

2nd AISDW

2nd International Conference on Artificial Intelligence for Sustainability in the Developing World

2nd International Conference on

Artificial Intelligence for Sustainability in the Developing World Conference

Proceeding Book

2nd AISDW

2nd International Conference on Artificial Intelligence for Sustainability in the Developing World

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2nd International Conference on

Artificial Intelligence for Sustainability in the Developing World

Conference Program & Abstracts

3 - 4 November 2026

Organized by:

Welcome to the 2nd International Conference on Artificial Intelligence for Sustainability in the Developing World (AISDW26)

The conference is jointly organized by the **University of Raparin**, **Akre University for Applied Sciences**, **Duhok Polytechnic University**, **Universiti Tun Hussein Onn Malaysia**, **International University of Erbil**, **Garmian Polytechnic University**, **Soran University**, **University of Zakho**, and **Lebanese French University**.

AISDW26 is a hybrid conference held on **3–4 November 2026** at the University of Raparin, Ranya, Sulaimaniyah, Kurdistan Region, Iraq. This is the second iteration of the AISDW, and the next edition will be organized in 2027.

The conference aims to bring together leading academics, scholars, and students to discuss theoretical and practical issues related to AI applications through sharing their experiences and research results. It provides a premier interdisciplinary forum for presenting and discussing the most recent trends, issues, and innovations, as well as the real-world difficulties encountered and solutions put into practice in AI research.

AISDW26 brings together researchers, scientists, and technologists from universities, research firms, and government agencies worldwide. All submitted papers were subjected to double-blind peer review and critical evaluation by the conference committees. Acceptance decisions were based on the paper's novelty, technical depth, and relevance to the conference's scope.

The conference explores how AI can drive sustainable development, climate action, inclusive education, healthcare innovation, and equitable governance. It emphasizes ethical adoption, local empowerment, and culturally responsive solutions tailored to resource-constrained contexts, bridging global best practices with local realities to foster responsible AI for long-term sustainability.

The conference publishing committee will submit accepted papers to **Springer Nature Link** and **Emerald Publishing**.

Website: https://aisdw26.uor.edu.krd/

Email: ai.conference@uor.edu.krd

Welcome message from Honorary Executive Chairperson

Distinguished Guests, Esteemed Speakers, Participants, colleagues, Ladies and Gentleman
Good morning and a very warm welcome to you all

It is my great pleasure to welcome you all to the "**2nd International Conference on Artificial Intelligence for Sustainability in the Developing World."**

Today we are privileged to gather a diverse community of researchers and scholars from local, national, and international institutions at this academic and scientific event, where you have met to share your valuable experiences and knowledge concerning the core topics associated with Artificial Intelligence and sustainability in the developing world.

This landmark conference is the outcome of a powerful collaboration among eight universities in the Kurdistan Region of Iraq. These include our host university, the University of Raparin, in collaboration with Akre University for Applied Sciences, Duhok Polytechnic University (DPU), Lebanese French University (LFU), International University of Erbil (IUE), Garmian Polytechnic University (GPU), University of Zakho, and Soran University.

This year, the conference's main theme centers around the intersection of AI and Sustainability because nowadays it touches many pillars of our current and future life, including social, economic, and environmental aspects. Understanding the importance of AI in sustainability and experiencing it in our academic career will allow us to foster a better future for all, where justice, fairness, equity, and innovation will lead to sustainable development for our nation and world.

As our region undergoes and navigates complex geopolitical dynamics and economic challenges, the topics chosen for this conference and the insights generated here are not just academic, but also essential for consideration. Therefore, this conference is a platform for everyone to challenge ideas, actively engage with the research presented in these two days, and build lasting international collaborations for shared responsibility for our institutions and our people in the Kurdistan region of Iraq and the rest of the world.

Lastly, I extend my deepest gratitude to our organizing committees, keynote speakers, researchers, and distinguished guests who have joined us from the region and different parts of the world to make this event possible.

Once again, welcome to the University of Raparin and AISDW26, I wish you all a productive and inspiring CONFERENCE. Thank you

Asst. Prof. Dr. Paiman Ramazan Ahmed
President, University of Raparin

Presidents of the Organizing Universities



Asst. Prof. Dr. Paiman Ramadan Ahmed

President of University of Raparin

Dr. Paiman is currently working as the President of University of Raparin. Rania-Kurdistan Region-Iraq. She has research interests in energy economics, sustainable development (SDGs), climate change, economic development, SDGs, migration, and the public sector in the developing world. She holds a Ph.D. in Public Administration from the National University of Public Service-Budapest-Hungary-2018.

Meanwhile, Her research works have been published in reputable journals such as International Environmental Agreements, Politics, Law and Economics, Journal of Public Affairs, Sustainable Development Wiley, Journal of Cleaner Production, Gondwana Research, Renewable Energy, Environmental Impact Assessment Review, Global Business Review, PUBLIC POLICY AND ADMINISTRATION, ECONOMIC RESEARCH-EKONOMSKA ISTRAŽIVANJA, and top-tier academic publishers: Elsevier, Emerald, Palgrave Macmillan, Sage, Springer, Taylor& Francis, Routledge, and Wiley.



Prof. Dr. Manhal Ilham Abdal

President of Akre University for Applied Sciences

Prof. Dr. Manhal serves as the first president of Akre University for Applied Sciences. He earned his Bachelor's degree in History (1993–1997), followed by a Master's degree in Journalism History (1999–2002), and later completed his PhD in History of International Relations / Philosophy of History at the University of Mosul (2004–2008). He was promoted to Professor in 2021.



Prof. Dr. Aree Adel Abdulqader

President of Duhok Polytechnic University

Prof. Dr. Aree Adel Abdulqader is a professor of Forestry and Wood Science and has led Duhok Polytechnic University as a President since 2021. She holds a Ph.D. in Wood Science from Mosul University. As a senior academic leader, she works to improve the quality of higher education, strengthen applied and technical training, and prepare graduates for the job market. She has taken part in academic reform in Kurdistan, including Bologna Process implementation, and has international experience through Fulbright Visiting Scholar placements in the United States. She is also a long-standing advocate for women's and children's rights.

Presidents of the Organizing Universities



Prof. Ts. Dr. Mas Fawzi Bin Mohd Ali

Vice-Chancellor / President of Universiti Tun Hussein Onn Malaysia

Prof. Ts. Dr. Mas Fawzi Bin Mohd Ali serves as the Vice-Chancellor and President of Universiti Tun Hussein Onn Malaysia (UTHM). He earned his Bachelor's degree in Electro-mechanical System Engineering from UMIST (UK) in 1997, a Master's from UTM (2007), and a Doctor of Engineering from the University of Tokushima (Japan) in 2012. He began his career gaining six years of industrial engineering experience at Samsung Electronics Display and Sharp-Roxy Electronics.

Dr. Mas Fawzi joined UTHM as a Tutor in 2004, steadily advancing to full Professor in 2022. Over his career, he has held key leadership positions—including Deputy Dean, Director of Strategic Planning, and Assistant Vice-Chancellor—culminating in his appointment as Vice-Chancellor on 14 July 2025.

As a researcher at the Centre for Energy and Industrial Environment Studies (CEIES), his work focuses on green technology, alternative fuels, and combustion engineering, holding several patented innovations. He is a Chartered Engineer with IMechE (UK), a Certified HRDC Trainer, a Certified International Negotiator, and has earned numerous service and academic awards.



Prof. Dr. Kawa Sherwani

President of International University of Erbil

Prof. Dr. Kawa Sherwani is the President of the International University of Erbil. He has held diverse academic and leadership positions at several universities across the Kurdistan Region, bringing rich experience in higher education management and development.

His research interests lie at the intersection of language and linguistics, education policy, educational technology, and career development skills. Dr. Sherwani is passionate about transforming higher education through innovation, technology, and student-centered career readiness programs, and preparing graduates for the evolving job market.

Presidents of the Organizing Universities



Dr. Sherwan Sharif Qurtas

President of Soran University

Dr. Sherwan Sharif Qurtas is the President of Soran University and an Assistant Professor specializing in hydrogeology and water sciences. He has held several academic leadership positions, including Dean of the Faculty of Engineering and Head of the Departments of Petroleum Geosciences and Geography, bringing extensive experience in higher education management, teaching, and research.

His research interests include hydrogeology, hydrology, geology, and environmental engineering, with a focus on groundwater resources and the environmental effects of urban growth. His work also applies GIS and remote sensing to the study of water resources and environmental challenges in the Kurdistan Region.



Prof. Dr. Diyar Abdulkareem Saeed

President of University of Zakho

Prof. Dr. Diyar Abdulkareem Saeed is the President of the University of Zakho. Born in Zakho in 1979, he specializes in Methods of Teaching. He completed his Bachelor's degree in Kurdish Language and Literature at the University of Duhok in 2001, followed by a Master's degree in 2007 at Duhok and a PhD at the University of Zakho in 2014.

Dr. Diyar has built an extensive administrative career at the University of Zakho and the University of Duhok. His prior leadership roles include Director of Registration, Vice Dean of Education, Head of the Turkish Language Department, Dean of the College of Humanities, and Vice President for Administration and Financial Affairs (2019–2023). His research focuses on research methods, language development, and higher education programs.



Prof. Dr. Abdulqadir Aziz Hassan Al-Naqshabandi

President of Lebanese French University

Professor Dr. Abdulqadir Aziz Hassan Al-Naqshabandi is the current President of Lebanese French University. He holds the academic title of Professor, with a general specialization in Pharmacy and a subspecialty in Clinical Analysis. He has extensive academic, administrative, and professional experience in higher education and the healthcare sector. Throughout his distinguished career, Professor Dr. Abdulqadir served for many years at Hawler Medical University, where he held several important academic and administrative positions. He served as Head of the Department of Pharmaceutics from 2001 to 2005 and subsequently as Dean of the College of Pharmacy from 2008 to 2013. In addition to his academic career, he served as Director of the Central Laboratory of the Ministry of Health for more than 20 years, contributing significantly to laboratory services and the healthcare sector. **Education:** Ph.D. in Pharmacy, College of Pharmacy, Hawler, Iraq, 2007; Master's Degree in Pharmacy, University of Baghdad, Iraq, 1980; Bachelor's Degree in Pharmacy, University of Baghdad, Iraq, 1978.

Conference Executive Chair



Prof. Dr. Jamal Ali Omar

Director General of the Research Center
University of Raparin

Dr. Jamal is a professor of applied linguistics. He is currently the Director General of the Research Center at the University of Raparin. He earned his PhD from Beirut Arab University/Lebanon in 2017. He taught MA and PhD candidates at both Raparin and Koya University. He also supervised two PhD and four MA students. He has 21 publications in his field and has reviewed more than 40 journal articles for both local and international journals, and promotion papers in Kurdistan Region of Iraq.

Conference Co-Chair



Prof. Dr. Farsat Heeto Abdulrahman

Dean of the College of Engineering at the University of Zakho

Dr. Farsat earned his Ph.D. in Engineering Surveying and Space Geodesy from the University of Nottingham (2013). He founded the Surveying Engineering Department at the University of Duhok and has held various leadership roles. His research focuses on GPS/GIS, laser scanning, photogrammetry, and sensor technologies. He has published more than 30 papers and serves on several editorial boards

Conference Secretary



Dr. Saman Muhammad Omer

Head of Software Engineering Department, College of Engineering, at the University of Raparin.

Dr. Saman Muhammad Omer is an Assistant Professor in the Software Engineering Department, College of Engineering, at the University of Raparin. He holds a PhD in Information System Engineering and an MSc (Eng.) in Advanced Software Engineering.His research interests include artificial intelligence, computer vision, machine learning, and deep learning, with a particular focus on image-based classification and detection systems. He has authored numerous peer-reviewed papers across various fields. Dr. Saman teaches a variety of undergraduate and postgraduate courses and supervises student projects at both levels, alongside his ongoing research activities

Conference Secretary



Asst. Prof. Dr. Ayad Nuri Faqi

Dean of the Faculty of Science at Soran University, Kurdistan Region of Iraq

Dr. Ayad is a specialist in Petroleum Geology. He obtained his Ph.D. in Petroleum Geology from the University of Aberdeen, United Kingdom, in 2016. He earned his M.Sc. in Petroleum Geology and B.Sc. in Geology from Salahaddin University-Erbil. He has extensive experience in academic leadership, research supervision, and scientific collaboration, having served in several administrative positions, including Vice Dean for Scientific Affairs and Vice Dean for Administrative and Student Affairs at the Faculty of Science, Soran University.

Head of Organizing Committee



Asst. Prof. Dr. Adel Ali Hasan

Head of the Information Technology Department at the Technical College of Informatics–Akre.

Dr. Adel Ali Hasan is an academic and researcher in Information Technology, holding a PhD from Duhok Polytechnic University and an MSc from the University of Portsmouth, UK. His research interests include Artificial Intelligence, Machine Learning, Natural Language Processing, Semantic Web, and Cybersecurity. He has published numerous research papers and actively contributes to postgraduate supervision, academic leadership, and international collaboration.

Head of the Scientific Committee



Prof. Siddeeq Yousif Ameen, BSc, MSc, PhD, SMIEE, FHEA

Quality Assurance Advisor and ALO
Duhok Polytechnic University, Duhok, Iraq

Experienced Professor with over 35 years in higher education, he holds a Master's and PhD in Digital Data Communication and Processing from Loughborough University (UK). Since starting his academic career in 1990, he has taught data communication, networking, security, and information systems while earning promotion to full Professor in 2003. His administrative leadership spans major roles, including Department Head, Deputy Dean at the University of Technology (Baghdad), Dean of Engineering at Gulf University, Dean of Research and Graduate Studies at Applied Science University (Bahrain), and General Manager of the Research Center at Duhok Polytechnic University. He holds an HEA Fellowship (2016) and extensively contributes to quality assurance, accreditation, NQF, and university program reviews.

Keynote Speaker 1



Prof. Dr. Kiran Sood

Professor, Chitkara Business School
Chitkara University, Punjab, India

Prof. (Dr.) Kiran Sood is a Professor at Chitkara Business School, Chitkara University, Punjab, India, specializing in insurance, finance, risk management, fintech, and emerging technologies in financial services. She holds a PhD in Insurance and completed her postdoctoral research in insurance at the University of Uşak, Turkey. She is also a Certified Enterprise Risk Management (ERM) professional, with significant academic and research contributions in insurance, finance, and risk studies.

Dr. Sood has established a strong international academic profile through her teaching, research, and scholarly engagements across Europe and Asia. She serves as an Affiliate Professor at the University of Malta, where she taught insurance under the Erasmus programme in November 2023. In July–August 2024, she was invited to deliver a nine-day teaching module on Forensic Accounting at the "Ukshin Hoti" University Summer School in Prizren, Kosovo. She also serves as a Research Fellow at the Women Researchers Council, Azerbaijan State University of Economics (UNEC). Continuing her global academic engagements, she taught MBA Executive courses at UNEC during April–June 2025. Further strengthening her international academic presence, Dr. Sood joined Haxhi Zeka University, Peja, Kosovo, as a Visiting Professor with effect from 1 April 2025.

Dr. Sood is actively engaged in editorial and peer-review activities within the global academic community. She recently joined the Cureus Journal of Business and Economics (CJBE), part of the Curious Journals – A Springer Nature Trustworthy AI Series, as an Associate Editor. She also serves as an international reviewer for the Luxembourg National Research Fund (FNR), where she evaluates PhD and postdoctoral research proposals.

An accomplished researcher, Dr. Sood has published extensively in reputed national and international journals and has authored and edited numerous Scopus-indexed books and book chapters. Her research primarily focuses on insurance, financial technology, risk management, sustainability, forensic accounting, and policy-oriented issues in finance. Through her interdisciplinary and applied research, she continues to contribute to both academic scholarship and industry-relevant knowledge at the global level.

Keynote Speaker 1: Abstract

Keynote Title

Explainable AI in Financial Fraud Detection: A Systematic Review of Trust, Governance, and Transparency in FinTech

Abstract

The growing integration of Artificial Intelligence (AI) into financial technology (FinTech) has transformed financial fraud detection, risk assessment, and regulatory governance. However, the increasing complexity of AI-driven models has intensified concerns regarding transparency, accountability, algorithmic bias, and organisational trust. Although Explainable Artificial Intelligence (XAI) techniques, such as SHAP and LIME, offer insights into algorithmic decision-making, existing research remains fragmented across technical, behavioural, and institutional perspectives. This study addresses this gap by systematically reviewing the literature on XAI-driven financial fraud detection, with particular emphasis on its behavioural foundations and governance implications. A systematic literature review was conducted using the Scopus database, following the PRISMA 2020 guidelines and the SPAR-4-SLR protocol. From an initial retrieval of 12,600 records, 99 articles met the predefined eligibility and quality criteria and were included in the final analysis. The review employed the Antecedents–Decisions–Outcomes (ADO) framework and the Theory of Planned Behaviour (TPB) as its primary analytical and theoretical foundations, complemented by the Resource-Based View, Decision Theory, Institutional Theory, Dynamic Capabilities View, and Socio-Technical Systems Theory. The findings reveal increasing scholarly interest in XAI governance, substantial concentration of research in banking and credit, and a predominance of quantitative and algorithm-oriented investigations. However, behavioural adoption, institutional accountability, and longitudinal governance outcomes remain comparatively underexplored. To address these limitations, the study proposes an integrated Stability–Transparency–Reliability (STR) model and introduces the concepts of Interpretative Agency and Interpretative Agility to explain how individuals and financial institutions can validate, adapt, and sustain trustworthy AI-generated decisions. The study contributes to FinTech research by integrating technical explainability with behavioural decision-making and institutional governance. Its implications support financial managers, auditors, policymakers, and technology developers in designing transparent, accountable, and audit-ready AI-enabled fraud detection systems.

