INTERACT'23

2nd International Conference On Emerging Trends In Electronics And Telecommunications Engineering,2023

15th - 16th March

NED University of Engineering and Technology

Karachi,Pakistan

ABSTRACT BOOK

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INTERACT'23

2ND INTERNATIONAL CONFERENCE ON EMERGING TRENDS IN ELECTRONICS AND TELECOMMUNATIONS ENGINEERING,2023

March 15th,16th 2023

Book Of Abstracts

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MESSAGE

PATRON IN CHIEF

Prof. Dr. Sarosh Hashmat Lodi

VICE CHANCELLOR, NED UNIVERSITY

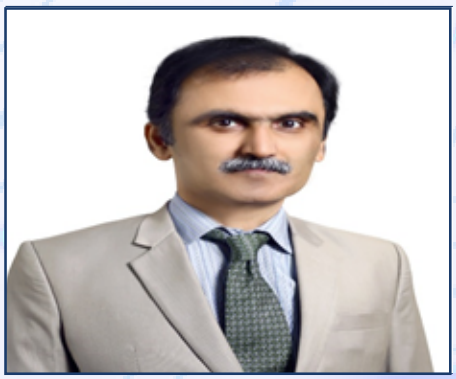
NED University of Engineering and Technology follows a legacy of hundred years of academic achievements and research excellence through effective collaboration between all stakeholders. The 2nd International Conference on Emerging Trends in Electronics and Telecommunications Engineering, 2023 (INTERACT-2023) is envisioned to provide an interactive platform for effective collaboration between researchers, industrialists, academicians and policy makers. The focus of this conference is to foster knowledge sharing and promote collaborations by bringing together leading experts, researchers, and professionals from around the globe in the fields of electronic and telecommunications engineering.

The electronic and telecommunications engineering industry continues to innovate and push the boundaries of what is possible. The emergence of new technologies such as 5G networks, artificial intelligence, and machine learning is opening up new horizons and the potential for further growth is limitless. Therefore, to keep up with the pace of advancement in these fields, this conference provides an excellent opportunity to take stock of where we stand, where we are heading and how we can work together to address the challenges and seize the opportunities that lie ahead.

This year's program is packed with exciting keynote speeches, industrial seminars and technical sessions to showcase the cutting-edge research and development activities in the field. I am sure this conference provides excellent opportunity to learn from other, network with peers, and engage in lively and thought-provoking discussions.

As the conference Patron-in-chief, I would like to extend my sincere appreciation to the organizing committee, the speakers, sponsors, panelists, and all attendees for their dedication and hard work in making this event a success. My best wishes for a successful event.

MESSAGE



PATRON

Prof. Dr. Muhammad Tufail

PRO-VICE CHANCELLOR, NED UNIVERSITY

The 2nd International Conference on Emerging Trends in Electronics and Telecommunications Engineering, 2023 (INTERACT-2023) is indeed a wonderful platform to highlight and discuss the recent global advancements in the fields of electrical, electronic, instrumentation, and communication engineering. I feel honoured to be part of this collaborative platform to exchange ideas and share the ongoing research work and practical experiences.

The theme of this conference is particularly related to the challenges and opportunities that we face today in the fields of electronic and telecommunications engineering. I am confident that the conference speakers will offer innovative insights and solutions that will contribute to the advancement of this field.

As the Patron of this conference, I would like to extend my heartfelt gratitude to the organizing committee, who has worked with dedication and commitment to create an event that will inspire us all to think deeply about the future of our industry. I would also like to thank the speakers, sponsors and panelists, whose valuable insights and experiences will certainly enrich our discussions and inspire us to think creatively about the future. Finally, I would like to extend my heartfelt gratitude to all the attendees whose participation is essential for the success of this conference.

I look forward to some thought-provoking and fruitful discussions which, I believe, will contribute to the growth and development of our industry.

MESSAGE

CONVENER

Prof. Dr. Saad Ahmed Qazi

DEAN AND FACULTY OF ELECTRICAL AND COMPUTER ENGINEERING, NED UNIVERSITY

I am immensely pleased to welcome you to the 2nd International Conference on Emerging Trends in Electronic and Telecommunications Engineering (INTERACT-2023). At this conference, we have the opportunity to explore the latest developments in electronic and telecommunications engineering, and discuss how we can further integrate these two fields to drive innovation and create new opportunities. As the convener of this event, it is an honour for me to be a part of this dynamic gathering of distinguished professionals and leading experts from both academia and industry.

The program is intended to provide a variety of sessions that address critical issues and trends in this rapidly developing field. There will be plenty of opportunities to learn from including insightful keynote speeches, informative panel discussions, and technical sessions. I hope that this conference provides a platform to bridge the gaps between the academia and industry resulting in partnerships and stronger alliances for a better future of Pakistan.

The conference is not only aimed at providing an opportunity for the exchange of knowledge but also to be a transformative experience for its participants as it opens the doors to global and industrial collaborations. I would like to encourage all participants to actively engage in discussions and other conference activities to have a broader impact through this collaborating platform.

I want to express my gratitude to everyone who contributed to making this event a success, including the organising committee, speakers, sponsors, panellists, and attendees. I look forward to seeing the exciting possibilities and ideas that emerge from this gathering. Once again, I extend a warm welcome to you all and I hope you enjoy the conference.

MESSAGE

CONFERENCE CHAIR

Prof. Dr. Muhammad Imran Aslam

CHAIRMAN, DEPARTMENT OF TELECOMMUNICATIONS ENGINEERING, NED UNIVERSITY

The past few decades have witnessed enormous growth in the field of Electronic and Telecommunications Engineering that has revolutionized the way we communicate, work, and live our lives.The 2nd International Conference on Emerging Trends in Electronic and Telecommunications Engineering, 2023 (INTERACT-2023) is our effort to bring together students, faculty, researchers, and industry professionals to exchange their ideas and experiences for effective knowledge sharing.

From insightful keynote speeches, to informative industrial speakers and research scholars, there will be ample opportunities to learn from one another and engage in lively and thought-provoking debates. Therefore, I encourage you to take full advantage of this unique opportunity to share your expertise and build lasting relationships.

Finally, on behalf of the entire conference organizing committee, I would like to express sincere gratitude to all of the distinguished speakers, panelists, and attendees who made this event possible. Your contributions and dedication are greatly appreciated.

