of healthcare both on patients and the state. In this tutorial, we will focus on our work developing a centralized dashboard and automated music therapy architecture using simple IoT hardware. While music therapy is not a new concept, it has traditionally been delivered in clinics or adopted individually without expert guidance. For the first time, we have attempted to integrate IoT technology with music therapy to create a more accessible and effective approach to managing general and mental health issues such as pain, stress, anxiety, and depression.

The tutorial will begin with an overview of the emerging trends and research in IoMT and music therapy, followed by a detailed discussion of our work on the centralized dashboard and automated music therapy system for general/mental health management. The demonstration will showcase a preliminary hardware prototype developed for managing anxiety, which incorporates NodeMCU, pulse oximetry, and SPO2 sensors to collect data and categorize the risk level on the centralized dashboard. The hand-held device will then play appropriate music to help manage anxiety.

In summary, this tutorial provides a comprehensive overview of integrating IoT technology with music therapy for healthcare management. Attendees will gain insights into the emerging trends and research in IoMT and music therapy and will have the opportunity to witness a demonstration of our prototype.

ABSTRACT OF PAPERS

1. Paper ID – 3: An EEG Based Thought-to-Text Translation Device for Disabled Individuals

Sarfraz Ali, Wajid Mumtaz, Aiman Maqsood

Abstract: Neurological disorders are the greatest contributors to disability which include epilepsy, Alzheimer disease, multiple sclerosis, Parkinson disease etc. Neurodegenerative conditions are life-debilitating situations and individuals suffering from such impairments fight a new battle every day. This manuscript aims to implement a Though-to-Text Conversion BCI system. The Thought-to-Text Convertor device is designed by using joint CNN-RNN deep neural network that learns high level features from MI-EEG signals. To eliminate several artifacts from EEG signals, a layer of Autoencoder is also added. XGBoost Classifier is used for the classification of EEG signals into five EEG imagery tasks. This Deep Learning model is then pickled using Python and deployed to server. The server gives command to developed GUI which classify the input EEG signals to corresponding alphabets. This Neural Network is trained on multiple open-sourced EEG data sets, with various optimization algorithms to achieve a high accuracy of the system and a desirable efficiency to match real-time applications. The textual output obtained can be utilized for rehabilitating paralysis and stroke patients. Proposed system has achieved an accuracy of 96.89% with a standard deviation of 33.5%

2. Paper ID – 4: LRCMP: A Sequential Statistical Framework for Predicting Cancer Mortality Rate

Mubarak Albarka Umar, Ali Nawaz, Tariq Qayyum

Abstract: In this era Science has seen a remarkable progression and rapid expansion in the field of Smart Grid infrastructure deployed in both Urban and Rural Communities. One of the key feature of Smart Grid infrastructure is Smart Grid Communication Network (SGCN). In SGCN the most cost effective and rapid deployment form of communication medium is Wireless connectivity. In this research, authors have recommended the use of unlicensed spectrum ISM band Microwave Radios in 2.4 GHz (2.402 to 2.472 GHz) and 5.8 GHz (4.910 to 5.970 GHz) as a substitute for licensed spectrum Microwave Radios between Neighborhood Area Network (NAN) to Meter Data Management System (MDMS) fragment of Smart Grid Communication Network (SGCN). In this investigation Authors will discuss the shortcomings of using traditional wired connectivity in Smart Grid Communication Network (SGCN). Further Authors will advise the use of Hybrid Mitigation techniques like Dynamic Frequency Selection (DFS) & Dual Polarization (DP) in Microwave radios to reduce interference to enhanced network technical operations capabilities of interconnectivity between Neighborhood Area Network (NAN) to Meter Data Management System (MDMS) fragment of Smart Grid Communication Network (SGCN).

3. Paper ID – 9: Penta-band Circular Patch Antenna with Partial Ground for Wireless Applications

Muhammad Zaeem, Ali Hamza, Muhammad Zahid, Yasar Amin

Abstract: In this paper, a penta-band slotted antenna with a partial ground is proposed. The suggested antenna is used for different portable devices for wireless communication. The FR4-epoxy substrate which has a thickness of 1.5 mm is used to create an antenna with a partial ground. The frequency bands 4.1 - 5.2 GHz, 7.6 - 8.6 GHz, 10.5 - 11.7 GHz, 13.5 - 14.7 GHz, and 18.6 - 20.2 GHz are all covered by a proposed antenna. For each of the covered fractional bandwidths 23.91%, 12%, 10.81%, 5.67%, and 8.24% respectively. The proposed antenna covers the application of Wi-Fi, Bluetooth, S-band, C-band, K-band, Ku-band, and X-band. The maximum gain of 4.7 dB is achieved by a proposed radiator for a higher band. The performance of an antenna makes it clear that it is good for wireless applications.

4. Paper ID – 10: Dual Band Scorpion-Shaped Antenna for 5.8 GHz ISM Band and X-Band Applications

Muhammad Umer Farooq, Hafiz Muhammad Saleh, Muhammad Zahid, Yasar Amin

Abstract: This paper presents the design of a microstrip patch antenna with a 'shorting pin' technique. The proposed antenna design resonates at 5.8 GHz with an additional band at 8.9 GHz. The overall dimension of an antenna is 15 mm x 12 mm. The first proposed antenna design with the full ground and without a shortening pin did not meet our requirements. Then we added a shorting pin to get the required band of frequencies which effectively led to a more suitable value of resonance frequency. But still, it was not adequate. At last, we partially reduced the ground instead of full ground which gave us the resulting dual bands at 5.8 GHz and 8.9 GHz. The ISM and X-Band are covered in the resulting dual bands. The results of the proposed design showed a high gain and larger bandwidth, and it is cost-effective as well. The design of proposed antenna is appropriate for ISM and X Band applications.

5. Paper ID – 16: Reputation of Social Media Influencers by using Twitter Comments of Consumers and Sentiment Analysis

Amna Dahri, Engr. Memoona Sami

Abstract: The social media is playing a significant role in consumers life. The social media influencers not only assist in opinion formation but also help in decision making. Therefore, it is necessary to measure the reputation of social media influencers based on the comments and sentiments shared by consumers and determine whether influencers' experiences are genuine and real. Sentiment analysis and opinion mining will be helpful to achieve this task to some extent.

6. Paper ID – 18: Fingerprint generation and authentication though Adaptive convolution generative adversarial network (ADCGAN)

Syed Muhammad Nabeel Mustafa, Syeda Sundus Zehra, Alina Baber, Maira Andleeb Siddiqui

Abstract: Fingerprints are crucial in identification of humans. The uniqueness of finger prints makes it an interesting subject. Fingerprints are termed as a technique used to define, assess, and quantify a person's physical and behavioural property. Deep learning has made its application in all the major fields such as natural language processing, computer vision and speech processing. Deep learning has also found its application in the important subject of fingerprint synthesis and biometric. The ever-growing complexity of fingerprint authentication issues, from cellphone authentication to airport security systems, seems to be best handled by these models. In recent years, deep learning-based models have been used more and more to raise the accuracy of various fingerprint recognition systems. The persuasive capacity of Generative Adversarial Networks (GANs) to generate believable instances that can be credibly taken from an existing distribution of samples has led to the promotion of a number of applications. Because of its game theoretic optimization technique, GAN not only exhibits exceptional performance on data generation-based tasks but also encourages study in privacy and security. In this work, using Adaptive Deep Convolution Generative Adversarial Networks (ADCGAN), we develop a model that generates and authenticate the fingerprints. A Socofing dataset was trained on ADGAN model. The model gave 92% accuracy. The conduct of fingerprint research has been made possible due to ADGAN, without restrictions related to the confidential nature of biometric data.

