# 1ST MITE INTERNATIONAL CONFERENCE ON EVOLVING TECHNOLOGIES IN COMPUTING (MICETC)– 2024

## About the Conference

Our mission is to bring together diverse voices to discuss the challenges and opportunities shaping the future of computing. The MICETC is an annual gathering of researchers, professionals and thought leaders in the computing industry. This conference offers an unparalleled opportunity for networking, knowledge sharing, and collaboration.

## Objective

The primary objective of 1st MiTE International Conference on Evolving Technologies in Computing (MICETC) is to foster a platform for experts, innovators, researchers, and industry leaders to come together and exchange ideas, discuss challenges, and explore the latest advancements in computing technologies. The conference aims to facilitate knowledge sharing, encourage collaboration, and inspire new perspectives on evolving technologies. It provides a space for attendees to gain valuable insights from keynote speakers, participate in thought-provoking discussions, and contribute to the continuous evolution of the computing field

## Themes

Keeping in view of the MiTE ethos of Technology and Entrepreneurship, the Department of Computer Science and ORIC planned to organize an international conference that focuses on evolving computing technologies. Hosting such international conferences not only enhances MiTE academic standing and visibility in the national and global research community but also highlight the institution's commitment to research excellence and knowledge creation. The MICETC was conceived with the vision of fostering innovation, knowledge sharing, and interdisciplinary collaboration in the rapidly evolving domain of computing technologies. As technological advancements, continue to reshape industries, this conference aimed to serve as a platform for researchers, academicians, and industry professionals to discuss emerging trends, challenges, and opportunity

# Preface

It is with great privilege and anticipation that I extend a warm welcome to the 1st MiTE International Conference on Evolving Technologies in Computing (MICETC). This event epitomizes our unwavering commitment to fostering dialogue and collaboration among a diverse assembly of researchers, innovators, and thought leaders, united by their pursuit of progress in the ever-evolving realm of computing technologies. As the Dean of the Millennium Institute of Technology & Entrepreneurship (MiTE) and the Conference Chair, I am profoundly honored to oversee this seminal gathering. I take this opportunity to express my heartfelt gratitude to the organizing committee: whose indefatigable efforts and meticulous planning have transformed this vision into reality. Their dedication has established an unparalleled forum for the exchange of knowledge, ideas, and expertise.

The MICETC heralds a pivotal moment in the collective endeavor to push the frontiers of computational innovation. In an increasingly globalized world, this conference emerges as a transnational confluence of academic and industrial ingenuity, addressing pressing challenges and unveiling novel opportunities. By fostering collaboration and knowledge sharing, it provides a fertile ground for groundbreaking discoveries and interdisciplinary synergies. The conference theme, **"Evolving Technologies in Computing"** encapsulates the transformative essence of this domain. It underscores the profound potential of innovation to redefine paradigms and advance global well-being. By delving into a broad spectrum of topics, the conference presents a tapestry of intellectual inquiry, spanning the theoretical underpinnings and practical applications of cutting-edge advancements. This diverse repertoire invites participants to reimagine possibilities and engage with transformative ideas that hold the promise of a more sustainable and progressive future.

We are privileged to host an illustrious roster of keynote speakers, whose visionary insights undoubtedly inspire and challenge conventional perspectives. The conference proceedings, comprising the invaluable contributions of presenters and authors, reflect the vigor and depth of ongoing research, offering a repository of ideas that will shape the trajectory of the computing discipline. It is my fervent hope that this conference proves to be an intellectually stimulating and professionally rewarding experience for all attendees. Thank you for your invaluable participation in this endeavor. May your time at MICETC and within our country be both enriching and memorable.

*Prof. Dr. Kamran Ahsan*
Dean, Faculty of Engineering & Computer Science,
Millennium Institute of Technology & Entrepreneurship (MiTE)
Conference Chair, MICETC

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# *Founding Trustee MiTE [Patron-in-Chief]: Dr. Faisal Mushtaq (T.I)*

Dr. Chaudhry Faisal Mushtaq 'Tamgha-i-Imtiaz, a distinguished academician, education reformer, and social entrepreneur, has left an indelible mark on education and social welfare in Pakistan. His outstanding contributions and global recognition have solidified his position as an influential leader in the field.

On an illustrious professional journey, Dr. Faisal Mushtaq served as the Former Education Minister and Former Minister for Human Rights, Population & Social Welfare, Minorities, and Baitulmal in the Interim Government of Punjab. His exceptional leadership earned him the distinction of being named one of the 500 most influential Muslims in the world for three consecutive years by the esteemed Royal Islamic Strategic Studies Center in Jordan.

In September 2021, Dr. Chaudhry Faisal Mushtaq was bestowed with an Honorary Degree of Doctor of Education by the prestigious University of Hertfordshire, United Kingdom, in profound recognition of his unwavering commitment and exceptional contributions to transforming education in Pakistan.

In recognition of his remarkable contributions and unwavering dedication to the education sector and community service, Founder & CEO Roots Millennium Education Group Dr. Faisal Mushtaq TI has been inducted as an Honorary Rotarian and decorated as the Ambassador of Rotary Pakistan. This prestigious recognition highlights his outstanding efforts in shaping the future of education and fostering positive change within the community.

As the Founder & CEO of Roots Millennium Education Group, Pakistan, and the President of the Millennium Institute of Technology & Entrepreneurship (MiTE), chartered by the Government of Sindh and recognized by the esteemed Higher Education Commission of Pakistan, Dr. Chaudhry Faisal Mushtaq spearheads institutions that embody technological advancement and entrepreneurial excellence. He has pioneered educational reforms, establishing a strong foundation for quality education. Additionally, as the Founder and CEO of the non-profit organization 'Change in Education Foundation,' he has successfully transformed over 200 government schools across districts, provinces, and rural communities in Pakistan, aligning with the country's commitment to the Sustainable Development Goals (SDGs) 2030. Driven by his unwavering dedication, he inspires others to join in creating a world where education is accessible, empowering, and transformative. In alignment with the United Nations' Sustainable Development Goals (SDGs), Dr. Mushtaq has consistently worked towards creating a sustainable and equitable future. He actively collaborates with national committees and organizations dedicated to achieving the SDGs, leveraging his expertise to drive meaningful change in areas such as poverty eradication, quality education, gender equality, and environmental sustainability.

In recognition of his outstanding contributions to education, youth empowerment, public sector development, and promotion of Chinese language and ICT in education, Dr. Faisal Mushtaq was honored with the prestigious National Civil Award, 'Tamgha-i-Imtiaz, TI,' by the President of the

Islamic Republic of Pakistan in 2013. This honor further solidifies his status as a national academic icon and an internationally acclaimed school and education management practitioner.

At the forefront of educational transformation in Pakistan stands Dr. Faisal Mushtaq, a visionary leader and esteemed Board Member of the National Curriculum Council. Beyond his role as a Board Member, Dr. Mushtaq actively engages with stakeholders, fostering partnerships and forging alliances to bring about positive change. His inclusive approach encourages dialogue and promotes the exchange of ideas, creating a collaborative environment where diverse voices are heard, and collective solutions are found. Dr. Faisal Mushtaq at the helm of the National Curriculum Council, Pakistan's educational landscape is being transformed, one innovative idea at a time. His impactful leadership, unwavering dedication, and forward-thinking vision are shaping the minds of our nation's future leaders, paving the way for a prosperous and inclusive society.

He serves on the Board of Governors for the Worldwide Fund for Nature (WWF) Pakistan Chapter, Fauji Foundation Pakistan, and the historic Cadet College HasanAbdal, his alma mater. Through these roles, he advocates for academic excellence, social entrepreneurship, and equal opportunities for all.

Dr. Mushtaq's commitment to global diplomacy is evident through his involvement in Model United Nations (MUN). By simulating United Nations conferences, MUN provides young individuals with a platform to engage in diplomatic discussions, hone their negotiation skills, and develop a nuanced understanding of global issues. Dr. Mushtaq's active participation in MUN highlights his dedication to fostering the next generation of diplomatic leaders who are well-versed in international affairs.

Dr. Mushtaq's expertise and influence extend to policy-making and strategic planning. He is a member of multiple government committees on education and information and communication technology (ICT) at the national level. Furthermore, he has been appointed as the National Book Ambassador by the National Book Foundation for several consecutive years.

With an unwavering commitment to national security through education and literacy, Dr. Faisal Mushtaq serves as a visiting lecturer for war college and national security course delegates at the prestigious National Defense University (NDU) in Islamabad. He fervently believes that education and literacy are the first line of defense for national security.

As a catalyst for change, Dr. Faisal Mushtaq continues to redefine the boundaries of youth empowerment and global development. Through his influential role in YPO MENA, his transformative work with NCC Pakistan, his active participation in Model United Nations, and his dedication to the United Nations SDGs, Dr. Mushtaq has become a beacon of hope and inspiration for the young generation, demonstrating that with determination and vision, they can shape a brighter future for themselves and for their communities. Through his organization, Change in Education Foundation, Dr. Mushtaq endeavors to bridge the education service gap in Pakistan. The foundation focuses on six key areas: Curriculum for Schools and Teacher Development, Help through Teacher Training & Monitoring, Assessments & Examinations Improvement, Nutrition and Health for Students, Gender Equality in Education, and Education for All. It is registered with the Pakistan Philanthropy Commission, reflecting its commitment to social and developmental causes.