Most importantly, I would like to extend heartfelt gratitude to our worthy sponsors, starting with **DreamBIG semiconductors** and **UBL** who provided us with the most critical support as our **Platinum sponsor**. I would like to recognize **PTCL Ufone Group** for partnering with us as our **Diamond sponsor**, **NuNami**, and **Xcelerium** for coming on board for this conference as **Gold Sponsors**, and **Digitek** for supporting us in **Silver category**. I am also thankful to our **Bronze category sponsors**, **Barqtron** and **Telec** for supporting the cause.

I am confident that this conference will serve as a catalyst for new ideas and collaborations, and I look forward to your active participation and leadership in shaping the future of our field.

MESSAGE

CONFERENCE CO-CHAIR

Prof. Dr. Ghous Bakhsh

CO-CHAIRMAN, DEPARTMENT OF ELECTRONIC ENGINEERING, NED UNIVERSITY

It is my honour to welcome you to the 2nd International Conference on Emerging Trends in Electronic and Telecommunications Engineering, 2023 (INTERACT-23). INTERACT'23 is envisioned to provide a forum to researchers, scholars, and experts from academia and industry to discuss the latest developments in the rapidly evolving fields of electronic and telecommunications engineering.

Over the past few years, the fields of electronic and telecommunications engineering have seen unprecedented growth and change. This can primarily be attributed to the advent of artificial intelligence and its prospective applications in every field. As we gather at this conference, we have the opportunity to share our insights, ideas, and best practices on how we can further advance the field of electronic and telecommunications engineering. Through our collective efforts, we can continue to drive innovation, find solutions to new challenges, and create a better future for all.

Finally, I would like to acknowledge the tireless efforts of the organizing committe
e in putting together an exceptional conference. I would also like to thank the speakers, sponsors, panelists, and attendees for making this event a success.

I am excited to see the outcomes of our discussions as we work together to advance our fields for the betterment of our future.

MESSAGE

CONFERENCE SECRETARY

Dr. M. Faizan Shirazi

ASSISTANT PROFESSOR, DEPARTMENT OF ELECTRONIC ENGINEERING, NED UNIVERSITY

It is my privilege to be part of the team who plays an important role in organizing the 2nd International Conference on Emerging Trends in Electronic and Telecommunications Engineering, 2023 (INTERACT-23).

The INTERACT-23 conference is planned to provide an interactive platform for researchers, practitioners, and professionals from the industry, academia, and government to discourse their expertise, experiences, and research results on all aspects of global emerging trends in Electronics and Telecommunications. Being a rapidly evolving area, it is extremely important to timely address the relevant issue particularly related to the implementation and indigenous development of such technologies. Through this conference, the collaboration between academia and industry will establish to discuss the most recent innovations, trends, and concerns as well as practical challenges encountered and solutions adopted in the fields of Electronics and Telecommunications to meet international needs.

Finally, I would like to give the credit to the whole team for organizing the INTERACT-23 conference and I would also like to thank all the sponsors for sponsoring the conference. We hope to continue this trend in the future.

I wish good luck to all the participants and solicit them to play an active role in scientific rigor and cultivate their thoughts for the benefit of society

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ABOUT INTERACT'23

WELCOME TO INTERACT'23

We warmly welcome you to the 2nd International Conference On Emerging Trends In Electronics And Telecommunication, INTERACT 2023, hosted by NED University Of Engineering And Technology.

The goal of the 2nd International Conference On Emerging Trends In Electronics And Telecommunications Engineering, 2023 (INTERACT-2023) is to bring together researchers, professionals and experts from universities and companies to focus on recent global evolution's in the broad field of Electrical, Electronics, Instrumentation, and Communication Engineering.

The motif of the 2nd International Conference On Emerging Trends In Electronics And Telecommunications Engineering, 2023 (INTERACT-2023) is to bring together researchers, intellectuals, and experts from academia and industry to share the most recent global advancements in the vast domain of Electrical, Electronics, Instrumentation, and Communication Engineering. Robotics, smart grid, power and control, embedded systems, mechatronics, artificial intelligence, wireless communications, signal processing, computer systems and networks, 5G/6G communication systems, communication technologies for smart communities are among the sub-themes covered by the conference.

The goal is to strengthen ties between academics and industry. It will aid both future progress and the resolution of crucial industrial concerns.This conference will foster the exchange of information. As a consequence, A creative platform for prominent academic scientists, industrialists, and researchers to exchange ideas and share their ongoing research effort and practical experiences will be formed. It will also cover contemporary difficulties and propose solutions to problems in Electronics and Telecommunications Engineering. It will establish academic-industry partnership for technological advancement and innovation. All of this is possible because of your participation, the generosity of our sponsors and the commitment of our volunteers.

"We Hope You Have A Wonderful Time At INTERACT'23"

COMMITTEES

Organizing Committee

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Prof. Dr. Sarosh Hashmat Lodi, Vice Chancellor, NEDUET

Patron:

Prof. Dr. Muhammad Tufail, Pro Vice Chancellor, NEDUET

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Prof. Dr. Saad Ahmed Qazi, Dean Faculty of Electrical and Computer Engineering, NEDUET

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Prof. Dr. Muhammad Imran Aslam, Chairman, Department of Telecommunications Engineering, NEDUET

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Event Secretary:

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Program Secretary:

Dr. Sundus Ali, Assistant Professor, Department of Telecommunications Engineering, NEDUET

Program Co-ordinator:

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Ms. Saba Fakhar
Lecturer, Department of Electronic Engineering, NEDUET
Mr. Shahid Ur Rehman
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Ms. Hafsa
Lecturer, Department of Electronic Engineering, NEDUET

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Dr. Areeb Ahmed
MAJU
Dr. Muhammad Hassan Sayyad
GIK Institute of Engineering Sciences and Technology, KPK, Pakistan
Dr. Akrama Khan
ITU, Lahore

KEYNOTE SPEAKERS

Prof. Dr. Kamran Arshad

Dean of Research and Graduate Studies, Professor in Electrical Engineering at Ajman University, UAE

Title of Talk: "Strategic Transformation of Universities from Teaching to Research"