Keywords: *Explainable Artificial Intelligence; Financial Fraud Detection; FinTech; AI Governance; Theory of Planned Behaviour; Systematic Literature Review; Interpretative Agility.*

Keynote Speaker 2



Prof. Dr. Ahmad 'Athif Mohd Faudzi

University of Technology, Malaysia

Prof. Ir. Ts. Dr. Ahmad ’Athif bin Mohd Faudzi is an academic, researcher and robotics entrepreneur whose work connects engineering research with practical applications. He is a Professor at the Faculty of Electrical Engineering, Universiti Teknologi Malaysia (UTM), and the founder and Managing Director of A2TECH Sdn. Bhd., a UTM spin-off developing and commercialising robotics and intelligent automation solutions. His work focuses on taking robotics from research and development into real operating environments.

Academic Background

He earned a Bachelor of Engineering (Honours) in Electrical–Computer Engineering (2004) and a Master of Engineering in Mechatronics and Automatic Control (2006) from UTM. He completed his Doctor of Engineering in System Integration at Okayama University, Japan, in 2010. This training informs his multidisciplinary approach to robotics, combining mechanical design, electronics, control, sensing and software.

Professional Experience and Research

At UTM, Prof. Ahmad ’Athif has held academic and research leadership roles, including serving as Director of the Centre for Artificial Intelligence and Robotics (CAIRO). His international experience includes a Visiting Research Fellowship at Tokyo Institute of Technology and participation in Ericsson Malaysia’s CEO@Faculty programme. He led ASM’s Precision Biodiversity pilot in collaboration with UPM, FRIM and other stakeholders, and has contributed through ASM-SIG Biodiversity and ASM-SIG Robotics. In 2025, he received the Academy of Sciences Malaysia Fellowship Recognition. Through A2TECH, he leads the translation of research into field-ready inspection, surveillance and cleaning robots, and supports collaboration between universities, industry and public-sector organisations.

His research spans robotics and system integration, soft and pneumatic or hydraulic actuators, predictive control, bio-inspired and rehabilitation robotics, underwater and field robotics, and connected systems. He has contributed to research, supervision and technology development across these areas, with applications in search and rescue, biodiversity monitoring, healthcare, inspection and palm-oil mechanisation. He is recognised as a Top Research Scientist Malaysia in Robotics and has received national and institutional recognition for research, service and project leadership.

Professional credentials include Professional Engineer with Practising Certificate, Chartered Engineer, Professional Technologist and HRD Corp Accredited Trainer.

Keynote Speaker 2: Abstract

Keynote Title

Physical AI Field Robots: From Lab to Market

Abstract

Physical AI enables robots to perceive, reason and act in the real world, but moving from a successful laboratory prototype to a dependable field product requires more than capable algorithms. This talk examines the challenges that arise in unstructured environments, including changing terrain, poor visibility, sensor contamination, unreliable communication, energy limits and safety risks. It highlights how system engineering, maintainability and operational reliability shape whether a robot can perform consistently and reach the market.

Drawing on the journey from research to product development, the talk presents field robotics applications including INSPECTO-D for confined-space inspection and X3CATOR-S for autonomous security patrol. The X3CATOR-S deployment at Port Klang Free Zone illustrates how field testing, mission data and operator feedback help reveal edge cases and guide continuous improvement. The talk concludes with practical lessons for developing field-ready robots: test outdoors early, log operational data, design for maintenance, favour robust simplicity and prioritise uptime. In field robotics, commercial success depends not only on what a robot can do, but on whether it can keep doing it safely and reliably in real conditions.

Keynote Speaker 3



Prof. Dr. Sabeeh Lafta Farhan

Professor of Architecture and Urban Planning
Vice President for Scientific Affairs, University of Wasit, Iraq

Prof. Dr. Sabeeh Lafta Farhan is a Professor of Architecture and Urban Planning and the Vice President for Scientific Affairs at the University of Wasit, Iraq. He previously served as an Academic Visitor at Nottingham Trent University, United Kingdom, within its research environment for architecture, urbanism, and global heritage. His academic work bridges urban planning, heritage conservation, sustainable development, and emerging digital technologies.

His research addresses the transformation of historic urban environments, spatial identity, cultural sustainability, public-space governance, and climate-responsive urban planning. With a particular focus on Iraqi cities—including Najaf, Karbala, Baghdad, Mosul, and Kut—he has examined how historic environments can accommodate contemporary pressures while retaining their cultural and social significance. His work draws on geographic information systems, space syntax, multi-criteria analysis, photogrammetry, three-dimensional modeling, augmented and virtual reality, participatory methods, and digital environmental assessment.

His publications include studies on participatory digital heritage management in Karbala, immersive metaverse experiences in historic spaces, sustainable restructuring of Najaf, the changing urban form and intangible heritage of Baghdad's historic bazaars, and mobility management in major pilgrimage environments. His research has appeared in international journals such as International Planning Studies, Digital Applications in Archaeology and Cultural Heritage, Buildings, the Journal of Cultural Heritage Management and Sustainable Development, and the International Journal of Sustainable Development and Planning.

Alongside teaching, research, and academic supervision, he contributes to institutional research strategy, international academic collaboration, and peer review for scholarly journals. His current interests include responsible AI-assisted urban decision support, digital heritage, climate resilience, and practical approaches to sustainable city development in the Global South.

Keynote Speaker 3: Abstract

Keynote Title

AI for Sustainable Cities in the Developing World: Integrating Urban Intelligence, Climate Resilience, and Digital Heritage

Abstract

Cities across the developing world face overlapping pressures from climate change, infrastructure constraints, rapid urban transformation, mobility demand, and the erosion of cultural heritage. Artificial intelligence (AI) offers promising tools for urban sustainability, yet technological solutions often struggle when local data, institutional capacity, and community trust are limited. This keynote argues for a place-based, human-centered approach in which AI strengthens, rather than substitutes for, urban knowledge and accountable planning.

Drawing on research in Najaf, Karbala, Baghdad, Mosul, and Kut, the presentation examines how geographic information systems (GIS), space syntax, participatory assessment, three-dimensional documentation, immersive environments, and environmental simulation can produce actionable evidence for complex urban decisions. Published studies of heritage interpretation and virtual experiences in Karbala, spatial transformation in historic Baghdad, and sustainable restructuring in Najaf provide practical foundations. Ongoing work on thermal environments, green corridors, and climate-related heritage risks broadens the discussion to resilience and resource management.

Building on this evidence, the keynote identifies opportunities for AI-assisted urban monitoring, climate-risk forecasting, pedestrian-flow analysis, scenario comparison, and prioritization of conservation and retrofit interventions. These are presented as research and implementation pathways—not as already validated AI outcomes of the cited case studies. A proposed decision-support workflow connects locally defined urban problems, reliable spatial data, interpretable models, participatory scenario evaluation, and transparent municipal action.

The discussion also addresses data gaps, algorithmic bias, privacy, cultural sensitivity, implementation costs, and the environmental footprint of digital systems. It concludes with a practical roadmap for universities, local authorities, and professional partners seeking to move from isolated digital projects toward responsible, scalable urban intelligence that advances climate resilience, cultural continuity, and more inclusive cities.

Keywords: *Artificial intelligence; Sustainable cities; Urban intelligence; Climate resilience; Digital heritage; Developing world.*

Keynote Speaker 4



Asst. Prof. Dr. Ashish Sharma

Department of Information Technology
Lebanese French University (LFU), Erbil, Kurdistan Region, Iraq

Dr. Ashish Sharma is an Assistant Professor in the Department of Information Technology at Lebanese French University (LFU), Erbil, Kurdistan Region, Iraq. He holds a Ph.D. in Computer Science, with research focused on developing predictive models for identifying seizure-related patterns in electroencephalography (EEG) signals. His academic background also includes an M. Tech. in Computer Science, a Master of Computer Applications (MCA), and a Bachelor of Science (B.Sc.).

With more than 18 years of academic and research experience, Dr. Sharma has developed expertise in Artificial Intelligence (AI), Machine Learning, Deep Learning, data analytics, signal processing, and healthcare applications. His research interests include AI-based medical data analysis, EEG signal processing, seizure detection, computer vision, and intelligent systems. He is particularly interested in developing practical AI solutions that are reliable, affordable, and suitable for real-world challenges.

Dr. Sharma has contributed to research publications in areas including AI, machine learning, computer vision, and intelligent systems. His scholarly work includes publications in internationally indexed journals and conference proceedings. He has also contributed to innovation through patent-related work and has received recognition for his research and innovation activities. In addition, he participates in academic peer review and maintains professional engagement with the research community.

As an educator and researcher, Dr. Sharma is committed to connecting theoretical knowledge with practical applications. He believes that AI should be developed not only to achieve strong technical performance but also to address real societal needs. His current interests include sustainable AI, resource-efficient computing, AI-enabled healthcare, and the responsible application of intelligent technologies in environments with limited resources.

Through his teaching, research, and academic engagement, Dr. Sharma aims to support technological innovation, interdisciplinary collaboration, and the development of accessible and sustainable AI solutions that can contribute to meaningful societal impact.

Keynote Speaker 4: Abstract

Keynote Title

From Intelligent Algorithms to Sustainable Impact: Building Affordable, Trustworthy, and Resource-Efficient AI for the Developing World

Abstract

Artificial Intelligence (AI) has the potential to improve healthcare, transportation, energy management, and other essential services. However, turning AI research into practical solutions remains challenging in developing countries, where limited budgets, unreliable internet connectivity, inadequate computing facilities, and shortages of technical expertise can restrict its adoption. Therefore, AI solutions must be designed not only to perform well but also to meet local needs, use resources efficiently, and deliver measurable benefits.

This keynote explores how AI can be developed and applied in ways that are affordable, accessible, trustworthy, and sustainable. Healthcare is used as an important example, particularly AI-based electroencephalography (EEG) analysis for seizure detection and wearable health monitoring. Such technologies may support health professionals in identifying potential risks and monitoring patients, provided that the systems are carefully tested and their limitations are understood. The presentation also discusses applications in intelligent transportation, energy efficiency, and Internet of Things (IoT) systems.

A key focus is the role of edge AI, which enables data to be processed closer to where it is collected. Depending on the application, this approach can reduce reliance on continuous internet connectivity and remote cloud services while supporting faster responses. The keynote presents five guiding principles for sustainable AI: affordability, accessibility, trustworthiness, resource efficiency, and measurable impact. It also outlines a practical path from research and pilot projects to wider implementation, emphasizing local validation, collaboration, responsible deployment, and long-term maintenance.

The central message is that the success of AI should not be measured by accuracy alone. Its real value lies in solving relevant problems reliably, within available resources, and in ways that people and institutions can use and trust. By connecting technological innovation with local priorities and measurable outcomes, AI can make a meaningful contribution to inclusive and sustainable development in developing countries.

Keywords: *Artificial Intelligence, Sustainable AI, Developing Countries, Healthcare AI, EEG-Based Seizure Detection, Edge AI, Resource Efficiency, Trustworthy AI.*

Keynote Speaker 5



Assoc. Prof. Dr. Md. Asrul Nasid Masrom

Dean, Faculty of Technology Management and Business (FTMB)
Universiti Tun Hussein Onn Malaysia (UTHM), Malaysia

Associate Professor Dr. Md. Asrul Nasid Masrom is a prominent academic leader and researcher and currently serves as Dean of the Faculty of Technology Management and Business (FTMB) at Universiti Tun Hussein Onn Malaysia (UTHM). An alumnus of Queensland University of Technology (QUT), Australia, where he earned his PhD in Built Environment, he also holds a Master of Construction Contract Management and a Bachelor of Building from Universiti Teknologi Malaysia (UTM). Demonstrating exemplary leadership throughout his career, Dr. Asrul is the former Deputy Dean of Research and Development at FTMB and has furthered international academic collaboration as a Visiting Scholar & Postdoctoral Fellow (2019–2020) at the University of Melbourne's School of Architecture, Building, and Planning.

An active, widely cited scholar with over 1,500 citations, Dr. Asrul specializes in construction management and procurement, construction contract management and law, built environment and project delivery, and sustainable smart cities and green infrastructure. His future-focused research interests center on digital transformation and community impact, with a focus on digitalization in construction (Industry 4.0 & Decarbonization), sustainable smart city frameworks (SSC), stakeholder-community engagement, and digital technology integration in asset management. Through these endeavors, he continues to champion innovation and visionary leadership in Built Environment & Construction Management.

Keynote Speaker 5: Abstract

Keynote Title

Building the Future: Immersive Technology in Community Engagement for Green Infrastructure Development

Abstract

Social infrastructure is built for communities, yet those communities rarely have a meaningful say in how it is designed. In healthcare construction, engagement is routinely weakened by low participation, technical proposals that lay audiences struggle to interpret, and consultation that arrives only after key design decisions have been fixed. This conceptual paper asks why communities disengage, and how immersive virtual technology (IVT) might draw them back in. Using self-determination theory, it argues that the problem is fundamentally motivational, not merely informational. A critical synthesis of the stakeholder management, immersive technology and motivation literature produces a framework in which four IVT affordances (immersive visualisation, interactivity, design simulation and remote accessibility) satisfy the psychological needs for autonomy, competence and relatedness. Meeting these needs strengthens intrinsic motivation and sustains community participation. Gamification is positioned as a reinforcing condition rather than a primary driver. Five hypotheses link these mechanisms to engagement and project outcomes. A mixed-method protocol for Malaysian healthcare projects is also proposed, combining partial least squares structural equation modelling, computational sentiment analysis and expert validation. The framework maps opportunities across the construction project life cycle while confronting its darker possibilities: virtual tokenism, persuasive rendering, digital exclusion and fading novelty. No empirical validation or performance gains are reported. The paper contributes a motivational account connecting external stakeholder management with digital construction communication, together with a testable research agenda. Its message for practice is clear: immersive tools will deepen engagement only when communities are offered genuine design choices, accessible channels and visible evidence that their input shapes the outcome.

Conference Tracks

The conference topics include the following tracks (but are not limited to):

Tracks of AISDW26	
Track 1	Machine and Deep Learning for Intelligent Systems
Track 2	AI for Healthcare and Biomedicine
Track 3	AI in Business and Industry
Track 4	AI in Social Sciences and Humanities
Track 5	AI in Education
Track 6	AI for Climate Change and Environmental Sustainability
Track 7	Use AI for Security, Privacy, and Ethical Considerations
Track 8	AI and Autonomous Vehicles
Track 9	AI for Smart Cities and Urban Planning
Track 10	AI in Agriculture and Food Systems

Conference Date and Venue

The conference will be held on **November 3–4, 2026** (Hybrid).

Conference Day One

Day 1	University of Raparin
Address	Activity Hall, 2nd Floor, College of Basic Education Building, University of Raparin, Main Road, Ranya, Sulaimaniyah, Kurdistan Region, Iraq
Date	**November 3, 2026**
Start time	9:00 AM

Conference Day Two

Day 2	University of Raparin
Address	Activity Hall, 2nd Floor, College of Basic Education Building, University of Raparin, Main Road, Ranya, Sulaimaniyah, Kurdistan Region, Iraq
Date	**November 4, 2026**
Start time	10:00 AM

Contact & Registration

Website: https://aisdw26.uor.edu.krd/
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Conference Management Platform: EDAS

Conference Program

Day 1: Tuesday, 3 November 2026

Location: Activity Hall, College of Basic Education, University of Raparin (UoR)

Session: Opening Session	
09:00-10:00	Registration
10:00-11:15	Opening of The Conference
10:00-10:05	Iraqi National Anthem
10:05-10:10	Kurdistan Region Anthem
10:10-10:15	Recitation of Quran Verses and Al-Fatiha for The Nation's Martyrs
10:15-10:25	Speech by President of UoR: **Asst. Prof. Dr. Paiman Ramazan Ahmed**
10:25-10:35	Speech by MoHE - KRG Representative: **Prof. Dr. Khatab Ahmed Mustafa Shekhani**
10:35-10:45	Speech by Conference Executive Chair: **Prof. Dr. Jamal Ali Omar**
10:45-11:10	Distribution of Shields and Certificates of Appreciation
11:10-11:15	A Piece of Local Music
11:15-11:45	Coffee Break
11:45-12:00	Keynote Speaker 1: **Prof. Dr. Sabeeh Lafta Farhan**
12:00-12:15	Keynote Speaker 2: **Prof. Dr. Kiran Sood**
12:15-12:30	Keynote Speaker 3: **Asst. Prof. Dr. Ashish Sharma**
12:30-12:45	A piece of live music
12:45-13:00	Keynote Speaker 4: **Assoc. Prof. Dr. Md. Asrul Nasid Masrom**
13:00-13:15	Book Author: **Prof. Dr. Mahdi Husseini**
13:15-13:30	Keynote Speaker 5: **Prof. Dr. Ahmad 'Athif Mohd Faudzi**
13:30-15:00	Lunch Break
15:00-16:30	Technical Sessions Begin

Conference Program

Day 2: Wednesday, 4 November 2026

Location: Activity Hall, College of Basic Education, University of Raparin (UoR)

Session: Closing Session	
10:00-11:30	Technical Sessions Begin
11:30-11:45	Coffee Break
11:45-12:00	Closing and Conference Recommendations: **Prof. Dr. Aree Adel Abdulqader**
12:00-12:30	Distribution of Shields and Certificates of Appreciation
12:30-12:45	Group Photo
13:00-14:30	Lunch Break
14:30-16-30	Raparin Area Tour
16:30	Farewell and Travel

Day One: Technical Sessions — 3 November 2026

Session No.: 01 / In-Person & Hybrid **Date: 03.11.2026**

Venue: *Activity Hall, 2nd Floor, College of Basic Education Building, University of Raparin, Main Road, Ranya, Sulaimaniyah, Kurdistan Region, Iraq*

Track: Machine and Deep Learning for Intelligent Systems	**Theme:** Medical Imaging and Biomedical Intelligence	
Chair: *Prof. Dr. Najmaddin Mohammed Saied*	**Rapporteur:** *Mr. Osama Khosraw Mohammed Ameen*	**Hall:** B8

