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BOOK OF ABSTRACTS

8th International Multidisciplinary Research Conference (IMRC-2026)

Use of Artificial Intelligence to Protect Lives and Promote Peace: A Global Perspective

September 10-12, 2026

Jointly Organized by

Sarhad University of Science & Information Technology Peshawar

University Of Peshawar

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About IMRC

International Multidisciplinary Research Conference (IMRC) series hosted by Sarhad University of Science and Information Technology (SUIT). IMRC series of conference started to attract researches and industry on a single platform. IMRC series of first conference was held in 2007, 2012, 2016, 2018, 2019, 2021, 2022 and now in 2026.

This is 8th IMRC 2026 (10th to 12th September 2026), themed "Use of Artificial Intelligence to Protect Lives and Promote Peace: A Global Perspective," provides an international platform for scholars, researchers, practitioners, policymakers, technologists, and civil society partners to explore the transformative potential of artificial intelligence in addressing contemporary global challenges.

The Conference seeks to promote interdisciplinary dialogue and research-based solutions in areas including technology, health, security, education, governance, ethics, humanitarian action, and the social sciences. It aims to encourage responsible innovation, strengthen academic and professional collaboration, and advance practical ideas that contribute to safer, more peaceful, and sustainable communities worldwide.

This conference is of too much importance. We cannot deny use of AI across multiple platforms, almost in every field of life. If we do not excel in this area we will be left out in the international world. AI is no longer optional. It is reshaping every sector globally. Nations and institutions that fail to adapt risk being left behind. This conference is a critical step for Pakistan and the region to:

· Build AI capacity and expertise
· Foster international collaborations
· Contribute to global policy and ethical frameworks
· Ensure we are active participants, not passive observers, in the AI revolution

We welcome you all for the IMRC 2026.

Preface

Artificial Intelligence has become one of the defining forces of our age, reshaping how societies learn, heal, govern, communicate, and coexist. Its promise is immense and so is its responsibility. It is in this spirit that the 8th International Multidisciplinary Research Conference (IMRC-2026) convenes under the theme "Use of Artificial Intelligence to Protect Lives and Promote Peace: A Global Perspective." This volume gathers the scholarship presented at the conference and offers it, in permanent form, to the wider research community.

Held from 10th to 12th September 2026 at the Bara Gali Summer Campus, University of Peshawar, IMRC-2026 is jointly organized by Sarhad University of Science and Information Technology and the University of Peshawar, in collaboration with Shaheed Benazir Bhutto Women University Peshawar, Women University Mardan, and the University of Buner. Continuing a series begun in 2007, it offers an international platform for scholars, practitioners, policymakers, and technologists to pursue interdisciplinary, research-based solutions.

The work assembled here spans eleven sub-themes from smart infrastructure, intelligent computing, and healthcare to education, commerce, law, agriculture, media, and interdisciplinary research aligned with the United Nations Sustainable Development Goals. Enriched by distinguished international and national keynote speakers, these contributions share one conviction: that AI must be developed responsibly, ethically, and in service of human safety, dignity, and peace.

We thank our joint organizers, collaborating universities, supporting partners, reviewers, and above all the authors whose work gives this conference its purpose. We warmly welcome you to these pages.

Organizing Committee
8th International Multidisciplinary Research Conference (IMRC-2026)

Aim and Objectives

Aim:

The overarching aim of IMRC-2026 is to provide an international, interdisciplinary platform where scholars, researchers, practitioners, policymakers, technologists, and civil-society partners can explore the transformative potential of Artificial Intelligence in protecting lives, promoting peace, and addressing pressing global challenges while advancing responsible innovation and practical, research-based solutions for safer, more peaceful, and sustainable communities worldwide.

Objectives:

1. Advance responsible use of AI for human safety and peace.
   To generate and disseminate research on how Artificial Intelligence can protect lives, strengthen human security, resolve conflict, and promote peace, ethics, and human rights at local and global levels.
2. Foster interdisciplinary dialogue and collaboration.
   To bring together experts across engineering, computing, health, social sciences, education, law, commerce, agriculture, media, languages, and the humanities to encourage cross-disciplinary exchange and joint problem-solving.
3. Promote AI-driven solutions to real-world challenges.
   To showcase applications of AI in smart infrastructure, healthcare and telemedicine, cybersecurity, precision agriculture, disaster resilience, governance, and the digital economy that deliver measurable social benefit.
4. Support the United Nations Sustainable Development Goals (SDGs).
   To align research and collaboration with the SDGs by addressing humanitarian needs, environmental sustainability, food security, quality education, and inclusive economic growth.
5. Encourage ethical and responsible innovation.
   To critically examine the ethical, legal, social, and policy dimensions of AI covering transparency, accountability, data governance, and responsible deployment so that technological progress serves the public good.
6. Strengthen academic and professional networks.
   To build lasting linkages among universities, government bodies, research institutions, and industry partners, both nationally and internationally, that outlast the conference itself.
7. Nurture emerging researchers and knowledge dissemination.
   To provide a venue for scholars and students to present work, receive expert feedback, compete for best-paper and best-poster awards, and publish selected papers in HEC-recognized journals and conference proceedings.
8. Contribute to policy and practice.
   To translate research insights into actionable recommendations for policymakers, development practitioners, and technologists working on governance, public policy, and community well-being

Conference Theme and Sub Themes

Conference Theme

"Use of Artificial Intelligence to Protect Lives and Promote Peace: A Global Perspective"

Conference Sub-Themes

Sr. No.	Sub-Theme	Sub-Theme Statement
1	Engineering & Technology	To Build Smart Infrastructure, Advance Sustainable Engineering & Strengthen Disaster Resilience.
2	Computing & Numerical Sciences	Advancement of Intelligent Computing, Cybersecurity & Emerging Digital Technologies.
3	Life Sciences, Medical and Nursing Sciences	To Transform Healthcare, Life Sciences & Public Well-being.
4	Social Sciences	To Promote Peace, Social Well-being & Ethical Governance.
5	Education & Humanities	To Enhance Education, Culture & Human Development.
6	Commerce, Economics & Management	To Drive Business Innovation, Digital Economy & Sustainable Growth.
7	Languages & Literature	Advancement of Language Technologies, Communication & Literary Innovation.
8	Law, Public Policy & Governance	To Strengthen Justice, Public Policy & Responsible Governance.
9	Agriculture & Environmental Sciences	To Enhance Smart Agriculture, Environmental Sustainability & Food Security.
10	Media, Communication & Creative Arts	Advancement of Digital Media, Communication & Creative Innovation.
11	Interdisciplinary Research	To Attain United Nations Sustainable Development Goals through Interdisciplinary Collaborations.

Joint Organizers

Sarhad University of Science and Information Technology, Peshawar

Sarhad University of Science and Information Technology (SUIT), Peshawar, is a multidisciplinary private-sector university recognized by the Higher Education Commission of Pakistan. Established under Ordinance No. XXIV of 2001 by the Government of Khyber Pakhtunkhwa, the University has completed twenty-five years of service to higher education, research and community development.

SUIT offers more than 100 degree programmes from bachelor's to doctoral levels across engineering and technology, computer science and information technology, life sciences, management sciences, arts, social sciences and education. Its programmes are recognized and accredited by relevant national professional and regulatory councils. The University's academic environment is supported by qualified faculty, well-equipped laboratories, smart classrooms, digital learning resources and modern information technology facilities.

Through industry-responsive curricula, practical training, research and innovation, SUIT strives to develop graduates who possess professional competence, critical-thinking ability and the confidence to address real-world challenges. Its educational philosophy emphasizes academic excellence, skills development, innovation, leadership and student support. In addition to its Main Campus in Peshawar, SUIT operates an approved campus in Islamabad, extending its academic services to a wider community. The University remains committed to providing academic facilities of international standards and producing graduates and researchers capable of contributing effectively at national and international levels.

University of Peshawar, Peshawar

Established in 1950, the University of Peshawar is one of Pakistan's oldest and most distinguished public-sector universities. Founded through the vision and efforts of national and regional leaders, it emerged as the principal institution of higher learning in Khyber Pakhtunkhwa and has since played a formative role in the educational, intellectual and socioeconomic development of the province.

The University offers undergraduate, graduate and doctoral education through a broad network of academic departments, institutes, colleges, academies and specialized research centres. Its academic portfolio encompasses the humanities, social sciences, natural and physical sciences, life and environmental sciences, management sciences, information technology, law, education and other professional disciplines. Through this multidisciplinary structure, the University promotes both specialized scholarship and collaboration across fields.

The University of Peshawar is committed to excellence in teaching, research and public service. It seeks to develop knowledgeable, responsible and professionally competent individuals who can contribute to national development and respond effectively to changing social and global challenges. Its historic campus provides a vibrant environment for academic inquiry, cultural engagement, innovation and student development. Over more than seven decades, the University has produced generations of scholars, professionals, public servants and leaders, earning recognition as the mother educational institution of Khyber Pakhtunkhwa and an enduring centre of knowledge and research

Collaborators

Shaheed Benazir Bhutto Women University, Peshawar

Shaheed Benazir Bhutto Women University (SBBWU), Peshawar, is the first public-sector women's university established in Khyber Pakhtunkhwa. The institution was inaugurated in 2004 and commenced its academic journey in 2005, with formal teaching activities beginning in 2006. Originally established as Frontier Women University, it was subsequently renamed Shaheed Benazir Bhutto Women University in recognition of the contributions made toward women's emancipation and national development.

The University was founded to expand women's access to quality higher education, particularly for students from remote and underserved areas of the province. Since its establishment, it has developed into a multidisciplinary institution offering education and research opportunities in the natural sciences, social sciences, humanities, management, computing, law, education and other emerging fields.