Strategic transformation is a process that universities undergo to shift their focus from teaching to research. This talk will brief about the strategic transformation of universities with Ajman University will be used as a case study. At Ajman University, the strategic transformation involved implementing several initiatives to enhance research outputs and cultivate a research culture. These research initiatives, their impact and how these initiates helped in shaping the research culture in the university will be presented. To facilitate the transformation, the university also focused on internationalization efforts to collaborate with leading institutions and researchers worldwide. This resulted in increased opportunities for faculty and students to engage in international research and study programs, fostering a diverse and dynamic research community. The success of Ajman University's strategic transformation demonstrates that it is possible for universities to shift their focus from teaching to research by implementing similar strategies. By prioritizing research and implementing strategic initiatives to enhance research capabilities, universities can make significant contributions to the global research community and drive innovation and positive change

Dr.Ruchire Eranga Wijesinghe

Senior Lecturer, University of Sri Jayewardenepur, Sri Lanka

Title of Talk: "Novel Trends in High-Resolution Optical Coherence Imaging for Strategic Technologies in the Modern Era"

Advanced trends of high-resolution optical coherence imaging technology are the key components within numerous industrial applications. A life without optical sensors has become challenging to implement and converge new technologies successfully. Optical imaging plays a vital role, while the applications have been expanded along with the progress in science and technology. High-resolution optical coherence imaging methods are widely applied in various industries, such as medicine, agriculture, manufacturing industries, environment monitoring, deep-sea applications and etc. Although conventional imaging methods are still in use, advanced trends in high-resolution optical coherence imaging are taking the technology to a new level. The rapid progress of these technologies allows the production of systems and components with a low cost-to-performance ratio. The potential in the field of digital image and signal processing involves new approaches for diverse improvement of the technologies. Therefore, these advanced trends of high-resolution optical coherence imaging can significantly contribute to enhancing the quality and availability of information for strategic technologies in the modern era.

KEYNOTE SPEAKERS

Prof. Dr. Muhammad Zeeshan Shakir

Professor, Senior Member IEEE, FHEA
Professor, School of Computing, Engineering and Physical Sciences

Title of Talk: "Role of Vertically Integrated Projects in Achieving Academic Excellence through Multidisciplinary Experiential Learning"

There is an indispensable need for digital transformation of our society, economy and industry and Artificial Intelligence (AI) has been considered as one of the break-through technologies for the next decade to revolutionise the industry 4.0 vision. McKinsey estimates that AI may deliver an additional economic growth of around US$13 trillion by 2030, increasing global GDP by about 1.2% annually. The major growth drivers include 1) the increasing use of emerging technologies such as Internet of Things and networks technologies to gain valuable insights about industrial processes and products, and 2) the growing need to adopt sustainable approaches for reducing the development, maintenance/production costs and downtime for various application sectors such as health care, built-in environment, and education.This talk presents Innovate UK funded projects between the University of the West of the Scotland and various industrial partners through Knowledge Transfer Partnership programme and demonstrate the application of AI for the development of 1) AI-enabled ultra-smart wheelchair improving game-changing technologies to improve the mobility of people with lower-limb paralysis; 2) world's first AI-enabled water leakage detection technology saving gallons of water and 3) AI-enabled network outage detection for network providers improving connectivity for industry.Now, there is a huge potential that these commercial AI driven use cases will escalate and transform the concepts of future 360-degree-automation in many other real time settings such as factories, transport, farming, fintech, education and energy where data analytics can be superimposed on virtual reality or mixed reality technology leading to AI enabled proactive servitisation.

Dr. Ted Johansson

Researcher at Department of Electrical Engineering, Uppsala University

Title of Talk: "Wireless Brain-Connect Interface to Machines"

The talk will present the EU Horizon 2020FET interdisciplinary project B-CRATOS that merges novel wireless communication, neuroscience, bionics, Artificial Intelligence and sensing technologies to create for the first time a battery-free high-speed wireless in-body communication platform for Brain-Machine-Body connectivity.

25 specialists in Neuroscience, Electronics, Biomedel engineering, and AI from universities, research institutes, and small companies in five European countries are working together for four years (now half-ways) to meet the ambitious goals

Prof. Dr. Bhawani Shankar Chowdhary

Professor Emeritus, Mehran University of Engineering and Technology Jamshoro

Title of Talk: "Role of Vertically Integrated Projects in Achieving Academic Excellence through Multidisciplinary Experiential Learning"

The experiential learning has proven to significantly impact the overall learning process of students through engagement in the projects. However, one of the challenge associated with the experiential learning is the continuity of the process over different generations. The process can be further improved by involving students from different levels in the same project where junior students can learn through experiences of senior students. This vertical integration of students provides continuity in the learning process leading towards overall academic excellence. The role of vertically integrated projects in student's learning and its impact on the performance will be discussed in the talk particularly in the context of multidisciplinary projects.

Prof. Dr. Jameel Ahmed

Dean Riphah International University

Title of Talk: "Artificial Intelligence in Healthcare"

Nowadays, Artificial intelligence is playing an important role in the progress and development of the healthcare sector by enabling better treatment, successful diagnosis, and prevention of diseases. The progress and development of AI-based healthcare systems revolutionized each decade. The last decade focused on "medical products" like medical equipment, hardware, and consumables whereas, the current decade concentrates on the "medical platforms" for example wearable and big data healthcare analytics. The next decade will focus on the "medical solutions" including medical robotics and augmented reality for the advanced surgeries. A few of the popular applications of AI in the health sector include diagnosis & treatment; medical imaging; drug discovery; customized medicine; predictive analytics; AI-powered virtual assistants and robotic surgery. The role of AI in the healthcare sector is crucial and the future for the betterment of mankind. Medical practitioners should be educated on the notion of artificial intelligence and how to apply it. To fully use AI, healthcare management must be harmonized across all platforms. Artificial intelligence has the potential to become an important part of the twenty-first century, and this may be accomplished with a united effort by the medical community and engineers.

Prof. Dr. Jawwad Ahmed Shamsi

Dean of Faculty of Computing, NUCES –FAST

Title of Talk: "Generative AI: Concepts and Cutting-Edge Applications"

Generative Artificial Intelligence (AI) is used to create new information. The strength of generative AI systems lies in creating data or information which has closer similarity with the original information. Generative AI models can be used to generate different types of information such as text, images, and videos. The increasing popularity of these systems lies with the wide-scale potential in assisting humans across different applications such as health, education, and customer support. Considering the massive challenges and enormous opportunities of the domain, this talk will enlighten generation and detection techniques of generative AI. The talk will also describe cutting-edge applications, which can be leveraged by integration of generative AI. The talk will follow a conceptual approach to in explaining important concepts.