7. Paper ID – 19: PWM Waveform Generation and Control Using Rotary Encoder on Spartan-3E Starter Board

Muhammad Bilal, Razia, Adil Hussain, Malhar khan, Abdul Munaim, Muhammad Alim

Abstract: The paper proposed the design and implementation of generation and control of a PWM waveform with variable duty cycle using rotary encoder. The model was developed and executed using various frequency values. The FPGA Spartan-3E board is used to generate the waveform Which has inbuilt rotary encoder. The required PWM signal can be generated by on-board signal and rotary encoder. By turning the encoder in a clockwise and anticlockwise direction, the duty cycle of the PWM signal can be changed. By pressing it up and down PWM signals of different frequencies are generated. In proposed design, The range of the duty cycle is 0 to 100%. The various frequencies have been produced by varying the frequency of the on-board clock signal, which is 50 MHz. Oscilloscope is used to analyze the output. PWM signal is often used to control the power sent to electrical devices, such as motors, and has a variety of applications in fields such as communications, control systems, and power electronics. FPGA use enables high-speed operation, customizability, efficient resource utilization, reusability and low cost.

8. Paper ID – 20: 2×2 Hexagonal-Shaped Antenna Array for 5.8 GHz ISM Band Applications

Muhammad Muqadas Taqdeer, Qazi Mohtishim Amjad, Muhammad Zahid, Yasar Amin

Abstract: A 2×2 hexagonal-shaped patch antenna array with the dimension of 49.47×47.94 mm2 is printed on an economical FR4 substrate with a relative permittivity of 4.4 and a peak gain of 7.78 dB. The proposed antenna operated on a frequency of 5.8 GHz that is used for Industrial Scientific Medical (ISM) applications, a wireless Local Area Network (LAN) application. The 2×2 hexagonal-shaped microstrip patch antenna is more efficient than a rectangular and circular-shaped antenna in terms of the required parameters such as gain, directivity, bandwidth, etc.

9. Paper ID – 21: Go Together: Bridging the Gap between Learners and Teachers

Asim Irfan, Muhammad Turab, Atif Nawaz

Abstract: After the pandemic, humanity has been facing different types of challenges. Social relationship, societal values, and academic and professional behavior has been hit the most. People are shifting their routines to social media, and gadgets and getting addicted to their isolation. This sudden change in their lives has caused an unusual social breakdown and mental health is endangered. In mid of 2021, Pakistan's 1st Human Library was established under HelpingMind® to overcome these effects. Despite online sessions and webinars, HelpingMind® needs technology to reach the masses.In this work, we customized the UI/UX of a Go-Together Mobile Application (GTMA) to meet the requirements of the client organization. A very interesting concept of the book (expert listener/ psychologist) and the reader is introduced in GTMA. It offers separate dashboards, separate reviews or rating systems, booking, and venue information to engage the humanreader with his/ her favorite human book. The loyalty program enables the members to avail discounts through a mobile application and its membership is global where both the humanreader and humanbooks can register under the platform. The minimum viable product has been approved by our client organization.

10. Paper ID – 22: Using Generative Adversarial Networks for Textile Design Generation

Shams Arfeen, Omema Ahmed, Muhammad Munawwar Anwar

Abstract: Deep generative models have recently played an important role in the growth of artificial intelligence in a variety of fields that need creativity. Despite its success, the generation of textile patterns is still largely unexplored. One possible explanation is that there is no publicly available data set large enough to train models on. However, research in this area can be useful because fashion designers can take up to several weeks to form a new design as they need inspirations and rely on a human's creativity, but a trained GAN model can generate thousands of designs per day without the need of any human intervention. Furthermore, the use of GANs to generate fabric patterns from traditional Pakistani culture is an untapped field of research. In this research, we will be using DCGANs to generate fabric designs that are representative of Pakistani culture. In addition, we will compare the performance of DCGAN's with StyleGAN and Variational Autoencoders (VAE).

11. Paper ID – 23: Design, Implementation, and Power Analysis for Network on Chip Architectures

Ayesha Farman, Yaseer Arafat Durrani

Abstract: Low-power consumption in Network-on-Chip (NoC) architectures is an important concern that cannot be ignored. In this work, two well-known NoC architectures such as 3x3 CLICHÉ and 3x3 TORUS architecture have been designed to achieve high performance with minimum power dissipation. The experimental work for designed architectures has been divided into two major parts for analysis. Firstly, the design has been simulated or tested using random input patterns that have been generated with different signal probabilities through the test bench. And secondly, the power of two NoC architectures has been estimated through the physical models, and comparison is done with a simulated tool. For an entire NoC, the total average power is extracted by the simple addition of dynamic and static power. In experimental results, the comparison shows that the total power consumed by the CLICHE architecture is low as compared to TORUS using fix number of IP cores in the network. Also, the average maximum error is estimated to be 18.7 % for power estimation.

12. Paper ID – 28: SELTHA: Secure, Efficient and Lightweight Authentication Mechanism for Unmanned Aerial Vehicle Network

Waqas Salam, Syed Khaliq-ur-Rehman Raazi, Nauman Hafeez Ansari

Abstract: Abstract—Internet of Drones (IoD) is the most common, fast growing and emerging application of Internet of Things (IoT). Due to the vast use of Unmanned Aerial vehicles commonly called as drones in IoD applications such as Rescue and Search Operation, Wild Life Monitoring, Photography and Video Recording, Military Spying Missions, Package Delivery, Agriculture and etc. has tremendously increased the challenges of Safety, Security and Privacy. To secure the drone communication and counters the security threats caused by unauthorized drones and malicious cyber invaders who can have access to sensitive information. IoD needs the Authentication mechanism that utilize the less computational power and resources because drones are equipped with limited battery power that can reduce their battery life time by using the existing Authentication methods of

Public Key infrastructure (PKI) Asymmetric cryptography like Digital certificate and Digital Signature that are resource intensive cryptographic functions. We proposed the mechanism SELTHA: Secure, Efficient and Lightweight TOTP based Hashed Authentication that specifically designed to reduce the computational resources and power overhead and ensure security challenges and threats to encounter. SELTHA negotiates the flight session key with registered drone and stores its flight plan and session key in its central database for that specific session. It uses onetime session key to calculate the Hashed Message Authentication code HMACSHA256 for message authentication and sent TOTP code along with the message authentication as the two factor authentication mechanism. To show the feasibility of SETLHA, we implement the prototype simulation using PBKDF2, HMAC-SHA256 and TOTP algorithms. Results shows that SELTHA authentication mechanism have achieved the lowest total communication cost and UAV computation cost that significantly reduced the battery power consumption to enhance UAV battery lifetime. SELTHA in contrast to other authentication mechanism is suitable to implement practically.

13. Paper ID – 32: 12 Element Inverted E-Shaped Massive MIMO Antennas for Future 5G Smartphone Applications

Mumtaz Ahmed, Muhammad Zahid, Ilsa Javed, Zain Zafar, Yasar Amin

Abstract: In this paper, we intend to employ massive MIMO technology in 5G Smartphone communication. Our aim is to achieve enhanced spectral efficiency and increased system capacity and high gain of the antenna. The proposed model presents the design of a 5G smartphone antenna made of FR4 Epoxy substrate having dimensions of 161×80 mm2. This antenna covers two bands that are 2 - 2.4 GHz and 5.8 - 6.1 GHz. A 12-element Massive multiple input multiple output (MIMO)/diversity antenna system is deemed to function. Twelve identical and highly isolated combinations of inverted E-shaped slot antennas are fed via straight lines in the suggested architecture. In free space, the first frequency band exhibits a returns loss value of -30 dB, second frequency band is -10 dB and an overall antenna efficiency in both bands is greater than 84%. High speed, enhanced capacity, less delay, and quality for transmission and radiation of radio waves in mobile phones are required. Signals from our mobile phones should be launched in a more intelligent manner. An antenna model is shown and explained for future mobile applications.