Dr. Faisal Mushtaq's remarkable academic journey includes studying Economics at the prestigious University of London and Accounting & Finance at the University of Salford in the United Kingdom. He also holds a degree in national security from the National Defense University in Islamabad.

Throughout his career, Dr. Faisal Mushtaq has received numerous awards and accolades for his outstanding contributions, including the National Civil Award of 'Tamgha-i-Imtiaz,' consecutive appointments as the National Book Ambassador, the Best Educationist of the Year 2014 Award, and the RCCI Gold Award 2013, among others.

In addition to his professional accomplishments, Dr. Faisal Mushtaq actively participates in various national and international organizations, including the International Networking for Educational Transformation (iNET), Rawalpindi Chamber of Commerce and Industry (RCCI), Islamabad Chamber of Commerce and Industry (ICCI), Management Association of Pakistan (MAP), and Cambridge International Assessments Education (CIAE) Advisory Council.

Dr. Faisal Mushtaq is a visionary leader and a prominent figure in the field of youth empowerment and global development. With a strong passion for making a positive impact on society, Dr. Mushtaq has dedicated his career to championing the rights and aspirations of young people, both within Pakistan and on an international scale. His extensive involvement in various prestigious national and global organizations has solidified his position as a catalyst for change.

Dr. Mushtaq holds a prominent role in the Young Presidents' Organization (YPO) Pakistan and Middle East North Africa (MENA) chapter, a highly influential network of young leaders from diverse industries. As a member of YPO, he actively engages with fellow executives and entrepreneurs, fostering collaboration, and sharing innovative ideas to drive economic growth and social progress.

Dr. Chaudhry Faisal Mushtaq's extensive knowledge, strategic mindset, and unwavering commitment to education and social welfare make him an impactful and influential personality in Pakistan and beyond. His tireless efforts have transformed the education landscape, empowered youth, and created opportunities for countless individuals to pursue their dreams.

Dr. Mushtaq's leadership and expertise have earned him numerous accolades, both nationally and internationally. His passion, innovative thinking, and relentless drive for social impact have made him a sought-after speaker at conferences and forums, where he inspires and empowers young individuals to realize their full potential and contribute to a better world.

### President MiTE [Joint Patron-in-Chief]: Ambassador Masood

Ambassador Masood Khan assumed his new position as President TMUC Higher Education Group, on October 7, 2024 and President MiTE, on November 14, 2024.

He served as Pakistan's Ambassador to the United States from 2022-2024. He was the President of Azad Jammu and Kashmir from August 2016 to August 2021. Immediately before becoming the President, he was the Director General of the Institute of Strategic Studies Islamabad, one of the top think tanks in Pakistan.

Ambassador Masood Khan had a distinguished diplomatic career. Most notably, he served as:

• Spokesman of the Ministry of Foreign Affairs from 2003 to 2005;

• Pakistan's Ambassador and Permanent Representative to the United Nations and other International Organizations in Geneva, Switzerland, from 2005 to 2008;

• Pakistan's Ambassador to China from 2008 to 2012; and

• Pakistan's Ambassador and Permanent Representative to the United Nations Headquarters, New York, from 2012 to 2015.

In his earlier diplomatic career, he held important diplomatic positions in China, The Netherlands, United Nations (New York) and the USA (Washington D.C from 1997 to 2002). Over the years, he has also held leadership positions in the international community which include:

• President of the Conference on Disarmament;

• Chairman of the Committee on Internet Governance of the 2005 World Summit for Information Society;

• President of the Biological Weapons Review Conference 2006;

• President of the Governmental Group of the International Labour Organization (ILO);

• Chairman of the ILO Reform Committee;

• Chairman of the Council of the International Organization for Migration;

• Chairman of the Organization of Islamic Cooperation in Geneva;

• Chairman of the Group of 77 and China.

In New York, Ambassador Khan represented Pakistan as a non-permanent member of the UN Security Council from 2012 to 2013 and became the President of the Security Council in January 2013. While in New York, he was also the:

• President of the Executive Board of United Nations International Children's Emergency Fund (UNICEF),

• Vice President of the Economic and Social Council,

• Vice President of the UN General Assembly, and

Ambassador Masood Khan also remained Pakistan's Chief Negotiator (Sherpa) for the US-led Nuclear Security Summits, from 2009 to 2015.

In the Ministry of Foreign Affairs, he has served as Director General United Nations, Director General Nuclear Disarmament, Director General Organization of Islamic Cooperation and Director General East Asia and Pacific. Earlier, he was Director Secretary General's Office and Director International Conferences.

His areas of specialization include nuclear diplomacy, South Asia, Pak-China relations, Pak-US relations, e-governance, multilateral diplomacy and international humanitarian law, among others.

He has spoken at prestigious universities and think tanks in the US, the UK, Europe, the Gulf region, China and South East Asia. He has also led scores of Pakistani delegations to international conferences. Before joining the Foreign Service he was a lecturer in English, a Pakistan Television host and a radio newscaster. He holds Awards of Hilal-e-Imtiaz for diplomatic services in 2013, Chinese highest award for diplomatic services in 2015.

## *Rector MiTE [Patron]: Prof. Dr. Huma Baqai*

Prof. Dr. Huma Baqai, is the First Rector of the Millennium Institute of Technology and Entrepreneurship (MiTE). She previously served as an Associate Professor of Social Sciences & Liberal Arts at IBA Karachi. She has served for more than ten year in positions of academic leadership. She is an eminent international relations expert and political analyst who has associated with electronic media for twenty plus year and has discussed domestic , goal , and social issues in over one thousand programs.

She has three books to her credit. She has authored twenty-nine national and international research articles and several book chapters. She has participated in over two hundred national and print media presence. As a columnist she has contributed hundred plus articles to renowned magazines and newspapers.

Dr. Baqi is also a content developer, certified Corporate Trainer, Certified Director duly approved by SECP , Senior Vice Chair , Karachi Council for Foreign Relations (KCFR) and serves on several advisory & governance book.

### *Considerations*

Prof. Dr. Huma Baqai, Rector of MiTE, extended a warm welcome to the attendees with an address that set the stage for a day of intellectual exchange and collaboration. Her remarks emphasized the university's dedication to fostering innovation and excellence in computing technologies.

## Conference Chair:  Prof. Dr. Kamran Ahsan

Prof. Dr. Kamran Ahsan (a computer scientist), after completing his PhD from Staffordshire University, UK, with a vast experience of teaching and research projects, Dr Ahsan returned to Pakistan with the spirit to serve the country and its people. He is an avid researcher and takes highest level of responsibility in ensuring the integrity of the research process. Dr. Ahsan has one patent to his credit while 4 others are almost finishing the process. He is widely published for his research in the area of disaster and health management through mobile technology which particularly includes his work for the disabled. In the limited span of time he has earned great respect for his research, he has chaired several international conferences and worked on multiple funded projects. Currently serving as a Professor, Dean of the Faculty of Engineering and Computer Science, and Director of ORIC (Additional Charge) at MiTE (Millennium Institute of Technology & Entrepreneurship). He previously held the positions of Director of IT and Director of ORIC. He has served as the Director of Quality Enhancement Cell (QEC) for a fairly long tenure in which he has initiated the entire department and its processes.
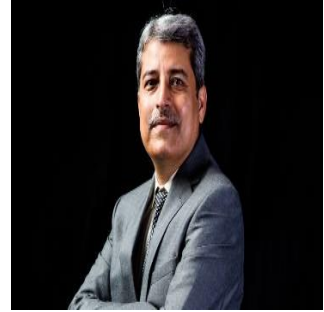
### Considerations

Prof. Dr. Kamran Ahsan, the Conference Chair, delivered an enlightening presentation on Emerging Trends in Artificial Intelligence: Global and Pakistan Perspectives. He highlighted how AI is transforming industries globally and in Pakistan, driving innovation in healthcare, agriculture, education, and engineering. While challenges like data privacy and infrastructure remain, AI offers opportunities for sustainable growth and collaboration. To fully leverage its potential, investments in research and innovation are essential, ensuring AI benefits are inclusive and transformative.

## Chief Guest: Prof. Dr. Atta-ur-Rahman

Prof. Atta-ur-Rahman obtained his Ph.D. in organic chemistry from Kings College, University of Cambridge (1968). He has over 1559 international publications in several fields of organic chemistry (h index 76, citations 38,200).

(https://scholar.google.com/citations?user=bSBNj1MAAAAJ)

including 86 international patents, 70 chapters in books, 875 research publications, and 391 books (11 authored and 380 edited). He is Editor of the world's leading encyclopaedic series of volumes on natural products "Studies in Natural Product Chemistry", 81 volumes of which have been published by Elsevier Science Publishers under his Editorship during the last three decades.