Prof. Dr. Arsalan Jawed

HEAD OF DEPARTMENT, AVIONICS AND PROFESSOR, KIET

Title of Talk: "Microsystems and Microchips for Healthcare and Bio-Monitoring Applications"

Microsystems and microchips are increasingly being used in healthcare and biomonitoring applications due to their small size, low power consumption, and high-performance capabilities. These technologies can be used for a wide range of applications, including diagnostic testing, monitoring of vital signs, drug delivery, and implantable devices. One example of the use of microsystems and microchips in healthcare is in the development of biosensors. Biosensors are devices that use biological molecules or organisms to detect and measure a wide range of analytes, such as glucose, lactate, and cholesterol. Microsystems and microchips can be used to create miniaturized biosensors that can be implanted or used externally to monitor biomarkers and detect disease. Another application of microsystems and microchips is in the development of drug delivery systems. These systems can be implanted or used externally to deliver drugs to specific areas of the body, resulting in more targeted and efficient treatment. Microsystems and microchips can be used to control the release of drugs and monitor their effectiveness, allowing for personalized treatment and improved patient outcomes.

INAUGURAL SESSION
Wednesday 15th March 2023
Main Auditorium
NED University of Engineering & Technology, Karachi

8:30 - 10:30	Registration
10:30 - 10:50	Guests Arrival
10:50 -11:00	Guests to be seated
11:00 - 11:05	Holy Quran Recitation
11:05 - 11:10	National Anthem
11:10 - 11:20	**Introduction by conference** Chair. Prof. Dr. Muhammad Imran Aslam
11:20 - 11:30	**Welcome address by** Conference Convener, Prof. Dr. Saad Ahmed Qazi
11:30 -11:40	**Address by** DreamBig Representative
11:40 - 11:50	**Addres by** United Bank Ltd. representative
11:50 - 12:15	**Plenary Talk by** Plenary talk by Dr. Kamran Arshad, Dean of Research and Graduate Stud ies, Ajman University
12:15 - 12:25	**Address by** Vice-Chancellor/Pro Vice-Chancellor, NED University of Engineering and Technology
12:25 - 12:35	**Address by** Chief Guest
12:35 - 12:45	Presentation of Conference Souvenir and Group Photo
12:50 - 14:00	**Networking and Lunch (Senate Hall)**

PROGRAM SCHEDULE

Technical Sessions
Wednessday March 15,2023 at NEDUET,Karachi

2:00 pm - 4:00 pm
Technical Session - 1
Sensor And System
Session Chairs: **Prof. Dr. Muhammad Mubashir Khan, Prof. Dr. Muhammad Shahid Shaikh,**
at Main Auditorium

2:00 pm - 4:00 pm
Technical Session - 2
Internet of Things (IoT)
Prof.Dr. Muhammad Ali Ismail, Prof. Dr. Sameer Qazi, Dr. Uzma Afsheen
at Audio Visual Hall,
Dept. of Civil Engg.

2:00 pm - 4:00 pm
Technical Session - 3
Industrial Session - 1
Moderators: **Dr. Asad Arfeen, Dr. Muhammad Fahim Ul Haque**
at Audio Visual Hall,
Dept. of Mechanical Engg.

Technical Sessions
Thusrday March 16,2023 at NEDUET,Karachi

9:00 am - 10:25am
Technical Session - 4
Artificial Intelligence (AI)
Session Chairs: **Prof. Dr. Imran Naseem, Prof. Dr. Najeed Ahmed Khan, Dr. Danish Mahmood Khan**
at Main Auditorium

9:00 am - 10:25am
Technical Session - 5
Wireless Communication
Session Chairs: **Prof. Dr. Fahad Azim, Prof. Dr. Shehnila Zardari, Dr. Aamir Zeb**
at Audio Visual Hall,
Dept. of Mechanical Engg.

10:30 am - 11:00 am
Networking & Tea Break

11:00 am - 12:30 pm
Technical Session - 6
Communication Systems
Session Chairs:
Prof. Dr. Muhammad Aamir, Dr.Irfan Ahmed, Dr. Rizwan Aslam
at Main Auditorium

11:00 am - 12:30 pm
Technical Session - 7
Robotics & Control
Session Chairs: **Dr. Imtiaz Kalwar, Dr. Eraj Humayun Mirza, Dr. Tariq Rehman**
at Lecture Hall,
Department of Electrical Engineering

11:00 am - 12:20pm
Technical Session - 8
Industrial Session - 3
Moderators: **Dr. Riaz Un Nabi Jafri, Dr.Sadia Muniza Faraz**
at Audio Visual Hall,
Dept. of Mechanical Engg.

12:30 pm - 2:00 pm
Networking & Lunch Break

2:00 pm - 3:00 pm
Technical Session - 9
Plenary Session on Semiconductor Industry
Moderator: **Dr. Hashim Raza Khan**
at Main Auditorium

CLOSING SESSION
Thursday 16 March 2023
Main Auditorium
NED University of Engineering & Technology, Karachi

15:00 - 15:15	Guests Arrival
15:15 - 15:20	Guests to be seated
15:20 - 15:25	Holy Quran Recitation
15:25 - 15:30	National Anthem
15:30 - 15:40	Welcome address by Conference Co-chair, Dr. Ghous Baksh Narejo
16:00-16:10	**Plenary Talk by** Dr. Ted Johannson, Uppsala University
16:10- 16:20	**Address by** PTCL Ufone Representative
16:20 - 16:30	**Address by** Pro Vice-Chancellor, NED University of Engineering and Technology
16:30 - 16:35	**Address by Chief Guest,** Chairman Sindh Higher Education Commission, Dr. Tariq Rafi
16:35 - 16:45	**Presentation of Conference** Souvenirs to Guests and Organizers
16:45 - 16:50	**Vote of Thanks by** Conference Secretaryg and Technology
16:45-16:50	**Group Photograph**
16:50 - 17:30	Prayers & Hi Tea

LIST OF ABSTRACTS

S.NO	PAPER ID.	Title	Authors	Affliation
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Paper No. 560

ANALYSIS OF AGRED PERFORMANCE IN LR-WPAN DENSE AD-HOC NETWORKS

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IEEE de fines the standard 802.15.4 for Low data Rate Wireless Personal Area Networks (LR-WPAN) to be used with Internet of Things (IoT) sensor device s. IoT device s utilizing this standard suffers from traffic congestion on node level in dense network scenarios in real time applications. Active queue management (AQM) schemes can optimize the queues of the nodes in order to relive nodes from congestion and improve performance. This paper investigates the impact of Aggressive Random Early Detection (AgRED) AQM in dense network configuration with larger payload and higher service rate for LR-WPAN. The findings indicate better delay, throughput and packet de livery ratio when using AgRED as compared to RED.

