About the Conference

Our mission is to unite diverse voices from academia and industry to explore the challenges and opportunities shaping the future of computing. MICETC serves as an annual platform for researchers, professionals, and thought leaders to engage in meaningful discussions and share innovative ideas. The conference provides an exceptional opportunity for networking, collaboration, and knowledge exchange. Participants will benefit from insightful keynote sessions and discover groundbreaking research and technological advancements that are driving progress in the computing landscape.

Objective

The 2nd MiTE International Conference on Evolving Technologies in Computing (MICETC) aims to provide a dynamic platform for experts, innovators, researchers, and industry leaders to exchange ideas, address challenges, and explore the latest advancements in computing technologies. The conference fosters knowledge sharing, encourages collaboration, and inspires fresh perspectives on emerging technologies. Attendees have the opportunity to gain valuable insights from keynote speakers, engage in thought-provoking discussions, and contribute to the ongoing 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 2nd 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 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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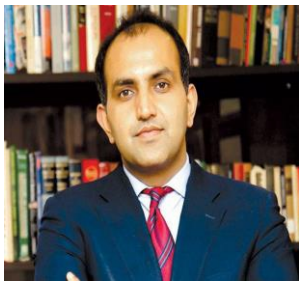
Founding Trustee MiTE [Patron-in-Chief]: Dr. Faisal Mushtaq (T.I)



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.

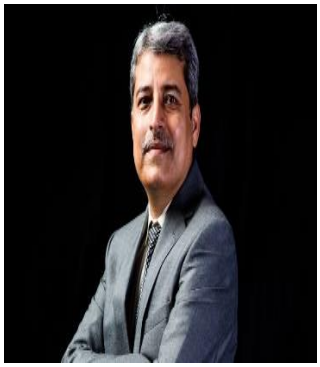
She has three books to her credit. She has authored twenty-nine national and international research articles and several book chapters. She has participated in over two hundred national and print media presence. As a columnist she has contributed hundred plus articles to renowned magazines and newspapers.

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, warmly welcomed the attendees, opening the session with remarks that set the tone for a day of knowledge sharing and collaboration. She highlighted the university's commitment to promoting 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 long tenure in which he has initiated the entire department and its processes.

Considerations

Prof. Dr. Kamran Ahsan, Conference Chair, delivered an engaging presentation on Emerging Trends in Artificial Intelligence: Global and Pakistan Perspectives. He discussed the growing influence of AI at both global and national levels, highlighting its transformative role in sectors such as healthcare, agriculture, education, and engineering. He also addressed existing challenges, including data privacy and infrastructural constraints, while emphasizing the immense potential of AI to drive sustainable development and foster collaboration. The session concluded with a call for increased investment in research and innovation to ensure the responsible and inclusive adoption of AI.

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

Prof. Atta-Ur-Rehman 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-Rehman 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-Rehman 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-Rehman 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-Rehman 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-Rehman 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-Rehman Institute on Natural Product Discovery (AuRins)" in 2013. Prof. Atta-Ur-Rehman 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-Rehman 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

Recent scientific and technological advancements are rapidly reshaping global innovation landscapes. In quantum computing, Google's "Willow" chip performs calculations in under five minutes that would take the fastest supercomputers 10 septillion years, with transformative implications for personalized medicine and cosmology. The integration of artificial intelligence (AI) with quantum computing promises to revolutionize problem-solving by decoding complex digital systems, designing novel life forms, and accelerating drug discovery. For example, the PIONEER Database, developed by the Cleveland Clinic and Cornell, identifies potential drug targets for cancers and other complex diseases, advancing precision therapeutics.

In medical innovation, Elon Musk's Neuralink achieved FDA approval in May 2023 for brain-computer interfaces with potential applications in obesity, autism, depression, and schizophrenia, and its "Blindsight" chip later gained FDA clearance in September 2024 to restore vision even with optic nerve damage. Meanwhile, IBM Watson now recommends cancer treatments that align with human oncologists' decisions in 99 % of cases, underscoring AI's growing role in clinical decision-making.

AI's rapid rise also brings ethical and safety concerns, highlighted by prominent scientists such as Stephen Hawking and Elon Musk, who warn about the profound risks of unchecked AI development. Nonetheless, AI is making positive impacts across sectors: in healthcare through tools like Babylon, Sense.ly's Molly, and the AiCure app for digital consultation and medication management; and in agriculture through AI-driven crop and soil monitoring, disease detection, and livestock management using UAVs and computer vision.

Sustainable energy technologies are progressing as well. Sharp Corporation has developed advanced compound solar cells exceeding 40 % efficiency using *Photon Enhanced Thermionic Emission (PETE)* for improved energy conversion. In biotechnology, research into ageing, apoptosis, telomere biology, and age-related genes—including Resveratrol, NAD, Metformin, and Curcumin—points toward new strategies for extending healthspan.

Adding to these global advancements, Prof. Dr. Atta-ur-Rahman, one of Pakistan's most distinguished scientists, continues to garner international recognition in 2025. He was recently honoured among the World's 500 Most Influential Muslims for his enduring contributions to science, technology, and education, reflecting his role in shaping research culture and scientific capacity in Pakistan and beyond.

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 6)*

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 8)*

Conference Panelist: Prof. Dr. Syed Irfan Hyder

Prof. Dr. Syed Irfan Hyder is the Vice Chancellor of Salim Habib University, Karachi, bringing over two decades of academic leadership, research, and administrative experience. He earned his B.E. in Computer Engineering from NED University, Karachi, an MBA from the Institute of Business Administration (IBA), and M.S. and Ph.D. degrees from the University of Texas at Austin, USA. Dr. Hyder has served in key roles including Deputy Director of Computer Studies at IBA, Vice President & Dean at PAF-KIET, Rector at IoBM, and Vice Chancellor of Ziauddin University. His research interests include artificial intelligence, machine learning, data analytics, cloud computing, and software engineering. He champions experiential learning, modern curriculum design, industry partnerships, and research development, aiming to elevate academic standards and prepare students for real-world challenges.