Prof. Atta-ur-Rahman is the most decorated scientist of Pakistan having won four civil awards including Tamgha-i-Imtiaz (1983), Sitara-i-Imtiaz (1991), Hilal-i-Imtiaz (1998), and the highest national civil award Nishan-i-Imtiaz (2002). Prof. Atta-ur-Rahman was elected as Fellow of the prestigious Royal Society (London) on 14th July 2006, and is now the only scientist in the Islamic World to be a Fellow of this 370-year-old Society. He won the prestigious UNESCO Science Prize (1999) and was elected Honorary Life Fellow of Kings College, Cambridge University, UK (2007). Prof. Atta-ur-Rahman has been conferred honorary doctorate degrees by many leading world universities including: Cambridge University (UK) (1987), Coventry University (UK) (2007), Bradford University (UK) (2010), Asian Institute of Technology (Thailand) (2010) and University of Technology Mara, (Malaysia) (2011).

Prof. Atta-ur-Rahman was conferred The World Academy of Sciences (TWAS) (Italy) Prize for Institution Building in October (2009) and the high civil award ("Grosse Goldene Ehrenzeischen am Bande") by the Austrian government (2007) and the highest scientific award of China, "The International Science & Technology Cooperation Award" (2020). Prof. Rahman was appointed Academician (Foreign Member) of the prestigious Chinese Academy of Sciences (2015) and Fellow (Foreign Member) of the Korean Academy of Science and Technology. The leading Chinese University on Traditional Medicine in Changsha, Hunan has established the "Academician Professor Atta-ur-Rahman One Belt and One Road TCM Research Center") in October 2019 and the largest university in Malaysia, Universiti Technologi, Mara, Malaysia (UiTM), has also established an institution entitled, "Atta-ur-Rahman Institute on Natural Product Discovery (AuRins)" in 2013. Prof. Atta-ur-Rahman was the Federal Minister for Science and Technology (14th March, 2000 – 20th November, 2002), Federal Minister of Education (2002) and Chairman of the Higher Education Commission with the status of a Federal Minister from 2002-2008. Prof. Atta-ur-Rahman was the Coordinator General of COMSTECH, an OIC Ministerial Committee comprising the 57 Ministers of Science & Technology from 57 OIC member countries from 1996 to 2012. He is presently Professor Emeritus at the International Center for Chemical and Biological Sciences, University of Karachi which is now internationally recognized as the UNESCO Center of Excellence.

*Considerations*

Significant scientific advancements include quantum computing, where Google's quantum chip "Willow" performs computations in under five minutes that would take the fastest supercomputers 10 septillion years, transforming fields like personalized medicine and origins of the universe. The integration of artificial intelligence with quantum computing promises to revolutionize civilization by cracking complex digital codes, designing new life forms, and advancing drug development. The PIONEER Database, developed by Cleveland Clinic/Cornell, identifies potential drug targets for cancers and other complex diseases.

In terms of medical breakthroughs, Neuralink, Elon Musk's brain implant company, was approved by the FDA in May 2023 and shows promise for treating conditions like obesity, autism, depression, and schizophrenia. In September 2024, the FDA granted approval to Neuralink's brain chip "Blindsight," which enables sight restoration even when the optic nerve is damaged. IBM Watson can now recommend treatments that match human oncologists' suggestions in 99% of cancer cases, showcasing its capability to outperform traditional methods.

Concerns about artificial intelligence are also prominent, with notable scientists like Stephen Hawking and Elon Musk warning about the profound risks posed by unchecked AI development. In terms of applications, AI has made significant strides in healthcare through tools like Babylon, Sense.ly's Molly, and AiCure app, which manage medical records, assist with repetitive tasks, and provide digital consultation and medication management. In agriculture, AI enhances crop and soil monitoring, disease detection, and animal monitoring using UAVs and computer vision techniques.

Advancements in sustainable energy are highlighted by Sharp Corporation's development of new compound solar cells with efficiencies over 40%, utilizing "Photon Enhanced Thermionic Emission" (PETE) for increased energy efficiency. In biotechnology, innovations in understanding and reversing the ageing process, apoptosis, telomere biology, and age-related genes, including Resveratrol, NAD, Metformin, and Curcumin, represent significant progress.

## *Keynote Speaker: Prof. Dr. S. M. Tariq Rafi*

Prof. Dr. S. M. Tariq Rafi serves as the Chairperson of the Sindh Higher Education Commission, Karachi. Former Vice Chancellor, Jinnah Sindh Medical University, Karachi. Prof. Dr. S.M. Tariq Rafi graduated in 1982 and joined Jinnah Post Graduate Medical Centre as Medical Officer, He did his F.C.P.S. & F.R.C.S. and became Professor of ENT at Jinnah Post Graduate Medical Centre in 2001. He has been the Convener, Examiner, Paper Setter at College of Physicians & Surgeons Pakistan (CPSP) and has trained more than 100 students for F.C.P.S., M.S. and D.L.O.

He has more than seventy publications in National and International Journals. He has been the Past President of the Society of ENT and Ex- President of SAARC ENT Society and the former Dean of ENT a College of Physician & Surgeons Pakistan and the former Vice Chancellor of Jinnah Sindh Medical University, Karachi. He is now the Chairperson of Sindh Higher Education Commission and he has been awarded with the civil award of Tamgha-i-Imtiaz by the President of Pakistan in recognition of his contributions to education and health in the country.

### *Considerations*

Prof. Dr. S. M. Tariq Rafi, Chairman of Sindh HEC, provided a compelling and thought-provoking perspective on the transformative impact of technology on education and industry. He highlighted the crucial role of technological advancements in shaping the future of both fields, emphasizing the need for integration into educational frameworks to foster innovation, enhance learning experiences, and prepare students for the evolving demands of the industry. He also underscored the importance of scholarships and funding opportunities provided by HEC to support students and faculty in pursuing research and higher education. This financial support is essential for nurturing talent, driving academic excellence, and fostering collaborations between academia and industry, ultimately contributing to the nation's growth and development.

# Panelist

# Panelist

## *Moderator:  Prof. Dr. Huma Baqai, Rector MiTE*

Prof. Dr. Huma Baqai, Rector of MiTE, is a distinguished expert in international relations and political analysis with over two decades of media engagement. She has authored three books, 29 research articles, and more than 100 articles featured in prominent magazines and newspapers. As a certified trainer and SECP-approved director, she holds the position of Senior Vice Chair at KCFR and contributes to various advisory boards. *(Her details biography available no 3)*

## *Conference Panelist:  Prof. Dr. Atta-ur-Rehman*

Prof. Atta-ur-Rahman, a renowned organic chemist, earned his Ph.D. from Cambridge University in 1968 and has over 1,559 publications, including patents and books. He has received multiple national and international awards, including four civil awards from Pakistan and the UNESCO Science Prize. Elected as a Fellow of the Royal Society in 2006, he has held key positions, including Pakistan's Minister for Science and Technology. Currently, he is Professor Emeritus at the University of Karachi. *(His details biography available no 5 )*

## *Conference Panelist:  Prof. Dr. Syed Irfan Hyder*

Prof. Dr. Syed Irfan Hyder's impressive credentials include an MS and PhD from the University of Texas, Austin, USA, as well as a BE from NED University of Engineering and Technology, Karachi, and an MBA from the Institute of Business Administration (IBA), Karachi. With a wealth of academic experience and a strong background in Information Technology, he has held key roles including IT Consultant at Oxford University Press, Director at Software Solutions (Pvt.) Ltd., Deputy Director of Computer Studies at IBA, Vice President & Dean at PAF-KIET, and Rector at the Institute of Business Management (IoBM).  He has also served as Vice Chancellor of Ziauddin University. Presently, he is the Vice Chancellor of Salim Habib University, where he is driving transformative initiatives that foster innovative strategies and make impactful advancements empowering students, faculty, and staff to excel in education, research, and societal contribution.

## *Conference Panelist: Prof. Dr. Tariq Rahim Soomro*

Prof. Dr. Tariq Rahim Soomro, Professor of Computer Science, and Rector at Institute of Business Management, has received BSc (Hons) and M.Sc degrees in Computer Science from University of Sindh, Jamshoro, Pakistan and his PhD in Computer Applications from Zhejiang University, Hangzhou, China and became the first Pakistani to receive all three degrees in the field of Computer Science.  He has more than 29 years of extensive and diverse experience as an administrator, computer programmer, researcher, and teacher.  As an administrator, He served as Coordinator, Head of Department, Head of Faculty, Dean of Faculty, Head of Academic Affairs and having wide experience in accreditation related matters, including ABET USA, HEC Pakistan, KHDA Dubai, United Arab Emirates (UAE) and Ministry of Higher Education and Scientific Research, UAE. He has published over 100 peer-reviewed papers.  He has been a senior member of IEEE since 2005 and IEEE Member since 2000.  He is currently serving as Chair IEEE Karachi Section and IEEE Computer Society R10 Southern Area Coordinator of Computer Society. He is member Task Force on Arabic Script IDNs by Middle East Strategy Working Group (MESWG) of ICANN, Member Editorial Board of several research Journals and also served as Technical Program Committee Member of several national and international conferences. He received the ISOC Fellowship to the Internet Engineering Task Force (IETF) for the 68th Internet Engineering Task Force (IETF) Meeting.  He is also the first Pakistani to became IEEE Computer Society Distinguished Visitor (2021-2023) and also became the first and only Pakistani to be selected by the IEEE Computer Society to the 'Inaugural Class of IEEE Computer Society' as Distinguished Contributor (2021) in the field of Computer Science.