Keywords--AgRED; RED; Active queue management; LR-WPAN; WSN; IEEE 802.15.4

Paper No. 3803

OPTIMIZED NETWORK SOLUTION FOR BILATERAL HAPTIC TELEOPERATION: IMPROVING ROBUSTNESS OVER LONG DISTANCES

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Bilateral Haptic Teleoperation (BHT) has been the center of consideration for the researchers over half a century. It is the cutting-edge technology that enables the operator to transmit touch sensations over the internet to any part of the globe. The BHT suffers from the issues of stability and transparency due the presence of network latency, jitters and device impedance. In this paper, we have designed an optimized network solution for bilateral haptic teleoperation. In this regard, successful long distance haptic teleoperation experiments have been performed with a pair of haptic devices i.e., Phantom Desk-top (TouchX) and Novint Falcon to test the robustness and versatility of the framework.

Keywords -- Haptic, networking, bilateral, User-Datagram Protocol, control buffer, Generalized Teleoperation, Phantom Desktop, TouchX, High level network controller

Paper No. 6832

MODIFYING THE OPTICAL PROPERTIES OF ZNS FOR OPTOELECTRONICS APPLICATIONS

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Iron (Fe) doped zinc sulphide (ZnS) nanoparticles were prepared by thermolysis with varying concentration of iron. X-ray diffraction (XRD) results revealed the zinc blend cubic struc- ture of ZnS. The effect of iron on lattice parameters such as crystallite size, micro strains and dislocation density was examined. The defect chemistry inside the samples was analysed by photoluminescence spectroscopy (PL). The variation in PL intensity introduced by doping can be used in optical applications. The optical parameters of nanostructures were investigated with different doping and incorporation of Fe substitute for Zn ions using UV-Visible (UV-Vis).

Keyword--ZnS, XRD, SEM, PL

Paper No. 4470

GENETIC ALGORITHM-BASED PROPORTIONAL INTEGRAL CONTROLLER (GAPI) FOR ROV STEERING CONTROL

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This article presents design and real-time implementation of an optimal controller for precise steering control of a remotely operated underwater vehicle (ROV). A PI controller is investigated to accomplish the desired steering performance. The gain parameters of the controller are tuned using the Genetic Algorithm (GA). The experimental response corresponding to the step waveform for the GA was obtained. A root-locus tuned PI controller alongside a Simulated Annealing-based PI controller (SAPI) is used to benchmark the response characteristics such as overshoot, peak time, and settling time. The experimental findings indicate that GAPI provides considerably better performance than SAPI and root-locus tuned controller.

Keywords--underwater vehicle; genetic algorithm; simulated annealing; ROV; root-locus; steering control

Paper No. 4022

A COMPARATIVE STUDY OF MULTIPLE 2D LASER SCANNERS FOR OUTDOOR MEASUREMENTS

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This research work examines the performance of several compact and lightweight 2D laser scanners, including the Hokuyo URG-04LX, Slamtec RPLidar A1-M8 and Hokuyo UTM-30LX-EW, for their potential use in scanning and mapping applications. A detailed study was conducted to evaluate the performance of each scanner specifically for outdoor mapping operations. The behavior for outdoor measurement of these scanners have not been provided by manufacturer. Multiple experiments were performed to characterize each scanner through statistical analysis, and all scanning data was recorded using the Robot Operating System (ROS) and processed offline. The paper discusses the results of testing for the drift effect on range measurements, the effect of various scanning distances on measurement accuracy, and the impact of direct sun exposure to different materials in outdoor environments on measurement accuracy.

Keywords--: laser scanner, outdoor, characterization, ROS

Paper No. 5841

CO-SENSITIZED DSSC WITH NATURAL DYES EXTRACTED FROM BEETROOT,POMEGRANATE AND CRANBERRY

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The aim of this study is to boost the power conversion efficiency of a dye-sensitized solar cell (DSSC) by using the co-sensitization strategy with appropriate natural dyes extracted from pomegranate, beetroot and cranberry. The fabricated DSSCs were evaluated using current-voltage characteristics and UV-Vis spectroscopy. The co-sensitized DSSC with beetroot and cranberry showed higher short circuit current density and power conversion efficiency than their individual dye-based DSSCs. This improvement in the performance is due to the lower aggregation of the dyes, broader absorption in the visible region and lower value of impedance. But co-sensitized DSSCs of pomegranate with beetroot and cranberry did not show any improvement in the performance.

Keywords-- DSSC; Natural dye; co-sensitized DSSC, co-sensitizer

Paper No. 2165

SIMULTANEOUS UPSTREAM AND INTER OPTICAL NETWORK UNIT COMMUNICATION FOR NEXT GENERATION PON

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In traditional passive optical network (PON) neighboring optical network units (ONUs)cannot communicate directly but through Optical line terminals resulting in propagation delays, security hazards and unnecessary use of upstream and downstream bandwidth. Inter optical network unit communication (IOC) can be a promising solution for these problems. IOC is mostly demonstrated with the help of dedicated or tunable transceivers increasing the cost of the system and making it complex. Transceiver sharing is also demonstrated in literature but it will be a bandwidth inefficient technique. In our paper simultaneous transmission of IOC signal and upstream signal is demonstrated in a time division multiplexed PON using single transmitter and self-phase modulation based wavelength convertor at each ONU that converts the upstream wavelength of 1310 nm to 1310.6 nm when IOC signal is being transmitted by that ONU, at the same time another ONU can transmit the upstream data at 1310 nm which results in efficient bandwidth utilization with less delays compared to the traditional PON. In our proposed design the IOC signal is reflected back by a uniform fiber bragg grating and upstream signal is transmitted through it. This design supports a data rate of 25 Giga bits/sec.