SBBWU provides a secure, inclusive and intellectually stimulating environment in which students can develop their academic, professional, moral and leadership potential. Its academic philosophy emphasizes critical thinking, creativity, entrepreneurship, innovation and solution-oriented research. The University also promotes collaboration among academia, industry, government and international institutions to ensure that its graduates remain globally competitive and locally relevant. Guided by its commitment to sustainable excellence in education and research, SBBWU continues to empower women as scholars, professionals, entrepreneurs and future leaders capable of contributing meaningfully to society.

Women University Mardan

Women University Mardan is a public-sector institution dedicated to advancing women's higher education, research and professional development in Khyber Pakhtunkhwa. Established in July 2016, the University is chartered by the Government of Khyber Pakhtunkhwa and recognized by the Higher Education Commission of Pakistan. It aspires to develop into a model women's university distinguished by academic quality, modern teaching practices and meaningful research.

The University provides a secure, supportive and student-friendly academic environment that encourages intellectual growth, confidence, aspiration and social responsibility. Its academic programmes encompass the sciences, social sciences, humanities, management, languages, psychology, economics, Islamic studies and other developing disciplines. Teaching is based on approved curricula and contemporary methods designed to equip students with relevant knowledge, analytical skills and professional competence.

Women University Mardan places particular emphasis on academic standards, research culture, quality enhancement and the personal development of its students. Through its academic departments, research activities, scholarly journals, conferences and institutional collaborations, the University contributes to knowledge creation and the wider development of society. It seeks to prepare educated, capable and responsible women who can pursue successful careers, assume leadership roles and respond effectively to national and global challenges. By combining academic excellence with civility, culture and character development, the University continues to provide women with a strong platform for future success.

University Of Buner, Buner

The University of Buner is a recognized and chartered public-sector university of Khyber Pakhtunkhwa. It was established as an independent university in 2016 under the Khyber Pakhtunkhwa Universities Act, 2012, as amended in 2016, following the upgradation of the former Buner Campus of Abdul Wali Khan University Mardan. The University is recognized by the Higher Education Commission of Pakistan.

Located in the scenic district of Buner, the University expands access to quality higher education for students from the district and surrounding regions. Its academic structure includes the Faculty of Arts, Humanities and Social Sciences, the Faculty of Numerical and Physical Sciences and the Faculty of Allied Health Sciences. Through its departments, it offers education and research opportunities in computer science, physics, chemistry, mathematics, biological sciences, management sciences, economics, languages, political science, psychology, Pakistan studies and health-related disciplines.

Guided by the principle that knowledge is power, the University promotes teaching, learning, critical thinking, research and community service. It strives to equip upcoming generations with intellectual ability, professional competence, ethical values and the skills required to contribute to social and economic development. Through quality-enhancement mechanisms, research initiatives, academic collaborations and student-development activities, the University of Buner continues to strengthen its role as an emerging centre of higher education and research in Khyber Pakhtunkhwa.

Supporting Partners

Higher Education Regulatory Authority, Khyber Pakhtunkhwa
The Higher Education Regulatory Authority (HERA) is an independent and impartial regulatory body for private-sector universities, institutes and colleges in Khyber Pakhtunkhwa. It derives its authority from the Khyber Pakhtunkhwa Registration and Functioning of Private Educational Institutions Ordinance, 2001. HERA streamlines, supervises and regulates private higher educational institutions while promoting recognized academic standards. Through registration, monitoring, facilitation and digitization, it works to protect students' interests and develop a transparent, quality-driven and student-centred higher education system.

Khyber Pakhtunkhwa Information Technology Board, Peshawar
The Khyber Pakhtunkhwa Information Technology Board (KPITB) is an autonomous public-sector organization established under an Act of the Provincial Assembly in May 2011. It leads the digital transformation of Khyber Pakhtunkhwa by promoting information technology, IT-enabled services and IT-enabled education. KPITB's initiatives encompass e-governance, cybersecurity, digital skills, smart government and ICT-based innovation. It also supports digital inclusion, technology entrepreneurship, start-ups and improved public-service delivery through efficient and citizen-focused digital systems.

Pakistan Scientific and Technological Information Centre, Peshawar
The Pakistan Scientific and Technological Information Centre (PASTIC) is the country's national hub for the collection and dissemination of scientific and technological information. Established in 1957 with UNESCO assistance, it operates as a unit of the Pakistan Science Foundation under the Ministry of Science and Technology. PASTIC supports researchers, educators, scientists, engineers and industry through scientific databases, literature searches, document supply, abstracting and indexing, library services and research training. Its national network includes a regional sub-centre in Peshawar.

Directorate General of Science and Technology, Khyber Pakhtunkhwa
The Directorate General of Science and Technology (DoST), Government of Khyber Pakhtunkhwa, is mandated to promote and develop science and technology throughout the province. It supports scientific research, innovation, technology transfer and the commercialization of locally developed solutions. Its programmes include research grants, studentships, innovation fellowships, patent and prototype support, scientific equipment assistance and STEAM outreach. Through its initiatives, DoST seeks to strengthen the provincial science ecosystem and apply scientific knowledge to economic, industrial and societal challenges.

Dosti Welfare Organization, Peshawar
Dosti Welfare Organization is a Peshawar-based nonprofit organization working for education, health, youth development and community empowerment. Sustained since 1996, it supports formal schooling and innovative non-formal education programmes, particularly for out-of-school children. Its initiatives also include awareness and prevention of genetic disorders, entrepreneurship, literature festivals and public debates. By connecting education with skills, dialogue, creativity and social responsibility, Dosti seeks to help individuals and underserved communities build more inclusive and sustainable futures.

Pakistan Science Foundation, Islamabad
Pakistan Science Foundation (PSF), established under the PSF Act of 1973, is the national apex organization for promoting and financing scientific research in Pakistan. Its major functions include research support, science popularization, international scientific cooperation, natural-science linkages and research-industry collaboration. PSF promotes scientific literacy through science caravans, fairs, clubs, competitions, exhibitions and educational outreach. It also oversees the Pakistan Museum of Natural History and PASTIC, contributing to research development, scientific information services and the advancement of a knowledge-based society.

ANSI Institute of Management Sciences Mardan
ANSI Institute of Management Sciences Mardan is an educational institution committed to academically rigorous, values-based and student-centred learning. Its educational approach seeks to prepare students for lives of leadership, service and responsible citizenship. Through enriched academic programmes, practical learning, arts, music and extracurricular activities, the institution supports the balanced development of its students. ANSI emphasizes creativity, curiosity and individual potential, supported by qualified faculty, engaged parents, alumni and community partners.

Polyfine Chem Pharma (Pvt.) Ltd.
Polyfine Chem Pharma (Pvt.) Ltd. is a pharmaceutical manufacturing company established in Peshawar in 1991. It was founded as a pioneering venture to address the need for quality pharmaceutical products in the healthcare market. Operating from the Industrial Estate in Hayatabad, the company maintains a portfolio of medicines in different therapeutic and dosage categories. Polyfine ChemPharma remains focused on pharmaceutical manufacturing, product quality and the provision of healthcare products through its professional and industrial operations.

Medizan Laboratories (Pvt.) Ltd.
Medizan Laboratories (Pvt.) Ltd. was established in Islamabad in 2005 with the objective of making quality medicines accessible at affordable prices. The company manufactures generic pharmaceutical products across several therapeutic areas, including antibiotics, analgesics, gastrointestinal, cardiovascular, hormonal and neuropsychological medicines. Its quality-

management operations include an ISO 9001 system and stability studies conducted according to relevant guidelines. Medizan combines manufacturing, quality assurance, research and development, and ethical marketing in support of domestic and international healthcare needs.

Saydon Pharmaceutical Industries (Pvt.) Ltd.
Saydon Pharmaceutical Industries (Pvt.) Ltd. is a pharmaceutical manufacturing organization based in the Industrial Estate, Hayatabad, Peshawar. The company contributes to the local healthcare sector through the manufacturing and supply of pharmaceutical products. Its presence within Khyber Pakhtunkhwa's pharmaceutical industry supports medicine availability, industrial development and professional employment. By participating in academic and research-oriented initiatives, Saydon also helps strengthen cooperation between universities, healthcare professionals & the pharmaceutical manufacturing sector.

Roryan Pharmaceutical Industries (Pvt.) Ltd.
Roryan Pharmaceutical Industries (Pvt.) Ltd. is a Peshawar-based pharmaceutical manufacturer established in 2005. The company produces medicines covering antibiotics, analgesics, antipyretics, antihistamines, anti-ulcer, anti-asthmatic, antifungal and other therapeutic categories. Its product range includes tablets, capsules, syrups, suspensions, sachets, creams, ointments and selected injectable products. Roryan states that its production and quality-control operations follow cGMP and good laboratory practices. Supported by domestic and international distribution networks, the company aims to provide quality medicines at affordable prices.

Medicraft Pharmaceuticals (Pvt.) Ltd.
Medicraft Pharmaceuticals (Pvt.) Ltd. was founded in 1992 by four professionals with extensive pharmaceutical marketing experience in Pakistan and abroad. The company was established to manufacture medicines of high quality and recognized standards at reasonable prices. Headquartered in the Industrial Estate, Hayatabad, Peshawar, Medicraft emphasizes quality manufacturing, customer satisfaction and improved healthcare outcomes. Its development plans focus on modern machinery, technical expertise, research, infrastructure improvement and exploration of international markets.