## *Conference Panelist : Prof. Dr. Khalid Khan*

Prof. Dr. Muhammad Khalid Khan is the President of Karachi Institute of Economics and Technology (KIET), Pakistan. He is also the Dean of Computing and Information Sciences. He is a seasoned professional having an experience of over two decades in Information System implementation, training, coaching and research. He holds a Post Doctorate in Blockchain and Predictive Analytics from UTP, Malaysia and PhD in Computer Science. He has attended two Master programs, one in Computer Science and the other in Business Administration. Dr. Khalid has won research funding from National and International agencies including UTP Malaysia and NRPU, TDF, NCAI funding from HEC Pakistan. The total award is above 30 Million PKR. Dr. Khalid has published and presented many articles in peer reviewed international journals and conferences. His citation count is around 900. Dr. Khalid's research interests include Blockchain scalability & Trust Mechanisms, Desktop Grids & Decentralized clouds, IoT based Healthcare & Air Quality Monitoring, Business Intelligence & Predictive Analytics, Technology Startups & Emerging Software Development Practices.

*Highlights*

The panel discussion on "Leveraging AI for Sustainable Economic Growth in Pakistan." Moderated by Prof. Dr. Huma Baqai, the panel featured an illustrious lineup of experts, including. Prof. Dr. Atta-ur-Rahman, Prof. Dr. Syed Irfan Hyder, Prof. Dr. Tariq Rahim Soomro and Prof. Dr. Khalid Khan. The discussion explored the profound transformative potential of artificial intelligence (AI) in driving growth and fostering sustainable development in Pakistan. Prof. Dr. Huma Baqai changed the format of panel discussion by taking questions from the audience and their answers by panelists. Various questions were asked by the researchers and students about the ways AI can revolutionize diverse sectors, enhance operational efficiency, and stimulate innovation, resulting in significant advancements across the country's landscape. Through the integration of AI technologies, there exists substantial potential to address challenges such as resource optimization, job creation, and the improvement of quality of life, thereby contributing to a more resilient and sustainable future for Pakistan. However, there is a concern among educators that the use of AI to complete assignments might lead to hesitation in awarding high marks to students, as this could potentially undermine the development of their skills. AI was designed to augment human work rather than replace human capabilities. AI was created with the intention of enhancing human convenience rather than diminishing human skills. Therefore, it is essential that students' responses to various questions be evaluated independently, without undue reliance on AI.

# International Speakers

# International Speakers

## Talk: Soft Sets in the Category of Locales
**Prof. Dr Mbekezeli Sibahle Nxumalo**
*Rhodes University, South Africa*

*Abstract—* Soft Sets in the Category of Locales Topology is an area of science, which deals with structures that remain the same after continuous deformations. One wonders if there is a link between topology and computer sciences. In computer sciences, we have a notion of soft sets. Here, we introduce the theory of soft set topology. We extend some of the soft set topology results to the category of locales.

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## Talk : Towards B5G/6G Wireless Network Technologies: Potential and Challenges
**Prof. Dr. Manzoor Ahmed**
*Hubei Engineering University, Chaina*

*Abstract—* This presentation delves into the next-generation wireless technologies, focusing on the potential of 6G and the challenges that lie ahead in its development. Beginning with an overview of 6G, the talk discusses the key reasons driving the need for this next leap in communication technology and its vision beyond 5G. It explores emerging technologies, particularly the concept of Reconfigurable Intelligent Surfaces (RIS), and their transformative potential in enhancing wireless networks. The presentation further investigates the various types and modes of RIS, their applications in high-frequency THz bands, mobile edge computing (MEC), vehicular, and unmanned aerial vehicle (UAV) networks. It also touches on the evolution of Non-Terrestrial Networks (NTN), including the key technical challenges of 5G-NTN, the standardization efforts within the 3GPP ecosystem, and the roadmap towards 6G-NTN. The session concludes with a long-term outlook on the evolution from 5G to 6G and the critical steps needed to enable its realization, emphasizing future use cases, requirements, and metrics that will shape this cutting-edge wireless communication era.

## Talk: AI Integration in Ocean Data

**Dr. Jay Kumar**
*Dalhousie University, Canada*

*Abstract—* Maritime transport is the backbone of global trade, with over 80% of the world's trade volume being carried by ocean vessels. In addition to facilitating commerce, the ocean plays a crucial role in global food security, providing approximately 15% of the protein in the human diet through fishing activities. Ensuring the safe, secure, and optimized transportation of goods and resources across vast oceanic expanses requires the integration of diverse systems and advanced technologies.

This presentation explores the pivotal role of big data in enhancing maritime transport and oceanic studies. Researchers are increasingly leveraging vast datasets generated by vessel movements, oceanographic properties, environmental variables, and biodiversity metrics to gain comprehensive insights into maritime operations and marine ecosystems. The talk will focus on two primary areas:

1. **Monitoring Vessel Movements:** Utilizing real-time and historical data to understand and predict vessel routes, enhance navigational safety, and optimize shipping logistics. Advanced analytics and machine learning algorithms are employed to forecast traffic patterns, mitigate risks, and improve route efficiency.

2. **Data Management of Ocean Variables and Biodiversity:** Implementing robust data management frameworks to handle the complexity and volume of oceanic data. This includes integrating data from various sources such as satellite observations, autonomous sensors, and marine research expeditions to monitor environmental changes and biodiversity. Effective data management enables the identification of trends, supports sustainable fishing practices, and aids in the conservation of marine habitats.

By highlighting these key areas, the presentation underscores the significance of interdisciplinary approaches and technological innovations in advancing maritime transport and oceanography. The integration of big data not only enhances operational efficiencies but also contributes to the sustainable management of ocean resources, ensuring their availability for future generations.

## Talk: The Future of Creativity: How Generative AI is Shaping Art, Innovation, and Human Potential

**Dr. Umair Ali Khan**

*Haaga-Helia University of Applied Sciences, Finland*

*Abstract*— Recent advances in Artificial Intelligence (AI), particularly Generative AI (GenAI), have the power to reshape the way businesses operate by transforming how they manage and use knowledge. These tools can simplify processes, boost productivity, and open up new opportunities for innovation and efficiency in the workplace. Among the most exciting developments are Large Language Models (LLMs), which have proven to be incredibly versatile for tasks like customer support, content creation, and personalized recommendations. These technologies are not just tools but enablers of transformation in the business world. This keynote will offer a clear and simple introduction to GenAI, starting with the foundational concepts behind these advanced models and covering the basics of how LLMs are developed, how they work, and why they are so effective. We will discuss the various ways LLMs can be integrated into business operations and the levels of integration businesses can achieve. Real-world examples will demonstrate how LLMs, combined with advanced data structures like knowledge graphs, can deliver smarter, faster, and more accurate solutions for diverse business needs. The session will also explore the opportunities GenAI brings, such as better decision-making, enhanced customer experiences, and tools that empower employees. At the same time, we will address key challenges, including ethical considerations and the practical issues businesses face when adopting AI, along with their potential solution.

## Talk: The Power of Responsible AI: Innovation, Compliance, and Global Impact

**Dr. Muslim Jameel Syed**

*Atlantic Technological University, Ireland*

*Abstract*— Responsible Artificial Intelligence (AI) is transforming industries, reshaping economies, and addressing critical social and environmental challenges. However, as AI adoption accelerates, so do concerns around ethical implications, regulatory compliance, and societal impact. This keynote explores the power of Responsible AI as a catalyst for innovation, driving economic growth while fostering social equity and environmental sustainability. By examining global regulatory frameworks, such as the EU AI Act, this session highlights the importance of aligning AI development with compliance standards to mitigate risks and build trust. Join us to uncover strategies for harnessing AI's potential responsibly, ensuring innovation benefits all stakeholders.

***Talk: The Critical Role of Cybersecurity in Unmanned Aerial Vehicles***
***Muhammad Iftikhar Umrani***

*Walton Institute, South East Technological University, Waterford, IrelandIreland*

*Abstract*— Unmanned Aerial Vehicles (UAVs), commonly known as drones, have significantly transformed various industrial sectors, including logistics, agriculture, disaster response, and surveillance. However, their growing use and integration into critical operations introduce them to a range of cybersecurity threats, such as sensor spoofing, signal interference, and unauthorized access. By exploiting these vulnerabilities, adversaries can disrupt operations, compromise sensitive data, and pose significant challenges to UAV reliability and safety.