Conference Panelist : Prof. Dr. Athar Mehboob

Dr. Athar Mahboob is a distinguished Pakistani academic, electrical engineer, and the current Vice Chancellor of Al-Kawthar University, Karachi. He has held significant leadership positions at The Islamia University of Bahawalpur and Khawaja Fareed University of Engineering and Information Technology, Rahim Yar Khan. Dr. Mahboob earned his BS and MS in Electrical Engineering from Florida State University, USA, and completed his PhD in Electrical Engineering with a specialization in Information Security & Cryptology from NUST, Pakistan. He is the founder of Ibn Khaldun Systems, an engineering and technology solutions provider, and has contributed to numerous industrial projects. For his outstanding contributions to science, engineering, and technology, he was awarded the Tamgha-e-Imtiaz by the President of Pakistan in 2012. Through his visionary leadership, he continues to advance higher education, promote innovation, and inspire excellence in research and technology across Pakistan.

Conference Panelist : Prof. Dr. Vali Uddin

Prof. Dr. Vali Uddin is a distinguished academic leader and researcher, currently serving as Vice Chancellor of UIT University, Karachi since June 2024. He earned his Ph.D. in Electrical Engineering from Northeastern University, Boston, M.S. from Boston University, and B.E. in Electronics Engineering from NED University (First Class First). With over 23 years of experience, he has held key positions including Vice Chancellor at SSUET, Dean at Hamdard and Iqra Universities, and Head of the Electrical Engineering Department at PNEC-NUST. Dr. Vali has authored over 75 publications in control systems, signal processing, and reduced-order controller design, and has been recognized with multiple awards for leadership, academic excellence, and institutional development. He has represented Pakistani institutions internationally and contributed to curriculum modernization and strategic academic planning.

Conference Panelist : Air Commodore Shaheen Idrees (Retd)

Air Commodore Shaheen Idrees (Retd) currently serves as the Director of Karachi Campus at Air University, where he oversees academic and administrative initiatives to promote excellence in higher education. With a distinguished career in the Pakistan Air Force, he brings extensive leadership experience, strategic vision, and organizational expertise to the academic sector. During his tenure in the Air Force, Air Cdre Idrees demonstrated exceptional skills in management, operations, and team leadership, which he now applies to the dynamic environment of higher education. At Air University, he is committed to fostering a culture of innovation, research, and academic integrity, ensuring students are equipped with the knowledge, skills, and ethical foundation required for professional success. Air Cdre Shaheen Idrees (Retd) continues to inspire through his dedication, professionalism, and unwavering commitment to excellence, making a significant impact on the educational landscape and shaping future leaders.

Conference Panelist : Brigadier (R.) Prof. Dr. Muhammad Abbas

Brig (R) Prof. Dr. Muhammad Abbas is a distinguished academic and administrator with extensive expertise in research, curriculum development, instructional design, and management of academic programs. He holds a B.E. degree from NED University, an MSc in Information Systems Engineering from The University of Manchester, UK, and a Ph.D. in Information Systems from The University of Manchester. With over 28 years of professional experience, Dr. Abbas has a proven record of delivering results by planning, implementing, and executing strategies effectively. He has successfully led numerous projects from conception to completion, adhering to budgetary and time constraints, while maintaining strong relationships with diverse stakeholders through his excellent interpersonal and communication skills. As an academic administrator, Dr. Abbas has held several key positions, including Director of Research and Development, Associate Head of Department, and Director of Quality Assurance. He has contributed significantly to curriculum design and instructional development, ensuring students receive high-quality education that equips them for professional success.

Highlights

The panel discussion on "*Beyond the Hype: Practical Roadmaps for AI-Driven Sustainable Growth in Pakistan*" was moderated by Prof. Dr. Huma Baqai and featured an esteemed panel of experts, including Prof. Dr. Atta-Ur-Rahman, Prof. Dr. Syed Irfan Hyder, Prof. Dr. Athar Mehboob, Prof. Dr. Vali Uddin, Air Commodore Shaheed Idrees (Retd.), Brig. (R.) and Prof. Dr. Muhammad Abbas. The session focused on moving beyond theoretical discourse to examine actionable strategies for leveraging artificial intelligence to support sustainable economic growth in Pakistan.

The discussion highlighted the practical applications of AI across key sectors, emphasizing its potential to enhance operational efficiency, promote innovation, optimize resources, and support evidence-based decision-making. Researchers and students actively participated by posing insightful questions on how AI can be effectively implemented to address real-world challenges, create employment opportunities, and improve the overall quality of life, thereby contributing to long-term national resilience and sustainability.

Adopting an interactive approach, Prof. Dr. Huma Baqai redefined the traditional panel format by engaging directly with the audience and facilitating a dynamic exchange of ideas between participants and panellists. This approach enriched the dialogue and allowed for a deeper exploration of practical concerns surrounding AI adoption.

The panel also addressed important academic and ethical considerations, particularly the growing reliance on AI tools in educational settings. Panellists expressed concerns that excessive dependence on AI for assignments may hinder the development of critical thinking and practical skills among students. It was emphasized that AI is intended to augment human capabilities rather than replace them, and therefore, academic assessments should prioritize originality, independent thinking, and skill development.

The session concluded with a consensus that while AI offers transformative opportunities for sustainable growth, its responsible and balanced use—especially in education and research—is essential to ensure meaningful human development alongside technological advancement.