Medicon Pharmaceutical (Pvt.) Ltd.
Medicon Pharmaceutical (Pvt.) Ltd., based in Hayatabad, Peshawar, operates as part of the Medicon Group's health and wellness portfolio. Its pharmaceutical division focuses on developing and delivering safe, effective and affordable medicines across various therapeutic areas. The wider group also works in nutraceutical and cosmetic products, combining scientific research with health and personal-care solutions. Medicon states that its pharmaceutical manufacturing follows GMP standards and is supported by regulatory licensing and quality certification, with products serving domestic and international markets.

Message VC SUIT, Peshawar

It is a matter of immense pleasure and pride for Sarhad University of Science & Information Technology, Peshawar, to jointly organize the 8th International Multidisciplinary Research Conference (IMRC-2026) from 10 to 12 September 2026, at the Bara Gali Summer Campus, University of Peshawar.

The theme of this year's conference, "Use of AI to Protect Lives and Promote Peace: A Global Perspective," is both timely and highly significant. Today, when Artificial Intelligence exhibits its remarkable potential in rapidly transforming societies, economies, education, healthcare, governance, and communication, its responsible and ethical use remains uncertain. This conference provides an important platform for scholars, researchers, professionals, policymakers, and students to explore how AI can be utilized to address complex global challenges, safeguard human life, promote social well-being, and contribute to sustainable peace as well as to identify and share the do's and don'ts associated with its use.

The multidisciplinary nature of IMRC-2026 reflects our belief that contemporary challenges cannot be addressed through isolated academic disciplines. Meaningful progress requires collaboration, exchange of knowledge, and the integration of diverse perspectives. I am confident that the research contributions, keynote addresses, and scholarly discussions presented during the conference will generate valuable insights and encourage new avenues of academic and institutional cooperation.

I extend my sincere appreciation to the University of Peshawar, our collaborating institutions, supporting partners, keynote speakers, session chairs, researchers, and members of the organizing committees for their invaluable contributions. I also warmly welcome all national and international participants whose presence will enrich the academic significance of this event.

I hope that IMRC-2026 will prove to be an intellectually rewarding experience and inspire responsible innovation for the protection of humanity and the advancement of peace.

I wish the conference every success.

Prof. Dr. Salim Ur Rehman
Vice Chancellor
Sarhad University of Science & IT, Peshawar

Message VC UoP, Peshawar

It gives me great pleasure to welcome the distinguished scholars, researchers, academicians, professionals, and students participating in the 8th International Multidisciplinary Research Conference (IMRC-2026), jointly organized by the University of Peshawar and Sarhad University of Science & Information Technology, Peshawar, from 10 to 12 September 2026.

The conference theme, "Use of AI to Protect Lives and Promote Peace: A Global Perspective," addresses one of the most important issues of our time. Artificial Intelligence has emerged as a powerful force with the capacity to improve healthcare, strengthen disaster preparedness, enhance public safety, support education, promote effective governance, and facilitate peaceful and inclusive societies. However, the benefits of this technology can only be fully realized through responsible research, ethical application, and meaningful cooperation among academic institutions, governments, industries, and communities.

The University of Peshawar has always remained committed to advancing knowledge, encouraging critical inquiry, and promoting research that responds to national and global challenges. We are therefore pleased to host this important academic gathering at our Bara Gali Summer Campus, where an inspiring environment provides an ideal setting for intellectual exchange, professional networking, and the development of lasting research collaborations.

I am confident that the multidisciplinary discussions and research findings presented at IMRC-2026 will deepen our understanding of the opportunities and challenges associated with AI. More importantly, I hope that the conference will encourage participants to pursue innovations that uphold human dignity, protect vulnerable communities, and contribute to a safer and more peaceful world.

I appreciate the dedicated efforts of the organizing committees, collaborating institutions, supporting partners, keynote speakers, session chairs, presenters, and all those who have contributed to making this conference possible. I also extend a warm welcome to our national and international guests and wish them a productive and memorable stay.

May this conference lead to meaningful dialogue, valuable partnerships, and research with a lasting positive impact.

Prof. Dr. Johar Ali
Vice Chancellor
University of Peshawar

Message VC SBBWU, Peshawar

It is a matter of profound honour and privilege to extend my warmest greetings to all distinguished keynote speakers, scholars, session chairs, delegates, and guests participating in the 8th International Multidisciplinary Research Conference-2026. As the Vice Chancellor of Shaheed Benazir Bhutto Women University, Peshawar, a proud collaborating institution, I welcome you to this prestigious gathering held at the scenic Bara Gali Campus of the University of Peshawar. This Abstract Book represents the collective intellectual efforts, rigor, and dedication of researchers who have joined us from across the nation and around the globe.

The central theme of this year's conference, "Use of Artificial Intelligence to Protect Lives and Promote Peace: A Global Perspective," could not be more relevant or urgent. As artificial intelligence rapidly reshapes engineering, healthcare, governance, cybersecurity, digital economy, and social well-being, higher education institutions carry an imperative duty to ensure technology remains aligned with human ethics, disaster resilience, and peacebuilding. By bridging diverse disciplines, ranging from numerical sciences and life sciences to law, humanities, and environmental management, this platform offers a vital space to develop responsible, AI-driven solutions to global challenges.

I extend my heartfelt congratulations to the organizing universities, Sarhad University of Science & Information Technology and the University of Peshawar, along with all collaborating partner institutions, for successfully assembling this national and international academic community. My appreciation also goes to the authors and researchers whose abstracts showcase meaningful interdisciplinary work aimed at achieving the United Nations Sustainable Development Goals.

I am confident that the presentations, discussions, and academic networking over these three days will spark groundbreaking research collaborations and inspire actionable outcomes. I wish all participants an intellectually enriching conference experience and a pleasant stay in Bara Gali.

Prof. Dr. Farhat Ameen
Vice Chancellor
Shaheed Benazir Bhutto Women University, Peshawar

Message VC Women University, Mardan

It gives me immense pleasure to extend my warm greetings and best wishes on the occasion of the 8th International Multidisciplainry Research Conference on the theme "Use of AI to Protect Lives and Promote Peace: A Global Perspective" being organized in collaboration with Sarhad University of Science and Information Technology, Peshawar.

International conferences provide a valuable platform for scholars, researchers, academicians, and practitioners to share knowledge, exchange ideas, and engage in meaningful intellectual discourse. Such academic gatherings are particularly important in today's rapidly changing world, where collaboration and interdisciplinary approaches are essential for addressing emerging challenges and advancing knowledge.

I am confident that this conference will foster meaningful academic and research collaborations, encourage the exchange of innovative ideas, and provide opportunities for researchers to establish professional networks at national and international levels. The collection of abstracts presented in this book reflects the scholarly contributions and intellectual diversity of the participating researchers.

Women University Mardan is proud to be a collaborator in this important academic initiative. We remain committed to promoting quality research, innovation, academic excellence, and meaningful partnerships with national and international institutions.

I congratulate the organizers, the participating researchers, reviewers, and all contributors for their efforts in making this conference possible. I hope that the deliberations and research presented during the conference will contribute significantly to the advancement of knowledge and have a positive impact on society.

I wish the conference every success and extend my best wishes for its fruitful and intellectually enriching proceedings.

Prof. Dr. Razia Sultana
Vice Chancellor
Women University Mardan

Message VC University of Buner, Buner

It gives me immense pleasure to extend my sincere greetings and best wishes to the organizers, researchers, scholars, and participants of the 8th International Multidisciplinary Research Conference-2026 on the theme "Use of Artificial Intelligence to Protect Lives and Promote Peace: A Global Perspective."

We are living in an era of rapid technological transformation, where Artificial Intelligence, machine learning, robotics, big data, IoT, advanced communication systems, and other emerging technologies are reshaping human life. These technologies offer enormous potential to address global challenges and improve the quality of life.

The theme of this conference is particularly timely. Artificial Intelligence can contribute significantly to protecting lives through early disease detection, intelligent healthcare, disaster prediction and management, environmental monitoring, and early warning systems. It can also support peace and stability through conflict prevention, humanitarian assistance, misinformation detection, and informed decision-making.

At the same time, technological progress must be guided by ethical values, transparency, privacy, security, and responsible governance. The integration of AI with technologies such as 5G/6G, autonomous systems, robotics, satellite technology, biotechnology, and quantum computing creates unprecedented opportunities, but also requires responsible and multidisciplinary approaches.

The University of Buner is honored to be a collaborator in this important academic gathering. I appreciate the organizers for providing a platform where researchers from diverse disciplines can exchange knowledge, develop collaborations, and explore innovative solutions for the challenges of the modern world.

I am confident that the conference will contribute to advancing the responsible use of Artificial Intelligence for the protection of life, promotion of peace, and sustainable development of society.

I wish the conference great success and all participants an intellectually enriching experience.

Prof. Dr. Jamshaid Ali Khan
Vice Chancellor
University of Buner

Message Conference Secretary

On behalf of Sarhad University of Science & Information Technology, Peshawar, and the University of Peshawar, it is our great honor and pleasure to welcome researchers, academicians, scholars, and practitioners from across Pakistan and around the world to the 8th International Multidisciplinary Research Conference (IMRC-2026), jointly organized by our two institutions and held from 10–12 September 2026.

This year's conference is themed "Use of Artificial Intelligence to Protect Lives and Promote Peace: A Global Perspective," reflecting our shared commitment to exploring how emerging technologies can be harnessed to address some of humanity's most pressing challenges safeguarding lives, promoting global peace, and fostering sustainable, ethical innovation.

IMRC-2026 continues a proud legacy of bringing together diverse minds across disciplines to exchange ideas, present cutting-edge research, and build meaningful academic and professional collaborations. We are especially honored to host national and international researchers whose work in artificial intelligence, security, peacebuilding, and allied fields will contribute richly to this important global conversation.