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***Talk: Optimal Sizing of Battery Energy Storage Capacity Considering Demand Charge for Industrial Loads***
***Madia Safdar***

*Lappeenranta University of Technology, Finland*

*Abstract*— Renewable energy sources (RES) are highly demanded to limit the greenhouse gas emissions arising from fossil fuel-based electricity generation. Concurrently, RES are intermittent by nature; therefore, a battery energy storage system (BESS) is needed to fulfill the continuous electricity demands around the clock. Industrial customers have to pay a demand charge, determined by their peak load demand. BESS can effectively bring down the demand charge for industrial customers by reducing their peak demands. However, a significant capital cost is incurred in deploying the BESS. This paper presents a feasibility study for a typical Finnish industrial load to evaluate its net energy cost amid on-site BESS deployment. The major contribution of this paper is to determine an optimum size of the battery for an industrial facility which helps in reducing the demand charge, coping with power outages/interruption and reduce burden on the grid during peak hours. An optimization model has been presented to determine the optimal size of BESS and minimize the operational cost for the industry which includes peak shaving and minimization of demand charge over a certain duration. The results prove that the proposed model brings reductions in energy procurement costs, shifts peak demands, and copes with power outages, thereby enhancing the stability and reliability of the power supply.

*Talk: Artificial Intelligence: An Emerging Trend in Health Informatics*

*Dr. Ashir Javeed*
*Blekinge Institute of Technology (BTH), Sweden*

*Abstract—* Artificial intelligence (AI) have transformed the medical industry by allowing for improved data analysis, predictive modelling, and automation of complex processes. These technologies use massive volumes of medical data, such as electronic health records, medical imaging, and genomic information, to enhance diagnosis, treatment planning, and patient care. AI-powered technologies, such as computer vision and natural language processing, have had great success in fields such as disease detection, radiography, pathology, and drug discovery. ML algorithms excel in discovering trends in data, allowing for early identification of conditions including cancer, cardiovascular disease, and neurological disorders.

In clinical settings, AI-driven decision support systems enhance physicians' accuracy by providing evidence-based recommendations and reducing diagnostic errors. Personalized medicine has been transformed through AI, enabling tailored treatments based on individual genetic and physiological profiles. Moreover, AI is instrumental in optimizing hospital operations, resource allocation, and patient monitoring, thereby improving efficiency and reducing costs.

Despite its transformative promise, integrating AI into medicine presents problems such as data protection, ethical constraints, and the necessity for interpretability of ML models. Addressing these concerns through strong regulatory frameworks and interdisciplinary collaboration is critical to the ethical and effective implementation of AI in healthcare. As AI and machine learning advance, they hold enormous promise for changing the future of medicine, promoting innovation, and improving patient outcomes.

# National Speakers

# National Speakers

## Talk: Post-Quantum Computing Era: Applications, Issues, and Challenge
### Prof. Dr. Amir Mehmood
*Al-Kawthar University, Pakistan*

*Abstract—* The post-quantum era is poised to reshape technology, introducing both groundbreaking applications and significant challenges. Quantum computers threaten traditional cryptographic protocols, demanding a swift transition to post-quantum cryptography to secure sensitive data. Beyond cybersecurity, quantum advancements promise revolutionary progress in fields such as optimization, artificial intelligence, drug discovery, and material science, unlocking solutions to problems previously deemed intractable. However, the journey to harnessing these capabilities is fraught with challenges, including the scalability of quantum-resistant algorithms, the integration of new technologies into legacy systems, and ethical concerns over misuse. This session will explore the exciting applications of quantum technologies, delve into the critical issues of ensuring security and reliability, and address the collaborative efforts needed to navigate this transformative era responsibly. Participants will gain insights into the evolving landscape and the steps required to prepare for a quantum-enabled future.

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## Talk : Agentic AI
### Prof. Dr. Muhammad Rafi
*National University of Computer & Emerging Sciences, Pakistan*

*Abstrat—* Agentic AI represents a transformative leap in artificial intelligence, introducing systems that exhibit autonomous decision-making and proactive behavior in dynamic environments. This keynote will explore the conceptual foundations of Agentic AI, its technical realization, and its implications for society. We will delve into the interplay of autonomy, adaptability, and ethical considerations, addressing how Agentic AI redefines the boundaries of machine intelligence.
Key Objectives:
1. Defining Agentic AI: Clarify the concept of agency in AI, distinguishing it from existing paradigms like supervised and reinforcement learning.
2. Core Technologies: Examine the role of generative models, multi-agent systems, and reinforcement learning in fostering autonomous agents.
3. Applications: Highlight real-world domains where Agentic AI is reshaping industries, including healthcare, robotics, and finance.
4. Challenges and Ethical Considerations: Address critical challenges such as interpretability, safety, and ensuring ethical alignment in autonomous agents.
5. Future Directions: Discuss the next steps for research and development in Agentic AI and its potential societal impacts

## Talk: Process mining in data science: A literature review
*Dr. Razi Ahmed*

*Sindh Institute of Management and Technology, Pakistan*

*Abstract—* Today, many organizations are required to resolve the difficulties associated with data mining techniques, however, there are many challenges pertaining the accomplishment of information retrieval as a massive quantity of data is inconsistent and therefor forcing the industrialists to perform rapidly to retain afloat. Innovative scientific systems and procedures support to quickly reply inquiries that can indicate growth in productivity, improving efficiency and excellence of services. Although, many tools have been developed for handling of data in real-time and overall led the experienced user to handle real communication software and correctly interpret the results cleverly, efficient and dominant concrete approaches exist such as process mining that ultimately allows an organization to benefit from the data warehouses in their system. Process mining provides insights at time of analyzing processes of particular problems, and also performs the conformance checking of processes aiming at finding bottlenecks. This paper prescribes the primary inside of mining information's systems and explain the various deterministic techniques in process mining used in the auto-learning process model generated from the events data. We also review all modern techniques and algorithms used in process mining.

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## Talk: The Singularity: From Visionary Concepts to Technological Reality
*Dr. Wazir Ali*

*Institute of Business Management, Pakistan*

*Abstract—* In this keynote, we will explore the fascinating journey of Artificial Intelligence (AI) from its visionary roots to the brink of the Singularity—a hypothetical point where AI surpasses human intelligence. Beginning with the early theoretical foundations laid by pioneers like Alan Turing and John von Neumann, we'll trace how AI evolved from abstract ideas into groundbreaking technologies that shape our world today. Through a historical lens, we'll examine key milestones in AI development, from its infancy in the mid-20th century to the present-day advances in deep learning, natural language processing, and machine vision. As AI continues to grow exponentially, the concept of the Singularity looms large—transforming industries, society, and even our understanding of intelligence itself. In this speech, we will discuss the current state of AI, its potential for creating superintelligence, and the profound implications it has on fields ranging from healthcare and education to ethics and employment.

Looking to the future, we will explore the challenges and opportunities that lie ahead as we navigate the path towards the Singularity, emphasizing the importance of responsible development, policy-making, and global collaboration. This talk will not only provide a

comprehensive overview of AI's past and present but also invite thought-provoking discussions on how humanity can prepare for a future shaped by intelligent machines. By examining AI's evolution, we will gain insight into how the promises and risks of the Singularity are intertwined, and how we can ensure that this next chapter in technological progress is one that benefits all of humanity.

## Talk: Keynote Title: 6G: The Next Frontier in Connectivity and Global Sustainable Innovation

**Dr. M. Mujtaba Shaikh**

*Quaid e Awam University of Engineering, Science and Technology, Pakistan*

*Abstract—* This keynote delves into the significance of 6G, the next generation of wireless communication technology. It explores the evolution of wireless networks from 1G to 5G, highlighting the limitations of current systems and the pressing need for 6G. Key features of 6G, including terahertz communication, ultra-low latency, AI-native networks, and massive connectivity. It also highlights the transformative applications of 6G, such as smart cities, healthcare, education, and sustainable development. While 6G promises to revolutionize connectivity, challenges such as spectrum allocation, hardware limitations, security concerns, and infrastructure costs have been discussed. Collaborative efforts between governments, industry, and academia are crucial to overcome these obstacles and realize the full potential of 6G. The keynote can be concluded by emphasizing the importance of sustainability in 6G development, including energy-efficient network design, renewable energy integration, and eco-friendly manufacturing practices.

## Title: Harnessing the Power of the Crowd in Evolving Computing Technologies

**Mr. Shakir Karim**

*Al-Kawthar University, Pakistan*

*Abstract—* Crowdsourcing has emerged as a transformative paradigm in the evolving landscape of computing technologies. By leveraging the collective intelligence of a global, diverse, and digitally connected workforce, crowdsourcing is redefining how we approach problem-solving, innovation, and data-driven tasks. This talk explores the evolution of crowdsourcing from its inception to its current applications in artificial intelligence, data annotation, and large-scale problem-solving. It highlights the enabling role of advanced computing platforms and technologies, the challenges of worker engagement and quality assurance, and the ethical considerations that underpin the design of effective systems. This session not only discusses the history of crowdsourcing but also showcases how crowdsourcing continues to shape the future of computing and offers actionable insights for researchers and practitioners in leveraging this powerful tool.