International Plenary/ Keynote Speakers

International Plenary/Keynote Speakers

Talk: Computational Deglutition

Prof. Dr Ervin Sejdic

University of Toronto, Canada

Abstract— A human body comprises of several physiological systems that carry out specific functions necessary for daily living. Traumatic injuries, diseases and aging negatively impact human functions, which can cause a decreased quality of life and many other socio-economical and medical issues. Accurate models of human functions are needed to propose interventions and treatments that can restore deteriorated human functions. Therefore, our research aims to develop novel data analytics approaches that can accurately assess swallowing functional losses due to aging and neurological disorders. Swallowing is a sensorimotor activity by which food, liquids, and saliva pass from the oral cavity to the stomach. It is one of the most complex sensorimotor functions due to the high level of coordination needed to accomplish the swallowing task over a very short period of one to two seconds. Dysphagia (swallowing difficulties) refers to any swallowing disorder caused by a variety of neurological conditions (e.g., stroke, cerebral palsy, Parkinson's disease), head and neck cancer, genetic syndromes, and iatrogenic conditions or trauma. When not effectively treated, dysphagia can cause malnutrition, dehydration, failure of the immune system, psycho-social degradation, and in general, a decreased quality of life. There is a widespread need for signal and image processing algorithms that can help clinicians in the management of dysphagia. Therefore, a recently proposed field called computational deglutition is a collaboration between clinicians and the signal/image processing community aimed at the development of clinically relevant algorithms that will aid clinicians during the assessment and treatment of swallowing disorders.

Talk: Digital Connectivity for Sustainable Futures: Transforming Society, Economy, and Industry

Prof. Dr. Zeeshan Muhamamd Shakir

University of the West of Scotland (UWS), UK

Abstract— Digital connectivity has become a critical enabler of sustainable development, reshaping how societies function, economies grow, and industries innovate. This talk, *Digital Connectivity for Sustainable Futures: Transforming Society, Economy, and Industry*, explores the role of advanced communication technologies in driving inclusive growth, resilience, and long-term sustainability. It examines how high-speed networks, IoT, cloud computing, and data-driven platforms support smart infrastructure, digital services, and efficient industrial processes. The discussion highlights the impact of connectivity on social inclusion, economic productivity, and industrial transformation, while addressing challenges related to accessibility, security, and digital equity. By aligning technological advancement with sustainability goals, digital connectivity can serve as a powerful catalyst for building smarter societies, competitive economies, and future-ready industries in an increasingly interconnected world.

Talk : Impact of Artificial Intelligence in Higher Education

Prof. Dr. Mohammad Ilyas

Florida Atlantic University, USA

***Abstract*—** Artificial Intelligence (AI) is a rapidly growing field and deals with simulating human behaviors and decision making with the use of computer. AI is rapidly becoming a transformative force in almost all aspects of our society. Higher education is no exception, and AI is reshaping the landscape of teaching, learning, research, and management in higher education institutions around the world. As the demands of the digital environment around us continue to evolve, higher education institutions are adapting to use AI as a tool for higher efficiency and increased productivity. In this paper, we discuss the scope of AI's impact on higher education. The impact of AI is divided into three sections; aspects of AI that are perceived to be positive, aspects of AI that are perceived to be negative, and aspects of AI that are perceived to be neutral.

Talk: Agentic AI: The next wave of Intelligence

Dr. Raza Hasan

Southampton Solent University, UK ***Abstract*—** Agentic AI represents the next evolutionary wave in artificial intelligence, moving beyond reactive and assistive systems toward autonomous, goal-driven agents capable of perception, reasoning, planning, and adaptive action. Unlike conventional AI models that respond to predefined inputs, agentic AI systems can independently formulate objectives, make decisions, interact with complex environments, and learn from outcomes with minimal human intervention. This talk explores the foundational concepts of agentic AI, highlighting how advances in large language models, reinforcement learning, multi-agent systems, and tool-augmented reasoning are converging to enable more intelligent and self-directed machines. The discussion examines real-world applications of agentic AI across domains such as healthcare, finance, education, software engineering, and smart infrastructure, where autonomous agents can optimize workflows, enhance decision-making, and drive innovation. Particular attention is given to the opportunities agentic AI offers for productivity gains and sustainable growth, as well as the emerging challenges related to alignment, transparency, accountability, and ethical governance. By addressing both the technological potential and the associated risks, this talk provides a balanced perspective on how agentic AI can be responsibly designed and deployed. The session aims to equip researchers, practitioners, and policymakers with insights into the capabilities of agentic systems and their role in shaping the future of intelligent, human-centered AI.

Talk: Intelligent Tutoring System and Student Characteristics

Dr. Rajermani Thinakaran

INTI International University, Malaysia

Abstract— Intelligent Tutoring Systems (ITS) have emerged as a powerful application of artificial intelligence in education, offering personalized and adaptive learning experiences tailored to individual student needs. By incorporating student characteristics such as prior knowledge, learning styles, cognitive abilities, motivation, and engagement levels, ITS can dynamically adjust instructional strategies, content sequencing, and feedback mechanisms. This talk explores the role of student modelling in the design of effective intelligent tutoring systems and highlights how accurate representation of learner characteristics enhances learning outcomes and knowledge retention. The discussion examines key techniques used in ITS, including data-driven learner profiling, adaptive assessment, and real-time performance analysis. It also addresses challenges related to data privacy, fairness, and the ethical use of student data. By aligning instructional support with individual learner traits, intelligent tutoring systems can promote self-regulated learning, reduce achievement gaps, and support inclusive education. The session emphasizes the importance of human-centered design to ensure ITS complements, rather than replaces, the role of educators in the learning process.