Time	Presenter	Paper ID	Paper Title
15:00–15:15	Mahir Essa Alsalihi	1571305036	Integrated Machine Learning, Molecular Docking, and Molecular Dynamics Prioritize Glycyrrhiza glabra Fatty Acids Alongside Glabridin as Candidate Leads for Respiratory Inflammation *Mahir Essa Alsalihi (Garmian Polytechnic University, Iraq)*
15:15–15:30	Iman Nihad Jubrail	1571305501	An Integrated Deep Learning Framework for Breast Cancer Classification and Tumor Detection in Mammography Using EfficientNetV2S and YOLOv8 *Iman Nihad Jubrail; Bnar Fareed Ibrahim; Teeba Ismail Khalil (Lebanese French University, Iraq)*
15:30–15:45	Nahro Nooraldeen Abbas	1571308014	Automated Hematological Cell Detection and Recognition from Microscopic Images Using YOLO Deep Learning Architecture *Nahro Nooraldeen Abbas, Ahmed Shahab Ahmed and Goran Omar Ali, Soran Abdulkarim Pasha, Renas Salih Ahmed (University of Garmian, Iraq)*
15:45–16:00	Sarbast Ahmed Mohammed	1571308420	AMG-CycleGAN: Anatomical Memory Guided Unsupervised MRI-to-CT Translation via Latent Anatomical Prototype Learning. *Sarbast Ahmed Mohammed (Soran University, Iraq); Sarhang Sulaiman Bakr (Erbil Polytechnic University, Iraq); Omed Sadeeq (Soran University, Iraq); Ako Bartani (University of Kurdistan, Iran)* .
16:00–16:15	Astitva Gourav	1571331578	Beat the Clock at the Edge: A Slice-Aware, Compression-Driven Inference Pipeline for Life-Critical Biomedical IoT over 5G mmWave *Astitva Gourav (Department of Electrical and Computer Engineering, Bharati Vidyapeeth (Deemed to be University) College of Engineering, Pune)*

Venue: *Activity Hall, 2nd Floor, College of Basic Education Building, University of Raparin, Main Road, Ranya, Sulaimaniyah, Kurdistan Region, Iraq*

Session No.: 02 / Mode: In Person & Online Date: 03.11.2026

Track: Machine and Deep Learning for Intelligent Systems	**Theme:** Language and Human Interaction	
Chair: *Prof. Dr. Dindar Shamsadin Bri*	**Rapporteur:** *Mr. Akam Aziz Abdulrahman*	**Hall:** B9

Time	Presenter	Paper ID	Paper Title
15:00–15:15	Koser Omer Ahmad	1571303588	Dimensions of Mystical Poetry: A Comparative Analysis of Human Poetic Experience and AI-Generated Verse *Koser Omer Ahmad (Garmian Polytechnic University)*
15:15–15:30	Party Ibrahim	1571309760	NLP-Driven Recommender System for Curriculum Gap Analysis: A Dual-Benefit Framework for Higher Education Sustainability *Party Ibrahim (Duhok Polytechnic University, Iraq)*
15:30–15:45	Vallent Primera Chandra	1571317584	A Low-Latency Python-Unity Integrated Framework for Real-Time BISINDO Recognition: A Comparative Analysis of Coordinate-Based Deep Learning Architectures *Vallent Primera Chandra; Wishly Valen Kwek; Antonius Alexander Maximilian Tjandra; Gabriel Asael Tarigan; Rhio Sutoyo (Bina Nusantara University, Jakarta, Indonesia)*
15:45–16:00	Mohammed Hussein Abdalla	1571345534	Opinion Mining of Sorani Kurdish Facebook Posts Using Multilingual Transfer Learning Models *Mohammed Hussein Abdalla (University of Raparin, Rania, Iraq)*
16:00–16:15	Adel Ali Hasan	1571356407	Kurdish Dialect Identification from Short Speech Segments Using Pretrained Speech Transformers *Adel Ali Hasan, Asst. Prof. (Akre University for Applied Sciences, Iraq); Mohammed Alsawaf (International University of Erbil, Iraq); Mohammed Hashim (AUAS)*

Venue: *Activity Hall, 2nd Floor, College of Basic Education Building, University of Raparin, Main Road, Ranya, Sulaimaniyah, Kurdistan Region, Iraq*

Session No.: 03 / Mode: In Person Date: 03.11.2026

Track: Machine and Deep Learning for Intelligent Systems	**Theme:** Intelligent Applications Security and Networks	
Chair: *Asst. Prof. Dr. Shwana Akoye*	**Rapporteur:** *Mr. Mohammed Hussien Ahmed*	**Hall:** B10

Time	Presenter	Paper ID	Paper Title
15:00–15:15	Farah Qasim Ahmed Alyousuf	1571305672	A Mapping Mechanism for Arb-Syllable Technique in Text-Based Steganography *Farah Qasim Ahmed Alyousuf (Lebanese French University, Iraq); Roshidi Din; Mohd Saiful Adli Mohamad (Universiti Utara Malaysia, Sintok, Kedah, Malaysia)*
15:15–15:30	Jamal Ali Omar	1571299337	The Alignment of AI-Powered EFL Learning Tools with Materials Development Principles from Teachers' Perspectives *Jamal Ali Omar; Sarkawt Muhammad Qadir (Department of English, University of Raparin, Ranya, Iraq)*
15:30–15:45	Amir Sherwani	1571299686	Deep-Learning Volatility Forecasting in Cryptocurrency Markets: Economic Value for Emerging-Market Investors Using Bitcoin and Ethereum as Currency and Inflation Hedges *Amir Sherwani; Mohammed Othman Sedeeq (Soran University (SU), Iraq); Rahela Aziz Rasul (University of Raparin, Iraq); Kamaran Ibrahim Yousif and Farooq Omar Abdullah (SU)*
15:45–16:00	Adel Ali Hasan	1571353064	Adaptive Machine-Learning Trust Scoring for Zero Trust Access Control in Iraq and the Kurdistan Region *Adel Ali Hasan (Akre University for Applied Sciences, Iraq); Mohammed Jalal (Sulymani Polytechnic University, Iraq)*
16:00–16:15	Siddeeq Y. Ameen	1571358896	Artificial Intelligence Resource Allocation in 6G Networks Using Deep Reinforcement Learning *Siddeeq Y. Ameen (Duhok Polytechnic University, Iraq); Salar Ismael Ahmed (Erbil Polytechnic University, Iraq*

Venue: *Activity Hall, 2nd Floor, College of Basic Education Building, University of Raparin, Main Road, Ranya, Sulaimaniyah, Kurdistan Region, Iraq*

Session No.: 04 / Mode: In Person Date: 03.11.2026

Track: AI in Business and Industry	**Theme:** Management Finance and Business Performance	
Chair: *Prof. Dr. Farsat Heeto A.*	**Rapporteur:** *Mr. Halgurd Rasol Ahmed*	**Hall:** B11

Time	Presenter	Paper ID	Paper Title
15:00–15:15	Aso Kurdo Ahmed	1571305801	Redefining the Bargaining Table: The Impact of Artificial Intelligence on Negotiation Management *Aso Kurdo Ahmed(International University of Erbil)* *Luqman Qader Abdulrahman (Hawler Medical University)*
15:15–15:30	Chia Mohammed Hassan	1571306184	Perceived Artificial Intelligence Implementation and Perceived Financial Performance in Iraqi Banking: Evidence from Bank Employees in Sulaymaniyah Governorate, Kurdistan Region of Iraq *Chia Mohammed Hassan; Nabard Karim Rahim* *(Garmian Polytechnic University, Kifri, Iraq; Vision Foundation for Strategic Studies)*
15:30–15:45	Zozik Sabah Rasool	1571306971	The Impact of Artificial Intelligence on Industrial Management: A Statistical Study of Modern Enterprises *Zozik Sabah Rasool; Mikaeel Biro Munaf; Muhajir Hagar Saleem (Soran University, Iraq); Bekhal Samad Sedeeq (Salahaddin University-Erbil, Iraq); Mustafa Farzinda Faris (Soran University, Iraq)*
15:45–16:00	Dilman Khoshavi Ramadan	1571317064	Measuring the Generational Gap in Mobile Advertising Effectiveness Using the AIDA Model: An AI-Based Predictive Approach in Duhok City *Dilman Khoshavi Ramadan (University of Duhok)*
16:00–16:15	Qabil Hamad Zrar	1571332848	The Impact of Implementing Artificial Intelligence (AI) on the Performance-Focused Activity-Based Costing (PFABC) Technique for Improving Product Cost *Hamad Zrar (Soran university, Iraq); Halmat Rasol Smiel (University of Raparin, Iraq); Laila Qasim Jasim, Paiwand Ayoob Faqe Ahmad and Sawin Sadiq Hisso (University of Soran, Iraq)*
16:15-16:30	Nasreen M. Sharafani	1571347270	Country Readiness for Adopting Artificial Intelligence and Its Impact on Economic Growth: An Econometric Study of a Sample of Middle-Income Developing Countries *Nasreen M. Sharafani (Duhok Polytechnic University, Iraq)*

Venue: *Activity Hall, 2nd Floor, College of Basic Education Building, University of Raparin, Main Road, Ranya, Sulaimaniyah, Kurdistan Region, Iraq*

Session No.: 05 / Mode: In Person Date: 03.11.2026

Track: AI in Education	**Theme:** AI for EFL Speaking, Writing, and Vocabulary	
Chair: *Prof. Dr. Siddeeq Y. Ameen*	**Rapporteur:** *Mr. Jaefer Sulieman Hamid*	**Hall: B**12

Time	Presenter	Paper ID	Paper Title
15:00–15:15	Sardar Abdalla Hussein	1571308905	Assessing University EFL Learners' Readiness to Use AI Voice Assistants for Speaking Practice *Sardar Abdalla Hussein (University of Raparin, Rania, Iraq)*
15:15–15:30	Karzan Othman Dawd	1571310409	Exploring EFL Learners' Acceptance of AI Tools for Writing *Karzan Othman Dawd; Hawraz Qader Hama (University of Raparin, Ranya, Iraq)*
15:30–15:45	Saman Mohammed Othman	1571311555	AI Conversational Agents to Enhance Self-Confidence and Reduce Kurdish EFL Learners' Speaking Anxiety *Saman Mohammed Othman and Jamal Ali Omar (University of Raparin, Iraq); Marewan Dhahir Taher (Koya University, Iraq)*
15:45–16:00	Ahmed Hamasur Pirot	1571311978	From Lookup to Learning: A Needs Analysis of Generative AI and Mid-Frequency Vocabulary among EFL Learners *Ahmed Hamasur Pirot and Jamal Ali Omar (University of Raparin, Iraq)*
16:00–16:15	Saman Babakr Watman	1571337080	Exploring Kurdish EFL Students' Perceptions of AI Tools for Enhancing Speaking Proficiency Through Task-Based Oral Communication *Saman Babakr Watman, Shwana Qadir Perot (University of Raparin, Iraq); Samrand Amini (Cihan University-Erbil, Iraq)*

Day Two: Technical Sessions — 4 November 2026

Venue: *Activity Hall, 2nd Floor, College of Basic Education Building, University of Raparin, Main Road, Ranya, Sulaimaniyah, Kurdistan Region, Iraq*

Session No.: 06 / Mode: In Person Date: 04.11.2026

Track: AI in Education	**Theme:** AI Readiness, Academic Practice and Economic Development	
Chair: *Asst. Prof. Dr. Bnar Fareed Ibrahim*	**Rapporteur:** *Mr. Nabaz Mawlod Ali*	**Hall:** B8

Time	Presenter	Paper ID	Paper Title
10:00–10:15	Sardar Abdalla Hussein	1571309648	Evaluating Teacher Trainees' Readiness to Integrate AI-Enhanced ICT Tools in Resource-Constrained Educational Contexts: A Mixed-Methods Analysis *Sardar Abdalla Hussein (University of Raparin, Rania, Iraq)*
10:15–10:30	Luay I. Sarhan	1571341145	A Hybrid System for Academic Attendance Management: Integrating QR Code and Location-Based Authentication (GPS) to Enhance Reliability *Luay I. Sarhan (Computer Institute, Duhok)*
10:30–10:45	Farhang Ali Awdi	1571346397	Between Academic Assistance and Academic Misconduct: Ethical and Unethical Use of Generative AI among University Students in Iraqi Kurdistan *Farhang Ali Awdi (Knowledge University, Iraq); Zhila Esmail Bayz (The International University of Erbil, Iraq)*
10:45–11:00	Ruqyah Jalal	1571348740	The Kurdish Language in the Artificial Intelligence Era: A Comparative Assessment of Digital Vitality and AI Readiness *Ruqyah Jalal and Kawa Sherwani, Darvan Shvan Khairaldeen (International University of Erbil, Iraq)*
11:00–11:15	Nasreen M. Sharafani	1571347270	Country Readiness for Adopting Artificial Intelligence and Its Impact on Economic Growth: An Econometric Study of a Sample of Middle-Income Developing Countries *Nasreen M. Sharafani (Duhok Polytechnic University, Iraq)* *AI in Business and Industry*

Venue: *Activity Hall, 2nd Floor, College of Basic Education Building, University of Raparin, Main Road, Ranya, Sulaimaniyah, Kurdistan Region, Iraq*

Session No.: 07 / Mode: In Person & Online Date: 04.11.2026

Track: AI in Social Sciences and Humanities	**Theme:** Governance Inclusion and Sustainable Development	
Chair: *Dr. Nabard Karim Rahim*	**Rapporteur:** *Mr. Shaki Khedir Mohammed*	**Hall:** B9

Time	Presenter	Paper ID	Paper Title
10:00–10:15	Abdulrahman K. Darwesh	1571307691	The Role of Artificial Intelligence in Political Awareness: Opportunities, Challenges, and Risks. *Abdulrahman K. Darwesh (Soran University, Iraq); Sami I. Mati (University of Leicester, UK)*
10:15–10:30	Ako hamakarim Raheem	1571332304	National Security in the Age of Artificial Intelligence (AI): Threats, Opportunities and Needs of Iraq and the Kurdistan Region *Ako hamakarim Raheem (Vision Foundation for Strategic Studies, Iraq)*
10:30–10:45	Aras Abdulkareem Miho	1571342414	Can Artificial Intelligence Reduce Financial Exclusion in Iraq? Digital Inequality, Institutional Readiness, and Sustainable Inclusion *Aras Abdulkareem Miho and Hayman Ahmed Mikail (Akre University for Applied Sciences, Iraq)*
10:45–11:00	S. Mahid Hosseini	1571346590	A Systemic Information Systems Framework for AI-Enabled Sustainable Development in the Kurdistan Region *S. Mahid Hosseini and Habib Soleimani (University of Kurdistan, Iran)*
11:00–11:15	Bestoon Othman	1571347643	E-Government Practices and Their Effect on Organizational Performance: An Empirical Study at the University of Raparin *Bestoon Othman (University of Raparin, Iraq)*

Venue: *Activity Hall, 2nd Floor, College of Basic Education Building, University of Raparin, Main Road, Ranya, Sulaimaniyah, Kurdistan Region, Iraq*

Session No.: 08 / Mode: In Person & Online Date: 04.11.2026

Track: AI in Social Sciences and Humanities	**Theme:** Education Organizations and Digital Behaviour	
Chair: *Asst. Prof. Dr. Saman Mohammed Omer*	**Rapporteur:** *Dr. Kamran Hussien Khdir*	**Hall:** 10

Time	Presenter	Paper ID	Paper Title
10:00–10:15	Arazoo Zand	1571321749	The Pros and Cons of Integrating AI in Academic Writing Classes: Erbil International University *Arazoo Zand and Huda Yassin (International University of Erbil, Iraq); Meram Salim Shekh Mohamad (Lebanese French University, Iraq)*
10:15–10:30	Bestoon Othman	1571346948	From Clicks to Campus: How AI-Powered Digital Marketing Shapes Student Enrollment Decisions in Malaysian Higher Education *Bestoon Othman (University of Raparin, Iraq); Amran Harun (Universiti tun Hussein Onn Malaysia, Malaysia)*
10:30–10:45	Bestoon Othman	1571346950	Perceived Artificial Intelligence Efficiency, Benefits, and Challenges as Predictors of Student Productivity in Malaysian Public Universities *Bestoon Othman (University of Raparin, Iraq); Amran Harun (Universiti tun Hussein Onn Malaysia, Malaysia*
10:45–11:00	Bestoon Othman	1571347645	Employee Motivation and Leadership Style in the Private Sector of Emerging Economy with Artificial Intelligence Enabled Management: Implications *Bestoon Othman (University of Raparin, Iraq)*
11:00–11:15	Mohammed Jalal	1571352221	The Impact of Website Security Features on Customer Conversion Rates in Kurdistan: The Mediating Role of Customer Trust *Mohammed Jalal (Sulymani Polytechnic University, Iraq); Bestoon Othman (University of Raparin, Iraq); Sazan Othman Rashed (Sulaimani Polytechnic University, Iraq)*

Venue: *Activity Hall, 2nd Floor, College of Basic Education Building, University of Raparin, Main Road, Ranya, Sulaimaniyah, Kurdistan Region, Iraq*

Session No.: 09 / Mode: In Person & Online Date: 04.11.2026

Track: AI in Social Sciences, Health Care and Agriculture	**Theme:** Public Health, Agriculture and Sustainable Communities	
Chair *Asst. Prof. Rokhsar Mohammed Omer*	**Rapporteur:** *Dr. Saman Mohammed Othman*	**Hall:** B11