# Conference Paper

# Diagnosis and Treatment of Breast Cancer Through Hematoxylin and Eosin Image Analysis

*Sidra Ansari, Muhammad Osaid, Muhammad Burhan Khan*

*National University of Computer and Emerging Sciences Karachi, Sindh, Pakistan*

*Abstract*—Breast cancer is the leading cause of cancer-related deaths among women worldwide. This research contributes to the diagnosis and treatment of breast cancer by image classification and image-to-image generation. Image classification is employed to diagnose cancer using Hematoxylin and Eosin (H&E) images, and image-to-image generation is utilized to generate H&E and immunohistochemical images, which are important for the treatment of breast cancer. A vision transformer-based model, which was trained on the BreakHis dataset of histopathology Images are used to classify H&E images for cancer diagnosis and achieved an accuracy of 92.5% which was better than other deep learning models with transfer learning. Image-to-image generation is used to generate images from immunohistochemical and H&E images using CycleGAN based model for breast cancer treatment. This model, which was trained on the BCI dataset, achieved the highest average performance with an SSIM of 0.788 and a PSNR of 25.942 dB.

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# AI for Perception Systems in Autonomous Vehicles: A Review

*Abdul Moiz, Waheeduddin Hyder, Ahmed Farooq, Azhar Hussain, Khubaib bin Naeem and Muhtad Asif*

*Department of Computer Science, Millennium Institute of Technology and Entrepreneurship- MiTE University Karachi, Pakistan*

*Abstract*— The evolution of artificial intelligence (AI) has significantly contributed to the progress of autonomous vehicle technologies, particularly in the creation of advanced perception systems. These systems are the cornerstone of autonomous vehicles, enabling real-time environmental awareness and informed decision-making. This paper explores the fundamental components and AI methodologies integral to perception systems, such as sensor technologies, sensor fusion, semantic segmentation, and object detection. Furthermore, it addresses challenges including environmental variability, computational demands, and dataset constraints, while highlighting emerging trends like edge computing and 5G integration. By examining these developments, this review emphasizes the pivotal role of AI in enhancing the safety and operational efficiency of autonomous vehicles.

# AI in Medicine: A Review of Its Impact on Health Care

Maham Ahmed, Waheeduddin Hyder, Saffia Shakeel, Kamran Ahsan, Anwar Ahmed Khan, Rahmatullah Khan and Umair Rao

*Department of Computer Science, Millennium Institute of Technology and Entrepreneurship- MiTE University*
*Karachi, Pakistan*

*Abstract*— Artificial intelligence (AI) has been transforming medical science by offering new insights and capabilities for diagnostics and treatments. This review explores the applications of AI in medicine, categorizing them into diagnostic imaging and personalized treatments. We identify the issues in AI-powered image recognition and interpretation techniques used for early detection of diseases such as cancer and neurological disorders. We discuss AI's use for individuals with physical disabilities, including those who are paralyzed, visually impaired, or speech impaired. AI-powered prosthetics integrate sensors, data processing, and predictive algorithms to interpret signals from the user's muscles or nervous system. We have identified the applications of AI in artificial limbs, focusing on how computer vision and brain-computer interfaces (BCIs) contribute to improve movement control, adaptability, and user experience.

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# Comparative Analysis: A Worldwide Perspective on Software Usage

*Muhammad Ali Khan, Rimsha Shahzad, Ayesha Tariq and Muhammad Abid Khan*

*Department of Computer Science, Millennium Institute of Technology and Entrepreneurship- MiTE University*
Karachi, Pakistan

*Abstract*— The article explores various software platforms across different continents, focusing on key entities like Alibaba Cloud (Asia), Spotify (Europe), Souq.com (Arabian countries), and Slack (USA). These platforms were chosen due to their significant regional influence and the insights they provide into local user preferences. Data was collected from diverse reports and statistics related to these platforms, analyzing key metrics such as user engagement and features. A total of 20 platforms were examined per continent, with an emphasis on the most relevant findings. The study reveals that cultural, economic, and technological factors are crucial in determining platform success. Alibaba Cloud excels in Asia, while Spotify's personalized features are popular in Europe. Adapting to local needs and implementing innovative strategies are key to achieving sustained global success. This research offers valuable insights into the interplay between global software platforms and regional demands.

# A Comprehensive Study of Social Media Application Usage Worldwide

*Riya Rodrigues and Muhammad Abid Khan*

Department of Computer Science, Millennium Institute of Technology and Entrepreneurship- MiTE University
Karachi, Pakistan

*Abstract*— The study delves into the ways social media platforms are utilized for communication, information dissemination, social interactions, and self-expression worldwide. It explores the benefits and drawbacks associated with social media use, including its potential to foster social connections, facilitate knowledge sharing, and promote activism. By analyzing existing literature and empirical data, this article aims to provide a comprehensive understanding of the evolving role of social media in contemporary society, also explores the diverse applications of social media through a structured analysis.

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# Diabetic Retinopathy Detection Using Deep Learning Models

*Kulsoom Farhan , Maheen Shabbir , Mubeen Khan ,Nimra Maqsood , Muhammad Daniyal*
*Department of Computer Science, The Millennium Universal College, Karachi, Pakistan*

*Abstract*—This project explores the potential of artificial intelligence (AI) to address the challenge of eye disease diagnosis in low-resource environments, particularly in developing countries like Pakistan. Early detection of eye diseases is critical,especially for individuals at high risk due to family history, age (over 60), diabetes, or prior eye injuries/surgeries. While timely intervention can prevent permanent vision loss, many eye diseases lack early symptoms. Regular eye examinations are crucial, yet access to such services can be limited in resource-constrained settings. This project aims to develop a deep learning model for automated eye disease detection using retinal fundus images. We will evaluate the performance of a range of pre-trained architectures, including established CNNs like VGG16, ResNet50, DenseNet (121 & 169), and XceptionNet, alongside more recent advancements like InceptionV3, InceptionResNetV2, Swin Transformer, MobileNet, EfficientNet, and ViT models. This model will be designed to accurately classify various eye diseases, potentially improving diagnostic accuracy and efficiency compared to traditional methods. By eliminating geographical and economic barriers to essential eye health services, the project aspires to promote a healthier future for underserved populations. Index Terms—Artificial Intelligence (AI) , Eye Disease Detection , Low-Resource Settings ,Retinal Fundus Images , Deep Learning , Convolutional Neural Networks (CNNs) , Deep Neural Networks (DNNs) , Transformers , VGG16 , InceptionV3 , InceptionResNetV2 ,ResNet50 , Swin Transformer , DenseNet169 , XceptionNet , DenseNet-121 , MobileNet ,EfficientNet , ViT Model , Diabetic Retinopathy (DR)

# A Novel Radio Active Waste Management System Using Block Chain Technology at AEMCK

*Uzma Ilyas,  Dr.Hina Hashmi and Dr.Mohsin Raza*
*Atomic Energy Medical Center Karachi, Pakistan, Pakistan Atomic Energy Commission*

*Abstract*— Radioactive waste (RW) contains or is contaminated with radionuclides, arising from various activities including nuclear facility operations, decommissioning, healthcare, industry, agriculture, and research. Nuclear regulators mandate that all facilities generating RW must implement a radioactive waste management program (RWMP) to ensure safe and compliant handling. Effective RW management is crucial for nuclear safety and environmental protection, requiring secure, traceable, and immutable record-keeping from waste generation to final disposal. According to international guidelines, [5] and national regulations, the retention period for RW disposal records depends on the half-life of the radioactive materials involved and the facility's operational license. However, RW records typically need to be kept for extended periods because of Regulatory Compliance, Safety and Environmental Protection, Waste Traceability, Audit and Inspection, Legal Accountability and long-term monitoring, At Atomic Energy Medical Centre, Karachi (AEMCK), a tertiary care nuclear center using radionuclides for diagnostic and therapeutic purposes, RW is generated, necessitating a robust RWMP. Historically, AEMCK relied on a manual record-keeping system, which posed several challenges including vulnerability to data tampering, inefficiencies in tracking, and difficulties with auditing. In 2021, AEMCK introduced a centralized digital system WIRKs (Radioactive Waste Inventory Record-Keeping System), which shared a single database among multiple users.

However, this centralized system was prone to confidentiality, integrity, and availability (CIA) risks, exposing it to potential tampering. To address these challenges, blockchain technology has been proposed for integration into WIRKs. This novel approach leverages the blockchain's decentralized nature, where each transaction related to RW, such as segregation, collection, storage, and disposal, is recorded across multiple nodes (secure folders) on the File Sharing Server (FSS). Each record is unique, time-stamped, and linked to previous records, making it nearly impossible to alter historical data. This system ensures full traceability, real-time monitoring, and enhanced security. By adopting cutting-edge blockchain technology, AEMCK's RW management system improves operational efficiency, reduces costs associated with manual tracking, and ensures a higher level of compliance with national and international safety standards, Identify applicable funding agency here. If none, delete this. marking a transformative step in radioactive waste management

# Conference Note

# Conference Note

MICETC2024 was successfully planned, managed, and executed within a limited timeframe. Initially conceived as a half-day national conference, the interest from both national and international speakers transformed it into a full-day international event. This expansion highlighted the significance and appeal of the conference themes and objectives. The conference began with the recitation of the Holy Quran, followed by an eloquent welcome address from Prof. Dr. Huma Baqai, the Rector of MiTE University and Patron of the event. In her speech, she laid the foundation for a day rich in intellectual discourse and collaborative engagement, underscoring the university's unwavering commitment to advancing innovation and excellence in the realm of computing technologies.