Talk: From Spaces to Locales: Extending the Language of Topology

Ms. Thobile Ngcamphalala

Rhodes University, South Africa

Abstract— Topology provides a foundational language for understanding continuity, convergence, and spatial structure through the study of topological spaces. However, modern mathematical and computational challenges increasingly demand frameworks that go beyond point-based spaces. This talk, *From Spaces to Locales: Extending the Language of Topology*, explores the shift from classical topology to point-free topology, where locales replace spaces as the primary objects of study. Locales emphasize the lattice of open sets rather than underlying points, offering a more flexible and constructive approach to topology. The abstract framework of locales enables deeper insights into continuity, compactness, and logical structure, particularly in settings where points are difficult to define or unnecessary. The discussion highlights key motivations for this transition, outlines the fundamental concepts of locale theory, and illustrates applications in logic, theoretical computer science, and constructive mathematics. By extending the language of topology, locales provide powerful tools for rethinking spatial reasoning in both pure and applied contexts.

Session Chair

Session Chair

Session Title: Innovations in Computer Science Education

Prof. Dr. Amir Mehmood

Al-Kawthar University, Pakistan

Session Overview— The session on "Innovations in Computer Science Education," chaired by Dr. Amir Mehmood, highlighted recent advancements in AI, machine learning, and cybersecurity. Paper presentations included an AI-based skill learning tool for personalized education, machine learning and deep learning models for soil type prediction with applications in agriculture and environmental monitoring, and a systematic global review of cyberattacks analyzing trends and defense strategies. The session fostered discussions on practical applications, research methodologies, and emerging directions in computer science and technology.

Session Title: Computational Methods in Research

Dr. Shama Siddiqui

DHA Suffa University, Pakistan

Session Overview— The session on "Computational Methods in Research", chaired by Dr. Shama Siddiqui, explored recent advancements in machine learning, optimization algorithms, and IoT security. Paper presentations included a comparative analysis of machine learning algorithms for sleep disorder classification, a study comparing genetic and firefly algorithms for solving the vehicle routing problem, and an investigation into vulnerabilities and mitigation techniques for securing the Internet of Things. The session encouraged discussion on practical applications, methodological approaches, and emerging trends in computational research.

Session Title: Emerging Software and Computing Technologie

Prof. Dr. Shahid Munir Shah

SZABIST University, Pakistan

Session Overview— The session on "Emerging Software and Computing Technologies", chaired by Prof. Dr. Shahid Munir Shah, highlighted recent innovations in cloud computing and intelligent systems. Presentations included an event-triggered serverless evolution framework for elastic cloud environments and an artificially enhanced guarding and intelligent surveillance system. The session fostered discussions on practical applications, technological innovations, and future directions in software and computing research.

Session Title: Intelligent Computing Application

Dr. Muhammad Faizan Shirazi

NED University of Engineering & Technology, Pakistan

Session Overview— The session on "Intelligent Computing Applications, chaired by Dr. Muhammad Faizan Shirazi, focused on advancements in machine learning, deep learning, and data analytics. Presentations included an automated approach for detecting and correcting mislabeling in sentiment-labeled datasets, a multi-branch explainable CNN model for chest X-ray pneumonia classification, and a high-recall machine learning framework for fine-grained cyberbullying detection. The session encouraged discussions on practical applications, explainable AI, and emerging trends in intelligent computing research.

Session Title: Data Analytics and Computing Solutions

Dr. Muhammad Ayaz Shirazi

Iqra University, Pakistan

Session Overview— The session on "Data Analytics and Computing Solutions", chaired by Dr. Muhammad Ayaz Shirazi, highlighted recent developments in machine learning, intrusion detection, and quantum communication. Presentations included a survey of AI/ML-based intrusion detection systems examining techniques, datasets, and performance, an ensemble machine learning framework for real-time network intrusion detection, and an adaptive quantum communication routing approach using reinforcement learning with advanced noise modeling and channel optimization. The session fostered discussions on practical applications, emerging technologies, and innovative research directions.

Session Title: Sustainable Computing and Technology

Dr. Sarwat Iqbal

Dawood University of Engineering & Technology, Pakistan

Session Overview— The session on "Sustainable Computing and Technology", chaired by Dr. Sarwat Iqbal, focused on AI-driven solutions for environmental monitoring and cybersecurity. Presentations included an urban flood early warning and risk mapping system using remote sensing and machine learning, and an explainable phishing email detection framework employing hybrid embeddings and ensemble learning. The session encouraged discussion on practical applications, sustainable technology solutions, and emerging trends in computing research.

Conference Paper

Comparative Analysis of Genetic Algorithm and Firefly Algorithm for the Vehicle Routing Problem

Muhammad Danish Tahir, Maryam Ahmed Raees, Dr. Asma Sanam Larik, Mubashir Mujtuba, Rizwan Muhammad Syed, Dr. Sarwat Iqbal

Department of Computer Science, Dawood University of Engineering & Technology Karachi, Sindh, Pakistan

***Abstract*—**VRP is a typical and not an easy combinatorial optimization problem that would come up with an optimal route using a collection of vehicles to offer predefined set of customers aiming at cutting down the cost in fuel, time, tracks etc. This research paper seeks to research two population-based metaheuristic algorithms such Genetic Algorithm (GA) and Firefly Algorithm (FA) on a synthetic, geographical population and consider their capability to resolve one instance of a Vehicle Routing Problem (VRP). Comparative experimentation through convergence trends, computational performance, and comparative solution quality are evaluated through this paper. Findings show that, although GA has high convergence rates and is easier and quicker to implement, FA has the capability of exploring the solution space more predictably and offering better final solution on numerous executions. The implications of these findings are that FA has a promising use in the routing optimization, particularly in dynamic and noisy networks.