Keywords --Bandwidth efficiency, Inter optical network unit communication, Self-phase modulation

Paper No. 5751

SIMULATION OF LOW FREQUENCY SONOPHORETIC PIEZOELECTRIC TRANSDUCER APPLIED OVER HUMAN SKIN

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Sonophoresis is the process that involves the passage of drug molecules through the skin under ultrasonic stimulation. Drugs with a molecular weight greater than 500 Daltons require some kind of stimulus to catalyze their penetration into the skin. Low frequency sonophoresis, i.e. applying low frequency (20-100 kHz) ultrasonic waves, is one of the active methods of stimulation used for transdermal drug delivery. Aim of this research is to explore the possibility of achieving high enough acoustic pressures inside human skin using a single element piezo-electric transducer required to realize the transdermal delivery of drugs with a high molecular weight. Therefore, this paper presents a design and simulation of a single element transducer to find voltage versus sound pressure level (SPL) as well as frequency response curves for low frequency sonophoresis on human skin. A piezoelectric transducer composed of PZT-5H placed over human skin has been simulated by combining pressure acoustic module, solid mechanics and electrostatic modules of the simulation tool The presented simulation applies sinusoidal excitation to a PZT-5H-based transducer. The peak voltage and the frequency of the input are varied to study the resulting variations in the acoustic pressure and SPL inside the human skin. Measurements of acoustic pressure are taken 0.1mm deep into the human skin. The peak acoustic pressure increases linearly from 0.072 Pa to 0.72 Pa as the peak applied voltage increases from 1 mV to 10 mV. The peak acoustic pressure increases exponentially from 0.2 mPa to 5 mPa as the frequency varies from 20 kHz to 100 kHz for a constant peak voltage of 1 mV. The SPL achieved at 880 kHz is 186 dB, which is suitable for drug delivery in some areas of medicine, such as ophthalmology.

Keywords --Drug delivery; transdermal; sonophoresis; piezoelectric transducer; simulation; COMSOL

Paper No. 6740

GA-BASED MOTOR DRIVE CONTROL OF PLANETARY GEARS OF A VARIABLE VALVE SYSTEM OF AN INTERNAL COMBUSTION ENGINE

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For an internal combustion engine to attain greater fuel economy and performance peremissions, variable valve-timing is often used. In this study, a PD controller for an electric driven planetary gear Variable Valve Timing (VVT) system is designed. The model under study consists of an electric motor integrated with a planetary gear system. The phase angle of the camshaft is controlled by VVT for the required torque and engine speed. A classical PD controller is designed using the root locus method, which is then benchmarked against a GA-optimized PD controller. Finally, a simulation study is carried out which demonstrates that GA optimized controller has better performance and capability to maintain an optimum phase angle for maximum brake power and regulation of the fuel and air mixture.

Keywords--variable valve system; planetary gear unit; internal combustion engine; genetic algorithm

Paper No. 9412

WIRELESS COMMUNICATIONS BEYOND ANTENNAS: THE ROLE OF INTELLIGENT RECONFIGURABLE SURFACES

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Intelligent reconfigurable surfaces (IRSs) are a new and emerging technology that have the potential to revolutionize the way that wireless communications systems are designed and implemented. These surfaces are made up of a large number of small, individually controllable elements, each of which can be used to manipulate the phase and amplitude of the electromagnetic waves that pass through it. This allows them to perform a wide range of functions, including wireless power transfer, beamforming, and cloaking. In this work, we provide an overview of the principles and applications of intelligent reconfigurable surfaces, and we discuss the advantages and challenges of these surfaces in wireless communications. We also provide an overview of the current state of research in this area. Moreover, we outline the future directions for the development of these surfaces.

Keywords-- 5G, 6G, Intelligent Reconfigurable Surfaces, Next Generation Wireless Systems, Wireless Communications

Paper No. 6595

A NOVEL YAGI-UDA ANTENNA BASED WIRELESS POWER TRANSMISSION (WPT) SYSTEM USING PASSIVE REFLECTORS

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This work examines how reflections from various reflective surfaces affect the reception of RF electromagnetic waves and how it impacts wireless power transmission. The frequency range used is 469.5MHz to 773.5MHz, and three reflective materials of almost 20% variation in reflection coefficient were tested with a Yagi Uda antenna at the receiving end. Additionally, the orientation of the antenna was changed in terms of elevation and azimuthal angles. The results were then assessed, and a conclusion was drawn.

Keywords-- signal strength; energy harvesting; wireless power transmission; reflectory media; reflection coefficients

Paper No. 8030

DESIGN AND IMPLEMENTATION OF SMART CONTRACT IN SUPPLY CHAIN MANAGEMENT USING BLOCKCHAIN AND INTERNET OF THINGS

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In this paper, we have presented the design and implementation of a blockchain-based approach for ensuring reliable supply chain management for commodities transported through smart containers. To administer interactions between the sender and receiver, our developed system makes use of the Ethereum blockchain's smart contract features. Smart container equipped with Internet of Things (IoT)-enabled sensors are used to monitor shipping conditions to check predefined shipping requirements. Smart contracts on Ethereum are used to automate payments, validate receivers, and give refunds in the case of violation of predefined requirements. We have also implemented our designed front-end decentralized WebApp and wallet that allows the sender and receiver to communicate with Ethereum smart contracts.

Keywords--Smart Contract, Internet of Things, Supply chain management, blockchain, Ethereum

Paper No. 510

ADAPTIVE GAUSSIAN AND DOUBLE THRESHOLDING FOR CONTOUR DETECTION AND CHARACTER RECOGNITION OF TWO-DIMENSIONAL AREA USING COMPUTER VISION

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Contour detection with close accuracy is challenging in various computer aided measurement applications. This paper evaluates the performance and comparison of thresholding and edge detection techniques for contour measurement along with character detection and recognition between image of high and low quality. Thresholding is one of the key techniques for pre-processing in computer vision. Adaptive Gaussian Thresholding (AGT) is applied to distinguish the foreground and background of an image and Canny Edge Detection (CED) is used for spotting wide range of edges. Adaptive Gaussian thresholding works on a small set of neighboring pixels, while Canny Edge Detection takes high and low intensity pixels in the form of thresholds are tested to find accurate contour measurements while retaining the maximum data content within them. Results show that Adaptive Gaussian thresholding outperforms Canny edge detection for both brightened sharp and blurry dull images.