Time	Presenter	Paper ID	Paper Title
10:00–10:15	Shilan Mohammed Ali	1571338581	From Medical History to Smart Prediction: Mapping the Sustainability of Seasonal Epidemic Countermeasures via AI *Shilan Mohammed Ali (Garmian Polytechnic University, Iraq)* *AI in Social Sciences and Humanities*
10:15–10:30	Narimah Kasim	1571357475	Adoption of Solid Wall Panel Technology in Small Scale Construction Firms *Narimah Kasim (Universiti Tun Hussein Onn Malaysia (UTHM), Malaysia)* *AI in Social Sciences and Humanities*
10:30–10:45	Siddeeq Yousif Ameen	1571360360	An AI-Based Remote Monitoring and Early Risk Detection System for Diabetes Management in Telemedicine *Siddeeq Yousif Ameen; Marya Ayob Omar (Duhok Polytechnic University, Duhok, Iraq)* *AI in Healthcare and Biomedicine*
10:45–11:00	Ala Asi Mohammed Al-Salihi	1571356544	AI-Guided Precision Cultivation and Bioactive Compound Elicitation in Melissa officinalis *Ala Asi Mohammed Al-Salihi; Mahir Essa Alsalihi; Halgurd Nasraden Hassan (Garmian Polytechnic University; Iraq)* *AI in Healthcare and Biomedicine*
11:00–11:15	Gelawezh Khalil Qader	1571314775	A Study on the Applications of Artificial Intelligence (AI) Technologies in the Production and Marketing of Broiler in Iraq: Reality and Aspirations *Gelawezh Khalil Qader (Akre University for Applied Sciences, Iraq); Jassim Kassim Al-Gharawi (Al-Muthanna University, Iraq); Ali Ridha Al-Yasiry (Ibn Sina University of Medical and Pharmaceutical Sciences, Iraq)* *AI in Agriculture and Food Systems*

Venue: *Activity Hall, 2nd Floor, College of Basic Education Building, University of Raparin, Main Road, Ranya, Sulaimaniyah, Kurdistan Region, Iraq*

Session No.: 10 / Mode: In Person Date: 04.11.2026

Track: Privacy and Ethical Considerations	**Theme:** Security, Privacy, Ethics, and Environmental Sustainability	
Chair: *Dr. Aram Mohammed Rasol*	**Rapporteur:** *Dr. Bewar Ahmed Abdullah*	**Hall:** B12

Time	Presenter	Paper ID	Paper Title
10:00–10:15	Suhaib Ghazi Salih	1571320423	A Hybrid Machine Learning-Based Anomaly Detection Model for Early Identification of Phishing Attacks *Suhaib Ghazi Salih, Sabat Muhamad and Hakem Beitollahi (Soran University, Iraq); Hoshang Qasim Awla (ERBIL/ DYANA, Iraq); Nergz Sattar Mohammed (Soran University, Iraq)*
10:15–10:30	Sana Mohammed	1571341687	Data Privacy and Artificial Intelligence in the Kurdistan Region: Assessing the Need for a Local Regulatory Framework *Sana Mohammed (Salento, Italy); Ali Saleem Saleem (Cihan university, Iraq)*
10:30–10:45	Walat A. Ahmed	1571342815	A Hybrid CNN-BiLSTM and Explainable AI Framework for False Data Injection Attack Detection in Solar PV Inverters *Walat A. Ahmed; Sipan M. Hameed; Marya A. Omar (Duhok Polytechnic University, Iraq)*
10:45–11:00	Fahad Mira	1571349556	Trust and Ethical Governance in the Metaverse *Fahad Mira (University of Bedfordshire, UK)*
11:00–11:15	Iman Subhi Mohammed	1571364952	A Novel Semantic-Aware Toonification Framework with Adaptive Color Abstraction *Iman Subhi Mohammed (University of Mosul, Iraq)*
11:15–11:30	Kardo S. M. Ranyayi	1571348116	Non-linear Hydro-Meteorological Forecasting Using Machine Learning in the Kurdistan Region of Iraq *Kardo S. M. Ranyayi; Dlshad A. Mahmood (University of Raparin, Iraq)* *AI in Climate Change and Environmental Sustainability*

Conference Committees

Conference Executive Chair: Prof. Dr. Jamal Ali Omar, Director General of the Research Center / University of Raparin

Organizing Committee

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19	**Dr. Humera Khan**	Lecturer, International University of Erbil / Member
20	**Dr. Nabard Karim Rahim**	Garmian Polytechnic University / Member

Conference Committees

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26	**Dr. Soran Abdulkarim Pasha**	Garmian Polytechnic University
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30	**Dr. Suhaila Mohd Yasin**	Universiti Tun Hussein Onn Malaysia, Malaysia (International)
31	**Dr. Rosmamalmi Mat Nawi**	Universiti Tun Hussein Onn Malaysia, Malaysia (International)
32	**Dr. Juzaimi Nasuredin**	Universiti Tun Hussein Onn Malaysia, Malaysia (International)
33	**Dr. Aram Mohammed Rasul**	University of Raparin (National)
34	**Dr. Kamaran Hussein Khdr**	University of Raparin (National)

Publication Opportunities

The conference publishing committee will submit accepted papers to **Springer Nature Link** and **Emerald Publishing**.

Important Note

The conference scientific committee reserves the right to exclude a paper from distribution after the conference (e.g., removal from the proceedings) in two cases:

- If the paper is not presented at the conference or if its quality and findings are not well explored and convincing, the scientific committee will check this with all accepted papers.
- Any accepted paper without presenting the work will be withdrawn from the conference proceedings (will neither be submitted to the publishing company nor the proceedings).

Partners

University of Raparin, Akre University for Applied Sciences, Duhok Polytechnic University, Universiti Tun Hussein Onn Malaysia, International University of Erbil, Garmian Polytechnic University, Soran University, University of Zakho, and Lebanese French University.

Note: More publishers, scientific journals, and partners will be added later.

The Alignment of AI-Powered EFL Learning Tools with Materials Development Principles from Teachers' Perspectives

Jamal Ali Omar *and* Sarkawt Muhammad Qadir *(University of Raparin, Ranya, Iraq)*

Abstract: The integration of Artificial Intelligence (AI) into English as a Foreign Language (EFL) education is reshaping how learners engage with content. Yet its effectiveness depends on alignment with established principles of materials development. This paper explores EFL university instructors' perceptions of AI-powered EFL learning tools, the extent to which these tools align with key principles of materials development from instructors' perspectives, and the challenges associated with their integration in the Kurdistan Region of Iraq (KRI). An explanatory sequential mixed-methods design was employed, using a 21-item questionnaire administered to 109 instructors and semi-structured interviews with 19 instructors. Quantitative data were analyzed using descriptive statistics and Spearman's rank-order correlation, while qualitative data were analyzed thematically. The findings revealed that instructors held positive perceptions of AI-powered EFL learning tools (M = 3.87, SD = .65) and perceived a high level of alignment between AI tools and materials development principles (M = 3.83, SD = .55). This alignment was particularly evident in principles such as activity variety, targeted language activities or focus on language features, engaging content, comprehensible input, and adaptability. Frequency of AI use and AI proficiency were positively correlated with perceptions ($r = 0.411$, $p < 0.001$, and $r = 0.24$, $p < 0.010$, respectively) and with alignment ($r = 0.28$, $p < 0.003$, and $r = 0.19$, $p < 0.048$, respectively). Instructors identified several challenges, including students' overreliance on AI, ethical concerns and bias, limited institutional support, and concerns about cultural appropriateness and material accuracy.

Keywords: Artificial Intelligence, AI-powered EFL learning Tools, English as a Foreign Language, Materials Development Principles, Kurdish EFL Instructors.

Deep-Learning Volatility Forecasting in Cryptocurrency Markets: Economic Value for Emerging-Market Investors Using Bitcoin and Ethereum as Currency and Inflation Hedges

Amir Sherwani, Mohammed Othman Sedeeq *(Soran University), Iraq);* Rahela Aziz Rasul *(University of Raparin, Iraq);* Kamaran Ibrahim Yousif, and Farooq Omar Abdullah *(*Soran *U*niversity*)*

Abstract: Households and firms in high-inflation emerging economies increasingly use Bitcoin and Ethereum as informal hedges against local-currency depreciation, yet cryptocurrency deep-learning volatility research is evaluated almost exclusively on statistical loss and rarely on the portfolio decisions it should inform. Using daily Bitcoin and Ethereum OHLCV data from Coinbase (1 January 2018 – 24 May 2026, N = 3,066 observations per asset across five volatility regimes), we benchmark Transformer, LSTM, and GRU forecasts against GARCH(1,1), EGARCH(1,1), and HAR-RV under walk-forward out-of-sample evaluation with Diebold-Mariano (HLN-corrected) and Model Confidence Set tests, then translate forecasts into a VaR-constrained portfolio rule for a representative investor exposed to the Egyptian pound, Turkish lira, Nigerian naira, and Argentine peso (currency paths are calibrated geometric Brownian motions matched to documented 2022–2025 depreciation and volatility statistics, pending replacement with live FRED/IMF series). HAR-RV (Corsi, 2009) achieves the lowest out-of-sample MSE for both assets (BTC: 56.0×10^{-3}; ETH: 75.7×10^{-3}), and deep-learning models do not statistically dominate the econometric benchmarks. The ranking flips on economic value: for the Ethereum-holding emerging-market investor, the Transformer delivers the highest annualized Sharpe ratio in three of four currencies (TRY: 2.64, NGN: 2.53, EGP: 1.69) despite losing on MSE. Every managed-volatility strategy dominates buy-and-hold in every currency, with the premium widening as depreciation accelerates; the flip is asymmetric, appearing for Ethereum but not Bitcoin. The results reframe the deep-learning-versus-econometric debate in financial forecasting around economic decision relevance rather than statistical accuracy alone.

Keywords: *Cryptocurrency volatility forecasting; Transformer deep learning; Emerging-market investors; Economic value of forecasts; Currency and inflation hedging; Bitcoin and Ethereum.*

Dimensions of Mystical Poetry: A Comparative Analysis of Human Poetic Experience and AI-Generated Verse

Koser Omer Ahmad *(Garmian Polytechnic University)*

Abstract: The emergence of advanced Large Language Models (LLMs) presents a nuanced challenge and a unique opportunity to re-examine the fundamental tenets of human creativity. This research delves into one of the most sublime and intricate modes of literary expression—mystical poetry (Sufism)—to conduct a comprehensive comparative analysis between the soul-centered experience of the human poet and the outputs of Artificial Intelligence. The central inquiry of this work is not merely whether AI can compose mystical verse, but whether it can replicate the spiritual depth, emotional resonance, and experiential essence that define this literary tradition.

Titled "Dimensions of Mystical Poetry: A Comparative Analysis Between Human Poetic Experience and Artificial Intelligence Output," the study employs a multi-dimensional descriptive-analytical framework. The texts are analyzed and contrasted based on four primary axes: 1) The linguistic and terminological dimension, focusing on the specialized Sufi lexicon and the nuances of syntactic structures; 2) The dimension of content and emotional depth, exploring the authenticity of spiritual experience, divine love, longing, and annihilation (*Fana*); 3) The imagery and symbolic dimension, contrasting symbols emerging from human interiority with those generated through algorithmic pattern recognition; and 4) The musical and rhythmic dimension, analyzing the meter and the internal harmony of the texts.

To provide this theoretical comparison with an empirical foundation, the research incorporates a case study drawing upon the works of the seminal Kurdish mystical poet, Mahwi, juxtaposing them with texts generated by state-of-the-art LLMs. The ultimate objective is to delineate the boundary between human consciousness and artificial simulation within the art of poetry. This work contributes to the ongoing discourse regarding the role of AI in creative domains, positing that while AI may serve as a potent tool for formal imitation, the mystical *"Haal"* (spiritual state)—as a primordial experience—remains an inimitable fortress of the human spirit. Finally, the research concludes with a presentation of findings and a systematically organized bibliography.

Keywords: *Mystical Poetry, Artificial Intelligence, Comparative Analysis, Spiritual Dimensions.*

Integrated machine learning, molecular docking, and molecular dynamics prioritize Glycyrrhiza glabrafatty acids alongside glabridin as candidate leads for respiratory inflammation

Mahir Essa Alsalihi (Garmian Polytechnic University, Iraq)

Abstract: Chronic respiratory inflammatory diseases remain a major therapeutic challenge, driving the ongoing search for plant-derived multi-component candidates with complementary mechanisms of action. The anti-inflammatory relevance of Glycyrrhiza glabra(licorice) has been established, however, the role of its fatty acid components is insufficiently characterized. In this work, an integrated computational workflow was used with an ethyl acetate root extract to profile the sample with GC–MS, apply machine learning (ML), conduct ADMET screening, perform target-specific molecular docking and molecular dynamics (MD) simulation. These 9 GC–MS profiled compounds were tested on a pre-trained Random Forest model for activity against the cytokines TNF-α, IL-6, and NF-κB, and then subjected to docking using AutoDock Vina with the 3D structures of the cytokines IL-6 (1ALU), NF-κB (1VKX), and TNF-α (2AZ5). Among the tested substances, glabridin had the best model-predicted activity score (Pa = 0.93) and the highest-ranking fatty acid was linoleic acid with the ranking score RS = 0.85. In the TNF-α interface, the mean docking scores for glabridin, linoleic acid and dexamethasone were determined to be −5.85 kcal/mol, −4.80 kcal/mol and −6.20 kcal/mol, respectively. Three independent 100 ns MD production simulations (300 ns total) of the TNF-α–linoleic acid complex demonstrated structural stability, with an ensemble MM/PBSA binding-energy estimate of −27.8 ± 2.4 kcal/mol. These results are computational prioritization of candidates not experimental validation for anti-inflammatory agents. The results indicate that additional experimental evaluation of individual compounds and specific compound combinations should be done in cellular systems such as LPS stimulated macrophages to determine if claims of target mediated activity or synergy can be made.

Keywords: *Glycyrrhiza glabra, machine learning, KNIME, molecular docking, linoleic acid, anti-inflammatory, cheminformatics, virtual screening.*

An Integrated Deep Learning Framework For Breast Cancer Classification And Tumor Detection In Mammography Using Efficientnetv2s And Yolov8

Iman Nihad Jubrail, Bnar Fareed Ibrahim, Teeba Ismail Khalil (Lebanese French University, Iraq)

Abstract: Breast cancer is one of the most prevalent cancers among women globally and early detection can enhance treatment options and outcomes. Mammography is the standard imaging modality for breast cancer screening however, interpretation can be challenging, particularly in women with dense breast tissue. Moreover, many computer-aided diagnosis systems focus on a single task and do not provide combined diagnostic and localization information. This study proposes an integrated deep-learning framework for classifying and localizing lesions in mammographic images. The data used in the development of the framework was obtained from a private data collection at Maryamana Hospital in Erbil, Kurdistan Region of Iraq. The dataset comprised 620 mammograms images from 310 patients. The framework combines an EfficientNetV2S-based multi-output model for benign–malignant diagnosis and breast-density classification with YOLOv8 for tumor detection and localization. The accuracy of diagnosis and breast-density classification for EfficientNetV2S was 98.56% and 100%, respectively. Among the evaluated detection variants, YOLOv8m provided the best balance between precision and recall, achieving 85.7% precision, 89.0% recall, an F1-score of 87.3% and an mAP@50 of 83%. Besides classification, the study also offered clinically relevant outputs, such as tumor size estimation in millimeters and lesion localization. The findings indicate that the integration of EfficientNetV2S and YOLOv8 offers an accurate and reliable solution for automated breast cancer analysis. The proposed framework has the potential to assist radiologists in improving diagnostic accuracy, support early detection, and enhance clinical decision-making, thereby contributing to more accessible and sustainable healthcare services.

Keywords: *Breast cancer; Mammography; EfficientNetV2S; YOLOv8; Breast density; Computer-aided diagnosis*

A Mapping Mechanism For Arb-Syllable Technique In 2 Text-Based Steganography

Farah Qasim Ahmed Alyousuf (Lebanese French University, Iraq); Roshidi Din and Mohd Saiful Adli Mohamad (Universiti Utara Malaysia, Sintok, Kedah, Malaysia)

Abstract: Text-based steganography faces significant challenges in balancing hiding capacity, security, robustness, and imperceptibility. Existing techniques such as Vertical Straight Line (VERT), Changing in Alphabet Letter Patterns (CALP), and Quadruple Categorization (QUAD) have demonstrated limitations in achieving optimal performance across all metrics. This paper proposes a mapping mechanism that leverages Arabic-to-English transliteration to classify English characters into Pointed Letters (PL) and Unpointed Letters (UL) groups for the Arb-Syllable technique. The proposed approach embeds binary bits by mapping English characters to their Arabic phonetic equivalents based on the presence or absence of diacritical points. Experimental results demonstrate significant improvements, achieving 100% security ratio and imperceptibility (Jaro-Winkler distance of 1.0), compared to maximums of 99.99% and 0.9982 for existing techniques. Furthermore, the hiding capacity performance increased by 30% compared to VERT, CALP, and QUAD. The proposed technique also exhibits superior robustness against structural attacks, preserving message integrity under formatting modifications.

Keywords: Text-based steganography, Arb-Syllable technique, Mapping mechanism, Arabic transliteration, Random and statistical method, Information hiding

Automated Hematological Cell Detection and Recognition from Microscopic Images Using YOLO Deep Learning Architecture

Nahro Nooraldeen Abbas, Ahmed Shahab Ahmed, Goran Omar Ali, Soran Abdulkarim Pasha, and Renas Salih Ahmed (University of Garmian, Iraq)

Abstract: Automated blood cell detection has become an important research area in medical image analysis due to its potential to improve the accuracy and efficiency of hematological diagnosis. Manual microscopic examination of blood smear images is labor-intensive, time-consuming, and highly dependent on expert interpretation, making it susceptible to observer variability. Recent advances in deep learning, particularly the You Only Look Once (YOLO) family, have demonstrated remarkable performance in real-time object detection tasks and have shown promising results in medical imaging applications. This study presents a comprehensive comparative evaluation of four recent YOLO architectures, namely YOLOv8m, YOLO11m, YOLO12m, and YOLO26m, for automated blood cell detection and classification using microscopic blood smear images. The dataset consists of annotated red blood cells (RBCs) and five categories of white blood cells (Basophils, Eosinophils, Lymphocytes, Monocytes, and Neutrophils). To ensure a fair comparison, all models were trained using identical preprocessing procedures, image resolution, hyperparameter settings, and evaluation metrics. Model performance was assessed using Precision, Recall, mAP@50, and mAP@50–95. Experimental results demonstrate that YOLO26m achieved the highest Recall (89.0%), mAP@50 (86.4%), and mAP@50–95 (67.2%) among the evaluated models, although it exhibited the lowest Precision (68.7%). These findings indicate a trade-off between detection sensitivity and precision, suggesting that YOLO26m may be preferable in applications where maximizing Recall is prioritized rather than representing a universally optimal architecture. The findings suggest that recent YOLO architectures provide reliable and effective solutions for intelligent computer-aided hematological diagnosis and can significantly assist medical specialists in blood cell analysis.