We warmly welcome all delegates, presenters, and contributors, and we look forward to three days of insightful discussions, groundbreaking research presentations, and productive dialogue that will help shape a safer and more peaceful future through responsible AI innovation.

Welcome to IMRC-2026

Meritorious Prof. Dr. Zafar Iqbal (Tamgha-e-Imtiaz)
Conference Secretary, 8th IMRC 2026

Message Director General, PASTIC

It gives me great pleasure to extend my felicitations to the organizers on the successful convening of this scholarly event. Academic conferences serve as vital platforms for knowledge exchange, research dissemination, and collaboration among researchers, academicians, and professionals, thereby contributing significantly to national research and innovation ecosystems. In line with its mandate and the National Science, Technology, and Innovation (STI) Policy 2022, the Pakistan Scientific and Technological Information Centre (PASTIC) supports academic events by publishing and printing Abstract Books, ensuring standardized formatting, high-quality production, and enhanced visibility of scholarly contributions.

PASTIC is operating under the Pakistan Science Foundation (PSF) and the Ministry of Science & Technology (MoST), a premier national institution mandated to collect, organize, preserve, and disseminate Scientific and Technological Information (STI) for the socio-economic development of Pakistan. Through its headquarters and regional centres, PASTIC provides access to research literature, abstracting and indexing services, national S&T databases, patent and innovation information support, and reference library services, along with reprographic, publication, and capacity-building initiatives. These services collectively support researchers, industry, and policymakers, strengthening evidence-based research, innovation, and international scientific collaboration.

I sincerely appreciate the cooperation extended by the conference organizers and reiterate PASTIC's commitment to supporting academic initiatives that advance research excellence and contribute to national development. I wish the organizers and participants every success in their academic endeavors.

Prof Dr. Muhammad Akram Shaikh
Director General
Pakistan Scientific & Technological Information Centre (PASTIC)

Message Managing Director, KPITB

It gives me immense pleasure to extend my warm greetings to the distinguished speakers, researchers, academicians, industry leaders, innovators, students, and participants attending the International Conference on Artificial Intelligence and Emerging Technologies at Baragali, Khyber Pakhtunkhwa. I commend Sarhad University of Science & Information Technology (SUIT) and the Khyber Pakhtunkhwa Information Technology Board (KPITB) for bringing academia, government, industry, and the research community together on this important platform.

Artificial Intelligence, particularly Generative and Agentic AI, alongside cloud computing, data science, cybersecurity, IoT, blockchain, robotics, and other emerging technologies, is rapidly transforming economies, governance, education, and society. The challenge before us is to harness these technologies responsibly, securely, inclusively, and for meaningful human and economic development.

This conference provides an opportunity to connect research with real-world applications and to advance dialogue on responsible AI, data governance, cybersecurity, digital trust, human-centered innovation, and future-ready skills. These priorities strongly complement KPITB's Digital KP Policy & Roadmap 2030, which envisions an integrated, digitally empowered, and inclusive Khyber Pakhtunkhwa.

Our vision is to build an AI-enabled, data-driven, citizen-centric government while strengthening digital infrastructure, interoperability, cybersecurity, innovation, entrepreneurship, and digital public services. Equally important is preparing our youth for the global digital economy through advanced skills, industry partnerships, innovation, incubation, freelancing, entrepreneurship, and technology exports.

Technology alone, however, cannot deliver sustainable transformation. Strong institutions, trusted data, human capacity, ethical safeguards, and collaboration among government, academia, industry, and researchers are essential. Together, we can accelerate the journey from research to innovation and from innovation to measurable socioeconomic impact.

I encourage our researchers, students, entrepreneurs, and young innovators to think globally, collaborate boldly, and develop solutions that address real challenges. Our ambition should be not only to adopt emerging technologies, but to research, develop, and export them from Khyber Pakhtunkhwa and Pakistan to the world.

I wish the conference every success and look forward to its contribution towards responsible AI, innovation, digital transformation, and a stronger knowledge-based economy.

Dr. Akif Khan
Managing Director
Khyber Pakhtunkhwa Information Technology Board (KPITB)

Message Director ANSI, Mardan

It was a privilege for ANSI Institute of Management & Sciences, Mardan, to be associated as a supporting partner with the 8th International Multidisciplinary Research Conference (IMRC-2026), organized by Sarhad University of Science & Information Technology in collaboration with the University of Peshawar.

The theme, "Use of Artificial Intelligence to Protect Lives and Promote Peace: A Global Perspective," addressed one of the most significant challenges and opportunities of our rapidly evolving world. The conference provided a valuable platform to explore the responsible application of Artificial Intelligence in education, healthcare, disaster management, public safety, and sustainable development.

At ANSI, we believe that research, innovation, and academic collaboration are essential for addressing complex societal challenges. Our faculty and academic community remain committed to fostering a culture of knowledge, critical inquiry, and responsible innovation.

We commend the organizers and participating institutions for successfully bringing together scholars, researchers, and academicians from diverse disciplines. The exchange of knowledge and ideas at this conference has contributed to meaningful academic dialogue and may inspire further research and responsible technological advancement.

On behalf of ANSI Institute of Management & Sciences, Mardan, we extend our sincere appreciation to the organizers and all participants for making IMRC-2026 a meaningful academic gathering.

Muhammad Naseer Afridi
Director
ANSI Institute of Management & Sciences, Mardan

Message Executive Director Dosti Welfare Organization

It is an honor for Dosti Welfare Organization to be associated with the 8th International Multidisciplinary Research Conference (IMRC-2026), jointly organized by the University of Peshawar and Sarhad University of Science & Information Technology, Peshawar, from 10 to 12 September 2026.

The theme of the conference, "Use of AI to Protect Lives and Promote Peace: A Global Perspective," reflects an important and emerging area of global discussion. Artificial Intelligence is rapidly influencing different fields of human life, and its responsible use offers significant opportunities for improving healthcare, education, public safety, disaster response, governance, and social development.

As a non-profit organization working for the development of underprivileged communities, Dosti Welfare Organization recognizes the importance of ensuring that technological advancement remains connected with human needs and social responsibility. The effective use of AI requires not only innovation and research, but also ethical consideration, responsible decision-making, and collaboration among institutions and communities.

We believe that IMRC-2026 provides a valuable platform for scholars, researchers, academicians, professionals, and students to exchange knowledge, present research, and engage in meaningful academic dialogue on the opportunities and challenges presented by Artificial Intelligence.

I sincerely appreciate the efforts of the University of Peshawar, Sarhad University, the organizing committees, participating institutions, researchers, speakers, and all partners whose contributions have made this conference possible. I am confident that the discussions and research presented during the conference will contribute to a better understanding of the responsible use of AI for the protection of lives and the promotion of peace.

On behalf of Dosti Welfare Organization, I extend my warmest greetings and best wishes to all national and international participants of IMRC-2026. May this conference provide a productive environment for intellectual exchange, strengthen institutional collaboration, and lead to meaningful research and initiatives for the benefit of society.

Arslan Naseer
Executive Director
Dosti Welfare Organization

About PASTIC

The Pakistan Scientific & Technological Information Centre (PASTIC) is a constituent organization of the Pakistan Science Foundation (PSF) operating under the Ministry of Science and Technology (MoST), Government of Pakistan. PASTIC is a premier national institution specialized in the collection, organization, management, and dissemination of Scientific and Technological Information (STI) to support research, development, and industrial innovation across the country.

The PASTIC National Centre is located at the Quaid-e-Azam University Campus, Islamabad, with a nationwide network of six Sub-Centres in Karachi, Lahore, Peshawar, Quetta, Faisalabad, and Muzaffarabad, ensuring broad regional outreach.

Since its inception, PASTIC has played a pioneering role in supporting Pakistan's research community, particularly during the early stages of national S&T infrastructure development. Its services historically included the supply of scientific and technical literature, abstracts and indexes, bibliographies, translations, patent information, science reference library services, technological information transfer, computer-based information dissemination, and reprographic and publication services.

For further details visit: www.pastic.gov.pk

PASTIC Objectives

- Development of National Scientific & Technological Information (STI) resources (databases)
- Dissemination of Scientific & Technological Information through contemporary reference information tools
- Collaboration & Cooperation with institutional libraries/repositories for resource sharing
- Promotion of R&D based industrial development
- Printing of S&T/R&D Publications
- Capacity/skill development of researchers, information professionals, innovators & entrepreneurs
- Development of collaborations with national and international information networks

PASTIC Functions

S&T Publications

- *Technology Roundup:* Publish bi-monthly bulletin by repackaging of latest global Trade and Technology information.

- Abstract Books of Conferences: PASTIC supports publication/printing of Abstract Books of Conferences organized by various S&T universities (on request).

PASTIC Online databases

- Pakistan Science Abstracts (PSA): Abstracts of research published in Pakistani S&T Journals & Conference Proceedings etc.
- National Digital Archive (NDA): Full text digital repository of National Journals
- PakCat: Union Online Public Access Catalogue (OPAC) of books available in Scientific & Technological Libraries of Pakistan
- Digital Repository of Indigenous S&T literature
- Directory of Scientific Periodicals of Pakistan: An index of scientific periodicals (e.g., Journals, Magazines etc.) published in Pakistan.
- Database of R&D Projects executed in Pakistan
- Database of Books published by Pakistani authors
- National Scientists Directory (NSD)
- Industry related databases (e.g., Industries, Industrial challenges etc.)