Keywords--Adaptive Gaussian Thresholding; Binarization; Canny Edge Detection; Contour measurement; Computer Vison ; Image segmentation; Character Recognition

Paper No. 6525

NOVEL IOT-BASED PLANT MONITORING SYSTEM

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The Internet of Things (IoT) plays a vital role in improving cultivation methods for greenhouses and providing farmers / landowners with relevant information to make decisions for optimal yields. The paper presents an intelligent system based on the IoT concept that provides information related to the temperature, humidity, and soil moisture intensity to the users remotely for the monitoring of plant conditions. The android application is designed for the users to monitor the plant health parameters and to manage the timing and frequency of water sprinkling. The sensors collect the readings and transfer them to the Blynk app using the ESP8266 Wi-Fi module. Based on the critical condition of the plant, the user can control the solenoid valve via an android application to maintain the healthy state of the plant.

Keywords-- Internet of Things; Android application; Plant health monitoring

Paper No. 9386

DESIGN OF SMART MEDICAL BOX FOR AUTOMATIC PILL DISPENSING AND HEALTH MONITORING

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Medication non-adherence or mismanagement in medicines schedules like missing doses, taking wrong amounts, or having medicines at incorrect times is a serious problem, especially in elderly patients or patients with serious illnesses, and may lead to deadly consequences. This paper proposes a smart medical box that dispenses not only medicines at prescribed schedules but also has a basic health monitoring system for the patient's temperature, oxygen level, and heart rate detection thus relieving the patient from visiting the doctor. This device is Raspberry pi controlled having an added security feature of biometric recognition so that the medicine is dispensed to the correct patient. Moreover, the user is notified once his medicine has been dispensed via SMS. The main aim of this project is to keep the device cost-effective, user-friendly, simple, and beneficial for the elderly population.

Keywords--pill; dispensing; microcontroller; raspberry; python; automatic

Paper No. 3842

SEMANTIC SEGMENTATION FOR VARIOUS APPLICATIONS: RESEARCH CONTRIBUTION AND COMPREHENSIVE REVIEW

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Semantic image segmentation is used to analyse the visual contents and carry out real-time decision-making. This narrative literature analysis evaluates the multiple innovations and advancements in the semantic algorithm-based architecture by presenting an overview of algorithms used in medical image analysis, lane detection, and face recogniti -on. Numerous groundbreaking works are examined from a variety of angles (e.g., network structures, algorithms and problems addressed). A review of recent development of semantic segmentation networks, such as U-Net, ResNet, SegNet, LCSegnet, FLSNet and GNet is presented with evaluation metric across a range of applications to facilitate new researchers in this field.

Keywords--; Semantic Segmentation; Encoder Decoder; Applications; Medical Imaging, Face Recognition; Lane Detection

Paper No. 772

DATA DEFENSE: EXAMINE FINTECH'S SECURITY AND PRIVACY STRATEGIES

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This research aims to investigate the problem of security and privacy in the fintech business, since the use of digital technologies has been increased in last few years. In this context, we conducted a survey of fintech companies to understand how they are addressing the security and privacy issue and what are the potential risks and benefits for consumers. According to the results, fintech companies are exploiting a range of technical, regulatory, and compliance measures to ensure the security and privacy of financial data, such as encryption, access controls, and data governance policies. However, we attempted to pinpoint open issues as well as prospective research directions. In such settings, there is a need to better understand the efficiency of different privacy and security measures, as well as the potential risks and advantages for customers while using fintech services. The article recommends that future research should broaden its scope and delve further into the security and privacy issues of specific types of fintech services.

Keywords--fintech, security, privacy, data protection

Paper No. 955

AN EFFICIENT OPTO ELECTRONIC FILTER DESIGN OF REFLECTIVE CMY COLORS FOR OPTICAL COMMUNICATIONS

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The discussed study presents a new type of opto-electronic color filters designed for optical communication that could revolutionize both the signal-processing field and the fiber optic communication industry. The study proposes a precise structure design for three reflective color filters based on a tri-layer configuration. This design includes a titanium dioxide layer on top, a semiconductor silicon layer in the middle, and a silicon dioxide layer at the bottom, creating a DSD structure. This design presents three different filters for pure hues, namely magenta, yellow, and cyan.One of the significant advantages of this tri-layer design is the thickness of each material layer, which plays a vital role in producing better intensity values and purity of CMY colors. This study presents the design of the new filters that could potentially have a significant impact on the display industry and life-saving medical equipment, where fiber optics with multi-layer opto-electronic color filters are used. The novelty of this study lies in its precise structure design and the potential to generate superior results compared to existing color filters. This innovative design can potentially be implemented in various fields, such as display technology and medical equipment, to enhance their performance and accuracy. Overall, this study's contribution highlights the potential advantages and usages of the proposed filters in various fields.

Keywords --Dielectric; Dielectric semiconductor dielectric (DSD); Multi-layer, Cyan, magenta, and yellow (CMY) Reflective color filters; Dielectric, Semiconductor.

Paper No. 8108

MOBILE CLOUD COMPUTING

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Mobile cloud computing (MCC), is an emerging concept that is gaining popularity in the IT sector. It's a significant topic of debate because it is being dis9 cussed as one of the most important trends for the future. After covid-19 pandemic, we had seen the rapid emergence of mobile computing, which also created massive hype over the usage of mobile applications. This survey paper includes an intro12 ductory part its literature review from latest advanced prominent publications, its methodology definition, infrastructure, advantages / limitations, after its discus14 sion and result, then last, we discuss MCC future work to be done in few years

Keywords -- Cloud computing; Mobile cloud computing; Artificial intelligence; Machine learning; augmented reality; Quality of services

Paper No. 8909

FEATURE-BASED SEMI SUPERVISED LEARNING APPROACH TO ANDROID MALWARE DETECTION

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The development of signature-based methods or Machine Learning (ML) techniques on static data has dominated automated malware detection on android platforms. However, these techniques may not detect dangerous activities that only manifest during runtime. Furthermore, there is already a significant volume of unlabeled malware data available, making the production of datasets through supervised ML approach of manual labelling expensive. For anti-virus researchers, the process of malware development poses a significant engineering challenge because they lack an effective method for capturing potentially new harmful files while removing clean and well-known files. In this research, we propose a semi-supervised ML technique to detect android malware from android permissions and Application Programmer Interface (API) call logs. The ML technique is incorporated into an android application to scan the installed applications and detect the corresponding levels of maliciousness with success. The results depict the feasibility of our proposed method and application.