14. Paper ID – 35: Fault Detection and Quality Inspection of Printed Circuit Board Using Yolo-v7 Algorithm of Deep Learning

Malhar khan, Karim Kolachi, Shahjahan Alias Sarang

Abstract: The requirements of the contemporary manufacturing environment where the delivery of 100% defect-free PCBs is expected, have increased the significance of the printed circuit boards (PCBs) inspection process. Billions of Electronic products are manufactured every year and the success rate of proper working is 97 % out of 100%. The remaining 3% is faulty products and most faults occur due to PCBs. This is a huge loss for the company; it is therefore needed to overcome the problem. This research will conduct a study of the newest model YOLO v7 (You-Only-Look-Once) algorithm of deep learning to find out the solution to minimize the loss of the company, it is an advanced kind of image classification in which an end-to-end neural network identifies defects in an image and highlights them with bounding boxes. This work is presented for the quality inspection, different types of fault detection, and classification of PCBs. Deep learning algorithms, such as convolutional neural networks (CNN), due to their high accuracy and efficiency have achieved considerable attention. In this proposed approach a highly accurate dataset was taken from The Open Lab of Peking University. The data set includes 1386 images having six kinds of defects (open circuit, spur, short circuit, missing hole, mouse bite, and spurious copper). The objectives of this research are to bring a solution not to have faulty PCBs and further decrease the manufacturing cost, product's waste and enhance the manufacturing process of the company.

15. Paper ID – 41: Hybrid Statistical Model for Ultra Short Term Wind Speed Prediction

Maria Ashraf, Bushra Raza, Maryam Arshad, Syed Sajjad Haider Zaidi, Bilal Muhammad Khan

Abstract: In the energy business, particularly in the wind energy industry, wind speed prediction is crucial. An accurate wind speed forecast is essential for optimizing wind turbine performance and increasing wind energy production efficiency. This study proposes a hybrid SARIMAX-RNN-SVR model for predicting wind speed. In order to increase forecast accuracy and get around the shortcomings of individual models, the model combines the advantages of three separate approaches. The linear relationship between wind speed and pertinent meteorological variables is captured using the seasonal autoregressive integrated moving average with exogenous

variables (SARIMAX). In contrast, the nonlinear relationship and long-term dependencies are captured using the recurrent neural network (RNN). Lastly, the combined model's predictions are improved using support vector regression (SVR). The performance of the proposed hybrid model is compared to that of the individual models of SARIMAX, RNN, and SVR using wind speed data from a small wind turbine located in Karachi, Pakistan. The outcomes show that the suggested model can solve further wind speed prediction issues and potentially assist wind energy management and planning.

16. Paper ID – 45: An Effective Approach for Violence Detection using Deep Learning and Natural Language Processing

Versha Kumari, Khuhed Memon, Burhan Aslam, Bhawani S Chowdhry

Abstract: An effective tool for violence detection is highly demanded to examine the rise in crime rate in today's era. Artificial Intelligence can play a significant role in violence detection and monitoring to tackle various problems of security and safety concerns. This research proposes strategies to incorporate Deep Learning and Natural Language Processing (NLP) to simultaneously detect anomalous objects and scenarios from videos using TensorFlow and aggressive, offensive, and hate speech from an audio channel of surveillance cameras. This research aims to automatically detect violence in real-time from surveillance footage by using TensorFlow custom object detection upon identification of firearms, robbery, fistfights, sexual harassment, and fire in successive images from the video feed. In addition, the audio channel of such surveillance cameras can also be significantly fruitful in detecting hate speech, verbal sexual abuse, and profanity. The proposed system includes an alert mechanism that detects any type of violence and automatically notifies the security administrator, enabling timely intervention to prevent potential damages to society. The developed models can be deployed on any existing surveillance system with next to negligible additional hardware and software resource requirements, thereby making it an efficient, fast, accurate, and economical solution. To train the model, custom datasets were designed for 6 categories in images and 2 categories in speech. The accuracy of the developed system was found to be 84%, with adequate performance under various luminance conditions, including night vision images.

17. Paper ID – 46: A Comprehensive Study of the Role of Self-Driving Vehicles in Agriculture: A Review

Ameer Hamza, Faisal Riaz, Samia Abid, Dr. Umar Raza, William Holderbaum, Bhawani Shankar Chowdhry

Abstract: The automation of self-driving agricultural vehicles, particularly self-driving tractors, has made significant strides in the growth of the agri-tech business. These self-driving agricultural vehicles will greatly aid the improvement of the legacy agricultural system in terms of safety, fuel economy, and time management. Driving a self-driving tractor on an unpaved path is a more challenging task as compared to driving it on a well-paved road with defined operational design domains with proper road infrastructure. To the best of our knowledge, though the significance of this challenging task is very clear, no comprehensive survey to address this challenge has been conducted yet. To overcome this problem, we have performed a detailed survey of techniques used in self-driving tractors for different purposes. In addition to the literature survey critique analysis of existing solutions has been performed and open questions have been raised. These open questions will help researchers in this field to perform state-of-the-art research.

18. Paper ID – 49: Investigating the suitability of ceramic insulators for coastal power distribution system in Pakistan using accelerated aging technique

Abdul Attayyab Khan, Jawad Ahmed Bhutta, Basit Ali, Azeem Azam

Abstract: The purpose of this research is to investigate the durability of ceramic insulators under different weather conditions, including temperature, precipitation, dust, and flashover, and to observe the behavior of contaminants. An experimental chamber was used to artificially age the ceramic insulators and examine the effects of four environmental factors: temperature, rain, fog, and dust. The experiments were conducted over a six-year period, during which reliable data sources were used to measure rainfall, temperature, humidity, and pH. Furthermore, artificially created acidic rain was utilized to obtain more accurate results. After each experiment, the test insulator was installed on the current test bench to measure the leakage current passing through the ceramic insulator. A comparison was made between aged and non-aged insulators, revealing that the amount of leakage current increased with increased dust exposure. As a result, this experimental research recommends the regular cleaning and monitoring of ceramic insulators installed in distribution networks.

19. Paper ID – 56: A Machine Learning-based Intrusion detection for IoT infrastructure

Sameer Aftab, Zafi Sherhan Shah, Sajjad Ali Memon, Quratulain Shaikh

Abstract: Abstract—Industrial Internet of Things (IIoT) is rapidly expanding in the industrial sector, and it is critical to ensure the security of IIoT systems against cyber threats. This paper proposes an intrusion detection system for IIoT based on machine learning algorithms. The proposed system uses decision tree, random forest, and naive bayes algorithms to classify the incoming network traffic as normal or malicious. The dataset used in this research consists of 500,000 samples, including 250,000 attack samples and 250,000 normal samples. The dataset was preprocessed and features were extracted to train and test the proposed intrusion detection system. To evaluate the performance of the proposed system, accuracy, recall, precision, F1-score, used for evaluation. The results of the experiments show that the proposed system achieved high accuracy, recall, and precision in detecting malicious traffic in the IIoT network. The decision tree algorithm achieved the highest accuracy of 99.73%, followed by random forest with 99.70% accuracy and naive bayes with 99.69% accuracy. The proposed intrusion detection system is expected to enhance the security of IIoT systems and mitigate the risk of cyberattacks in the industrial sector. It is recommended to integrate the proposed system with existing IIoT security systems to improve their effectiveness and provide a comprehensive security solution.