Next, Prof. Dr. Kamran Ahsan, the Conference Chair, delivered an insightful presentation on Emerging Trends in Artificial Intelligence: Global and Pakistan Perspectives. He highlighted the transformative impact of AI on various industries worldwide and in Pakistan, including healthcare, agriculture, education, and engineering. While acknowledging the challenges of data privacy and infrastructure, Prof. Ahsan underscored AI's potential for sustainable growth and innovation, stressing the need for investments in research and development to maximize its benefits.

The Chief Guest, Prof. Dr. Atta-ur-Rahman, then delivered a lecture on significant advancements in science and technology. He discussed the revolutionary potential of quantum computing, exemplified by Google's "Willow" chip, which can perform calculations in minutes that would take supercomputers millennia. He also explored AI's role in personalized medicine, drug development, and healthcare management, emphasizing its transformative capabilities. Prof. Dr. Atta-ur-Rahman highlighted breakthroughs in sustainable energy and biotechnology, including Sharp Corporation's solar cells with over 40% efficiency and innovations aimed at reversing aging. However, he also raised concerns about the risks of unchecked AI development, calling for careful consideration and regulation. Following the lecture, The Chairman of Sindh HEC, Prof. Dr. S. M. Tariq Rafi, honored the event as an invited speaker, further solidifying the conference's importance and recognition within the academic and research communities.

The conference proceeded with a panel discussion on "Leveraging AI for Sustainable Economic Growth in Pakistan." Moderated by Prof. Dr. Huma Baqai, the panel featured an illustrious lineup of experts, including:

- Prof. Dr. Atta-ur-Rahman
- Prof. Dr. Khalid Khan
- Prof. Dr. Syed Irfan Hyder
- Prof. Dr. Tariq Rahim Soomro

The discussion explored AI's transformative potential for growth and sustainable development in Pakistan. Prof. Dr. Huma Baqai modified the panel format by taking audience questions, which the panelists answered. Researchers and students inquired about how AI can revolutionize sectors, improve efficiency, and drive innovation, leading to significant progress in the country. Integrating AI technologies offers significant potential for addressing challenges like resource optimization, job creation, and enhancing quality of life, contributing to a sustainable future for Pakistan.

However, educators express concern that AI use in assignments might hinder skill development. AI should augment, not replace, human work. Students' responses must be evaluated independently, without overreliance on AI. After the panel discussion, The conference featured an excellent array of international speakers, who addressed a wide spectrum of topics, including:

- ***Dr. Mbekezeli Sibahle Nxumalo (online) (Rhodes University, South Africa)*** — presented on "Soft Sets in the Category of Locales." In his talk, he explored the significant mathematical properties and applications of soft sets within the category of locales, particularly in the context of topological spaces. By defining soft sets through their interactions with the set of parameters and their operations within a lattice framework, a rich structure is established that combines both algebraic and topological characteristics. These structures provide a new perspective on modeling uncertainty and imprecision within mathematical frameworks, bridging the gap between classical set theory and topology. The introduction of soft lattices and locales offers a solid foundation for further research, enabling the development of new theories and applications across various domains such as computational topology, fuzzy logic, and decision-making processes. Highlight the versatility and potential impact of soft sets in advancing both theoretical and practical aspects of mathematics and related field

- ***Dr. Muslim Jameel Syed (in-person) from  Atlantic Technological University, Ireland)*** — delivered an inspiring talk on "The Power of Responsible AI: Innovation, Compliance, and Global Impact" (In-Person). Dr. Muslim Jameel's presentation emphasized the transformative impact of AI on industries, emphasizing the importance of compliance, ethical considerations, and sustainable practices. Responsible AI not only drives innovation and efficiency but also ensures fairness, transparency, and trustworthiness across global ecosystems. As we advance into the digital age, adopting a responsible AI approach is not just beneficial but essential for fostering a sustainable and equitable future. Embracing these principles will empower organizations and individuals alike, enabling them to harness AI's full potential while mitigating risks and challenges.

- ***Prof. Dr. Manzoor Ahmed (online) (Hubei Engineering University, China)*** — provided a comparative analysis of 5G and 6G technologies, including RIS and ISAC. He discussed the transition from 5G to 6G represents a significant leap in wireless network technologies, driven by the need for enhanced connectivity, reduced latency, and more sophisticated applications across diverse environments. Dr. Manzoor Ahmed's discussion highlighted the evolving landscape of technologies that will shape this transition, including Reconfigurable Intelligent Surfaces (RIS) and Non-Terrestrial Networks (NTN). RIS offers transformative benefits in terms of signal enhancement, spectrum efficiency, and connectivity in challenging environments, while NTN promises ubiquitous coverage and reduced latency through satellite communication. As we move towards 6G, the integration of these technologies will enable not only more advanced communication capabilities but also the creation of a more dynamic and flexible network ecosystem. The challenges, including regulatory issues, implementation complexities, and real-time optimization, will be crucial in shaping the roadmap towards 6G. The advancements presented in this talk underscore the pivotal role of RIS and NTN in achieving the goals of 6G, offering a promising outlook for the future of wireless communications.

- ***Dr. Umair Ali Khan (online) (Haaga-Helia University, Finland)*** — discussed "Maximizing Productivity and Innovation Through the Responsible Use of Generative AI" (Online), In his talk he discussed maximizing productivity and innovation through the responsible use of Generative AI requires careful integration into organizational workflows. By leveraging the capabilities of Large Language Models (LLMs) and incorporating knowledge graphs, organizations can enhance knowledge extraction, improve decision-making, and provide personalized services. Addressing limitations such as hallucinations, biasedness, and lack of contextual understanding is crucial for the successful adoption of GenAI. Ethical considerations are also paramount, ensuring that the integration of GenAI aligns with both organizational goals and societal values. This ongoing project highlights the transformative potential of Generative AI in business and the critical steps needed for its effective implementation.

- ***Dr. Ashir Javeed (online) (Blekinge Institute of Technology, Sweden)*** — was scheduled to present on the topic of "Artificial Intelligence: An Emerging Trend in Health Informatics." However, due to previous speakers significantly exceeding their allotted time, a cascade effect occurred, which overlapped with Dr. Javeed's scheduled presentation slot. In addition, Dr. Javeed had other crucial commitments ahead that could not be rescheduled. Given these unavoidable circumstances, he was unfortunately unable to deliver his presentation, and he graciously excused himself from presenting.

- ***Dr. Jay Kumar (online) (Dalhousie University, Canada)*** — Dr. Jay Kumar was scheduled to present on the topic "AI Integration in Ocean Data". Dr. Kumar, an expert in AI integration in ocean data, had committed to presenting his talk live at the conference. However, due to an unavoidable commitment on his end, he was unable to join the session live. Instead he kindly shared a recorded video presentation for the conference; however, due to time constraints, the video was not played.

- ***Ms. Madia Safdar (in-person) (LUT University, Finland)*** — discussed "Optimal Sizing of Battery Energy Storage Capacity Considering Demand Charge for Industrial Loads". In her talk she explored the optimal sizing of Battery Energy Storage Systems (BESS) for industrial loads is crucial in mitigating demand charges and enhancing energy efficiency. This study utilizes an optimization model within the General Algebraic Modeling System (GAMS) to determine the most cost-effective BESS capacity, balancing charging and discharging to minimize energy costs and demand charges. The model considers various constraints including energy procurement costs, load demands, and battery capital costs. Results indicate that BESS can significantly reduce energy bills, lower peak demands, and offer ancillary services, with potential savings of up to 8% even when factoring in battery costs. As battery prices are expected to decline in the future, this solution will become increasingly viable, offering not only economic benefits but also environmental advantages and improved grid stability.

- ***Mr. Muhammad Iftikhar Umrani, (in-person) (Research scholar at the Walton Institute, SETU, Ireland***— delivered a profound and intellectually stimulating discourse on "The Critical Role of Cybersecurity in Unmanned Aerial Vehicles (UAVs)." He disused about Unmanned Aerial Vehicles (UAVs) are revolutionizing industries—from logistics to disaster response—yet their increasing reliance on AI and connectivity exposes them to critical

cybersecurity threats. Imagine a delivery drone hacked mid-flight—what are the implications? He further elaborates that this research under the UAVSecProject investigates real-time autonomous security systems for UAVs using cutting-edge AI techniques like GANs and GNNs. These technologies bolster threat detection, ensure reliability, and adapt to evolving challenges. Yet, UAVs face GPS jamming, sensor spoofing, and malware attacks, demanding robust encryption, multi-factor authentication, and AI-driven anomaly detection. Stakeholder collaboration and security-by-design principles are imperative to safeguarding UAV ecosystems.

The conference showcased a remarkable lineup of national speakers, covering a diverse range of topics,

- *Prof. Dr. Amir Mahmood, (in-person) (Dean of Computing, Al-Kawthar University)* — delivered an insightful talk on "Post-Quantum Computing Era: Applications, Issues, and Challenges." He explained how quantum computing marks a transformative leap in computational science, surpassing the limitations of classical computing constrained by Moore's Law. While classical systems excel in many areas, they struggle with problems involving exponential complexity and high-dimensional data. Quantum computing, leveraging superposition, entanglement, and interference, processes information in revolutionary ways. Dr. Mahmood highlighted the power of qubits, which enable unparalleled parallelism, and algorithms like Shor's and Grover's, which promise breakthroughs in cryptography, AI, and healthcare. However, challenges such as quantum DE coherence, error correction, scalability, high costs, and ethical concerns—like threats to classical cryptography—must be addressed. Dr. Mahmood emphasized the need for global efforts to integrate quantum systems responsibly, ensuring their transformative potential benefits society while safeguarding digital security.