Comparative Analysis of Machine Learning Algorithms for Sleep Disorder Classification

Darakhshan Mujtaba, Alishba Anwa, Syeda Fakhra Jalal, Dr. Irfan Ahmad Usmani

Department of Computer Science, Salim Habib University
Karachi, Pakistan

***Abstract*—** Sleep disorders represent a significant public health challenge affecting millions globally, with profound implications for physical health, cognitive function, and quality of life. This study presents a comprehensive comparative analysis of eight machine learning algorithms for automated sleep disorder classification using a structured dataset comprising physiological and behavioral features. The evaluated algorithms include Logistic Regression, Random Forest, Gradient Boosting, K-Nearest Neighbors, Naive Bayes, Decision Tree, Support Vector Machine, and Multi-Layer Perceptron Neural Network. Our experimental results demonstrate that both Random Forest and Logistic Regression achieve exceptional predictive accuracy of 97.35%, substantially outperforming other approaches. The comparable performance of these algorithmically distinct methods can be attributed to the dataset's inherent characteristics: Logistic Regression's success indicates strong linear separability and well-balanced feature contributions, while Random Forest's equivalent performance demonstrates robust ensemble generalization and capacity to capture both linear relationships and subtle non-linear interactions. Gradient Boosting (95.58%) and KNN (95.58%) achieved strong secondary performance, while SVM and MLP Neural Network substantially underperformed at 79.65%, likely due to suboptimal hyper-parameter configuration or insufficient training. This research contributes empirical evidence supporting machine learning-based clinical decision support systems for sleep medicine, offering critical insights into algorithm selection, model interpretability, and practical deployment considerations for healthcare applications.

Explainable Phishing Email Detection Using Hybrid Embeddings And Ensemble Learnings

Bisma Shehzadi, Mumtaz Ali Shah, Shahid Sultan, Rizwan Taj

Department of Computer Science, University of Wah
Wah-Cantt, Pakistan

***Abstract*—** Phishing email detection can be addressed as one of the most current questions of the cybersecurity that should be discussed as the enhancement of the abilities of the attack and the necessity to introduce digital communication. The existing paper proposes an exceptionally powerful and feasible framework, as it combines the most applicable approaches to the study of phishing recognition within the natural language processing (NLP) and machine learning to accomplish it in the most accurate way. It depends on TF-IDF, FastText, and SBERT (MiniLM-L6-v2) embeddings in order to train the 10,684-dimensional space of feature and eliminates the problem of the disproportion between the classes by using the ADASYN-implemented oversampling to generate 2,501 fake phishing data. The two are then trained off and further supplemented with weighted ensemble to induce the complement of benefits on the SVM, random forest and XGBoost. The correctness, the recall of SVM and F1-score, the Random Forest, the XGBoost and the combination of the classes are identical and even-handed between the ones with 39,154 emails (a stratified dataset). The significant textual features can be determined using SHAP-based interpretability and the transparency and credibility are also enhanced. Live interface is a pointer of the actual deployment power in which an email is typed directly, or files uploaded through Gradio.

TriadDetect: High-Recall ML for Fine-Grained Cyberbullying Classification

Bhavinkumar Parmar

***Abstract*—** This paper presents TriadDetect, a supervised NLP pipeline designed to prioritize high recall in detecting and categorizing harmful online content across three operational classes relevant to moderation workflows. The system relabels an existing corpus to support a triadic taxonomy and learns distributional text representations, after which interchangeable classifiers—artificial neural networks, support vector machines, k-nearest neighbors, and Naive Bayes—are trained and compared under a standardized protocol that emphasizes recall-first model selection with 95% confidence-interval significance testing. The implementation couples word-vector encoders with modular trainers and integrates class weighting to manage imbalance, targeting maximum true-positive capture while constraining false positives. The evaluation plan employs cross-validated scoring on the relabeled dataset with ablations across encoders and classifiers, and outlines risk mitigation via reannotation or class rebalancing when category coverage is insufficient. Collectively, the contribution is an ML-first blueprint for deployable, high-recall cyberbullying detection and multi-class classification, with reproducible components and clear statistical decision criteria for real-world safety applications.

An Ensemble Machine Learning Framework for Real-Time Network Intrusion Detection

Hania Siddiqui, Rizwan Taj, Muhammad Sarfraz Shahid, Mumtaz Ali Shah, Shahid Sultan, Armughan Ali

Department of Computer Science, University of Wah
Wah-Cantt, Pakistan

***Abstract*—** The classical signature-based intrusion detectors are unable to detect new attacks and zero-day attacks. This paper proposes a desktop, real-time Intrusion Detection System (IDS) that combines the use of Random Forest, Logistic Regression, Gradient Boosting classifiers, and Decision Trees in a majority voting ensemble with built-in confidence thresholding. The ensemble is trained and assessed using the UNSW-NB15 dataset and implemented with the aid of a PyQt5 graphical interface, which enables the simulation of real-time streaming, dynamic visualization of anomalies, and model retraining on demand. The experimental results show that the proposed ensemble achieves an F1-score of 0.981, 98.1% recall, and 98.2% precision, with an accuracy of 98.5%, outperforming the results of classifiers and the currently available IDS solutions. The system is minimalist, readable, and can be run on a typical desktop computer, making it applicable to physical world, resource-restricted cybersecurity conditions.