20. Paper ID – 64: Praise or Insult? Identifying Cyberbullying using Natural Language Processing

Nimra Tariq, Zafi Sherhan Syed, Erum Saba

Abstract: Cyberbullying has become a prevalent issue in the current era of technology. The prevalence of such content at online platform not only perpetuates harmful behavior but also poses a threat to online communities and individuals mental health. To address this issue there is growing need for automated systems to detect toxic comment on social media. In our research our focus is on utilizing natural language processing (NLP) techniques to distinguish between praise or insult in an online comments on Reddit, a popular social media platform. In particular, we first benchmarked the classification performance using Term-Frequency Inverse Document Frequency (TF-IDF) featurizer and then employed two different deep learning based approaches, Keras Embeddings and Global vectors for word representation (GloVe). Our results show that whereas TF-IDF feature achieve an accuracy of 83%, GloVe achieve an accuracy of 89%, but Keras Embeddings achieved an accuracy of 93%. These results suggest that there is ample opportunity for further research and development in this area, with the potential to make a real difference in the fight against cyberbullying.

21. Paper ID – 65: Inductance Enhancement Using Nested Inductor Topology for RF and Voltage Regulators Applications

Wesam Khalil, Muhammad Ayaz, Kiran Nadeem

Abstract: The increasing demand of inductors in various industries reflects the attention of scientific communities to identify various solutions based on the magnetic flux density. This paper presents the design and simulation analysis of various inductors being investigated in COMSOL. The performance of straight line and circularly bent shaped inductors (nested inductor) is investigated based on simulation of the same dimension, size inductor in COMSOL. The achieved results predict that by changing the shape of the inductor from straight line to circularly bent, keeping all other parameters including permeability the same the inductance of the inductor is increased from $0.38568 \mu H$ to $0.7525 \mu H$. The magnetic flux density in a straight-line inductor is increased from 4mT to 6mT in a circularly bent or nested inductor.

22. Paper ID – 68: Fall Detection System using a single Accelerometer through Machine Learning

Saad Areeb, Sumair Aziz, Aliza Shoukat Awan, Muhammad Umar Khan, Adil Usman, Syed Zohaib Hassan Naqvi

Abstract: Falling is one of the critical health threats which affects the standard of living for people. Falls are the common cause of serious injuries or sometimes even it can be fatal. Thus, fall detection may be very helpful in minimizing the severe consequences of falling. This study presents a machine learning based fall detection system that employs only one low-cost accelerometer (ADXL) sensor. Acceleration signals from the human body were acquired. Three axial acceleration data was fused using sum magnitude vector (SMV). Five distinguished features were extracted from the sum magnitude vector. The values of features were given as input to support vector machine (SVM) classifier. The system has attained a high accuracy of 99.3 %. A few well-known classifiers were trained and tested for comparison purposes

23. Paper ID – 73: Machine Learning's Artificial Characteristics for Classifying Lung Sounds

Ihtisham Ul Haq, Hamza Ahmad Khan

Abstract: Classifying lung or heart sounds is challenging due to the complexity of audio data, its dynamic properties in the time and frequency domains, and the specificity of the sounds being studied. When working with insufficient data or data that is both uneven and loud, spotting lung or heart illnesses is just as difficult. In addition, improving deep learning's effectiveness is hampered by poor data quality. Here we introduce a novel feature-based fusion network, called FDC-FS, to classify thoracic auscultation and expiratory breath sounds. The purpose of the FDC-FS framework is to effectively share information among three independent audio-recording-based deep neural network models. The novel aspect of the proposed transfer learning is that it merges three separate models into a single fused model that is better suited for deep learning. We used publicly available data for this study, including lung sound data from the ICHBI 2017 challenge and data from the heart challenge. We used data augmentation methods like noise distortion, pitch shift, and temporal stretching to solve multiple issues with the data in these sets. We carefully dissected the audio recordings to isolate three distinct characteristics: the spectrogram, the mean-frequency-coherence spectrum, and the chronagram. We then fed the resulting picture feature vectors that had been adjusted using the audio information into three highly successful convolutional neural network models. We verified that the suggested fusion model outperforms state-of-the-art methods. It was determined that utilising a spectrogram, FDC-FS correctly classified 99.1% of lung sounds and 97.1 % of heart sounds.

24. Paper ID – 74: A Novel Hybrid AI-Based System for Early Detection of Oral Squamous Cell Carcinoma via Histopathological Images

Mehran Ahmad, Ihtisham Ul Haq, Muhammad Irfan Khattak, Atif Jan

Abstract: Oral cancer is a serious health condition that affects many people around the world. Oral cancer is a dangerous and potentially life-threatening form of cancer if not detected and treated early. It can spread quickly to other parts of the body, such as the lymph nodes and other organs, which can make treatment more difficult and increase the risk of mortality. Histopathological image analysis plays a crucial role in the diagnosis of oral squamous cell carcinoma (OSCC) by identifying abnormal cells. However, manual diagnosis is reliant on the skill and experience of doctors, which can be time-consuming when tracing all the tissues in a patient's biopsy. Furthermore, manual diagnosis can be limited by subjective differences in doctors' opinions. To overcome these challenges and improve cure rates for patients, this study underscores the vast potential of artificial intelligence (AI) approaches in OSCC diagnosis. The research applied three different methodologies: Gabor + CatBoost, ResNet50 + CatBoost, and Gabor+ ResNet50 + CatBoost. Here we extract 32 low-level features from the Gabor Filter and 100532 high-level features from the ResNet50 model. To reduce the dimensionality of the high-level features and avoid overfitting, we apply principal component analysis (PCA) and retain the top 4096 components. Firstly, the extracted features of Gabor and ResNet50 were classified individually through CatBoost. Secondly, the extracted features are then concatenated and fed into CatBoost for image classification. Among the three proposed strategies for classification, it was found that the third strategy, which involved the combination of Gabor filtering with ResNet50 feature extraction, and classification through CatBoost, achieved the best performance, with the highest accuracy of 94.92%, 95.51% precision, 84.30% sensitivity, 95.54% specificity, 94.90% F1 score and 94.9% of AUC. These AI-based approaches offer promising solutions for more accurate and efficient OSCC diagnosis.

25. Paper ID – 75: Investigation of the Specific Absorption Rate (SAR) in the Human Head Model for Underground Mining Stope Scenario

Muhammad Ahsan Ashraf, Muhamamd Ahsan Mahboob, Kuda Mungwariri

Abstract: The rise in wireless devices has led to an increase in the amount of radiation energy absorbed in the human body. SAR (Specific Absorption Rate) is a common property used to evaluate absorbed energy and measure the radiation absorbed by human tissue. This paper investigated the SAR value of the wearable device worn on a miner's head in an underground mining environment on a horizontal stope rock face, using 868 MHz and 2400 MHz frequencies. The results suggested that the SAR values were lower when the device was not mounted directly on the head but outside the safety helmet. At higher frequencies, the average SAR was higher than at lower frequencies; however, at low frequencies, the SAR in the head's deep tissues was greater than in surface tissues. The relationship between the number of pillars, the head's actual position, and the support

structure's materials was evaluated along several framing scenarios. It was determined that in the stope scenario, the position of the human head has a bigger impact on absorption than the pillar's size and material.