Promotion of Commercializable Technologies & Industrial Products

Organize STEM and IT Expo for promotion of local R&D, SMEs, technologies/products/services, as well as empowering youth and general public on new and faster ways of delivering and accessing information.

National Science Reference Library Facility

A state-of-the-art Traditional Library facilitating the researcher through following services: Reference & Referral Services; Reader Service; Internet Service, Journal Listings; Photocopying & Scanning Services.

Skill Development/Capacity Building

Organize Seminars/Workshops /Trainings/ for capacity building of:

- Young Researchers on Data analysis, Reference Management etc.
- Women Entrepreneurs on E-marketing &E-business skills
- Library Professionals on Library automation & digitization
- Journal Publisher/Editors on E-Journal management & publishing
- Researchers and Innovators on Intellectual Property Rights, Media Information Literacy

Conference Program

Pre Conference Day: September 09, 2026
Arrival and Registration of Participants: 10:00 am till 7:00 pm
Dinner: 8:00 pm

Day 1: September 10, 2026		
Time	**Venue**	**Details of Event**
07:00- 08:15	**Dining Hall**	Breakfast
07:30 -08:15	**Registration**	
08:30-10:30	**Hall-A**	Session 01 (Social Sciences-I)
	Hall-C	Session 02 (Education & Humanities-I)
10:30-11:00	**Dining Hall**	Tea Break
11:00-11:10	**Hall-B**	Guests to be Seated for Opening Ceremony
11:15-01:00	**Hall-B**	Opening Ceremony, Group Photos
01:05-02:00	**Dining Hall**	Lunch and Prayer Break
02:15-04:00	**Hall-B/ Lawn**	Panel Discussion and MoU Signing Ceremonies/ Tree Plantation
02:05-03:55	**Hall-A**	Session 03 (Life, Nursing, & Medical Sci-I)
02:05-04:15	**Hall-C**	Session 04 (Languages & Literature-I)
02:05-04:15	**Lawn**	Poster Presentations
04:15-04:40	**Dining Hall**	Tea Break
04:45-07:00	**Hall-A**	Session 05 (Life, Nursing, & Medical Sci-II)
04:45-06:40	**Hall-B**	Session 06 (Computing & Numerical Sci.-I)
04:45-06:30	**Hall-C**	Session 07 (Engineering & Technology-I)
Day 1 Sessions		
08:30-10:30	Conference Dinner (Theme: Cultural Night*)	
* All guests will be dressed in their national or cultural attire as per theme of conference dinner.		
Day 2: September 11, 2026		
07:00-08:15	**Dining Hall**	Breakfast
08:30-10:30	**Hall-A**	Session 08 (Education & Humanities-II)
08:30-12:15	**Hall-B**	Session 09 (Languages & Literature-II)
08:30-10:30	**Hall-C**	Session 10 (Engineering & Technology-II)
10:30-11:00	**Dining Hall**	Tea Break
10:40-01:00	**Hall-A**	Session 11 (Social Sciences-II)
11:00-12:30	**Hall-C**	Session 12 (Agriculture & Environmental Sci.)

Time	Venue	Details of Event
01:00-02:15	**Dining Hall**	Lunch & Prayer Break
02:30-07:00	**Parking Area**	Excursion
08:30pm	**Dining Hall**	Dinner on Campus
Day 3: September 12, 2026		
07:00-08:15	**Dining Hall**	Breakfast
08:30-10:00	**Hall-A**	Session 13 (Education & Humanities-**III**)
08:30-11:00	**Hall-B**	Session 14 (Law, Public Policy & Governance)
08:30-10:30	**Hall-C**	Session 15 (Computing & Numerical Sci.-II)
10:30-11:00	**Dining Hall**	Tea Break
11:10-12:25	**Hall-A**	Session 16 (Commerce, Economics & Management Sci.)
11:00-01:20	**Hall-C**	Session 16 (Interdisciplinary Research for Sustainable Development)
01:00-02:00	**Dining Hall**	Lunch and Prayer Break
02:00-02:10	**Hall-B**	Guests to be Seated for Closing Ceremony
02:10-04:00	**Hall-B**	Closing Ceremony and Group Photos
Departure from Campus		

International Keynote Speakers

Sr. No	Name of Keynote Speaker	Designation, University / Affiliation
1	**Dr. Aykut Kismir**	Professor, Ankara University, Türkiye
2	**Dr. Fasee Ullah**	Associate Professor, Department of Computing, Universiti Teknologi PETRONAS, Malaysia
3	**Dr. Usama Shalaby**	Professor, Alzhar University, Egypt
4	**Dr. Arzo Ciftsuren**	Professor, Istanbul University, Tukiye
5	**Dr. Vafa Yazdn Manesh**	Professor, University of Tehran, Iran
6	**Dr. Ali Bayat**	Professor, Faculty of Foreign Languages and Literatures, University of Tehran, Iran
7	**Dr. Raza Raghib**	Professor, Department of Urdu, Alzhar University, Egypt
8	**Engr. Prof. Kennedy Chibuzor ONYELOWE**	Professor, Director, Directorate of University Advancement, Michael Okpara University of Agriculture, Umudike, Nigeria
9	**Dr. Fauziya Ali**	Professor, North Quest College, Edmonton, Canada
10	**Dr. Ghassan Abdul Majeed**	Professor of Literature and Civilization, University of Aleppo, Syria
11	**Dr. Maria M Garcia**	Professor of Linguistics, University of the Punjab, Lahore
12	**Dr. Noorhidawati Binti Abdullah**	Professor, University Malaya (UM), Kuala Lumpur, Malaysia
13	**Dr. Pakize Erdogmus**	Professor, Engineering Faculty, Duzce, Türkiye
14	**Dr. Abdul Kareem Essa Al-Ruheli**	Professor, Madeena Munawara, Kingdom of Saudi Arabia
15	**Dr. Davut Shabaz**	Professor, Faculty of Languages, History and Geography, Ankara University, Türkiye
16	**Dr. Taghreed Mohamed Al-Bayoumi**	Professor, Department of Urdu, Alzhar University, Egypt
17	**Dr. Shariyeh Hosseini Nasab**	Professor, COMSATS University, Lahore
18	**Dr. M. Ahsan Khan**	PhD Chemical Engineering / Postdoctoral Fellow, KU Leuven, Arenberg Campus, Belgium

Sr. No	Name of Keynote Speaker	Designation, University / Affiliation
19	**Dr. Asad Ullah**	Professor, Department of Physical Sciences, MacEwan University, Canada
20	**Dr. Tan Wen Nee**	Associate Professor, Universiti Sains Malaysia
21	**Dr Saeid Shirazi**	Assistant Professor, Faculty of Theology and Islamic Studies, University of Tehran

National Keynote Speakers:

Sr. N	Name of Keynote Speaker	Designation	Institution / Affiliation
1	**Dr. Mahboob Hussain**	Professor and Dean, Faculty of Arts and Humanities, University of the Punjab, Lahore	
2	**Dr. Ahmad Bilal**	Professor, Chairman, Department of Graphic Design; Founding Director, Postgraduate Research Centre of Creative Arts, University of the Punjab, Lahore	
3	**Dr. Adnan Abid**	Professor, Faculty of Computing and Information Technology, University of the Punjab, Lahore	
4	**Engr. Dr. Muhammad Azhar Naeem**	Professor of Electrical Engineering, University of the Punjab, Lahore	
5	**Dr. Kalyan Singh Kalyan**	Professor, GC University, Lahore	

ABSTRACTS
KEYNOTE SPEAKER

Humanity and Peace in the Digital Age: Understanding Artificial Intelligence through the Lens of Muhammad Iqbal's Universal Philosophy

Aykut Kişmir

Ankara University, Türkiye

The modern world is undergoing an unprecedented technological evolution shaped by the transformative power of Artificial Intelligence (AI). However, this era of scientific advancement and industrialization exerts constant stress and pressure on individuals, often triggering narrow national or regional perspectives. In this context, the philosophy of Muhammad Iqbal, Pakistan's national poet and a global thinker, offers a timeless guide for anchoring technological innovation in ethical and humanitarian foundations. Iqbal is a universal figure whose intellectual reach spans both Eastern and Western thought. The core of his philosophy lies in his exceptional ability to create an effective synthesis of old and new thought according to the needs of the time. This keynote will explore the potential of AI to protect lives and promote peace by examining it through Iqbal's universal perspective of "humanity and faith". Iqbal posits that due to limited opportunities and inherent weaknesses, individuals are often unaware of the "great destiny" prepared for them; he emphasizes that this evolutionary maturity can only be achieved through "hard and persistent work". Within this framework, AI should be positioned as a tool for "evolutionary maturity," helping to build societies resistant to human misery and enhancing global security and health. Furthermore, the interdisciplinary nature of memory studies and literature's role in reviving collective memory provides a framework for how AI-based data analytics can be used to foster social peace by drawing lessons from shared histories. Iqbal's vision, inspired by the idea of "seeing all nations with one eye", reminds us that AI must be coupled with responsible innovation to bridge global inequalities and contribute to sustainable, peaceful communities. Ultimately, this session invites participants to rethink AI not merely as a technology, but as a "cloud of mercy" serving a utopian world order centered on humanity and freedom, as envisioned by Iqbal.

Keywords: Muhammad Iqbal, Artificial Intelligence, Global Peace, Collective Memory, Humanity, Ethics of Technology.