Keywords: *Blood Cell Detection, Deep Learning, YOLO, Medical Image Analysis, Object Detection, Microscopic Blood Smear Images.*

AMG-CycleGAN: Anatomical Memory Guided Unsupervised MRI-to-CT Translation via Latent Anatomical Prototype Learning

Sarbast Ahmed Mohammed (Soran University, Iraq); Sarhang Sulaiman Bakr (Erbil Polytechnic University, Iraq); Omed Sadeeq (Soran University, Iraq); Ako Bartani (University of Kurdistan, Iran)

Abstract: Magnetic resonance imaging (MRI)-only synthetic computed tomography (CT) generation offers a promising alternative to conventional CT acquisition. Existing unsupervised MRI-to-CT translation methods often rely on adversarial and cycle-consistency constraints, which may lead to structural distortions and anatomically inconsistent predictions. To address this limitation, we propose Anatomical Memory Guided CycleGAN (AMG-CycleGAN), a novel unsupervised framework for MRI-toCT translation. AMG-CycleGAN introduces a shared anatomical memory bank that learns modality-invariant anatomical prototypes from both MRI and CT domains. An anatomical encoder extracts latent structural representations, which are matched against the memory bank to retrieve relevant anatomical priors that guide cross-modal image translation. In addition, an anatomical contrastive learning objective and a memory consistency constraint are incorporated to enhance structural representation learning and preserve anatomical fidelity throughout the translation process. By jointly leveraging adversarial learning and memory-guided anatomical supervision, AMG-CycleGAN generates anatomically faithful synthetic CT while maintaining realistic CT appearance. Experimental results on benchmark MRI–CT datasets demonstrate that AMG-CycleGAN consistently outperforms state-of-the-art unsupervised translation methods, highlighting its potential for reliable MRI-only clinical workflows.
Index Terms

Keywords: *CycleGAN, Anatomical Memory Space, Anatomical Guidance, Contrastive Learning.*

NLP-Driven Recommender System for Curriculum Gap Analysis: A Dual-Benefit Framework for Higher Education Sustainability

Party Ibrahim *(Duhok Polytechnic University, Iraq)*

Abstract: Fast technological change has expanded the gap between university curricula and job market also the skill demands in developing regions, contributing to youth unemployment and undermining (I,II) SDG 4 (Quality Education) and SDG 8 (Decent Work and Economic Growth). This paper proposes an NLP-driven recommender system for curriculum gap analysis, structured as a dual-benefit framework for students and faculty. The student-facing dashboard crawls job portals, extracts required Skills using NLP, and compares them with the user's curriculum to generate a personalized up-skilling roadmap with targeted course and certification recommendations. The system analysis interface for teaching staff aggregates anonymized student interactions to calculate the Aggregate Mismatch Index and visualizes curriculum gaps in real time. A pilot survey of 60 students at Duhok Polytechnic University reveals strong perceived misalignment between curricula and job market requirements, and high reliance on self-learning platforms. By providing students with actionable upskilling pathways and equipping educators with data-driven insights for curriculum improvement, the framework bridges information asymmetry and supports more adaptive, market-responsive higher education in developing regions.

Keywords*: Natural Language Processing (NLP); recommender systems; curriculum gap analysis; curriculum–labor market alignment; personalized up-skilling; higher education; employability; skills extraction; Aggregated Discrepancy Index (ADI); Sustainable Development Goals (SDG 4 and SDG 8); developing regions.*

A Low-Latency Python-Unity Integrated Framework for Real-Time BISINDO Recognition: A Comparative Analysis of Coordinate-Based Deep Learning Architectures

Vallent Primera Chandra, Wishly Valen Kwek, Antonius Alexander Maximilian Tjandra, Gabriel Asael Tarigan, and Rhio Sutoyo *(Bina Nusantara University, Jakarta, Indonesia)*

Abstract: Automated Sign Language Recognition (SLR) is essential for bridging communication barriers between the Deaf and hearing communities. While appearance-based deep learning models achieve high accuracy on static datasets, their real-time integration into interactive graphical frontends often introduces significant computational latency and frame-rate drops. This paper presents a low-latency, cross-platform integrated framework for real-time Indonesian Sign Language (BISINDO) recognition, connecting a high-performance Python inference backend with an interactive Unity Engine frontend. By flattening multi-dimensional MediaPipe Holistic skeletal landmarks into a continuous sequential vector array (1 × 60 × 258), we eliminate resource-heavy raw RGB dependencies and preserve user privacy. We evaluate and compare four prominent deep learning architectures—LSTM, GRU, Temporal Convolutional Networks (TCN), and Transformers—under identical training configurations. To facilitate seamless real-time execution, a high-frequency cross-platform network bridge driven by connectionless User Datagram Protocol (UDP) sockets is established alongside a multi-threaded Unity listener loop. Experimental results show that the Gated Recurrent Unit (GRU) model achieves a superior offline validation accuracy of 100.0% while minimizing live real-time inference latency to 122.1 ms on consumer-grade integrated hardware. Furthermore, our streaming architecture completely eliminates network transit overhead (0 ms lag) and locks the Unity rendering pipeline at a fluid, stable 60 Frames Per Second (FPS). This work demonstrates a highly responsive, optimized framework that balances algorithmic precision with real-world interactivity for automated sign language translation.

Keywords: *Sign Language Recognition (SLR), Gated Recurrent Unit (GRU), Unity Engine, User Datagram Protocol (UDP), Real-Time Systems, BISINDO*

Track: Machine and Deep Learning for Intelligent Systems

Beat the Clock at the Edge: A Slice-Aware, Compression-Driven Inference Pipeline for Life-Critical Biomedical IoT over 5G mmWave

Astitva Gourav, (Bharati Vidyapeeth (Deemed to be University))

Abstract: A chest-worn ECG or EEG patch is really asking a network for two opposite favors at the same time: carry a steady stream of routine data, and still catch a life-threatening event within milliseconds. 5G tries to answer both with separate slices — eMBB for the steady stream, URLLC for the emergency — but that split is only as good as the compute sitting behind it. This paper stress-tests that promise using an NS-3.38 / 5G-LENA + MATLAB co-simulation of a 3GPP Urban Micro, 28 GHz mmWave cell carrying biomedical IoT traffic split 70:30 across eMBB and URLLC. We place inference in three different spots — a remote cloud, a full-size model sitting at the edge, and a pruned-and-quantized model at the edge with URLLC-priority scheduling — and compare what each choice costs in time, energy, and reliability. At 100 UEs, 5 Mbps per UE, random-walk mobility, averaged over 5 seeds, the compressed and priority-scheduled edge setup pulls latency down from 138.7 ms (cloud) and 71.3 ms (plain edge) to 47.9 ms, energy per packet from 480.2 mJ and 218.6 mJ down to 91.5 mJ, and packet loss to 0.9% — while classification accuracy, tracked on its own axis, moved around in a 70–80% band across runs (mean 76.3%) instead of settling on one tidy figure. We are upfront about the scope: this is one fully worked-through operating point pulled out of a wider 135-run sweep, and the remainder of that sweep, sharper per-seed accuracy statistics, and validation on real hardware are named openly as work still to be done, not glossed over.

Keywords: *Edge inference placement, Slice-aware scheduling, Model compression, URLLC, eMBB, Biomedical IoT, 5GLENA, mmWave co-simulation*

Opinion Mining of Sorani Kurdish Facebook Posts Using Multilingual Transfer Learning Models

Mohammed Hussein Abdalla (University of Raparin)

Abstract: Opinion mining on social media, particularly for low-resource languages like Kurdish, encounters considerable obstacles due to morphological intricacy and orthographic diversity. The goal of this research is to assess the efficacy of multilingual transfer learning models in categorizing the feelings (positive, negative, and neutral) of Kurdish (Sorani) Facebook posts. For this purpose, a dataset consisting of 5,000 posts and user comments was meticulously tagged and pre-processed. This study evaluated the performance of advanced transformer models, such as mBERT and XLM-R, with classical machine learning methods (SVM and Naive Bayes) and deep learning models (BiLSTM). The experimental results demonstrated that the suggested XLM-R model, utilizing the cross-lingual RoBERTa architecture with integrated fine-tuning, attained an accuracy of 92.8% and an F1 score of 0.925, indicating a substantial superiority over alternative models. The results show that multilingual transfer learning is a good way to get over the problems with labeled data in Kurdish. It also shows that it is very good at collecting semantic nuances and dealing with noise in informal social media texts.

***Keywords**: Opinion mining, Kurdish (Sorani), Multilingual Transfer Learning, XLM-RoBERTa, mBERT, Social Media Mining, Low-Resource NLP.*

Adaptive Machine-Learning Trust Scoring for Zero Trust Access Control in Iraq and the Kurdistan Region

Adel Ali Hasan (Akre University for Applied Sciences), *Mohammed Jalal* (Sulymani Polytechnic University)

Abstract: Government and university services in Iraq and the Kurdistan Region are moving online, and access decisions can no longer rest on whether a user happens to sit inside the office network. This paper presents a deep neural network trust scorer, a multi-task model that reads 32 contextual features of an access request and returns three outputs at once: a grant or deny decision, a four-level action (full access, limited access, step-up authentication or deny) and a continuous trust score. The model was trained and tested on 150,000 simulated requests generated for 500 users, 800 devices and 100 resources, of which 15% were malicious. On the held-out test set it reached 93.31% binary accuracy, a weighted F1-score of 93.15%, an area under the receiver operating characteristic curve of 0.9715, 98.67% accuracy on the four-level action and a coefficient of determination of 0.975 for the trust score. Over five random seeds it reached 93.51 ± 0.14% accuracy and stayed significantly ahead of logistic regression and gradient-boosted trees ($p \leq .0004$), including when the test users or devices never appeared in training. A full decision through the enforcement point took a median of 0.20 ms on a two-core processor. The model sits inside the policy decision point of the zero trust reference architecture of the United States National Institute of Standards and Technology, where it advises but never overrides mandatory identity and device checks. All data are synthetic, so the figures show feasibility rather than field performance, and a staged pilot for local institutions is outlined.

Keywords: Zero trust, Access control, Trust score, Multi-task learning, Deep neural network, Kurdistan Region

Kurdish Dialect Identification from Short Speech Segments Using Pretrained Speech Transformers

Adel Ali Hasan (Akre University for Applied Sciences), *Mohammed Alsawaf* (International University of Erbil), *Mohammed Hashim* (Akre University for Applied Sciences)

Abstract: Identifying Kurdish dialects from short speech segments is challenging because each segment contains limited phonetic and contextual information. This study aims to compare WavLM Base Plus and XLS-R-300M for classifying Badini, Hawrami and Sorani recordings from the Kurdish Language Dialects dataset. Its contribution is an audited comparison under a common protocol incorporating exact-input deduplication, a shared attentive statistics pooling classifier, validation-based model selection and prediction-level verification. Duplicate preprocessed waveforms are removed before partitioning, and each pretrained encoder is adapted separately through supervised training. Checkpoints and candidate probability mixtures are selected using validation performance, while accuracy, macro-F1, balanced accuracy and confusion matrices summarize held-out performance. XLS-R performs better than WavLM on the evaluated clips, and the recorded selected probability mixture assigns all weight to XLS-R, providing no ensemble improvement. Recalculation from archived predictions confirms the reported classification measures. However, exact-input deduplication does not establish speaker or recording-source independence. The findings therefore support an exploratory comparison on the documented clip partition, with independent speaker and source evaluation required to establish broader generalizability.

Keywords: *Kurdish dialect classification; Self-supervised speech learning; XLS-R; WavLM; Attentive statistics pooling; Duplicate removal.*

Artificial Intelligence Resource Allocation In 6g Networks Using Deep Reinforcement Learning

Salar Ismael Ahmed (Erbil Polytechnic University), *Siddeeq Yousif Ameen* (Duhok Polytechnic University)

Abstract: The rapid evolution of sixth-generation (6G) wireless networks introduces stringent requirements for high data rates, ultra-low latency, massive connectivity, energy efficiency, and reliable quality of service (QoS). Efficient resource allocation is therefore a critical challenge because network conditions, user demands, interference, and channel states vary dynamically. This research proposes an AI-based resource-allocation framework for 6G using a Deep Q-Network (DQN) to jointly optimize subchannel assignment and transmit-power allocation. The proposed method observes channel-state information, traffic demand, queue status, interference, and QoS requirements, and learns adaptive allocation decisions through interaction with the network environment. A multi-objective optimization model is formulated to maximize sum rate, energy efficiency, and fairness while minimizing latency and satisfying power and QoS constraints. MATLAB simulations evaluate the proposed approach against Random and Round-Robin allocation using sum rate, throughput, latency, energy efficiency, power consumption, BER, outage probability, spectral efficiency, packet-delivery ratio, fairness, and QoS satisfaction. The results demonstrate that the proposed DQN framework provides superior overall performance and more efficient resource utilization, particularly as network user density increases. The study confirms the potential of DQN-based intelligent resource allocation for adaptive, reliable, and energy-efficient 6G networks.

Keywords: *6G, Artificial intelligence, Resource allocation, Deep reinforcement learning, DQN, Spectrum allocation, Power allocation, User association*

AI-Guided Precision Cultivation and Bioactive Compound Elicitation in Melissa Officinalis

Ala Asi Mohammed, Mahir Essa Alsalihi and Halgurd Nasraden Hassan (Garmian Polytechnic University, Iraq)

Abstract: Precision cultivation of medicinal plants using artificial intelligence (AI) controlled-environment systems provides an adaptive data-driven approach to optimize microclimatic parameters and elicit secondary metabolite accumulation. This study presents a cyber-physical greenhouse system that was designed to control the microclimate and irrigation parameters of the greenhouse for a 75-day growth period of Melissa officinalis L. using a random forest model (0.89-0.94 R2 for all of the control variables). The AI-controlled system used 37.8% less water than the conventional open-loop system and saved 45.8% of the fertiliser input; there were several statistically different, reproducible microclimatic regimes ($p < 0.001$). Statistical comparisons, two-way ANOVA and Duncan's Multiple Range Test, showed that shoot height, fresh biomass and dry matter accumulation were significantly different amongst the three substrates, with peat-based substrates outperforming soil ($p<0.001$), particularly under an imposed abiotic stress regime (32.88 ± 1.59°C; 33,608 ± 1,307 Lux). Essential oil production is increased to 5.34% and GC-MS analysis of the oils revealed concomitantly increased proportions of oxygenated monoterpenes(expanding from 58.68% to 81.37% of the volatile profile),, which are also the major components of the oils, citral (increased from 30.95% to 41.98%) and geraniol (increased from 8.92% to 13.18%). Similarly, radical scavenging activity of antioxidant assays performed with DPPH also indicated that the stressed extract showed a greater activity compared to the normal extract (IC_{50} = 21.5 µg/mL vs. 42.1 µg/mL). The outcomes indicated that AI based abiotic elicitation might be a potential technology that can be utilized in precision agriculture to manipulate the phytochemical composition of medicinal plants and also for conserving protecting resources.

Keywords: *AI-Driven Precision Agriculture, Melissa officinalis, Stress-Induced Biosynthesis, Edge Computing Horticulture, Abiotic Elicitation, Terpenoid Modulation.*

An AI-Based Remote Monitoring and Early Risk Detection System for Diabetes Management in Telemedicine

Marya A Omer and Siddeeq Y. Ameen (Duhok Polytechnic University, Iraq)

Abstract: Diabetes mellitus needs monitoring and proper clinical follow up to lower the risk of complications. This study shows a test of an AI based remote monitoring and early risk detection system that can be used in a telemedicine setting. The system takes glucose readings that are collected from a distance adds a few chosen body signals and habits and uses machine learning tools to spot people who might have blood sugar patterns. For the test we made a fake data set that has 5,000 records. We tried four machine learning methods: Logistic Regression, Random Forest, XGBoost and Long Short Term Memory (LSTM). We split the data into training, validation and an independent test set. We measured how well the methods worked with accuracy, precision, sensitivity, specificity, F score and the area under the ROC curve. We also checked how fast the system worked, looking at data delivery rate response time how long it takes to make an alert system uptime and how easy it is to use. In the test the LSTM method did best with 93.2 % accuracy 94.0 % sensitivity, 92.9 % specificity 89.2 % F score and an AUROC of 0.97. The telemedicine platform sent 98.6 % of data correctly. Made alerts in an average of 2.35 seconds. Usability testing gave the system a score of 84.3 out of 100 on the System Usability Scale. These numbers show how an AI enabled telemedicine system can be reviewed from both a machine learning side and a system performance side. Because we used data and simulated measurements the results are only a model, for what might happen in real life and need more real testing.