26. Paper ID – 76: Comparison of Memory-less and Memory-based Models for Short-Term Solar Irradiance Forecasting

Ubaid Ahmed, Anzar Mahmood, Ahsan Raza Khan, Sohail Razzaq

Abstract: The world's energy consumption is continuously rising due to rapidly growing human population and expanding industrial sector. Integrating Renewable Energy Resources (RERs) with the power system comes up with severe challenges as the nature of these resources is intermittent. Among RERs, solar energy is a viable means of producing power. However, due to the intermittent nature of solar energy, accurate forecasting is necessary for smooth operation of power systems. The operational applications such as load balancing and economic dispatch can be facilitated and made more effective using very short-term forecasting. Therefore, this study proposes a memory-less third-order Markov model for very short-term solar irradiance forecasting. The proposed model uses the Random Forest (RF) for dimensionality reduction and model performance is evaluated using Root Mean Square Error (RMSE), Mean Square Error (MSE) and Normalized Root Mean Square Error (NRMSE). The results are compared with the existing Long-Short Term Memory (LSTM). The 3rd-order MC outperforms LSTM model. In terms of NRMSE, an improvement of 40.5%, 39.9% and 63.4% is recorded for the datasets of three Pakistani cities, Islamabad Karachi and Lahore, respectively.

27. Paper ID – 78: Modeling and Control of Liquid Carrying Aerial Vehicle's Endurance and Performance Based on LQR And PID Control Strategies

Syed Muahmmad Nashit Arshad, Yasar Ayaz, Umer Asgher, Sara Ali, Noman Naseer

Abstract: Quadcopters have become a popular choice for transporting liquids in various industries due to their versatility and maneuverability. In this research, we compare the effectiveness of two control strategies, Linear Quadratic Regulator (LQR) and Proportional-Integral-Derivative (PID), in achieving stability and calculating the energy requirement of a liquid-carrying quadcopter. We present a detailed modeling, design and simulation analysis of the quadcopter control system with both LQR and PID controllers and evaluate their impact on the quadcopter's energy requirement. Our results show that the LQR controller outperforms the PID controller in terms of performance, achieving up to a 12% decrease in battery requirement. Moreover, the increased battery life resulting from the optimized control strategies also leads to improved performance metrics such as reduced oscillations, steady-state error, and overshoot during the quadcopter's trajectory tracking. Our research highlights the importance of selecting an appropriate control strategy for optimizing the battery life and performance of a liquid-carrying quadcopter. The advantages of using LQR controllers over traditional PID controllers can lead to significant improvements in the quadcopter's overall performance and reduced operational costs.

28. Paper ID – 79: Exploring the Impact of False Location Identification on the Inference of Social Ties in Location-Based Social Networks

Aqeel Ahmed, Xianghong Lin, Ali Arshad, Khalil Ur Rahman, Nauman Ali Khan

Abstract: Global Positioning System (GPS) and Wifi facilitate the users to add extra location information to their social networks, which forms Location-Based Social Networks (LBSNs). Analysis of social networks formed over LBSNs are helpful in understanding human behavior and is utilized in e-business recommender systems. Co-occurrences between two sets of users based on various locations give us a clue about the social connection between the two users. But sometimes, locations like Bus Stop and public areas give us the wrong indication of friendship. In our research, we treated such a set of locations as False Locations. For improved social ties inference, we propose a framework, that takes the LBSNs as an input and generates two sets of results. The first result is a set of inferred friendship relations that is based on mutual friend and co-occurrence count. The second result is a set of friendship ties based on mutual friend and co-occurrence count and False Location. We tested the performance of the proposed framework using Gowalla and CDR datasets. Results identify those public places have a negative impact on social ties inferring.

29. Paper ID – 81: A Comparative Study of the Performance of Real time databases and Big data Analytics Frameworks

Syed Muhammd Nabeel Mustafa Jospeh Peter Terenece Noronha, Muhammad Umer Farooque, Syeda Sundus Zehra

Abstract: The amelioration of information technology and the infiltration of it almost all the sectors of world have resulted in massive efflux of data. The rampant increase in the generation of data has introduced to a new term called, Big data. Big data is letting industry set the pace of future research and development. The need rose to further refine the data and get most out of it. Scientists and researchers performed analytic on the Big data to analyze it for patterns and behaviors hidden inside the data. Big data analytics aid in understanding the data through various tools, algorithms and frameworks. It allows stakeholders to make business plans and strategies according to the revelations from data. There are various tools and technologies available to perform analytics on the data. The most popular among scientists and researchers are real-time database and Big data analytics frameworks. In the paper, we evaluate the performance of the tools and technologies of Big data analytics. Mongodb and Firebase are real-time databases implemented in this study and Impala and Hive are the BDA frameworks. The parameter to perform the comparison is the query execution time. It is found out that Impala and Hive gave lesser execution time than Mongodb and Firebase. The query execution time of Impala on 50 mb dataset and 100 mb dataset was recorded to be 4 ms and 14 ms respectively. Hence, Big data Analytics Frameworks are better performing analytics tools for Big data Analytics

30. Paper ID – 82: Design of Phased Array Antenna System for LoRa Applications

Hafsa Talpur, Badar Muneer, Umair Ahmed Korai, Faisal Karim Shaikh

Abstract: The proposed work focuses on the design and fabrication of Phased array antenna system operating in the range of Long-Range communication (LoRa) band with center frequency of 915 MHz. The phased array antenna system consisting of 2-element patch antenna array along with tunable phase shifter is designed using Reflection Type Phase Shifter (RTPS) method. The design offers the phase shift of 11.25˚, 22.5˚ and 45˚. The cooperate-fed array feeder network is designed using two-way Wilkinson's type structure to equally split power in to two ports to enhance port impedance matching and isolation. The experimental results show system achieves return loss better than 10 dB in the overall range of frequencies. The phased array antenna system is designed and simulated using Advance Design System (ADS). The phased array antenna system is fabricated on low-cost Epoxy glass fiber FR-4 PCB board using the chemical method. The measured results and simulated results are in good agreement with each other.

31. Paper ID – 86: Myocardial D-Spect Image Segmentation using RSF Model and Kernal Difference operator

Humna Tahreem Awan, Shahnawaz Talpur, Asif Aziz Memon

Abstract: One of the top causes of death worldwide is now ischemic heart disease. The modern diagnostic technology known as dynamic single-photon emission computed tomography (D-SPECT) is frequently utilized to confirm the myocardial function in patients with a variety of heart disorders. To build a 3-D myocardial model and let doctors conduct assessments of cardiac function, accurate automatic localization and segmentation of myocardial areas is beneficial. Image segmentation is a crucial method in preclinical cardiac research because of this. One of the frequent problems with image segmentation is intensity inhomogeneity, which is brought on by imperfect instrumentation and image blemishes. This research presents a unique region-based active contour model that can precisely segment the myocardial D-SPECT image. As RSF Model detects the intensity inhomogeneity of the object and KD operator make the weak boundaries of the object strong. By integrating the RSF(region-scalable fitting) energy model and the KD(kernel difference) operator, the suggested method ensures accuracy and computational efficiency and can address the problem of high sensitivity for myocardial D-SPECT segmentation.

32. Paper ID – 91: Advancement Of Sign Language Recognition Through Technology Using Python And OpenCV

Aneesh Pradeep, Mukhammadkhon Asrorov, Muxlisa Quronboyeva

Abstract: The ability to communicate effectively is critical for every individual in society, but communication can be a challenge for people who are deaf or hard of hearing. Sign language is one of the primary means of communication for this population. However, communication can be difficult for people who need to learn sign language, leading to misunderstandings and frustration. Sign language recognition technology can help bridge this communication gap. Sign Language Recognition (SLR) handles the recognition of hand gestures and

continues to generate a text or voice for the corresponding hand gesture. Static and dynamic hand motions are the two different categories. Although static hand gesture recognition is simpler than dynamic hand gesture recognition, both recognitions are essential for human communities. This paper focuses on smart gloves that can detect sign language and on sign language recognition using Python and OpenCV.