Quantum Cryptography: Its Role in Future Cybersecurity Challenges

Fasee Ullah

Department of Computing, Universiti Teknologi PETRONAS (UTP), Seri Iskandar, Malaysia

The arrival of large scale quantum computing poses an existential threat to the cryptographic underpinnings of today's digital infrastructure. Algorithms like Shor's and Grover's can break widely deployed public-key schemes (RSA, ECC) and weaken symmetric primitives, exposing sensitive communications to "harvest-now, decrypt-later" attacks, where adversaries collect encrypted

data today to decrypt when quantum machines mature. This keynote reviews the emerging quantum security threat landscape and discusses two complementary paradigms of defenses: Quantum Key Distribution (QKD) and Post-Quantum Cryptography (PQC). The talk first reviews the physics foundations of QKD, whose security is based on the laws of quantum mechanics, rather than computational hardness assumptions. It then critically reviews the practical benefits of QKD as well as the real limitations in terms of transmission range, cost and dependence on infrastructure. The focus then shifts to PQC and the recently standardized quantum-resistant algorithms where hybrid security architectures and the concept of crypto-agility are discussed as practical ways forward for near-term protection. These approaches together show how organizations can add an additional level of defense by combining physics-based and mathematics-based solutions instead of a single solution. Special focus is given to resource-constrained and high-stakes environments such as the Internet of Things (IoT), healthcare systems, and emerging 6G networks, where computational overhead, latency and reliability constraints hinder the deployment of quantum-safe solutions. Based on the speaker's research on medical body-area networks, cloud data auditing and lightweight security for consumer IoT, the talk highlights the design tradeoffs in securing devices that cannot afford heavy cryptographic loads. Finally, the keynote provides a structured migration roadmap to move legacy systems toward quantum-resilient security and points out open research directions across protocol design, standardization and real-world integration. In line with the conference theme of using advanced technologies to defend lives and foster a safer digital society, the aim is to give researchers and practitioners a better understanding of the risks, the available countermeasures and the strategic decisions needed to defend critical systems in the post-quantum era.

مصنوعی ذہانت، مصنوعی یا اصل،مستقبل قریب کا آنے والا ایک دشوار فیصلہ (ادب کا خصوصی مطالعہ

Vafa Yazdan Manish

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بیسویں صدی میں انٹرنیٹ کی ایجاد نے جہاں علوم کی وسعتوں میں اضافہ کیا وہیں انسانی علوم کی معلومات کے خزائن بھی بڑھتے چلے گئے۔معلومات کا ذخیرہ اپنے حجم میں پھیلتا جارہا ہے۔دنیا ٹیکنالوجی کے زیرِ اثر نت نئی تبدیلیوں سے گزر کر مصنوعی ذہانت تک آپہنچی ہے۔اکیسویں صدی کاانسانی معاشرہ ٹیکنا لوجی کے اثرات سے گراں بار ہے۔ربیٹ اورمصنوعی ذہانت نے معلومات کو یک جنبشِ قلم ہماری دسترس میں کردیا ہے۔ماضی میں ایک کتاب کی جستجو طالب علم کو میلوں کے سفرپر مجبورکرتی تھی لیکن آج علم کی دنیا ٹیکنالوجی کی بدولت ہروقت ہمارے درمیان ہے۔معلومات کا یہ انبار ربیٹ اورمصنوعی ذہانت سے جڑکر معاشرے کو مزید تن آسانی میں مبتلا کررہا ہے۔ٹیکنالوجی اوربالخصوص مصنوعی ذہانت اب انسانی ذہن وافکارکے مدِ مقابل ہے۔اس کے اثرات سے علوم اورزبان وادب کا منظرنامہ بھی متاثر ہورہا ہے۔وقت گزرنے کے ساتھ ساتھ مصنوعی ذہانت کی معلومات کا حجم ،پروسسنگ کی رفتار،پیچیدہ زبان کو سمجھنے کی صلاحیت اورانسانوں سے رابطہ استواررکھنے کی مہارت

بھی بہتر ہوتی جارہی ہے۔یوں محسوس ہوتا ہے انسان جیسا ریبٹ بھی وجود میں آنے کو ہے۔مصنوعی ذہانت کا کردار ہر شعبہ میں اپنے اثرات مرتب کررہا ہے نیز یہ امربھی قابلِ توجہ ہے کہ اس کے استعمال کے رحجانات میں آئے دن اضافہ ہورہا ہے۔بالخصوص نوجوان طبقہ اس کی جانب زیادہ متوجہ ہے اوراس ربیٹ پر مکمل اعتماد کرتاہے۔یہ تمام اموردانشوروں کی فکر میں اضافہ کررہے ہیں ۔اگرمصنوعی ذہانت نے انسان کی جگہ لے لی توکیا دنیا میں معاشی بحران پیدا ہونے کاامکان بڑھے گا؟۔کیاتخلیق کار کی قدر گھٹ مصنوعی ذہانت کی وجہ سے کم ہوجائے گی؟تخلیق ادب،نظم ونثر کی اہمیت تسلیم شدہ ہے لیکن ادیب وشاعر مصنوعی ذہانت کی کہانی نویسی،شاعری اوردیگر تخلیقی مہارتوں کودیکھتے ہوئے زبان وادب کے مستقبل کے حوالے سے الجھن کا شکار ہیں ،کیا مستقبل میں کہانی اورشاعری کی تخلیق انسانی دسترس میں نہیں رہے گی؟کیا ادب کی تخلیق مصنوعی ذہانت کے مرہونِ منت ہوگی؟مصنوعی ذہانت کی تخلیقی مہارت تخلیق کاروں کو ذہنی کشمکش میں مبتلا کیے ہوئے ہے لیکن اس کے مثبت پہلوؤں کو نظراندازبھی نہیں کرسکتے۔ماضی کی ایجادات کے ساتھ جس طرح انسان نے زندگی جینا سیکھا مستقبل میں مصنوعی ذہانت کے ساتھ بھی گزارا کرنا ہوگا۔ اس مقالے میں مصنوعی ذہانت کا تعارف اوراس کے مختلف پہلوؤں بالخصوص زبان وادب کے حوالے سے مثبت اورمنفی جہات کی وضاحت کرتے ہوئےاختتام پر نتائج کے ضمن میں مصنوعی ذہانت کاکردار ،دشواریوں کے باوصف زبان وادب میں مصنوعی زبان کی معاونت،اس کے درست استعمال کے حوالے سے تجاویز اورامکانات پر روشنی ڈالیں گے اور دو سؤالات کا جواب دینے کی کوشش کریں گے: کیا مصنوعی ذہانت انسان کی نفسیات، تہذیب اور آرٹ او رادب کے میدان میں خطرناک ثابت ہوتی ہے ؟ کیا مصنوعی ذہانت فنکاروں اور لکھنے والوں کے لیے ایک دھمکی کی حیثیت رکھتی ہے؟

ادبیات کی تفہیم میں مصنوعی ذہانت کا کردار

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ایک مثبت نقطہ نظر سے دیکھا جائے تو یہ کہہ سکتے ہیں کہ آج کا انسان ایک ایسے عہد میں زندگی بسر کر رہا ہے جس میں مصنوعی ذہانت (Artificial Intelligence) محض ایک نئی ٹیکنالوجی نہیں ، بلکہ زندگی کی بنیادی ضرورت بنتی جا رہی ہے۔ سوشل میڈیا کے لیے ویڈیوز اور تصاویر کی تیاری سے لے کر کینسر جیسے مہلک امراض کی تشخیص، زبانوں کے ترجمے، سائنسی تحقیق، صنعتی پیداوار اور تعلیمی نظام تک، مصنوعی ذہانت نے زندگی کے تقریباً ہر شعبے میں اپنی افادیت ثابت کر رہی ہے۔ اس کی غیر معمولی تجزیاتی صلاحیت، وسیع معلومات تک فوری رسائی اور پیچیدہ مسائل کو مختصر وقت میں حل کرنے کی استعداد نے انسانی زندگی کو پہلے سے کہیں زیادہ سہل، منظم اور مؤثر بنا رہاہے۔ اس اعتبار سے مصنوعی ذہانت کو انسانی ذہن کی توسیع (Extension of Human Intelligence) کہا جا سکتا ہے، کیونکہ یہ انسان کی علمی اور عملی صلاحیتوں میں بے مثال اضافہ کرتی ہے۔ لیکن انسان کی زندگی صرف معلومات، منطق اور تجزیے کا نام نہیں۔ انسان ایک احساس رکھنے والی، خواب دیکھنے والی، محبت کرنے والی اور معنی تلاش کرنے والی ہستی ہے۔ یہی وہ مقام ہے جہاں ادب کی اہمیت سامنے آتی ہے۔ انسان فطری طور پر حسن، تخیل اور جمالیاتی احساس کی طرف مائل ہے، اسی لیے ادب اور ہنر ہمیشہ اس کی دلچسپی کا مرکز رہے ہیں۔ ادب کا تعلق مادی حسن سے نہیں، لیکن وہ انسان کے باطن میں پوشیدہ جذبات، احساسات، افکار اور اخلاقی اقدار کو نہایت مؤثر انداز میں نمایاں کرتا ہے۔ ایک سچا ادیب اپنے مشاہدے، تجربے اور تخلیقی بصیرت کے ذریعے نہ صرف انسانی زندگی کی حقیقتوں کو آشکار کرتا ہے بلکہ اپنے معاشرے