Automated Mislabelling Detection and Correction in Sentiment-Labelled Dataset

Saba Mehfooz, Shahid Sultan, Mumtaz Ali Shah, Rizwan Taj
Department of Computer Science, University of Wah,, Wah-Cantt, Pakistan

***Abstract*—** Mislabeling in a sentiment analysis dataset can mislead models and reduce prediction accuracy, making detection and correction crucial. Conventional deep learning techniques, such as label-specific denoising with HSM and GMM soft relabeling, are computationally costly, complex, and often overlook instance-specific noise. To effectively identify and rectify noisy labels, our suggested method combines Transformer-based Sentence-BERT embeddings with a lightweight ensemble of Logistic Regression, Linear SVM, and LightGBM. Baseline predictions from the ensemble are analyzed using majority-vote disagreement and probability-confidence filtering to identify potential mislabels. High-confidence mismatches between ensemble consensus and original labels are automatically corrected, while low confidence or conflicting cases are removed as ambiguous noise. After constructing a cleaned dataset, SMOTE-Tomek resampling is applied to mitigate class imbalance. The ensemble models are then retrained on the refined dataset, yielding improved and more stable performance compared to baseline training. This approach achieves high predictive performance with up to 97% accuracy for SVM, 97% for LR, and 99% for LightGBM. It also reduces computational overhead when compared to deep MLP pipelines, improves dataset quality, and addresses class imbalance via SMOTE-Tomek.

An AI Based Skill Learning Tool

Muhammad Husnain Ali, Muhammad Fawad Khan Ghori, Dr. Asma Sanam Larik, Mahnoor Mughal, Qurat ul Ain Nadeem, Fatima Irfan

Department of Computer Science, Dawood University of Engineering & Technology Karachi, Sindh, Pakistan

***Abstract*—** Current education systems only provide limited opportunities to collaborate and learn from each other through traditional settings. This has created a barrier to establishing an ecosystem to support ongoing development through collaborative efforts using the latest technology. To solve this problem, this tool was created as an AI-based solution that gives developers and learners access to skill-set exchanges, matched mentors and peer-to-peer structured learning experiences. Using AI-based chatbots that verify the skills claimed by users creating interactive dynamic skill profiles that ensure that mentorship will be matched with the appropriate user based on skills and provide a secure and trustworthy way to connect and interact with mentors and users. The main page of the platform has been designed using a simple User Interface (UI) that will give learners a list of categories, the ability to find mentors, and a simple onboarding process. Additionally, the platform includes a recruiting module that helps businesses identify verified candidates. This AI-based tool was created with a focus on scalability, security, and accessibility to foster the development of an engaged digital community and allow members to learn from each other and develop together.

Securing the Internet of Things: A Study on Vulnerabilities and Mitigation Techniques

Riya Rodrigues, Muhammad Abid Khan

Department of Computer Science, Millenium Institute of Technology & Entrepreneurship, Karachi, Pakistan

***Abstract*—** The large-scale adoption of Internet of Things (IoT) devices, which is projected to reach close to 30 billion connections by the year 2030, has introduced a massive and vulnerable surface in industries such as healthcare, industrial, and smart cities. This has been mainly attributed to the need to reduce costs, especially by vendors who have introduced devices that are vulnerable to certain inherent securities, such as lack of authentication, lack of encryption, and lack of support for software updates in a secure manner which has resulted in an average of 820,000 hacking attempts on a daily basis. This proposed research attempts to carry out a comprehensive analysis on the anatomy of insecurity within IoT devices by identifying the architecture of the attack surface to build the resilience necessary to secure the future of the connected world.

A Survey of AI/ML-Based Intrusion Detection Systems: Techniques, Datasets, and Performance

Muhammad Rayyan Ayub, Muhammad Umair Ali, Muhammad Saleem, Kamal Akhtar

Department of Computer Science, DHA Suffa University Karachi, Pakistan

***Abstract*—** Intrusion Detection Systems (IDS) play a key role in network security by identifying potential threats and attacks. With the growth of cyber threats, researchers have applied artificial intelligence (AI) and machine learning (ML) to enhance the performance of IDS. This survey provides a detailed overview of common ML techniques used in IDS, such as decision trees, support vector machines, neural networks, and ensemble methods. We also summarize the most widely used public datasets, including NSL-KDD, CIC-IDS2017, and UNSW-NB15, highlighting their structure and limitations. The paper compares reported performance metrics across studies and identifies challenges like data imbalance, real-time detection, and overfitting. This review aims to guide future research toward more accurate and adaptive IDS solutions.

A Systematic Global Comparative Review of Cyber Attacks

Ayesha Tariq, Kanwal Kumar, Rubaisha Ashraf, Abdullah Memon

Department of Computer Science, Millenium Institute of Technology & Entrepreneurship, Karachi, Pakistan

***Abstract*—** This study shows more than 51 cyberattacks from the past year 5 years**.** Cyberattacks are arising more often and causing huge impacts on different organization as attackers are seeking privileges like power systems, banks, hospitals, and major tech companies. This study shows several major attacks such as the Colonial Pipeline ransomware attack, the Kaseya VSA supply-chain breach, the Change Healthcare hack, and cryptocurrency thefts. This study tells us to understand how these types of attacks happen, where these organizations are most vulnerable, and how much damage those attacks have impacted. The research also shows that ransom payments are only a fragment of the total cost of an attack, since most losses come from interruption, rehab, and long-term business effects. Since so many industries are connected and as they rely on each other, cyberattacks can quickly have a huge impact across several sectors. This makes it even more important to improve how improve the systems and build those types of security systems that can adapt and respond more effectively to the attacks and alert the organization if there are any vulnerabilities or breaches.

Conference Note

MICETC 2025, an annual conference, was successfully planned, managed, and executed within a limited timeframe. MICETC is organized every year and has established itself as a significant academic and professional platform. The strong interest and participation from both national and international speakers highlighted the importance, relevance, and broad appeal of the conference themes and objectives, reinforcing MICETC's standing as a consistently impactful annual event. 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-Rehman 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.