33. Paper ID – 100: Touch Gesture Recognition using Chipless RFID Technology

Ammarah Altaf, Muhammad Zahid, Humayun Shahid, Yasir Amin

Abstract: This paper deals with a novel RFID-based sensor reinforcing touch gesture recognition is initiated. The developed sensor takes dominance over an RFID chipless variant that enables the fabrication of an inactive, fully-printable tag with an incorporated frequency domain-based sensor. The sensor consists of four rhombus-shaped resonators that are strangely distributed in four corners of the geometry. The suggested sensor-incorporated tag accurately tracks the position of human digits, allowing surveillance of finger swipes that may then be utilized to identify unlock sequences and security codes. Its performance is evaluated using the sensor's Radar Cross Section (RCS) response, which may be seen in spectral domain. The response of RCS clearly shows a dip in frequency where each unique resonating element of the sensor resonates. The spectral dip floats far beyond the associated band when touch event occurs. On a 0.76 mm thick Rogers RT/Duroid®5880 laminate, a functioning iteration of the sensor tag is made and its electrostatic performance is evaluated in the meantime. The sensor observes a modest physical footprint with the dimensions of 45 mm by 55 mm. The acquired results support the suggested sensor's viability for use in access control and authentication applications.

34. Paper ID – 106: Leveraging Data Science to Advance the United Nations Sustainable Development Goals

Zulfiya Muytenbaeva, Aneesh Pradeep

Abstract: This paper explores the potential of leveraging data science to advance the United Nations Sustainable Development Goals (SDGs). Data science is a multidisciplinary field that uses statistical and computational methods to extract insights and knowledge from data. The SDGs are 17 interrelated goals designed to promote sustainable development and eradicate poverty. The paper discusses how data science techniques can be applied to each of the 17 SDGs and also mentions the role of AI in achieving the SDGs. While data science presents a tremendous opportunity to advance the SDGs, it poses challenges like data privacy or quality.The paper reviews several examples of how data science has been used to address specific SDGs, such as ending hunger, promoting health and well-being, and reducing inequalities. The paper also discusses some of the challenges and opportunities for leveraging data science in the context of the DGs, including issues related to data quality, privacy, and equity. Overall, the paper argues that data science has the potential to be a powerful tool for advancing the SDGs, but that careful attention must be paid to the ethical and social implications of data-driven approaches.

35. Paper ID – 108: A Transformer based approach for Fake News detection using Time Series Analysis

Aniq ur Rahman, Hassan Nazeer, Malik Muhammad Asim, Farzana Kulsoom

Abstract: Fake news is a growing problem in the digital age, spreading misinformation and affecting public opinion. In this research, we aim to address the issue of fake news detection by utilizing time series analysis and deep learning techniques. We propose a time series analysis method that identifies fake news through the identification of ground truth from previously connected content using sequence-to-sequence approaches. The results of our experiments demonstrate the superiority of pretrained models, such as GloVe and Bert, over traditional encoding approaches and word embedding techniques in detecting fake news. Our study also compares the effectiveness of various deep learning methods, including Long-Short Term Memory (LSTM), Gated Recurrent Unit (GRU), LSTM with attention, GRU with attention, and Transformers with 8 and 16 multi-heads. The use of attention mechanisms in Recurrent Neural Networks (RNNs) has been shown to improve their performance in detecting fake news. The results show that Transformers with 8 and 16 multiheads outperformed other deep learning techniques, providing the best results in detecting fake news. Our findings offer valuable insights for future research in the area of fake news detection. The results of this study have implications for the development of efficient and effective techniques for countering fake news and offer a solid and trustworthy solution for fake news identification.

36. Paper ID – 109: A robust Carrier Frequency and Timing Offset Estimation in Inter-UAV OFDM communication Links

Farzana Kulsoom, Iraj Fatima, Hassan Nazeer Chaudhry, Aneeqa Gul, Adeel Akram

Abstract: The UAV-mounted base station has been integrated into 5G and beyond to provide communication in an emergency when conventional systems fail due to some reason. Moreover, it is also used in coverage enhancement and for other strategic purposes. In this work, we have considered a MIMO-OFDM based UAV system that is inclined to fast-fading channels due to the continuous motion of UAVs. Due to the mobility of UAVs, there is a frequency and timing offset which must be estimated for proper and seamless communication. For that purpose, we have proposed a data-aided maximum likelihood-based scheme that efficiently estimates the carrier frequency and timing offset. Results show that our algorithm outperforms the state-of-the-art system in terms of MSE.

37. Paper ID – 112: BER Analysis of 5G Antennas and Modulation Schemes using UFMC

Waleed Shahjehan, Irshad Hussain

Abstract: The conventional waveforms require strict orthogonally are not compatible with 5G networks. The orthogonal waveforms are highly sensitive to carrier frequency offset leads to high Bit Error Rate (BER). Some other waveforms like Filter Bank Multicarrier (FBMC) and Generalized Frequency Division Multiplexing (GFDM) needs large block of subcarriers for its filter, consequently more signal power is demanded. To minimize the BER and efficient utilization of Signal to Noise Ratio (SNR), Universal Filtered Multi-Carrier MIMO (UFMC-MIMO) is proposed for QPSK, 16QAM and 64QAM. The simulation results show improvement in high order QAMs and for large antenna configurations.

38. Paper ID – 115: Enhancing Contextualized GNNs for Multimodal Emotion Recognition: Improving Accuracy and Robustness

Muhammad Huzaifa Shahbaz, Zain-Ul-Abidin, Khalid Mahboob, Fayyaz Ali

Abstract: Emotion recognition from facial expressions is an important research area in the field of artificial intelligence. In this study, we propose a novel deep-learning model for emotion recognition from facial expressions. Our model uses a combination of modifications in COGMEN (COntextualized GNN-based Multimodal Emotion Recognition) to extract features from facial images and other modalities and capture temporal dependencies between frames. We evaluated our model on the IEMOCAP dataset and achieved an accuracy of 87.8%, outperforming (mostly) existing state-of-the-art methods. Furthermore, our model has a lower computational complexity compared to other methods, making it more practical for real-time applications. We also report a high F1 score for each emotion category, indicating good performance across all classes. Our results demonstrate the potential method for improving emotion recognition from multiple modalities (i.e.: Audio, Visual & Text) and have implications for a wide range of applications such as affective computing, human-computer interaction, and mental health monitoring.

39. Paper ID – 141: ECG Signals Analysis based on Compressed Sensing and Compressed Learning Techniques for Heart Disease Recognition

Bharat Lal, Qimeng Li, Raffaele Gravina, Pasquale Corsonello

Abstract: Advancements in the acquisition and processing of physiological signals have facilitated deeper analysis aimed at disease identification and diagnosis. However, with the dramatic rise in data size and power consumption, it is necessary to use effective data compression, signal acquisition, transmission, and processing techniques, especially in tele-health and mobile-Health applications. A new area of research involves integrating Compressed Sensing (CS) and Compressed Learning (CL) with an electrocardiogram (ECG) signals to overcome such issues. This research paper investigates the use of CS and CL techniques on ECG signals from three distinct groups of individuals: those with normal sinus rhythms (NSR), congestive heart failure (CHF), and cardiac arrhythmia (ARR). The study employs three measurement matrices,Random Gaussian Matrix (RGM), Random Bernoulli Matrix (RBM), and Structured Fourier Matrix (SFM) with the Block Sparse Bayesian Learning reconstruction algorithm. The features extracted from the compressed signal and reconstructed signals using Long Short-Term Memory (LSTM) and Support Vector Machine (SVM) algorithms in both compressed sensing and compressed learning. The results show that the LSTM and SVM algorithms achieve high accuracy in both training and testing phases, with LSTM performing better in CL with SFM, while both SVM and LSTM perform better in SC with RGM and RBM. This study demonstrates the potential of CS and CL techniques in extracting relevant features from ECG signals, which could have implications for diagnosing and treating cardiac conditions.