Keywords: *AI, Diabetes Mellitus, Telemedicine, Remote Patient Monitoring, ML, LSTM, XGBoost, IoT, Clinical Decision Support, Predictive Analytics*

Country Readiness for Adopting Artificial Intelligence and Its Impact on Economic Growth: An Econometric Study of a Sample of Middle-Income Developing Countries

Nasreen M. Sharafani *(Duhok Polytechnic University, Iraq)*

Abstract: Governments seek to adopt artificial intelligence as a cornerstone of digital transformation and a driver of economic growth. However, empirical evidence regarding how government readiness in this area translates into economic performance remains limited and inconsistent. Therefore, this study aimed to measure the impact of government readiness to adopt artificial intelligence on the economic growth of a sample of middle-income developing countries during the 2021–2025 period. The research used the Government AI Readiness Index as the independent variable and the economic growth rate as the dependent variable, while employing gross fixed capital formation, trade openness, and the inflation rate as control variables. Through the use of panel data and a fixed-effects model estimation, the results revealed a clear disparity in government readiness levels among the sampled countries; Iraq recorded the lowest average index (34.42 points), while Malaysia achieved the highest (66.59 points), with an overall trend toward improved readiness levels observed throughout the study period. The results also indicated that the Government AI Readiness Index had a statistically significant negative impact on economic growth, suggesting that improvements in readiness levels did not translate into tangible economic gains during this period. The study concluded that government readiness to adopt artificial intelligence is a necessary but insufficient condition for achieving economic growth unless it translates into productive applications, innovation-supportive policies, human capital development, digital infrastructure advancement, and greater institutional efficiency, thereby maximizing the economic impact of artificial intelligence in the medium and long term.

Keywords: Digital Economy, Government Readiness for Artificial Intelligence, Economic Growth, Fixed Effects M

Redefining the Bargaining Table: The Impact of Artificial Intelligence on Negotiation Management

Aso Kurdo Ahmed *(International University of Erbil)* Luqman Qader Abdulrahman *(Hawler Medical University)*

Abstract: Not only has the adoption of artificial intelligence (AI) revolutionized negotiation management, but it has also changed negotiation management from a supportive to a proactive and strategic role. You do this by enabling value creation coupled with analysis speed at extremely low cost. Despite the broad strategic advantages provided by AI, it can also be a cause of bias. negotiating is a human-centered process and a very human element is needed to balance efficiency with ethical negotiation. do not believe a future of negotiation management will exist, without negotiators; instead, think the negotiation management systems of the future will have experienced humans adding value by creatively solving problems while leveraging the database capabilities of artificial intelligence. Fulfilling the previously unachievable potential of negotiation management, this paper explores how AI is changing the 'bargaining table' by extending human capability and delivering algorithmic precision to complex exchanges. To analyze the impact of AI, you should examine not only its application to existing decision processes around value-creation strategy and factor selection (which produces many AI advantages) but also how different deployment modes across a broad range of variables (including one to 18 variables) can unlock the true potential of defining superior ways to create and deploy capital. The paper reflects on these challenges as well the potential loss of intuitive human empathy, ethical concerns surrounding transparency, and the dangers of increasing dependence on algorithmic recommendations. Where this translates, as the paper sees it at least, is that rather than superseding human negotiators, would have instead a new dawn of negotiation: an AI-enhanced hybrid (more a tactical guide than executor). These findings offer guidance for managers managing this technology shift: one focused on automation and human agents of trust and connect in real-time.

Keywords: Negotiation, management, ai, analytics, strategic decision-making.

Perceived Artificial Intelligence Implementation and Perceived Financial Performance in Iraqi Banking: Evidence from Bank Employees in Sulaymaniyah Governorate, Kurdistan Region of Iraq

Chia Mohammed Hassan, Nabard Karim Rahim *(Garmian Polytechnic University, Iraq)*

Abstract: Banking institutions are increasingly integrating artificial intelligence (AI) into analytical, operational, and risk-related activities. This study evaluates whether the degree of AI use is associated with perceived financial performance among banks operating in Sulaymaniyah Governorate, Kurdistan Region of Iraq. Using a quantitative cross-sectional survey design, 90 questionnaires were distributed to employees across nine participating banks in Sulaymaniyah Governorate, Kurdistan Region of Iraq. Seventy-five usable questionnaires were returned, yielding a response rate of 83.3%. Respondents were selected using convenience sampling. Two constructs were examined: perceived AI implementation and perceived financial performance. Internal consistency was high, with Cronbach's alpha values of 0.920 for perceived AI implementation, 0.898 for perceived financial performance, and 0.915 for the complete instrument. The descriptive results placed AI implementation at a high level (mean = 3.78, standard deviation (SD) = 1.23; relative importance = 75.60%) and perceived financial performance at a similarly high level (mean = 3.73, SD = 1.19; relative importance = 74.60%). The two constructs were strongly and positively correlated ($r = 0.778$, $p < 0.001$). Regression results showed that perceived AI implementation significantly predicted perceived financial-performance scores ($B = 0.723$, standard error (SE) = 0.068, $t = 10.575$, $p < 0.001$). The model accounted for 60.5% of the variance in perceived financial-performance scores ($R^2 = 0.605$) and was significant overall ($F = 111.84$, $p < 0.001$). The evidence therefore indicates that respondents reporting greater AI implementation also reported higher perceived financial-performance scores. In the Iraqi banking setting, continued investment in digital infrastructure, staff capability, data governance, cybersecurity, and AI-based risk management may support more effective digital transformation and competitive improvement.

Keywords: AI adoption, Perceived financial performance, Machine Learning, Deep Learning, Commercial banking, Iraq Stock Exchange, Sulaymaniyah Governorate, Financial Accuracy, Iraqi banking sector.

Track: AI in Business and Industry

Measuring the Generational Gap in Mobile Advertising Effectiveness Using the AIDA Model: An AI-Based Predictive Approach in Duhok City

Dilman Khoshavi Ramadan *(University of Duhok)*

Abstract: Generational differences may relationship how consumers respond to mobile advertising at different stages of the advertising response process. This study aims to examine generational differences in mobile advertising effectiveness using the AIDA model and to explore the potential of artificial intelligence-based models to predict advertising effectiveness among younger and older consumers in Duhok City. A quantitative, cross-sectional research design was adopted. Data were collected through an online questionnaire from 381 respondents in Duhok City, comprising 193 younger adults aged 18–30 and 188 older adults aged 50 years and above. The questionnaire measured six dimensions of the generational gap and the four stages of the AIDA model. Data were analyzed using descriptive statistics, independent-samples t-tests, Pearson correlation, and multiple linear regression. In addition, Logistic Regression, Decision Tree, and Random Forest models were developed using Python to examine the predictive potential of machine learning. SHAP analysis was used to interpret feature contributions, while AraBERT was used to analyze open-ended responses. The findings revealed statistically significant differences between younger and older adults in Attention, Interest, and Action, whereas no statistically significant difference was found in Desire. For younger adults, the Technological Dimension was the strongest significant predictor of advertising responses, while the Value Dimension was the strongest significant predictor among older adults. The regression models explained 62% and 58% of the variance in advertising responses among younger and older adults, respectively. Among the evaluated machine-learning models, Random Forest achieved the highest test accuracy at 89.5%. The findings indicate that generational differences are relevant to mobile advertising responses, although the pattern of differences varies across the stages of the AIDA model. The integration of the generational gap, AIDA, and artificial intelligence provides a framework for examining and predicting differences in consumer responses to mobile advertising in the context of Duhok City. The findings should be interpreted within the characteristics of the sampled population and the cross-sectional design of the study.

Keywords: *Generational Gap, AIDA Model, Mobile Advertising, Artificial Intelligence, Machine Learning, Consumer Behavior, Duhok City.*

Track: AI in Business and Industry

The Impact of Implementing Artificial Intelligence (AI) on Performance Activity Based Costing (PFABC) Technique for Improving Product Cost

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Abstract: This study examines the impact of implementing Artificial Intelligence on the Performance Focused Activity Based Costing technique and the impact of Performance Focused Activity Based Costing Technique on improving product cost. The study provides evidence from manufacturing companies in Erbil and the Ranya Olive Oil Factory in Ranya City, Kurdistan Region, Iraq. The objective is to examine the impact of Artificial Intelligence implementation on the Performance Focused Activity Based Costing Technique and to assess how Performance Focused Activity Based Costing Technique contributes to improving product cost. The study employed regression analysis model to examine the impact of Artificial Intelligence on Performance Focused Activity Based Costing Technique. In addition, the nine steps of the Performance Focused Activity Based Costing Technique were applied to determine their influence on product cost estimation and cost improvement. The results indicate that Artificial Intelligence implementation has a significant positive impact on the adoption and application of Performance Focused Activity Based Costing Technique in manufacturing companies. The productivity results of the study for the main production activities at Ranya Olive Oil Factory are generally unfavorable in main activity, indicating that the actual operational performance did not reach the planned level. The results of the study show the company's need for the best plan for production, resource allocation, and control of operations, especially in planning and controlling raw material preparation, labor costs, and product packaging activities. In contrast, the non-manufacturing activities, especially those of administration and marketing, indicate favorable productivity. The study recommends that industrial firms in the Kurdistan Region implement Artificial Intelligence technologies and Performance Focused Activity Based Costing Technique to improve the efficiency and effectiveness of cost-management practices. These tool of Artificial Intelligence with Performance Focused Activity Based Costing Technique can facilitate the implementation of the costing system, support strategic decision-making, reduce production costs, and improve operational planning.

Keywords: *Artificial Intelligence (AI), Performance Focused Activity Based Costing Technique (PFABC), Product Cost*

Track: AI in Business and Industry

The Impact of Artificial Intelligence on Industrial Management: A Statistical Study of Modern Enterprises

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Abstract: The current research highlights the effect of artificial intelligence on the performance of industrial management, as well as explores the effect of decision-making efficiency as a mediator variable for improving the performance of organizations. The study is conducted in the city of Erbil, which is located in Kurdistan Region, Iraq, where digital technologies are increasingly used by industrial enterprises. For the purposes of the current research, the quantitative approach that involves descriptive and analytical research methods is used. Questionnaire is used as a method of data collection, which includes the use of Likert Scale with five levels of response. Reliability was tested using Cronbach's alpha, while validity tests, model fit indices, CFA, and hypotheses testing were used in assessing the proposed relationships. It was found that the use of Artificial Intelligence positively influences both Industrial Management Performance and Decision-Making Efficiency. Furthermore, Decision-Making Efficiency plays a key mediating role in positively influencing the relationship between the use of Artificial Intelligence and organizational performance. Therefore, it can be concluded that Artificial Intelligence contributes to increased productivity, efficiency, strategic planning, and managerial efficiency in industrial organizations. Hence, Artificial Intelligence is considered to be a strategic asset which helps in achieving sustainable organizational performance.

Keywords: Artificial Intelligence, Industrial Management, Modern Enterprises, Statistical Analysis, Managerial Decision-Making.

Track: AI in Social Sciences and Humanities

A Systemic Information Systems Framework for AI-Enabled Sustainable Development in the Kurdistan Region

S. Mahid Hosseini and Habib Soleimani (University of Kurdistan, Iran)

Abstract: The Kurdistan Regional Government (KRG) has articulated an ambitious vision for digital transformation, positioning itself as a future leader in tech-driven governance in the Middle East. However, the realization of AI-enabled sustainable development faces a critical bottleneck: systemic information systems (IS) barriers that impede the creation of integrated, high-quality data infrastructures. This paper addresses four research questions: (1) What are the systemic IS barriers that impede AI-enabled sustainable development in the Kurdistan Region? (2) How do these barriers manifest across key sectors, including healthcare, agriculture, construction, and Kurdish language technology? (3) What institutional arrangements and governance mechanisms are needed to address these barriers? (4) What is the existing ecosystem of institutions and capacities that can serve as a foundation for development? Drawing on General Systems Theory and Institutional Theory, complemented by the Institutional Analysis and Development (IAD) framework, the paper diagnoses barriers across four interconnected dimensions: (1) strategic vision versus implementation reality, (2) fragmented data and infrastructure deficits, (3) human capital and digital literacy shortages, and (4) governance and regulatory voids. The paper further maps the existing ecosystem of universities, research centres, archives, NGOs, and private sector IT providers that constitute the Region's emerging AI infrastructure. It concludes by proposing a theoretically derived, empirically informed hybrid model adapted from comparable regional digital transformation initiatives, offering a roadmap for building the foundational information systems required for AI to contribute meaningfully to sustainable development in the Kurdistan Region. The proposed model is presented as a framework requiring validation through primary data collection; it is not offered as a prescriptive blueprint.

Keywords: *Artificial Intelligence, Sustainable Development, Information Systems, Kurdistan Region, Digital Transformation, Kurdish NLP, Institutional Theory, Data Privacy, E-Government*

Adoption of Solid Wall Panel Technology in Small-Scale Construction Firms

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Abstract: The industrialised building system (IBS) in Malaysia has been expanding extensively, with the proportion in government projects being 84% in 2021, compared to 60% in private projects. It was reported that many top developers are currently successfully adopting IBS in their projects with good outcomes. The usage of solid wall panel technology as an IBS component is in demand in the construction industry. Therefore, the main purpose of this study is to investigate the adoption of solid wall panel technology in small scale construction firms. The objectives of this study are to determine the challenges and steps to improve the adoption of solid wall panel technology in small scale construction firms. To achieve the objectives, this study used quantitative methods for primary data collection and a literature review through gathering information from books, journals, proceedings, etc. as secondary data. A set of questionnaires was distributed to small and medium construction firms in Johor state of Malaysia. Furthermore, the data collected were analysed using the Statistical Package for Social Sciences software (SPSS). The findings show that the cost and technical skill gap are the critical challenges, and mindset and behavioural is less critical among the challenges of solid wall panel technology adoption. Incentive and economic policies are a priority, and workforce skill development are less considerable on improvement steps for the adoption of solid wall panel technology. In conclusion, solid wall panel technology adoption among small and medium construction firms will promotes sustainable construction across developing economies.

Keywords: *Adoption; Construction Firms; Solid Wall Panel; Technology*

Can Artificial Intelligence Reduce Financial Exclusion in Iraq? Digital Inequality, Institutional Readiness, and Sustainable Inclusion

Aras Abdulkareem Miho and Hayman Ahmed Mikail (Akre University for Applied Sciences, Iraq)

Abstract: This study examines the conditions under which artificial intelligence (AI) could contribute to financial inclusion in Iraq by distinguishing digital access from effective financial participation. The analysis combines the 2024 Iraq Global Findex individual-level microdata (1,000 adults), published World Bank indicators, Central Bank of Iraq payment-system evidence, and the Oxford Insights Government AI Readiness Index. Survey-weighted logistic regressions are estimated for account ownership and digital-payment use, with robust standard errors and average marginal effects. The weighted microdata reproduce the published 2024 benchmarks: account ownership was 30.2%, digital-payment use 25.0%, mobile-phone ownership 91.5%, and smartphone ownership 71.1%. In adjusted models (N = 993), women were 10.5 percentage points less likely to own an account and 7.4 points less likely to use digital payments than otherwise comparable men. Tertiary education was associated with increases of about 21.6 and 21.5 points, workforce participation with 11.9 and 12.0 points, and smartphone ownership with 14.8 and 13.8 points, respectively. Rural residence was not independently significant after adjustment. The models achieved weighted AUC values of 0.781 and 0.779. These findings indicate that Iraq's inclusion challenge is not connectivity alone but the conversion of digital access into usable financial participation. AI may help reduce selected frictions in fraud control, customer support, onboarding, and supervision, but responsible deployment requires human review, accessibility, data governance, consumer protection, and monitoring of distributional outcomes.

Keywords: *Artificial intelligence; Financial inclusion; Digital finance; Digital inequality; Iraq*

E-Government Practices and Their Effect on Organizational Performance: An Empirical Study at the University of Raparin

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Abstract: This paper will look at how the e-government practice has had an impact on the performance of the organization at the University of Raparin in Iraq, Kurdistan Region. As information and communication technologies (ICT) continue to develop at a rapid pace, public sector organizations, such as universities, are moving towards digital systems to enhance service delivery, administrative competence, transparency and stakeholder involvement. Nevertheless, there is a paucity of empirical data regarding the effect of these practices in institutions of higher learning in the developing world. The conceptualization of e-government practices is based on the multi-dimensional construct of e-service delivery, e-administration, e-transparency, and e-participation. The efficiency, service quality, productivity, and user satisfaction are used to measure organizational performance. The quantitative research design was utilized, and data were gathered using a structured questionnaire on 362 respondents who consisted of academic staff, administrative employees, and system users. Structural Equation Modeling (SEM) with SmartPLS was used to perform data analysis. Composite reliability, convergent and discriminant validity were used to establish reliability and validity. Path analysis and bootstrapping techniques were used to test the hypothesis. The findings show that the impact of e-government practices on organizational performance is considerable and positive. The most significant impact is seen on e-administration and e-service delivery, but e-transparency and e-participation help to enhance accountability and stakeholder engagement. This work offers the empirical evidence of a developing country situation and presents the practical implications of enhancing the digital transformation in universities.

Keywords: *E-Government Practices, Organizational Performance, E-Service delivery, E-administration, E-transparency, E-participation*

Employee Motivation and Leadership Style in the Private Sector of Emerging Economy with Artificial Intelligence Enabled Management: Implications

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Abstract: The present study is an attempt to explore the mutual relationship between multiple dimensions of leadership (transformational, transactional, autocratic, democratic and laissez-faire) and employee motivation within private-sector organizations in the Raparin Independent Administration, Kurdistan Region of Iraq. It also makes sense of the results in relation to the current management, and does not use AI as an empirical measure. 200 valid employee responses were obtained in a cross-sectional quantitative survey. The leadership styles and employee motivation were measured on a five-point Likert scale and analyzed using partial least squares structural equation modeling (PLS-SEM) in SmartPLS. Structural paths were tested after checking the reliability, convergent validity and discriminant validity. The strongest positive relationship was between Democratic leadership and employee motivation with beta = 0.349 followed by Transformational leadership with beta = 0.309 and Transactional leadership with beta = 0.151. The results showed that autocratic leadership was negatively correlated with the motivation (beta = -0.250) but the laissez-faire was not significant (beta = -0.070). The model accounted for 31.6% of the variance in employee motivation. The study contrasts five leadership styles in one model in a research under-researched setting for the private sector in emerging economies. It also broadens AI's role in management: current research into algorithmic HR and AI leadership is summarized, highlighting the need to involve, support, provide feedback on, and rely on human judgment in the managerial decisions made increasingly through technology. Adopting participative and developmental leadership, ensuring employee voice and autonomy, and avoiding algorithmic over-control and under-support are key elements to be considered alongside the use of AI-based decision, monitoring, or feedback systems by managers.