The conference proceeded with a panel discussion Beyond the Hype: Practical Roadmaps for AI-Driven Sustainable 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. Athar Mehboob
- Prof. Dr. Vali Uddin
- Air Commodore Shaheed Idrees (Retd.)
- Brig. (R.) Prof. Dr. Muhammad Abbas

The discussion emphasized the practical applications of AI across critical sectors, highlighting its potential to improve operational efficiency, drive innovation, optimize resource utilization, and support evidence-based decision-making. Researchers and students actively engaged by asking insightful questions on how AI can be applied to tackle real-world challenges, generate employment opportunities, and enhance overall quality of life, thereby contributing to long-term national resilience and sustainable development. After the panel discussion, The conference featured an excellent array of international plenary speakers, who addressed a wide spectrum of topics, including:

- ***Prof. Dr. Ervin Sejdic (Online) (University of Toronto, Canada)*** — presented on *"Computational Deglutition."* In his talk, he explored the development of data analytics approaches to accurately assess swallowing functional losses due to aging and neurological disorders. Swallowing is a complex sensorimotor function, and dysphagia (swallowing difficulties) can lead to malnutrition, dehydration, and decreased quality of life. Prof. Sejdic highlighted the emerging field of computational deglutition, a collaboration between clinicians and signal/image processing experts, aimed at developing clinically relevant algorithms to support the assessment and treatment of

swallowing disorders. The talk provided an overview of recent advances and emphasized the potential of these algorithms to aid clinical decision-making.

- ***Prof. Dr. Zeeshan Muhammad Shakir (In-Person) (University of the West of Scotland, UK)*** — discussed *"Digital Connectivity for Sustainable Futures: Transforming Society, Economy, and Industry."* He examined the role of advanced communication technologies in enabling sustainable development, social inclusion, and industrial transformation. The talk highlighted high-speed networks, IoT, cloud computing, and data-driven platforms as key drivers for smart infrastructure, digital services, and efficient industrial processes, while addressing challenges related to accessibility, security, and digital equity.

- ***Prof. Dr. Mohammad Ilyas (Online) (Florida Atlantic University, USA)*** — delivered a presentation on *"Impact of Artificial Intelligence in Higher Education."* His talk focused on how AI is transforming teaching, learning, research, and management within higher education institutions. The discussion highlighted AI's positive, negative, and neutral impacts, including improvements in efficiency, productivity, and decision-making, while also addressing potential challenges. Prof. Ilyas emphasized how higher education can strategically adopt AI to enhance educational outcomes in a rapidly evolving digital environment.

- ***Dr. Raza Hasan (Online) (Southampton Solent University, UK)*** — presented on *"Agentic AI: The Next Wave of Intelligence."* His talk explored autonomous, goal-driven AI systems capable of perception, reasoning, planning, and adaptive action. Dr. Hasan highlighted the convergence of large language models, reinforcement learning, multi-agent systems, and tool-augmented reasoning, and discussed real-world applications in healthcare, finance, education, software engineering, and smart infrastructure. He also addressed the opportunities and challenges of agentic AI, including alignment, transparency, accountability, and ethical governance.

- ***Dr. Rajermani Thinakaran (Online) (INTI International University, Malaysia)*** — delivered a presentation on *"Intelligent Tutoring System and Student Characteristics."* His talk emphasized how ITS can provide personalized and adaptive learning experiences by incorporating student characteristics such as prior knowledge, cognitive abilities, learning styles, motivation, and engagement levels. He discussed techniques including learner profiling, adaptive assessment, and real-time performance analysis, while addressing challenges related to data privacy, fairness, and ethical use of student data. Dr. Thinakaran highlighted how human-centered ITS design can enhance learning outcomes, reduce achievement gaps, and support inclusive education.

- ***Ms. Thobile Ngcamphalala (Online) (Rhodes University, South Africa)*** — presented on *"From Spaces to Locales: Extending the Language of Topology."* Her talk explored the transition from classical point-based topology to point-free topology, emphasizing locales as primary objects of study. She discussed how this framework enables a more flexible and constructive approach to continuity, convergence, and spatial reasoning. Applications were highlighted in logic, theoretical computer science, and constructive mathematics, showing how locales provide new perspectives for both pure and applied mathematical contexts.

The conference showcased a remarkable lineup of session chairs, covering a diverse range of topics,

- ***Prof. Dr. Amir Mehmood (In-Person) (Al-Kawthar University, Pakistan)*** — chaired the session on *"Innovations in Computer Science Education."* The session highlighted recent advancements in AI, machine learning, and cybersecurity. Presentations included an AI-based skill learning tool for personalized education, machine learning and deep learning models for soil type prediction in

agriculture and environmental monitoring, and a systematic global review of cyberattacks analyzing trends and defense strategies. The session fostered discussions on practical applications, research methodologies, and emerging directions in computer science and technology.

- ***Dr. Shama Siddiqui (In-Person) (DHA Suffa University, Pakistan)*** — chaired the session on *"Computational Methods in Research."* The session explored recent advancements in machine learning, optimization algorithms, and IoT security. Presentations included a comparative analysis of machine learning algorithms for sleep disorder classification, a study comparing genetic and firefly algorithms for solving the vehicle routing problem, and an investigation into vulnerabilities and mitigation techniques for securing the Internet of Things. Discussions emphasized practical applications, methodological approaches, and emerging trends in computational research.

- ***Prof. Dr. Shahid Munir Shah (In-Person) (SZABIST University, Pakistan*)** — chaired the session on *"Emerging Software and Computing Technologies."* The session highlighted recent innovations in cloud computing and intelligent systems. Presentations included an event-triggered serverless evolution framework for elastic cloud environments and an artificially enhanced guarding and intelligent surveillance system. Discussions focused on practical applications, technological innovations, and future directions in software and computing research.