40. Paper ID – 146: Behavioral Analysis of the Architecture and Protocols of the Acoustic Sensor Network

Abdul Moid Khan, Pablo Ortero Roth, Dr. Miguel Ángel Luque Nieto, Muhammad Amir, Muhammad Khurram

Abstract: The area of underwater wireless sensor networks (UWSNs) had recently received much attention due to its superior competencies in ocean surveillance, marine tracking, and software deployment for detecting underwater targets. However, the literature available is not compiled alongside the modern day's technologies and its course to find out the current developments which were powered by the underwater sensor technologies. Researchers from academia and business have recently begun paying close attention to UWSNs. As a result, various research projects have been undertaken to develop UWSN methodologies, tools, protocols, and architectures. Hence, this paper provides the most recent evaluation of the handy data by reviewing previous research papers on UWSN architectures and the means of communication that helps and assists the UWSN community in an effective UWSN environment. This study aims to identify and propose the best suitable UWSN architecture and communication protocol in the presence of a vast variety of architectures and protocols under different dynamic environmental parameters. This research paper focuses on the important requirements indispensable for core UWSN services and architectures. It also helps and provides a clear view and classification of different UWSN architectures, applications, communication means, and routing protocols in the aquatic environment. Further, the prominent issues and challenges which are still under observation and discussion are highlighted and presented as information for future lookup directions. It has been determined that sufficient methodologies, protocols, and instruments for monitoring UWSNs exist. However, design verification skills are limited. Existing procedures are insufficient to fulfill UWSNs' increasing expectations. The findings are significant in this setting. This paper lays a strong foundation for improving current UWSN tools and methodologies for big, complex networks by selecting appropriate routing protocols for UWSN communication.

INTERNATIONAL MULTI-TOPIC CONFERENCE 2023 (IMTIC'23)

PROGRAM SCHEDULE

MAY 10-12, 2023

(Details at www.imtic.muet.edu.pk)

DAY 01 (MAY 10, 2023 WEDNESDAY)			
S. NO.	**TIME**	**EVENT IN MUET, JAMSHORO**	
08:30 AM – 11:45 AM		KEY NOTES AND INAUGURAL SESSION VENUE: USPCAS-W AUDITORIUM	
1	08:30 AM	REGISTRATIONS	
2	09:30 AM	GUESTS TO BE SEATED	
3	10:00 AM	ARRIVAL OF THE CHIEF GUEST	
4	10:05 AM	RECITATION OF HOLY QURAN AND NATIONAL ANTHEM OF PAKISTAN	
5	10:10 AM	IMTIC'23 OVERVIEW BY DR. UMAIR AHMED KORAI, ASSISTANT PROFESSOR, MUET	
6	10:15 AM	WELCOME NOTE BY PROF. DR. BHAWANI S. CHOWDHRY	
7	10:20 AM	KEYNOTE ADDRESS BY DR. DR. ENRIQUE NAVA, UNIVERSITY OF MALAGA, SPAIN	
8	10:50 AM	KEYNOTE ADDRESS BY PROF. MARJA MATINMIKKO-BLUE, UNIVERSITY OF OULU, FINLAND (ONLINE)	
9	11:20 AM	ADDRESS BY THE VICE CHANCELLOR MUET	
10	11:30 AM	ADDRESS BY THE CHIEF GUEST	
11	11:40 AM	VOTE OF THANKS BY DR. FAISAL KARIM SHAIKH, TPC CHAIR	
11:45 AM–12:05 PM		CLOSING OF INAUGURAL SESSION + TEA BREAK	
12:05 PM – 01:35 PM		KEYNOTE ADDRESSES	
12	12:05 PM	KEYNOTE ADDRESS BY PROF. DIL AKBAR, AALBORG UNIVERSITY, DENMARK	
13	12:50 PM	KEYNOTE ADDRESS BY PROF. GORAN STOJANOVIĆ, UNIVERSITY OF NOVI SAD, SERBIA (ONLINE)	
01:35 PM – 02:30 PM		LUNCH / PRAYER BREAK	
02:30 PM – 04:30 PM		TECHNICAL PAPER PRESENTATION VENUE: USPCASW AUDITORIUM & USPCASW CONFERENCE HALL	
14		SESSION CHAIR/CO-CHAIR: Prof. Dr. Aftab Ahmed Memon/ Dr. Mohsin Memon	SESSION CHAIR/CO-CHAIR: Prof. Dr. Qasim Ali Arain/ Dr. Zafi Shah
	02:30 PM	Paper ID – 100	Paper ID – 46
	02:45 PM	Paper ID – 64	Paper ID – 106
	03:00 PM	Paper ID – 76	Paper ID – 75
	03:15 PM	Paper ID –141	Paper ID – 16
15		SESSION CHAIR/CO-CHAIR: Prof. Dr. Syed Ali Hassan/Prof. Dr. Attiya Baqai	SESSION CHAIR/CO-CHAIR: Prof. Dr. Arbab Nighat/Wafeeq Ajoor
	03:30 PM	Paper ID – 68	Paper ID – 04
	03:45 PM	Paper ID – 20	Paper ID – 21
	04:00 PM	Paper ID – 10	Paper ID – 56
	04:15 PM	Paper ID – 112	Paper ID – 22
04:30 PM – 05:00 PM		TEA AND CLOSING OF DAY – 01	

S. NO.	TIME	EVENT IN MUET, JAMSHORO	
**DAY 02 (MAY 11, 2023 THURSDAY)**			
09:30 AM – 11:45 AM		**KEYNOTES SESSION** **VENUE: USPCAS-W AUDITORIUM**	
1	09:30 AM	KEYNOTE ADDRESS BY DR. SYED ALI HASSAN, NATIONAL UNIVERSITY OF SCIENCES AND TECHNOLOGY, PAKISTAN	
2	10:15 AM	KEYNOTE ADDRESS BY DR. MUHAMMAD HAROON YOUSAF, UNIVERSITY OF ENGINEERING & TECHNOLOGY TAXILA, PAKISTAN	
3	11:00 AM	KEYNOTE ADDRESS BY DR MITHUN MUKHERJEE NANJING UNIVERSITY OF INFORMATION SCIENCE AND TECHNOLOGY, CHINA (ONLINE)	
11:45 AM – 12:00 NOON		**TEA BREAK**	
12:00 NOON – 01:00 PM		**TECHNICAL PAPER PRESENTATION** **VENUE: USPCAS AUDITORIUM + CONFERENCE HALL**	
		SESSION CHAIR/CO-CHAIR: Dr. Nadeem Abbas/Engr. Nafeesa Zaki	SESSION CHAIR/CO-CHAIR: Dr. Enrique Nava/Dr. Badar Muneer
4	12:00NOON	Paper ID – 49	Paper ID – 82
5	12:15 AM	Paper ID – 28	Paper ID – 09
6	12:30 AM	Paper ID – 03	Paper ID – 86
7	12:45 AM	Paper ID – 19	Paper ID – 35
01:00 PM – 02:20 PM		**LUNCH / PRAYER BREAK**	
02:20 PM – 05:00 PM		**TECHNICAL PAPER PRESENTATION AND KEYNOTE ADDRESSES** **VENUE: USPCAS AUDITORIUM** **SESSION CHAIR/CO-CHAIR: Dr. Shahnawaz Talpur/Dr. Naeem Mahoto**	
8	02:20 PM	Paper ID – 79	
9	02:35 PM	Paper ID – 32	
10	02:50 PM	Paper ID – 146	
11	03:05 PM	Paper ID – 45	
12	03:20 PM	KEYNOTE ADDRESS BY DR. NADEEM ABBAS, LINNAEUS UNIVERSITY SWEDEN	
13	04:05 PM	KEYNOTE ADDRESS BY PROF. ANDREA M. TONELLO UNIVERSITY OF KLAGENFURT (ONLINE)	