Keyword-- malware detection; android malware; static analysis; machine learning; semi-supervised learning.

Paper No. 2150

EXTRA SUPER-FAST CHARGER FOR ELECTRIC VEHICLES (EV'S) AND PLUGIN HYBRID ELECTRIC VEHICLES (PHEV'S)

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The main abstract of this research work is to develop fast and protected charging system for electric vehicles. Recently now a days different charging methods are being introduced. The main charging methods are induction charging method and conduction charging method. In this paper conduction charging method is introduced. In conduction there are three level of charging methods. In level 1 there is single phase, in level 2 there is single and 3 phase both. Lastly in level there is three phase AC charging method, DC conduction charging method and AC & DC conduction charging method. So, level 3 charging method is the main focus of this paper. So, 12-diode rectifier or 12-Pulse rectifier with firing angle of zero degree having two bridges is used for ac to dc conversion and for dc-to-dc SEPIC converter is used. The design of this paper was simulated and verified in MATLAB/Simulink and the result show that total harmonic distortion THD of input current have been reduced and overall efficiency have also been improved.

Keywords --THD Total Harmonic Distortion; SEPIC; EV's Electric Vehicles; PHEV Plugin Hybrid Electric Vehicles

Paper No. 4056

PERFORMANCE OF DENSE MILLIMETER WAVE NETWORK WITH UNIFORM CYLINDRICAL ARRAY

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Future networks would be dense reducing the link length between users and the base stations (BSs). Moreover, higher frequency spectrum such as millimeter wave (mmwave) will be employed for providing high data rates and capacity but at the cost of increased path loss and blockage. The challenges in a dense network are two-fold. Firstly, small link lengths require taking into account the BS height for optimum coverage performance. Secondly, to mitigate signal loss at high frequencies, the BS and users must be equipped with antenna arrays. In this work, we derive mathematical expressions for signal-to-interference-plus-noise (SINR) coverage probability for a three-dimensional mmwave network by considering the height of BS and the buildings blockage. Uniform cylindrical antenna arrays are employed at BS and user equipment. Results show that there exists a certain BS height for a particular BS density and cell radius at which the coverage probability could be maximized.

Keywords -- millimeter wave communication, beamforming, 3D network, stochastic geometry

Paper No. 6583

A CASE-STUDY ON THE POTENTIAL APPLICATIONS OF V2V COMMUNICATION FOR IMPROVING ROAD SAFETY IN PAKISTAN

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The connected vehicles are the future of transportation. Road can be much safer when vehicles are able to communicate about the traffic and road conditions to its surrounding vehicles, or if they can "talk" to each other. A smooth communicat -ion among vehicles can be helpful in terms of road safety in case of sudden speed breaks, bumps, slow moving traffic ahead, bad visible condition as fog and importantly wrong way traffic. Our work suggests potential applications of Vehicle -to-Vehicle (V2V) communication for improving road safety in Pakistan. We have considered one such unsignalized inters -ection point at main University Road, Karachi and presented an approach to make this road safer for vehicles and pedestrians using V2V technology.

Keywords-- V2V communication; road safety; unsignalized intersection; Dedicated Short-Range Communications (DSRC)

Paper No. 5728

APPLICATION OF ADAPTIVE ALGORITHMS ON ULTRASOUND IMAGING

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Ultrasound, also known as ultrasonography, plays a major role in the medical imaging eld. Ultrasound images are inevitably prone to different kinds of noises and speckle during acquisition. Adaptive lters show the best performance in removing noise. Ultrasound, also known as ultrasonography, plays a major role in the medical imaging field. Ultrasound images are inevitably prone to different types of noises. Therefore, different types of lters are applied to remove noise and speckles from images. Adaptive filters show the best performance in removing noise and speckles from images.
In this paper, we compared the Least Mean Square algorithm, Quaternion Least Mean Square algorithm and Normalized Least Mean Square algorithm for ultrasound image processing. It is proved that NLMS shows better performance among these algorithms. The results are shown to understand the performance of algorithms..

Keywords -- Ultrasound; Adaptive Filters; LMS; QLMS; NLMS

Paper No. 7943

IMPACT OF AMPLITUDE RESPONSE ON THE CAPACITY OF AN INTELLIGENT REFLECTING SURFACE ENABLED NARROWBAND SISO SYSTEM.

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Future wireless networks are characterized to have a combination of various technologies like artificial intelligence, machine learning, combined communication, sensing and others. In this context, intelligent reflecting surfaces have been identified as a powerful candidate for 6G enabling technologies. In this paper, we present the performance analysis of an Intelligent reflecting surface (IRS) assisted narrowband single input single output (SISO) system. We evaluate the capacity and received signal to noise ratio (SNR) of a SISO wireless system by considering the effect of amplitude response of the channel and changes in transmit SNR. Simulation results show that the capacity of the system can be significantly improved in the presence of passive as well as active reflecting elements even when the strength of direct link between the transmitter and receiver is verylow. Similarly, transmit SNR has a significant impact in overall performance improvement of the system.

Keywords -- 6G technology; Capacity; Intelligent reflecting surface; Wireless communication

Paper No. 1352

WATERMARK EMBEDDING SCHEME WITH VARIANCE OF CHROMATIC COMPONENTS

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This paper contains the idea for the insertion of watermark with variance of color components of the image. Color image is converted into CIE color space. Chromatic components are transformed into sequency domain by applying Complex Hadamard Transform. The variance of the spatiochromatic coefficients is calculated and watermark is selected from the transformed image on the bases of the variance by setting the threshold value. Watermark is only inserted in image blocks those have the smaller value of variance than the threshold value. The watermark embedding process is observed in numerous sequences by measuring the peak to signal ratio and figure of merit. Simulation results are presented and discussed using the two variants of Complex Hadamard Transform and Discrete Cosine Transform. The watermark is embedded and extracted using the two Complex Hadamard Transform versions. (1) Sequency Ordered Complex Hadama -rd Transform and (2) Conjugate Symmetric Sequency Ordered Complex Hadamard Transform. Relative to DCT, SCHT provides high image quality.

Keywords -- 6G technology; Capacity; Intelligent reflecting surface; Wireless communication

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