Keywords: *leadership styles, employee motivation, artificial intelligence, AI based management, transformational leadership, democratic leadership, algorithmic leadership, PLS-SEM, emerging economy, Kurdistan Region of Iraq*

From Clicks to Campus: How AI-Powered Digital Marketing Shapes Student Enrollment Decisions in Malaysian Higher Education

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Abstract: Amid the growing use of artificial intelligence (AI) in higher education marketing, this study examines how AI-personalised advertisements, AI-chatbot assistance, and AI-generated promotional content relate to students' enrollment decisions in Malaysia. Guided by the Technology Acceptance Model (TAM), the study used a quantitative, cross-sectional survey distributed online to students from Malaysian public and private higher-education institutions. The final analysis used 101 responses obtained through convenience sampling. The measures demonstrated strong internal consistency, with Cronbach's alpha values ranging from .882 to .914. The multiple-regression model was statistically significant, $F = 51.257$, $p < .001$, and explained 61.3% of the variance in enrollment decisions ($R2 = .613$; adjusted $R2 = .601$). AI-personalised advertisements were the strongest predictor (beta = .390, $p < .001$), followed by AI-chatbot assistance (beta = .274, $p = .004$) and AI-generated promotional content (beta = .222, $p = .030$). Academically, the study extends TAM-related reasoning to AI-enabled recruitment touchpoints and a self-reported enrollment-decision outcome. Practically, it suggests that Malaysian higher-education institutions should prioritise relevant personalisation, responsive chatbot support, and credible promotional content while protecting transparency, privacy, and student autonomy. Because the data are cross-sectional and self-reported, the results demonstrate associations with perceived enrollment decisions rather than causal effects on confirmed enrollment behaviour.

Keywords: *artificial intelligence, digital marketing, personalised advertising, chatbots, promotional content, enrollment decisions, higher education, Malaysia*

From Medical History to Smart Prediction: Mapping the Sustainability of Seasonal Epidemic Countermeasures via AI

Shilan Mohammed Ali (Garmian Polytechnic University, Iraq)

Abstract: The stability of public health in Iraq and the Kurdistan Region is constantly threatened by seasonal respiratory infections. In order to improve regional health security, this study introduces an integrated artificial intelligence (AI) framework and assesses the durability of seasonal influenza and respiratory outbreaks over historical and modern administrative periods. A recurring pattern of cold-season recurrence, socioeconomic vulnerability, and reactionary institutional actions may be seen in pandemic waves from the late Ottoman era (1889) to the current era (COVID-19). This paper suggests an end-to-end computational pipeline that combines Geographic Information Systems (GIS) for geospatial mapping, predictive machine learning pipelines, and Natural Language Processing (NLP) for digitizing unstructured historical archives in order to move from reactive crisis management to proactive forecasting. Deep learning architectures were assessed for predicted accuracy using multi-source data streams from archive records, climate telemetry, and regional sentinel networks. For seasonal surges, empirical results show that a long short-term memory (LSTM) network provides great predicted accuracy (R^2 = 0.915) with a four-week operational lead time. Additionally, spatial models show distinct regional differences, connecting central surges to urban crowding and viral stability in high-altitude northern zones to cold-humid microclimates. In the end, health authorities may address socioeconomic disparities, improve regional epidemic preparedness, and optimize vaccine cold-chain distribution by implementing this predictive paradigm.

Keywords: *Artificial intelligence, Epidemic forecasting, Historical epidemiology, Long Short-Term Memory (LSTM), Public health security, Respiratory pandemics, Spatiotemporal analysis, Kurdistan region*

National Security in the Age of Artificial Intelligence (AI): Threats, Opportunities and Needs of Iraq and the Kurdistan Region

Ako Hamakarim Raheem (Vision Foundation for Strategic Studies, Iraq)

Abstract: Artificial Intelligences are becoming increasingly important in national security, creating new capabilities for intelligence analysis, digital security, border management, sensitive infrastructure protection and crisis response. In contrast, the threats posed by this technology, such as cyber attacks, advanced fraud, dissemination of misleading information, data leaks and the use of new tools by non-state forces, have created a new scope of security vulnerabilities. This paper examines in detail the security consequences of using smart technology in Iraq and the Kurdistan Region, with an emphasis on current threats, strategic opportunities, institutional readiness, and the political foundations required for the responsible adoption of this technology. The study was conducted in a qualitative manner using scientific sources, government documents and international benchmarks and combined objective analysis and gap assessment in five key dimensions: digital infrastructure, legal and regulatory frameworks, financial resources, human capital, and institutional coordination. The findings show that Iraq and the Kurdistan Region have great opportunities to use smart technology to strengthen national security, but their ability to organise and use this technology is still constrained by fragmented digital infrastructure, lack of expertise, and lack of an appropriate legal framework. The study comes to the conclusion that the acquisition of smart tools alone is not enough but requires parallel development at institutional, legal, financial and human capacity levels. Finally, the paper proposes a strategic roadmap centred on formulating a national strategy, strengthening data protection and cybersecurity laws, improving digital infrastructure, investing in specialist human capital, and creating a national mechanism for coordination between government institutions, universities and the private sector. The study highlights that a governance framework that fits the characteristics of the region is a key step in harnessing new technology while ensuring national security, sovereignty and public confidence.

Keywords: *Artificial Intelligence (AI); National Security; Cybersecurity; Threat Assessment; Digital Sovereignty; Iraq; Kurdistan Region*

Track: AI in Social Sciences and Humanities

Perceived Artificial Intelligence Efficiency, Benefits, and Challenges as Predictors of Student Productivity in Malaysian Public Universities

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Abstract: Against the rapid integration of artificial intelligence (AI) into higher education, this study examines whether students' perceptions of AI efficiency, benefits, and challenges are associated with their productivity in Malaysian public universities. A quantitative, cross-sectional survey was administered to public-university students who used AI tools for academic activities. Of 218 responses received, six failed the screening criterion, leaving 212 usable responses. The data were analysed using descriptive statistics, reliability analysis, and multiple regression. All four scales demonstrated satisfactory internal consistency (Cronbach's alpha = .851-.870). The regression model was statistically significant ($F = 104.048$, $p < .001$) and explained 60.0% of the variance in student productivity ($R2 = .600$; adjusted $R2 = .594$). AI benefits were the strongest positive predictor (beta = .622, $p < .001$), followed by AI efficiency (beta = .156, $p = .009$). AI challenges also had a statistically significant positive coefficient (beta = .114, $p = .013$), contrary to the hypothesised negative relationship; therefore, H3 was not supported. The findings suggest that perceived usefulness is more central to productivity than operational convenience alone and that awareness of AI-related challenges does not necessarily suppress productive use. Academically, the study extends the Technology Acceptance Model (TAM) from acceptance toward a productivity outcome in a Malaysian public-university setting. Practically, it supports benefit-led AI training, responsible-use guidance, and institutional access to credible academic AI tools.

Keywords: *Artificial intelligence, AI benefits, AI challenges, AI efficiency, student productivity, Technology Acceptance Model, Malaysian public universities*

The Impact of Website Security Features on Customer Conversion Rates in Kurdistan: The Mediating Role of Customer Trust

Mohammed Jalal (Sulymani Polytechnic University, Iraq); Bestoon Othman (University of Raparin, Iraq); Sazan Othman Rashed (Sulaimani Polytechnic University, Iraq), Bewar Ahmed Abdalla (University of Raparin, Iraq)

Abstract: This paper focuses on the impact of security features of websites on the customer conversion rates in Kurdistan with special attention to the mediation role of consumer trust. With the digitized business environment, organizations face significant challenges in ensuring online transactions are secure and this can have a direct impact on consumer behaviour and purchasing decisions. The paper examines key elements of website security, including secure payment systems, HyperText Transfer Protocol Secure (HTTPS)/ Secure Socket Layer (SSL) encryption, trust badges and certification logos, privacy policies and transparency, and how they contribute to customer trust and improved conversion. The research methodology adopted was quantitative and a standardized survey questionnaire was used whereby Internet consumers in Kurdistan were sent the questionnaire. The convenience sampling was used to obtain a sample of 250 people, which guaranteed the sample representation in different age groups, genders, and online buying experience levels. Data analysis was performed using SPSS and descriptive statistics were used to summarize the demographics of the respondents and inferential statistics, including correlation, regression, and mediation analysis, to explore the relationship between the characteristics of website security, customer trust and conversion rates. It is expected that the results will demonstrate that high levels of site security help to increase customer confidence significantly, thus affecting the rates of conversion positively. Moreover, the client trust is hypothesized to act as a partial mediator between the security features on the websites and the customer conversion rates. The results will provide substantial information to e-commerce companies and online service providers in Kurdistan, highlighting the strategic importance of cybersecurity in protecting consumer data and improving business performance and competitive edge.

Keywords: *Website Security Features, Customer Conversion Rates, Customer Trust, E-Commerce, Kurdistan*

Track: AI in Social Sciences and Humanities

The Pros and Cons of Integrating AI in Academic Writing Classes: Erbil International University

Arazoo Zand and Huda Yassin (International University of Erbil, Iraq); Meram Salim Shekh Mohamad (Lebanese French University, Iraq)

Abstract: With the rapid proliferation of Generative Artificial Intelligence (AI) tools, higher education institutions globally are grappling with the pedagogical shifts required to maintain academic integrity while fostering digital literacy. This study investigates the advantages and drawbacks of integrating AI writing assistants within the undergraduate academic writing curriculum at Erbil International University (EIU). Utilizing a mixed-methods approach, the research analyzes survey data and semi-structured interviews from both EIU language faculty and students to assess the impact of AI tools on student learning outcomes and instructional methodologies. Preliminary findings indicate that while AI integration significantly enhances student brainstorming, grammar proficiency, and structural organization (the pros), it simultaneously introduces critical challenges, including diminished critical thinking, risks of plagiarism, and a growing faculty burden regarding assessment fairness (the cons). Furthermore, the study highlights unique regional context factors, such as the varying levels of English language proficiency among EIU students, which influence how AI tools are adopted. Ultimately, this paper proposes a balanced pedagogical framework for EIU, outlining actionable guidelines for ethical AI utilization that empowers student writers without compromising cognitive engagement or academic rigor.

Keywords: *AI, writing, performance, EIU students, pros and cons*

Track: AI in Social Sciences and Humanities

The Role of Artificial Intelligence in Political Awareness: Opportunities, Challenges, and Risks

Abdulrahman Karim Darwesh (Soran University, Iraq); Sami I. Mati (University of Leicester, United Kingdom)

Abstract: Artificial intelligence (AI) increasingly mediates how citizens encounter, interpret, and act upon political information, yet the relationship between AI and political awareness remains theoretically underdeveloped. This conceptual, theory-building article integrates dispersed literatures (communication theory, political-knowledge research, computational social science, AI ethics, and Global South governance scholarship) into an original analytical framework. Drawing on an integrative narrative review of peer-reviewed research published primarily between 2016 and 2026, the article first reconceptualises political awareness as a four-dimensional construct comprising factual knowledge, structural understanding, issue-salience perception, and critical-epistemic competence. It then advances the Algorithmically Mediated Political Awareness (AMPA) pipeline, a six-stage process model (exposure, salience, framing, interpretation, knowledge, and participation), in which each stage carries both an augmentation path and a degradation path. The augmentation path captures AI's capacity to widen access to political information, support deliberation, and improve government-citizen communication; the degradation path captures misinformation, synthetic media, microtargeting, bias, surveillance, and polarisation, several of which the empirical literature shows to be more contested than public debate assumes. Seven propositions are derived to guide future empirical research, with particular attention to developing societies and the Kurdistan Region of Iraq, where platform-dominated information environments meet embryonic AI governance. The article concludes that AI strengthens political awareness only under conditions of AI literacy, transparency, and locally grounded ethical governance, and translates this conditional argument into actor-specific recommendations.

Keywords: *artificial intelligence; political awareness; political communication; algorithmic governance; misinformation; AI literacy; developing societies*

Track: AI in Education

AI Conversational Agents to Enhance Self-Confidence and Reduce Kurdish EFL Learners' Speaking Anxiety

Saman Mohammed Othman and Jamal Ali Omar (University of Raparin, Iraq); Marewan Dhahir Taher (Koya University, Iraq)

Abstract: This study investigates the dual role of AI conversational agents in enhancing self-confidence and reducing speaking anxiety among university-level Kurdish learners of English as a Foreign Language (EFL). Speaking remains one of the most challenging skills for EFL learners, often hindered by psychological barriers such as fear of making mistakes, peer judgment, and limited exposure to authentic practice. By integrating AI-powered tools into classroom and independent learning contexts, this research examines how AI-driven dialogue systems can provide supportive, low-stakes environments that foster both confidence and fluency. To this end, a mixed-methods design was employed to explore how AI-driven agents can build self-confidence and reduce anxiety. A bilingual survey and a focus group discussion were conducted in 3 public universities in the Kurdistan Region of Iraq. The quantitative results reveal a significant impact of the chatbots on enhancing self-confidence, increasing eagerness to speak, reducing anxiety, and improving speaking ability. Similarly, the qualitative data support deeper positive reflection by the participants towards the effect of those chatbots on speaking competence. The paper concludes that the best solution for Kurdish EFL learners' learning situation is to use the AI conversational agents to enhance their communicative competence. Hence, it is recommended that educators, language policymakers, and researchers prioritize the integration of AI chatbots into language pedagogy.

Keywords: *AI Conversational Agents, Speaking Skill, Self-Confidence, Speaking Anxiety*

Track: AI in Education

Assessing University EFL Learners' Readiness to Use AI Voice Assistants for Speaking Practice

Sardar Abdalla Hussein and Salah B. Hussein (University of Raparin, Iraq)

Abstract: Artificial Intelligence (AI) is offering new ways for students to practice language skills outside the classroom. For English as a Foreign Language (EFL) learners, opportunities for authentic speaking practice are often limited. Conversational AI tools, such as generative AI voice modes and pronunciation applications, give students a chance to practice speaking at their own pace. However, it is not yet clear if students in developing and resource-constrained environments are ready, willing, or able to use these tools effectively. This study investigates university-level EFL learners to understand their perceptions and habits regarding AI for oral language practice. Using a practical survey design, the main aim of this research is to find out if students are currently using conversational AI to practice English, whether they feel these tools help reduce their fear and anxiety of speaking, and what practical roadblocks (such as internet access or lack of awareness) prevent wider use. By identifying these challenges and measuring student readiness, this research highlights how educators can better support independent language learning. Ultimately, the findings will help teachers introduce AI into their curricula in a practical and sustainable way, empowering students to take charge of their own speaking fluency.

Keywords: *Artificial Intelligence; AI Voice Assistants; English as a Foreign Language (EFL); Speaking Anxiety; Willingness to Communicate (WTC); Computer-Assisted Language Learning (CALL); Autonomous Learning; Pedagogical Scaffolding*

Track: AI in Education

Between Academic Assistance and Academic Misconduct: Ethical and Unethical Use of Generative AI Among University Students in Iraqi Kurdistan

Farhang Ali Awdi (Knowledge University, Iraq); Zhila Esmail Bayz (The International University of Erbil, Iraq)

Abstract: Generative AI, which can independently generate text and content, has now been increasingly integrated into college students' daily study. It can indeed help students address academic issues and lend a hand to their learning, but it has also sparked numerous concerns, some people worry that it will be misused irresponsibly, while others fear that some individuals will take advantage of it to commit acts that violate academic integrity. A mixed-methods approach was adopted. In this study, two types of data were collected. First, 255 students were recruited to complete a questionnaire that included 20 Likert scale items, commonly referred to as agreement scales, which allowed students to rate the level of conformity of each statement. In addition, 15 students participated in semi-structured interviews. This type of interview does not follow a rigid, fixed list of questions; instead, questions are adjusted flexibly based on the flow of conversation to collect more specific ideas from the participating students. The analysis results show that the tasks students generally use AI tools for fall into four categories: asking AI to explain content they do not understand, brainstorming ideas to refine their thinking around a topic, revising and polishing content they have written themselves to improve its quality, and verifying whether the content they produced is correct and reliable. However, records also note that some students used AI to engage in activities related to academic misconduct.

Keywords: *Generative AI; Academic Integrity; Ethical AI Use; Academic Misconduct; University Students*

Track: AI in Education

Evaluating Teacher Trainees' Readiness to Integrate AI-Enhanced ICT Tools in Resource-Constrained Educational Contexts

Sardar Abdalla Hussein (University of Raparin, Iraq)

Abstract: Artificial Intelligence (AI) is rapidly changing how teachers work. Today, many popular educational tools, such as Canva, Gamma, Google Workspace with Gemini, Microsoft Copilot, Kahoot!, and Nearpod, have built-in AI features that make lesson planning, presentations, and student engagement much easier. However, simply having access to these tools does not automatically mean teachers are ready or able to use them, especially in developing or resource-constrained areas where infrastructure can be a challenge. This study investigates teacher trainees who have recently completed a training course on using Information and Communication Technology (ICT) and AI in education. Using a descriptive mixed-methods survey approach, this study collects data on their experiences and future teaching plans. The primary aim of this study is to find out if these teacher trainees actually plan to use AI tools in their real-world classrooms, identify the practical roadblocks they expect to face (such as internet limitations or lack of student devices), and measure their overall confidence in applying AI. By understanding these challenges and the trainees' current readiness, this study will highlight how future ICT training programs can better support educators. Ultimately, the findings will provide a clear picture of what is needed to introduce AI into local classrooms in a practical, responsible, and sustainable way that truly empowers teachers and benefits students.