DAY 02 (MAY 11, 2023 THURSDAY)				
TUTORIALS/SYMPOSIUM IN MUET, JAMSHORO				
TIME	**Title of Tutorial/Symposium**	**Speaker**	**Venue**	**Tutorial Chair**
09:00 AM – 03:00 PM	**Internet of Things (IoT): The Key Enabler of a Smart Quality Life**	WAFEEQ OMRAN, National Health Regularity Authority, Bahrain	**Department of Telecommunication Engineering**	Dr. Abdul Latif Memon & Engr. Rizwan Ali Shah
09:00 AM – 11:00 AM	**The Sound of Wellness: A Centralized Dashboard and Music Therapy Prototype for Enhanced Healthcare Management**	Dr. Shama Siddiqui and Dr. Anwar Siddiqui, DHA Suffa University, Pakistan	**Department of Electronics Engineering**	Dr. Attiya Baqai
11:00 AM – 01:00 PM	**Cybersecurity Challenges Unveiled: A Practical Demonstration of Digital Threats and Solution**	Dr. Muhammad Asad Arfeen, NED University of Engineering & Technology, Pakistan.	**Department of Software Engineering**	Prof. Dr. Qasim Arain
03:00 PM – 06:00 PM	**Embedded Internet of Things in the Era of 6G Networks**	Dr. Waleed Ejaz, Lakehead University, Canada	**Department of Telecommunication Engineering**	Dr. Faheem Aziz Umrani & Engr. Mehran Memon

DAY 02 (MAY 11, 2023 THURSDAY)			
SYMPOSIUM & TECHNICAL SESSION IN SSUET, Karachi			
SESSION CHAIR: Prof. Dr. Muhammad Aamir			
TIME	**Title of Tutorial/Symposium**	**Speaker**	**Venue**
02:00 PM – 02:30 PM	KEYNOTE SESSION	Prof. Mithun Mukherjee, Nanjing University of Information Science and Technology, Nanjing, China	Bashir A Malik Auditorium, SSUET, Karachi

02:00 PM – 04:30 PM	**PhD Symposium & Poster Presentation Sessions** **VENUE: SSUET KARACHI**		
PhD Symposium Session	**PhD Symposium**		**Poster Presentation**
	Venue: Bashir A Malik Auditorium, SSUET, Karachi SESSION CHAIR: Dr. Mahesh Kumar, MUET Sectretary: Dr. Durre Jabeen, SSUET	Venue: Research Library FS-04, Block F, SSUET, Karachi SESSION CHAIR: Dr. Lubna Farhi, SSUET Secretary: Dr. Waleej Haider, SSUET	Venue: FS-01/Lab FS, Block F, SSUET, Karachi SESSION CHAIR: Dr. Raheela Asif, NEDUET Secretary: Dr. Rukaiya, SSUET
1	02:00 PM	Mr. Shafiq	Mr. Saad	**Poster Display and Evaluation**
2	02:20 PM	Mr. Omer Khan	Sehreen Moorat	
3	02:40 PM	Abeer Chang	Ms. Sadaf Raza	
4	03:00 PM	Mr. Fahad Akbar	Shafi Muhammad Jiskani	
5	03:20 PM	Engr. Intizar Ali	Beenish Ansari	
6	03:40 PM	Yahya Sameen Junejo	---	
8	04:00 PM	Certificate Distribution		
9	04:20 PM	Vote of Thanks by Prof. Dr. Muhammad Aamir, Dean FoECE, SSUET		
10	04:30 PM	Hi-Tea		

DAY 03 (MAY 12, 2023 FRIDAY)				
TECHNICAL SESSIONS IN SSUET, Karachi				
SESSION CHAIR: Dr. Muhammad Ibrar ul Haque Secretary: Dr. Shakil Ahmed				
	TIME	Title of Tutorial/Symposium	Speaker	Venue
1	09:30 AM – 12:30 PM	KEYNOTE ADDRESS 1	Dr. Enrique Nava, University of Malaga, Spain	Bashir A Malik Auditorium, SSUET, Karachi
2		KEYNOTE ADDRESS 2	Dr. Atif Siddiqui, Airbus Defence and Space, UK	
3		KEYNOTE ADDRESS 3	Dr. Nadeem Abbas, Linnaeus University, Sweden	

DAY 03 (MAY 12, 2023 FRIDAY)				
S. NO.	TIME	EVENT IN SSUET, KARACHI		
	12:30 PM – 02:30 PM	LUNCH AND PRAYER BREAK		
	02:30 PM – 04:30 PM	TECHNICAL PAPER PRESENTATION SESSIONS (Three Sessions) VENUE: SSUET KARACHI		
Technical Session		Venue: Bashir A Malik Auditorium, SSUET, Karachi SESSION CHAIR: Dr. Mudassir, Indus University Secretary: Dr. Sidra Abid	Venue: Conference room Block F, SSUET, Karachi SESSION CHAIR: Dr. Seema Ansari Secretary: Dr. Shaheena Noor	Venue: Conference room Block B, SSUET, Karachi SESSION CHAIR: Dr. Vali Uddin, VC SSUET. Co – Chair: Dr. Bhawani Shankar Chowdhry, Chair IEEE. Secretary: Prof Tahir Mehmood Chaudhry, Chairman Computer Society Pakistan. Coordinator: Prof Dr. M. Aamir, Dean FoEC, SSUET. Prof Dr. Asif, Dean Basic Sciences, SSUET.
4	02:30 PM	Paper ID – 18	Paper ID – 78	Rountable Session on "Roadmap Towards Digital Transformation: Pakistan Institute of Information Technologies (PIIT) as a Role Model"
5	02:50 PM	Paper ID – 73	Paper ID – 115	
6	03:10 PM	Paper ID – 74	Paper ID – 108	
7	03:30 PM	Paper ID – 81	Paper ID – 23	
8	03:50 PM	Paper ID – 41	Paper ID – 65	
9	04:10 PM	Paper ID – 91	Paper ID – 109	
	04:30 PM – 06:00 PM	CONCLUDING CEREMONY at Bashir A Malik Auditorium		
10	04:30 PM	Arrival of the Chief Guest		
11	04:40 PM	Recitation of Holy Quran and National Anthem of Pakistan		
12	04:50 PM	Welcome Address of Hon. Chancellor, Mr. Jawaid Anwar		
13	05:00 PM	IMTIC'23 Overview to be presented by Prof. Dr. Bhawani Shankar Chowdhry, Chair IEEE Karachi Section.		
14	05:10 PM	Address by the VC MUET		

15	05:20 PM	Closing Remarks by Prof. Dr. Vali Uddin, Vice Chancellor, SSUET, Karachi.
16	05:30 PM	Shields/Souvenir Distribution
17	05:45 PM	Vote of Thanks by Cdr.(R) Syed Sarfaraz Ali, SSUET
18	06:00 PM	Hi Tea