- ***Dr. Muhammad Faizan Shirazi (In-Person) (NED University of Engineering & Technology, Pakistan)*** — chaired the session on *"Intelligent Computing Applications."* The session focused on advancements in machine learning, deep learning, and data analytics. Presentations included an automated approach for detecting and correcting mislabeling in sentiment-labeled datasets, a multi-branch explainable CNN model for chest X-ray pneumonia classification, and a high-recall machine learning framework for fine-grained cyberbullying detection. Discussions highlighted practical applications, explainable AI, and emerging trends in intelligent computing research.

- ***Dr. Muhammad Ayaz Shirazi (In-Person) (Iqra University, Pakistan)*** — chaired the session on *"Data Analytics and Computing Solutions."* The session highlighted recent developments in machine learning, intrusion detection, and quantum communication. Presentations included a survey of AI/ML-based intrusion detection systems examining techniques, datasets, and performance, an ensemble machine learning framework for real-time network intrusion detection, and an adaptive quantum communication routing approach using reinforcement learning with advanced noise modeling and channel optimization. Discussions emphasized practical applications, emerging technologies, and innovative research directions.

- ***Dr. Sarwat Iqbal (In-Person) (Dawood University of Engineering & Technology, Pakistan)*** — chaired the session on *"Sustainable Computing and Technology."* The session focused on AI-driven solutions for environmental monitoring and cybersecurity. Presentations included an urban flood early warning and risk mapping system using remote sensing and machine learning, and an explainable phishing email detection framework employing hybrid embeddings and ensemble learning. Discussions highlighted practical applications, sustainable technology solutions, and emerging trends in computing research.

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

Highlights

MICETC 2025 commenced with a welcome address by Prof. Dr. Huma Baqai, Rector of MiTE University, who emphasized the importance of emerging technologies in academia and industry. Prof. Dr. Kamran Ahsan, Dean Faculty of Engineering & Computer Science, highlighted the transformative role of artificial intelligence in reshaping industries globally and within Pakistan. The participation of the renowned scientist Prof. Dr. Atta-Ur-Rehman added significant prestige and credibility to the conference, while the presence of Rectors and Vice-Chancellors from various esteemed universities further reflected its strong academic standing. International speakers from leading global institutions shared valuable insights, reinforcing the conference's international outlook and scholarly depth.

The event also witnessed active participation from students of Salim Habib University, DHA Suffa University, and Dawood University of Engineering & Technology, substantially enhancing MiTE University's visibility and inter-institutional engagement. The technical sessions addressed cutting-edge topics, with Prof. Dr. Atta-ur-Rehman discussing advancements in quantum computing and its integration with artificial intelligence for applications in medicine and drug development; Prof. Dr. Ervin Sejdic presenting advancements in computational deglutition for the assessment and treatment of swallowing disorders; Prof. Dr. Zeeshan Muhammad Shakir exploring digital connectivity for sustainable futures; Prof. Dr. Mohammad Ilyas highlighting the transformative impact of AI in higher education; Dr. Raza Hasan presenting on agentic AI and autonomous systems; Dr. Rajermani Thinakaran discussing intelligent tutoring systems and student modelling; and Ms. Thobile Ngcamphalala sharing insights on extending the language of topology from spaces to locales.

Overall, MICETC 2025 significantly enhanced MiTE University's academic profile by successfully delivering a hybrid international conference that fostered global engagement, high-quality research dissemination, and meaningful student participation while offering valuable insights into emerging computing and industry trends.

Gallery

Prof. Dr. Huma Baqai is welcoming the audience.

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

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

Panel Discussion moderated by Prof. Dr. Huma Baqai

Prof. Dr. Huma Baqai presented a shield to Prof. Dr. Atta-Ur-Rehman

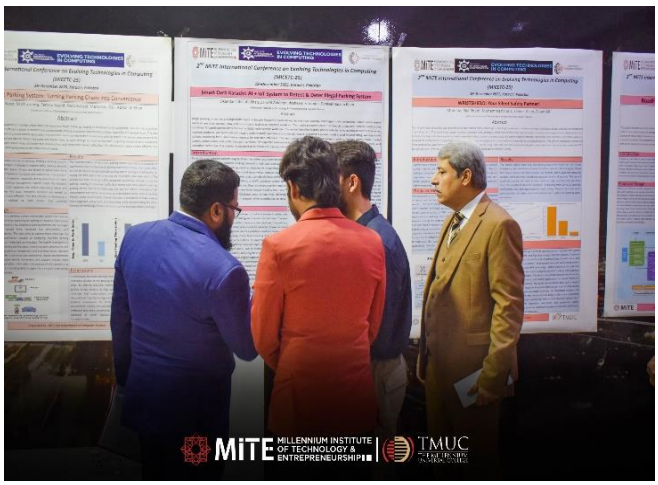
Prof. Dr. Atta-Ur-Rehman presented a shield to Prof. Dr. Wali Uddin

Prof. Dr. Huma Baqai presented a shield to Prof. Dr. Amir Mehmood

Prof. Huma Baqai presented a shield to Brigadier (R.) Prof. Dr. Muhammad Abbas

Inauguration of Final Year Project Lab at MiTE

International Plenary Talk by Prof. dr. Zeeshan Muhammad Shakir



Poster Presentation by Students from different Universities

Poster Presentation by Students from MiTE University

MiTE Team and Guest group picture

MiTE Students group picture

Random click of guests.

Random click of guests.

Conference Organizing Team

MILLENNIUM INSTITUTE OF TECHNOLOGY & ENTREPRENEURSHIP

2ND MiTE INTERNATIONAL CONFERENCE ON EVOLVING TECHNOLOGIES IN COMPUTING

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