Keywords: *Artificial Intelligence in Education; Teacher Readiness; Pre-service Teachers; Technology Acceptance Model (TAM); Teacher Self-Efficacy; Resource-Constrained Environments*

Exploring EFL Learners' Acceptance of AI Tool for Writing

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Abstract: Learners of English as a foreign language EFL have always struggled with developing writing skills. Meanwhile, the rise of AI has transformed the education process with a double-edged effect; it has facilitated the way writers compose texts, as well as leading to some specific concerns as how it is used. This study employed a mixed-methods study to explore EFL learners' acceptance of AI tools for developing writing skills. A questionnaire was designed to collect quantitative data which was completed by 96 Kurdish university EFL students and analysed though descriptive statistics. Students written responses for six interview questions provided qualitative data for the study which was analysed thematically. The findings show that students hold a positive attitude towards utilizing AI tools, particularly for idea generation, paragraph organization, grammar, vocabulary, and revision. Students generally perceived AI as a competent scaffold that helps novice writers to successfully draft texts and refine them step by step, not a crutch they lean on. Several concerns related to the use of AI were also reported by the students including overdependence, accuracy, originality, and teacher evaluation. Overall, these findings show that AI receives positive acceptance among students, along with the need to cautiously consider some potential AI drawbacks. In conclusion, the study confirms that students should be provided with full teacher guidance and be trained to have efficient AI-literacy to fully and responsibly exploit the benefits of AI tools.

Keywords: *AI-assisted writing, EFL learners, writing development, learner acceptance, scaffolding, Technology Acceptance Model*

Track: AI in Education

Exploring Kurdish EFL Students' Perceptions of AI Tools for Enhancing Speaking Proficiency Through Task-Based Oral Communication

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Abstract: The swift advancement of AI-powered tools is indisputable; it has extended to all facets of learning the English language, particularly speaking skills. This paper investigates the attitudes of Kurdish EFL students' perceptions regarding the use of AI tools to develop their speaking skills through oral communication tasks. It additionally aims to unveil the influence of Al-Powered tools on Kurdish EFL students' oral communication in English. Moreover, it tries to explore the use of AI tools to enhance students' linguistic expertise via task based oral communication. The study employs a quantitative method through a questionnaire to 90 EFL college students in the English language department at college of Education at the University of Raparin. The findings of the study reveal that most participants hold positive attitudes toward AI tools in their language learning journey; as it has helped them to increase their motivation and enhance their speaking skills through task based oral communication.

Key words: *AI-powered tools, Speaking proficiency, EFL students, English Language Learning, oral communication tasks*

Track: AI in Education

From Lookup to Learning: A Needs Analysis of Generative AI and Mid-Frequency Vocabulary Among EFL Learners

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Abstract: Mid-frequency vocabulary is essential for academic reading but remains largely outside classroom instruction, making incidental, meaning-focused exposure particularly important. Generative artificial intelligence could help facilitate such exposure, yet in under-resourced English as a foreign language contexts, research has focused largely on learners' perceptions rather than on how they actually use these tools or where current use falls short. To address this gap, this study presents a two-phase mixed-methods needs analysis involving 57 undergraduate English majors at the University of Raparin. An anonymous questionnaire assessed mid-frequency vocabulary difficulties, examined limitations in current generative AI use, and gathered responses to four literature-grounded design features. Follow-up interviews with five frequent users of these tools were analysed thematically to explain the survey patterns. The questionnaire findings show that learners' difficulties centre on vocabulary retention and productive use, while their tool use is frequent but largely unstructured. The interviews further indicate that learners re-encounter looked-up words, but repetition typically arises from external exposure and contextual demands rather than from a deliberate learning plan or the tool itself. Output verification occurred mainly when learners were directly responsible for the accuracy of their work. Across both phases, spaced recycling emerged as the most strongly supported principle and the feature most often requested by interviewees without prompting. These findings identify specific gaps in current AI-supported vocabulary practices and provide evidence-based design requirements for structured AI-mediated vocabulary learning.

Keywords: *Mid-frequency vocabulary; Generative artificial intelligence; Incidental vocabulary acquisition; Needs analysis; English as a foreign language*

Hybrid Academic Attendance Management System: Integrating Quick Response (QR) Code and Geolocation Authentication (GPS) to Enhance Reliability

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Abstract: Managing student attendance in academic institutions serves as a fundamental pillar for ensuring the quality of the educational process. However, reliance on traditional paper-based methods remains a significant barrier to digital transformation due to time inefficiency and compromised reliability. This research aims to design and develop an integrated web system that offers a smart technical solution, combining rapid verification speed with robust spatial security. The proposed methodology focuses on constructing a hybrid system that employs Quick Response (QR) Code technology as the primary identification interface, reinforced by a spatial authentication algorithm using Global Positioning System (GPS) technology implemented in JavaScript. The system's back-end infrastructure was developed using PHP coupled with a MySQL database to guarantee secure, real-time data processing, storage, and live display for faculty members. To evaluate system efficiency, it was deployed and field-tested at Duhok Computer Institute across classrooms encompassing 30 students. Practical results demonstrated significant efficacy in two key areas: first, reducing attendance recording time from 10 manual minutes to under 90 seconds electronically; second, completely eliminating "proxy attendance" vulnerabilities, as the system displayed exceptionally high precision in rejecting attendance attempts beyond the designated classroom perimeter, maintaining accuracy within a few meters. The study concludes that integrating web technologies with location-based services delivers a cost-effective, highly efficient solution for educational institutions, recommending the adoption of such systems to strengthen academic discipline and align with smart university standards. Furthermore, survey findings distributed among students and faculty reinforced system success, indicating a 92% satisfaction rate and strong acceptance of spatial verification as a tool for academic fairness.

Keywords: *Smart Attendance System, Barcode (QR Code), Geolocation (GPS), Computer Institute-Duhok, Web Programming*

The Kurdish Language in the Artificial Intelligence Era

Ruqyah Jalal; Kawa Sherwani; Darvan Shvan Khairaldeen (International University of Erbil, Iraq)

Abstract: Kurdish is a macrolanguage spoken by 20-40 million people all over the world. This study evaluates the position of Kurdish in the AI era and compares its digital resources with four high-resource languages (English, Arabic, Turkish and Persian) and three minority languages that are being revived (Welsh, Basque and Irish). While text translation seems to be the most-developed area of Kurdish language technology, Google, Microsoft and Meta's NLLB-200 models support both Sorani and Kurmanji. Central Kurdish now has more validated Common Voice speech hours than Turkish, Welsh and Arabic. However, major text-to-speech systems do not support Kurdish yet. Whisper and other commercial speech recognition systems do not recognize Kurdish yet either. Kurdish is not included in documented language lists of many commercial LLMs, and most multilingual benchmarks for testing LLMs do not include Kurdish for testing. Furthermore, Kurdish web content is about 200 times smaller than corresponding Turkish content in Common Crawl. Pilot testing of a widely used, commercial LLM revealed substantial undocumented capability: the model reached 98% accuracy on Sorani reading comprehension, compared with 99% on the same items in English. Moreover, while translation into English performed better than corresponding published fine-tuned models, generation into Kurdish was far from optimal and lagged markedly behind corresponding models for English. A Kurdish AI Readiness Framework of possible actions to be prioritized is outlined in this article, and a possible native, human-based, evaluations benchmark is also proposed for both Sorani and Kurmanji varieties of Kurdish.

Keywords: *Kurdish language; low-resource languages; artificial intelligence; natural language processing; digital language vitality; language technology*

Non-Linear Hydro-Meteorological Forecasting Using Machine Learning in the Kurdistan Region of Iraq

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Abstract: Accurate hydro-meteorological forecasting in topographically heterogeneous and data-sparse regions remains a challenge, as elevation, orographic effects and temporal variability produce non-linear climate responses. This study develops and tests a machine-learning framework to forecast monthly relative humidity, minimum and maximum air temperature, and precipitation in Duhok, Erbil, and Sulaimany in the Kurdistan Region of Iraq. Monthly observations (2012-2024) were pre-processed and temporally imputed using the historical calendar-month median. Three models of increasing complexity were compared: Ordinary Least Squares (OLS) regression as a linear benchmark, Random Forest (RF) regression to capture non-linear relations and higher-order interactions, and a Long Short-Term Memory (LSTM) network to capture temporal dependence. Cross-validated results show that RF achieved the highest R^2 (0.5347) and lowest MAE (4.16), compared with 0.5254 and 4.32 for LSTM and 0.5181 and 4.23 for OLS. In contrast, LSTM achieved the lowest RMSE (12.97, versus 13.47 for OLS and 14.53 for RF), indicating that it better limits large forecast errors, whereas RF is more accurate for typical cases. The two non-linear models are therefore complementary rather than competing. Forecasts for November 2026 from both models indicate lower minimum and maximum temperatures, but the models differ in humidity and rainfall, most strongly in Duhok (about 3 °C difference in maximum temperature), while agreement is higher in Sulaimany. Although a large share of variability remains unexplained, the results show the potential of machine learning, and of using RF and LSTM together, as a practical forecasting framework for water-resource management, agricultural planning, drought assessment and climate-risk early warning in semi-arid regions.

Keywords: *Hydro-meteorological forecasting; Random Forest; Long Short-Term Memory; non-linear climate modeling; Kurdistan Region of Iraq*

A Hybrid CNN-BiLSTM and Explainable AI Framework for False Data Injection Attack Detection in Solar PV Inverters

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Abstract: Telemetry, synchronization, and smart grid control in solar photovoltaic (PV) deployment into smart grid infrastructures rely upon IoT based smart inverters to communicate. However, as these systems become cyber-physically integrated, they also become vulnerable to cyber threats like False Data Injection (FDI) attacks, wherein an adversary can inject false telemetry data and cause misinformed state estimations, potentially leading to catastrophic grid-wide black-outs. Also, the presence of dynamic environmental conditions like changing weather patterns due to cloud coverage, rainfall, dust, and other factors, makes it more difficult to differentiate true data anomalies caused by such events from those produced by a malicious agent. In this paper, a new approach for reliable False Data Injection (FDI) attacks detection in smart inverters in an IoT based grid deployed solar PV scenario is introduced. The proposed scheme uses a novel hybrid network combining 1D Convolutional Neural Network (1D-CNN) for extracting spatial correlations in multi-variable data features and Bidirectional LSTM (BiLSTM) to capture temporal dependencies to identify weather changes and attacks. To further enhance the model, we also utilize SHapley Additive exPlanations (SHAP), to estimate a contribution from the most important features that help in model interpretation. Under the chronological evaluation protocol, the proposed CNN-BiLSTM framework achieved 97.20% accuracy, 97.50% precision, 88.26% recall, and 92.65% F1-score, with a false positive rate of 0.56% on the independent test set. These results were obtained using synthetically generated PV telemetry and synthetic FDI perturbations and therefore do not establish equivalent performance against real-world or adaptive attacks.

Keywords: *CNN-BiLSTM, explainable AI, false data injection, SHAP, smart grid, solar PV inverter.*

A Hybrid Machine Learning-Based Anomaly Detection Model for Early Identification of Phishing Attacks

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Abstract: Phishing URL detection remains a significant cybersecurity challenge due to the continuous evolution of phishing techniques that evade traditional blacklist- and rule-based approaches. This paper proposes a hybrid phishing URL detection framework that combines handcrafted lexical features with DistilBERT-BiLSTM semantic representations and an XGBoost classifier to identify both known and previously unseen phishing URLs. A balanced dataset containing 734,102 legitimate and phishing URLs collected from PhishTank, PhiUSIIL, StealthPhisher, and Mendeley was used for training and evaluation. Experimental results achieved 99.64% accuracy, 99.64% F1-score, and an ROC-AUC of 99.96% on an independent test dataset. Furthermore, validation using real-world OpenPhish zero-day phishing URLs achieved a 93.33% detection rate, demonstrating strong generalization performance against emerging phishing attacks. The proposed framework provides an accurate and practical solution for real-time phishing URL detection and offers an effective approach for enhancing modern cybersecurity systems.

Keywords: *Phishing Detection, Hybrid Framework, DistilBERT-BiLSTM XGBoost, Zero-day Attacks*

Data Privacy and Artificial Intelligence in the Kurdistan Region: Assessing the Need for a Local Regulatory Framework

Sana Mohammed (Salento, Italy); Ali Saleem Saleem (Cihan university, Iraq)

Abstract: The rapid expansion of artificial intelligence (AI) and digital government creates new opportunities for public-service delivery in the Kurdistan Region of Iraq, but it also increases the volume, sensitivity, and complexity of personal-data processing. The Kurdistan Regional Government (KRG) has already identified security and data privacy as a core pillar of its Digital Transformation Strategy and has proposed privacy standards, impact assessments, data-retention mechanisms, and data-protection legislation. This paper assesses the need for a local regulatory framework that addresses privacy risks arising from AI adoption in government and other high-impact sectors. A qualitative legal and policy analysis is conducted using KRG policy documents, publicly available regional institutional material, international AI-governance principles, and recent evidence of AI deployment in the Region. The analysis identifies five central governance gaps: unclear allocation of responsibility across the AI lifecycle; limited AI-specific requirements for sensitive and biometric data; insufficiently defined individual rights in automated processing; weak requirements for algorithmic transparency and impact assessment; and the absence of a clearly identifiable independent oversight mechanism dedicated to data protection and AI-related risks. Based on these findings, the paper proposes a locally adaptable framework built around lawful and proportionate processing, privacy by design, data minimisation, impact assessment, transparency, human oversight, security, accountability, individual rights, cross-border data safeguards, and regulatory supervision. The framework is intended to complement rather than replace broader Iraqi and international legal obligations and to support trustworthy digital transformation in Kurdistan.

Keywords: *Artificial intelligence; data privacy; Kurdistan Region; AI governance; data protection; digital government; regulatory framework*

Trust and Ethical Governance in the Metaverse

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Abstract: Rapid growth of the Metaverse has introduced complex challenges related to trust, transparency, and ethical governance. While emerging technologies such as blockchain and artificial intelligence enhance security, sustainable adoption requires comprehensive governance frameworks. This paper examines ethical risks, governance models, and trust-building mechanisms within immersive environments. The findings highlight the importance of standardized policies and user-centered governance to ensure responsible digital interactions. Although encryption and multi-factor authentication provide a level of security measures, they do not suffice to counter high vulnerability levels that are present in immersive virtual ecosystems. Current solutions that combine blockchain with artificial intelligence (AI) are promising to enhance privacy because they provide a person with better control over his/her data and provide control over privacy in real-time. However, challenges like scalability, ethical considerations, and smooth integration are yet to be addressed. The existing regulatory frameworks, such as the General Data Protection Regulation (GDPR), do not adequately address the privacy issues peculiar to the Metaverse; thus, there is a dire need to develop new and flexible legislation. International data protection policies, technological advancement, and awareness campaigns are crucial in empowering users. Since the Metaverse is still developing, developers, policymakers, and end-users should collaborate to develop comprehensive and sustainable privacy protection systems.

Keywords: *Ethical Governance; User Trust, Privacy; Metaverse; Blockchain; AI technologies.*

A Novel Semantic-Aware Toonification Framework with Adaptive Color Abstraction

Iman Subhi Mohammed, Altaay (University of Mosul, Iraq)

Abstract: The proposed study will create an intelligent hybrid algorithm to transform photographs into high-quality and realistic cartoons. It combines both the Whale Optimisation Algorithm (WOA) and the Contrast-Limited Adaptive Histogram Equation (CLAHE) algorithm. There are four important parameters that WOA is used to identify the best values of, such as binary filter coefficients and CLAHE parameters, which are required to provide a fine balance between contrast improvement and fine details maintenance. The pictures are then optimised and transformed into the CIELAB colour space to use adaptive colour abstraction and cut the number of colours whilst preserving the natural gradations. Morphological masks and Gaussian blurring are applied to the skin areas of the HSV space in order to provide a human look in terms of realism. Quantitative measures of PSNR, SSIM and LPIPS, and qualitative measures of edge quality and colour uniformity were used to test the performance of the algorithm. It indicates that the given method is better at visual consistency and perceptual accuracy compared to the traditional ones, which proves the usefulness of integrating dynamic optimisation strategies with adaptive processing to come up with more realistic and creative cartoons.

Keywords: *Whale Optimisation Algorithm (WOA); CLAHE; Contrast; Octree Quantisation Algorithm; GAN*

A Study on the Applications of Artificial Intelligence (AI) Technologies in the Production and Marketing of Broiler in Iraq: Reality and Aspirations

Gelawezh Khalil Qader (Akre University for Applied Sciences, Iraq)

Abstract: The use of Artificial Intelligence (AI) applications in the broiler (poultry) production and marketing sector in Iraq, represents a qualitative leap, balancing a local reality facing significant structural challenges, with an ambition to keep pace with global developments to achieve feed security and profitability. The poultry sector in Iraq currently faces complex challenges, that make the adoption of AI in its very early stages difficult, including traditional infrastructure, the energy and water crisis, traditional marketing practices, and a lack of data on actual production volume and market trends. Therefore, investors and academics in Iraq are looking to introduce AI technologies, to revolutionize production and marketing across several axes. The most important of these is in the production sector, encompassing smart breeding and management, including intelligent environmental control, visual and audio systems for early disease detection, and improved feed conversion efficiency. Furthermore, AI is being used in marketing and sales, by predicting market prices and linking production fields to modern slaughterhouses and sales outlets via AI-powered digital platforms. This will direct the product to the areas of highest demand and reduce transportation costs, to transform this ambition into a tangible reality in Iraq, serious steps are required, involving both government agencies and the private sector. This includes transitioning to modern, enclosed facilities, supporting farmers with affordable loans to convert their farms to automated, closed systems as a first step before introducing artificial intelligence. It also involves providing sustainable energy solutions (such as hybrid solar power systems) to operate sensors and servers without interruption. Farmers' associations and the Ministry of Agriculture should be encouraged to collect accurate data and make it available to Iraqi developers to build software solutions suitable for the Iraqi environment. Artificial intelligence in the Iraqi broiler sector represents a very promising ambition and a future necessity to reduce production costs and compete with imported chicken. However, its implementation on the ground still faces obstacles related to infrastructure and funding. Success begins with modernizing traditional farms first, then automating them intelligently.

Keywords: *artificial intelligence (AI), production, marketing, broiler, Iraq*

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