- *Prof. Dr. Muhammad Rafi, (in-person) (Head of the AI & DS Department at FAST Karachi Campus)* — delivered an insightful talk on *Agentic AI – A New Paradigm for AI Applications*. He discussed how Agentic AI represents a transformative advancement in artificial intelligence, enabling machines to exhibit human-like behaviors. Unlike traditional AI, which is designed for specific tasks, Agentic AI is autonomous, proactive, and adaptive. It is capable of reasoning, optimizing workflows, and facilitating communication within multi-agent systems. At its core, Agentic AI integrates Generative AI, Reinforcement Learning, and Natural Language Processing, creating systems that anticipate challenges and offer dynamic solutions. Frameworks like AutoGen simplify the development of these intelligent agents, providing customizable tools to address complex applications. One compelling example is its use in stock trading, where multiple agents coordinate price inspections, strategy formulation, and trade execution seamlessly. While the potential is immense, we must address ethical challenges, ensuring trust, alignment, and fairness in these systems.

- *Prof. Dr. Razi Ahmed (in-person) (Sindh Institute of Management and Technology)* — explored a comprehensive review of "Process Mining in Data Science," highlighting its role in analyzing real-world processes through event logs. The four primary types of process mining—discovery, conformance, enhancement, and operational support—offer distinct benefits. Discovery creates models from event logs, conformance compares records with ideal models

to find deviations, and enhancement improves process models based on real data. Process mining uncovers bottlenecks, boosts efficiency, and provides factual insights into business operations. Selecting the best software requires evaluating features like data-driven algorithms and time-driven costing. Ultimately, process mining helps optimize operations and drives digital transformation.

- ***Dr. Wazir Ali (in-person) (IoBM Karachi) —*** presented "The Singularity: From Visionary Concepts to Technological Reality". In his talk he explored the concept of singularity represents a pivotal moment in human history—a future where technology evolves to surpass human intelligence, fundamentally altering our way of life. Dr. Wazir Ali's exploration into this visionary concept underscores the transformative potential of merging human capabilities with artificial intelligence. As we move closer to the singularity, the boundaries between humans and machines blur, paving the way for augmented humanity and enhanced cognitive abilities. Nanotechnology, genetics, and robotics are at the forefront of this evolution, driving significant advancements in health, intelligence, and even immortality. The emergence of platforms like Singularity University signals a societal shift towards greater trust in technology and an openness to the post-human era. Rather than resisting this inevitable transformation, embracing the singularity could lead to a future where humanity not only coexists with but also transcends its technological creations. The journey towards the singularity promises a redefinition of what it means to be human, emphasizing integration and coexistence with artificial intelligence as the next step in our evolutionary path.

- ***Dr. Mujtaba Sheikh: (online) (Quaid-e-Awam University of Engineering, Science & Technology Nawabshah, Sindh, Pakistan) —*** was scheduled to deliver the presentation on the topic of "6G: The Next Frontier in Connectivity and Global Sustainable Innovation". However, during his allotted timeslot, a technical issue occurred on Dr. Sheikh's end. He was given sufficient time to resolve the issue, but as the problem persisted, he was unfortunately unable to deliver his talk.

- ***Mr. Shakir Karim (in-person) (Al-Kawthar University) —*** delivered an insightful talk on "Harnessing the Power of the Crowd in Evolving Computing Technologies." He began by painting a vivid picture: Imagine a crowd of horses— powerful, energetic, and seemingly untamed. While each horse possesses immense strength individually, his or her energy is scattered when left uncontrolled. However, when united and directed with purpose, these horses transform into an unstoppable force. They can plow fields, pull carriages across vast distances, or even power machines that contribute to building civilizations. Similarly, just as we harness the power of horses, we can harness the power of people. By leveraging human knowledge, creativity, and collaboration, we can achieve extraordinary outcomes—whether it's solving global problems, driving innovation, or advancing computing technologies. A crowd of people, when guided correctly, holds immense potential. He also elaborated that, In the digital era, crowdsourcing has emerged as a powerful tool. Individuals from all corners of the world contribute their skills, ideas, and efforts toward common goals, creating scalable and inclusive solutions. Over time, computing technologies like AI and cloud computing have amplified this potential. Crowdsourcing is not without its challenges, such as security, privacy, and integration complexity. However, as AI-driven platforms evolve, the future of crowd computing looks promising.

An outstanding selection of paper presentations, exploring diverse and impactful topics such as AI in healthcare, advancements in connectivity, and the implications of automation on the workforce. The conference concluded with the distribution of certificates to speakers and participants, followed by a heartfelt vote of thanks from Prof. Dr. Kamran Ahsan. The event was a resounding success, setting a high benchmark for future initiatives and reaffirming MiTE's role as a leader in technological innovation and collaboration.

# Highlights

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The event started with the welcome address delivered by Prof. Dr. Huma Baqai, the Rector of MiTE University. Prof. Dr. Kamran Ahsan, Dean Faculty of Engineering & Computer Science highlighted how AI is transforming industries globally and in Pakistan. The participation of esteemed scientist Prof. Dr. Atta-ur-Rehman lent immense prestige and credibility to the conference. Furthermore, the presence of Prof. Dr. S. M. Tariq Rafi, Chairman of Sindh HEC, as an invited speaker further underscored the event's significance. The attendance of Rectors and Vice-Chancellors from various esteemed universities further highlighted the academic weight of the conference.

International speakers from esteemed global institutions contributed valuable insights, making the event a global success. Furthermore, the Faculty Exchange program, part of an EU-funded project, facilitated the participation of two researchers from European universities, enhancing MiTE's academic standing. The conference also saw the participation of students from DHA Suffa University and Al-Kawthar University, which significantly boosted MiTE's visibility.

The discussions at MICETC 2024 offered valuable insights into cutting-edge topics. Prof. Dr. Atta-ur-Rehman's speech covered advancements in quantum computing, such as Google's "Willow" chip, which can solve complex problems in minutes. He also discussed the integration of AI and quantum computing and their potential to revolutionize fields like medicine and drug development.

Dr. Syed Muslim Jameel highlighted the importance of Responsible AI, emphasizing fairness, accountability, and transparency in AI systems. Dr. Umair Ali Khan focused on maximizing productivity using Generative AI tools, while Prof. Dr. Razi Ahmed explored the role of process mining in data science to optimize business processes. Prof. Dr. Manzoor Ahmed discussed the transition from 5G to 6G networks and their potential to provide ultra-fast connectivity for various applications. Ms. Madia Safdar shared her research on optimizing battery storage systems for energy efficiency, while Prof. Dr. Amir Mahmood discussed the challenges of post-quantum computing and its potential applications. A panel discussion on "Leveraging AI for Growth in Pakistan" highlighted AI's potential in sectors such as healthcare, education, and agriculture, addressing resource optimization and operational efficiency, while also raising concerns about over-reliance on AI in academic evaluations. The event significantly raised MiTE's profile, enhancing its visibility and credibility through the participation of eminent speakers, high-quality research presentations, and the successful organization of a hybrid event that attracted a global audience. The conference also provided a platform for students to engage with the latest advancements in computing technologies, encouraging their participation in discussions and presentations and offering insights into emerging industry trends.

# Gallery

# Gallery



*Figure 1: Prof. Dr. Huma Baqai is welcoming the audience.*



*Figure 2: Prof. Dr. Kamran Ahsan, presenting an insightful presentation on Emerging Trends in Artificial Intelligence*



*Figure 3: Prof. Dr. Atta-ur-Rahman, delivering a lecture on significant advancements in science and technology*



*Figure 4: The Chairman of Sindh HEC, Prof. Dr. S. M. Tariq Rafi, is delivering a keynote address*



*Figure 6: Dr. Asad Hussain is delivering a speech*



*Figure 5: Prof. Dr. Atta-ur-Rahman presented a shield to Prof. Dr. Muhammad Rafi.*

*Figure 8: Prof. Dr. Atta-ur-Rahman presented a shield to Prof. Dr. Amir Mahmood*



*Figure 7: Prof. Dr. Atta-ur-Rahman presented a shield to Dr. Muslim Jameel*



*Figure 9: Prof. Dr. Atta-ur-Rahman presented a shield to Mr. Muhammad Iftikhar Umrani*



*Figure 10: Prof. Dr. Atta-ur-Rahman presented a shield to Ms. Madia Safdar*



*Figure 12: Prof. Dr. Atta-ur-Rahman presented a shield to Mr. Shakir Karim*



*Figure 11: Prof. Dr. Huma Baqai presented a shield to Prof. Dr. Atta-ur-Rahman*

*Figure 14: Random click of guests.*


*Figure 14: Random click of guests.*


*Figure 15: MiTE Team and Guests Group Photo*