کی فکری اور اخلاقی اصلاح میں بھی اہم کردار ادا کرتا ہے۔ ادب انسان میں محبت، رواداری، انصاف، ہمدردی اور حسن ذوق جیسی اعلیٰ انسانی اقدار کو فروغ دیتا ہے اور اسے اپنے معاشرے اور زمانے سے زیادہ گہرا تعلق قائم کرنے کی ترغیب دیتا ہے۔ یہی وجہ ہے کہ فارسی اور اردو زبان و ادب، دونوں نے برصغیر کی تہذیبی اور فکری تشکیل میں ہمیشہ نمایاں کردار ادا کیا ہے اور آج بھی انسانی شعور کی آبیاری کا ایک مؤثر ذریعہ ہیں۔ فارسی اور اردو ادب صدیوں سے انسان کے اسی باطنی سفر کے امین رہے ہیں۔ فردوسی نے شاہنامہ میں صرف ایرانی بادشاہوں کی تاریخ بیان نہیں کی بلکہ اقتدار، انصاف، وفاداری اور انسانی عظمت کے ایسے آفاقی تصورات پیش کیے جو ہر زمانے کے انسان کے لیے رہنمائی کا سرچشمہ ہیں۔ مولانا جلال الدین رومی کی مثنوی معنوی انسان کو یہ سکھاتی ہے کہ عقل اپنی جگہ ضروری ہے، مگر حقیقت کی آخری منزل عشق، وجدان اور خود شناسی سے حاصل ہوتی ہے۔ سعدی کی گلستان اور بوستان علم کو اخلاق اور انسان دوستی کے ساتھ جوڑتی ہیں، جبکہ حافظ شیرازی کی غزلیں، یکرنگی، انسان کے باطن، امید اور آزادیِ فکر کی ترجمان ہیں۔اردو ادب بھی انسانی شخصیت کے انہی پہلوؤں کو نمایاں کرتا ہے۔ میر تقی میر نے انسان کے دکھ، تنہائی اور شکست کو لازوال شعری پیکر عطا کیا، مرزا غالب نے عقل اور احساس کے باہمی تعلق کو نئی جہت دی، علامہ اقبال نے خودی، عمل اور مسلسل ارتقا کا درس دیا، جبکہ فیض احمد فیض نے محبت کو سماجی انصاف اور انسانی آزادی سے ہم آہنگ کیا۔ ان مصادیق میں فارسی اور اردو ادب کے بہت سے دیگر شعرا اور ادیبوں اور ان کے ادبی کارناموں کا ذکر کیا جاسکتا ہے۔ لیکن بات کو سمیٹنے کی خاطر ان چند ناموں پر اکتفا کیا جاتا ہے۔ حقیقت یہ ہے کہ مصنوعی ذہانت انسانی دانش میں اضافہ کرتی ہے، جبکہ ادب انسانی روح اور احساس کو جلا بخشتا ہے۔ ایک انسان کو مسائل حل کرنا سکھاتی ہے اور دوسرا زندگی کا مفہوم سمجھاتا ہے۔ اسی لیے عصرِ حاضر کا سب سے اہم سوال یہ نہیں کہ مصنوعی ذہانت ادب کی جگہ لے سکتی ہے یا نہیں، بلکہ یہ ہے کہ مصنوعی ذہانت ادب کی خدمت کس طرح کر سکتی ہے۔ اس سلسلے میں امکانات بے حد وسیع ہیں۔ مصنوعی ذہانت فارسی اور اردو کے کلاسیکی متون کو جدید نسل کے لیے زیادہ قابلِ فہم بنا سکتی ہے۔ مثال کے طور پر مولانا روم کی مثنوی یا حافظ شیرازی کی غزلوں میں موجود پیچیدہ عرفانی تعبیرات کو سادہ اور رواں زبان میں سمجھایا جا سکتا ہے۔ بیدل دہلوی کے دقیق اسلوب کی وضاحت کی جا سکتی ہے، اور فردوسی کے شاہنامہ کے کرداروں کو تاریخی اور تہذیبی پس منظر کے ساتھ پیش کیا جا سکتا ہے تاکہ نوجوان قاری ان کے فکری اور اخلاقی پیغام سے بہتر طور پر آشنا ہو سکے۔ اسی طرح اردو ادب میں غالب کے اشعار کے استعارات، اقبال کے فلسفۂ خودی، میر کی داخلیت، فیض کے انقلابی شعور اور انتظار حسین یا قرۃ العین حیدر کی تہذیبی علامتوں کی وضاحت مصنوعی ذہانت کے ذریعے زیادہ مؤثر انداز میں کی جا سکتی ہے۔ قاری کی عمر، علمی سطح اور ذوق کے مطابق ان متون کی تشریح پیش کر سکتا ہے، مشکل الفاظ کی وضاحت کر سکتا ہے، تاریخی و ثقافتی حوالوں کو واضح کر سکتا ہے اور مختلف ادیبوں کے اسالیب کا تقابلی مطالعہ بھی فراہم کر سکتا ہے۔ تحقیق کے میدان میں بھی مصنوعی ذہانت نئے امکانات پیدا کرتی ہے۔ ہزاروں صفحات پر مشتمل متون میں کسی مخصوص استعارے، علامت، کردار یا فکری رجحان کا سراغ لگانا، مختلف شعرا کے اسالیب کا تقابل کرنا، یا فارسی اور اردو ادب کے باہمی اثرات کا مطالعہ کرنا اب پہلے کی نسبت کہیں زیادہ آسان ہو گیا ہے۔ اس طرح محقق زیادہ وقت محض مواد جمع کرنے کی بجائے اس کے تجزیے اور تنقیدی تعبیر پر صرف کر سکتا ہے۔ اس تمام بحث کا حاصل یہ ہے کہ موجودہ دور میں مصنوعی ذہانت اور ادب دو متوازی دنیائیں نہیں بلکہ انسانی تہذیب کے دو تکمیلی پہلو ہیں۔ مصنوعی ذہانت انسان کی ذہنی اور عملی صلاحیتوں کو وسعت دیتی ہے، جبکہ ادب اس کے دل، وجدان اور اخلاقی شعور کو جلا بخشتا ہے۔ جب یہ دونوں قوتیں ایک دوسرے کے ساتھ ہم آہنگ ہو جائیں تو نہ صرف علم زیادہ مؤثر ہوتا ہے بلکہ انسان بھی زیادہ باشعور، حساس اور تخلیقی بن جاتا ہے۔ مستقبل کا کامیاب معاشرہ وہی ہوگا جو مصنوعی ذہانت کی رفتار کو ادب کی بصیرت اور انسانی اقدار کے ساتھ ہم آہنگ کرنے میں کامیاب ہوگا۔

اردو ادب کی تفہیم میں مصنوعی ذہانت کا کردار: چیٹ جی پی ٹی کا ایک تطبیقی و تنقیدی مطالعہ

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ماضی میں انسان اور جدید ٹیکنالوجی کے درمیان تعلق زیادہ تر ادبی متون کی تدوین، ترتیب اور اشاعت تک محدود تھا، لیکن مصنوعی ذہانت (Artificial Intelligence) کی تیز رفتار ترقی نے اس تعلق کو ایک نئی جہت عطا کی ہے۔ آج مصنوعی ذہانت نہ صرف ادبی مواد کی تیاری، تدوین اور ترجمے میں معاونت فراہم کرتی ہے بلکہ ادبی متون کے تجزیے، تعبیر اور تنقیدی مطالعے میں بھی مؤثر کردار ادا کر رہی ہے۔اس کے باوجود مصنوعی ذہانت انسانی تخلیقی شعور، جذبات، وجدانی ادراک، جمالیاتی حس اور تہذیبی وثقافتی سیاق و سباق کے مکمل فہم سے محروم ہے، اس لیے اسے انسانی تخلیق اور تنقیدی بصیرت کا متبادل نہیں بلکہ ایک معاون علمی وسیلہ تصور کیا جانا چاہیے۔ یہ تحقیق بنیادی طور پر ایک تطبیقی مطالعہ ہے، جس میں توصیفی و تجزیاتی منہج اختیار کرتے ہوئے چیٹ جی پی ٹی کو بطور عملی نمونہ استعمال کیا گیا ہے۔ تحقیق کا مقصد اردو ادبی متون کی تفہیم، تعبیر، تجزیے، تنقید اور ترجمے میں چیٹ جی پی ٹی کی صلاحیتوں اور حدود کا عملی جائزہ لینا ہے۔ اس مقصد کے لیے منتخب اردو ادبی متون پر چیٹ جی پی ٹی کے تجزیات، تعبیرات اور جوابات کا تقابلی و تنقیدی مطالعہ کیا گیا ہے تاکہ اس کی علمی افادیت، دقت، قابلِ اعتماد ہونے کی سطح اور ادبی متون کی تفہیم میں اس کی عملی استعداد کا تعین کیا جا سکے۔ تحقیق کے نتائج سے معلوم ہوتا ہے کہ چیٹ جی پی ٹی اردو ادبی متون کے ابتدائی تجزیے، موضوعاتی درجہ بندی، لسانی خصوصیات کی شناخت، بنیادی ادبی مفاہیم کی وضاحت اور متعلقہ معلومات کی تیز رفتار فراہمی میں نمایاں مؤثریت رکھتا ہے، جس سے ادبی تحقیق کے وقت اور محنت میں خاطر خواہ کمی آ سکتی ہے۔مزید برآں، نتائج یہ بھی ظاہر کرتے ہیں کہ اگرچہ چیٹ جی پی ٹی ادبی تعبیر، ترجمہ اور تنقیدی معاونت میں مفید کردار ادا کرتا ہے، تاہم وہ ادبی متون کے علامتی، جمالیاتی، تہذیبی، تاریخی اور جذباتی پہلوؤں کے عمیق فہم میں انسانی ناقد کا مکمل متبادل نہیں بن سکتا،خصوصاً وہاں جہاں تخلیقی بصیرت، ثقافتی سیاق اور ادبی ذوق بنیادی اہمیت رکھتے ہوں۔ یہ مطالعہ اس نتیجے پر پہنچتا ہے کہ چیٹ جی پی ٹی اور دیگر بڑے لسانی نمونے (Large Language Models) اردو ادبی تحقیق، تدریس اور تنقید میں مؤثر معاون ذرائع بن سکتے ہیں، تاہم ان کے نتائج کی صحت اور معنویت کو انسانی علمی بصیرت اور تنقیدی شعور کی روشنی میں جانچنا ناگزیر ہے۔ اس طرح مصنوعی ذہانت اور انسانی ذہانت کا باہمی امتزاج اردو ادب کی تفہیم، تحقیق اور تنقید کے لیے نئے امکانات پیدا کر سکتا ہے۔ کلیدی الفاظ :مصنوعی ذہانت، چیٹ جی پی ٹی، اردو ادب، ادبی تنقید، ادبی متن،تفہیم ادب،بڑے لسانی نمونے۔

البیومی اردو زبان کی تعلیم میں مصنوعی ذہانت کی ایپلی کیشنز کے استعمال کے چیلنجز (تطبیقی مطالعہ)

El-Bayoumi تغرید محمد

شعبۂ اردو زبان و ادب، کلیۂ الدراسات الانسانیۃ، جامعہ الازہر، مصر

اس میں کوئی شک نہیں کہ جدید ذرائع ابلاغ اور ٹیکنالوجی ہماری معاصر زندگی کا ایک بنیادی حصہ بن چکے ہیں۔ کمپیوٹرز اور اسمارٹ فونز نے انسانی زندگی پر ایسا گہرا اثر ڈالا ہے جس کی ماضی میں کوئی مثال نہیں ملتی۔ اسمارٹ فونز کی ذہین ایپلی کیشنز اب ہمیں بعض اوقات خود ہماری ذات سے بھی زیادہ جانتی ہیں، اور ان کا استعمال زندگی کے ہر شعبے میں وسیع پیمانے پر ہو رہا ہے۔ ظاہر ہے کہ تعلیم کا شعبہ بھی ان جدید تبدیلیوں اور رجحانات سے الگ نہیں رہ سکتا۔ اگر ہم بطور اساتذہ تکنیکی ترقی کے ساتھ قدم ملا کر نہ چل سکے تو ہمارے

تعلیمی ادارے اور تدریسی نظام خطرے سے دوچار ہو جائیں گے، کیونکہ وہ عالمی مسابقت کی صلاحیت سے محروم رہ جائیں گے۔ اسی لیے ہم پر یہ ذمہ داری عائد ہوتی ہے کہ معلوماتی ٹیکنالوجی اور مصنوعی ذہانت کی جدید جہات کو عملی طور پر بروئے کار لائیں، اور مختلف تعلیمی کورسز کی تیاری میں ان کا لحاظ رکھیں، مثلاً آن لائن کورسز (Online Courses)، ای لرننگ پلیٹ فارمز (E-learning Platforms)، اور تعلیمی مقاصد کے لیے موبائل ایپلی کیشنز۔ جدید ٹیکنالوجی زبان کی تدریس، خصوصاً قواعدِ زبان کی تعلیم کے حوالے سے جاری مباحث میں بھی اہم مقام اختیار کر چکی ہے۔ قواعد کی تدریس کو بعض اہلِ علم نے ایک ایسی "لسانی اور سیاسی جنگ گاہ" (Linguistic and Political Battlefield) قرار دیا ہے جہاں مختلف نظریات اور تدریسی رجحانات ایک دوسرے کے مقابل آتے ہیں۔ • مطالعے کا طریقۂ کار:اس تحقیق میں محققہ نے اردو زبان کی تعلیم کے لیے ChatGPT کے عملی استعمال کا جائزہ پیش کیا ہے۔ یہ ایپلی کیشن مشین لرننگ (Machine Learning) اور مصنوعی ذہانت (Artificial Intelligence) کی جدید ٹیکنالوجی پر مبنی ہے۔ اسے OpenAI نے نومبر 2022ء میں عوام کے لیے متعارف کرایا، اور آج یہ دنیا بھر میں سب سے زیادہ استعمال ہونے والی مصنوعی ذہانت کی ایپلی کیشنز میں شمار ہوتی ہے۔ یہ صارف کے ساتھ مکالمہ کرکے اس کی ضرورت کے مطابق بہترین جواب فراہم کرتی ہے اور مختلف قسم کے احکامات پر عمل کرنے کی صلاحیت رکھتی ہے، مثلاً مختلف نوعیت کا تحریری مواد تیار کرنا، زبانوں کا ترجمہ کرنا، یا کسی مخصوص موضوع پر متن تخلیق کرنا۔ جب محققہ نے اردو زبان سیکھنے کے لیے ChatGPT سے مکالمہ کیا تو اس نے معلومات کی تنظیم، ترتیب، عمدہ پیشکش، تیز رفتار جواب دہی اور تدریسی معاونت میں قابلِ ذکر کارکردگی کا مظاہرہ کیا۔ اگرچہ ترجمے میں بعض مقامات پر چند خامیاں بھی سامنے آئیں، تاہم مزید مکالمے اور رہنمائی کے بعد اس نے اپنی سابقہ غلطیوں کی اصلاح کی، درست معلومات فراہم کیں، اور صارف کو واضح طور پر آگاہ بھی کیا کہ سابقہ جواب میں تصحیح کی گئی ہے۔

From Smart Cities to Peaceful Cities: Can AI Help Us Design Urban Environments for Safety, Trust and Coexistence?

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The idea of the “smart city” has largely been associated with efficiency: collecting data, optimising infrastructure, managing traffic, monitoring public space, and predicting urban problems. But as artificial intelligence becomes increasingly capable of analysing complex urban conditions, a more fundamental question needs to be asked: what kind of city are we trying to make smarter? This keynote proposes a shift in focus from the smart city to the peaceful city, a city designed not only to function efficiently, but to support safety, trust, social interaction, and coexistence. AI offers new possibilities for understanding the relationship between people and their urban environments. By combining spatial, environmental, behavioural, and temporal data, AI can help identify patterns that are difficult to recognise through conventional urban analysis. It can reveal where people feel unsafe, where public spaces are avoided, where movement patterns create conflict, where social interaction is limited, and where the physical environment may contribute to exclusion or

vulnerability. The potential value of AI, however, is not simply in predicting where crime or conflict might occur. Its more constructive role may be to help architects and urban designers understand why certain environments generate fear, isolation, or tension, and explore how spatial interventions could address these conditions. Better visibility, active building edges, accessible public spaces, pedestrian connections, mixed uses, and opportunities for social interaction may sometimes contribute more to urban safety than increased surveillance. This approach also raises important questions about privacy, bias, ownership of urban data, and whose experiences are represented in AI systems. A city cannot become peaceful simply by becoming more technologically controlled. The keynote therefore argues for a shift from monitoring urban problems to understanding urban life. AI should support, rather than replace, human and architectural judgement. The future of the city should not be measured only by how efficiently it operates, but also by whether its physical and social environments allow different people to share space, develop trust, and coexist. The challenge is not simply to build smarter cities, but to decide what intelligence should ultimately serve.

From Cells to Organisms: The Power of Site-Directed Mutagenesis and the Role of Quantum Mechanics in Biological Processes

Asad Ullah

University Educator

Combining experimental mutagenesis and computational methods helps scientists understand the connection between genotype and phenotype, which is essential to modern molecular biology and biochemistry. The combination of experimental mutagenesis with computational and theoretical approaches has become a vital strategy for dissecting the relationships between protein structure and function, as well as for understanding the molecular basis of biological processes. This presentation will examine how site-directed mutagenesis, random mutagenesis, and principles of quantum mechanics can be integrated to explore the structural, energetic, and functional determinants of protein activity. This presentation will address the use of site-directed and random mutagenesis to find residues crucial for catalysis and structure. This draws upon my research background in the modification of membrane transport proteins and other systems of biological relevance. Experimental results will demonstrate how systematic substitutions of amino acids provide mechanistic insight into protein folding, stability, substrate specificity, ion transport, and allosteric regulation. The lecture will also explore the rising significance of quantum physics in describing biological events at the atomic and electronic levels. The lecture illustrates how multidisciplinary techniques help us better understand complex biological processes. This step is a move from descriptive molecular biology to predictive mechanistic models. The discussion will also cover future opportunities for integrating mutagenesis, artificial intelligence, high-performance computing, and quantum-based

simulations to accelerate advances in protein engineering, therapeutic discovery, and precision medicine.

Exploring the Bioactive Potential of Essential Oils from Malaysian Medicinal Plants

Tan Wen Nee

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Malaysia has a rich biodiversity that provides an invaluable source of indigenous medicinal plants, many of which have long been used in traditional healing practices. Among the various natural products obtained from these plants, essential oils have attracted increasing scientific interest owing to their diverse chemical composition and biological activities. This presentation explores selected essential oils from Malaysian medicinal plants, highlighting their chemical composition, bioactive constituents, and pharmacological activities, while connecting traditional knowledge with contemporary scientific research. Particular emphasis will be placed on their bioactive potential and possible applications in healthcare and biomedical fields, as well as the challenges associated with their stability, bioavailability, and delivery. In this context, nanotechnology offers promising strategies to enhance the stability, bioavailability, and delivery of essential oils through nanoencapsulation, nanocarriers, and controlled-release systems. By integrating the rich medicinal plant resources of Malaysia with advances in nanotechnology, this presentation highlights promising opportunities for translating bioactive natural products into potential therapeutic applications while reinforcing the importance of conserving the medicinal plant resources of Malaysia as a valuable reservoir of bioactive compounds.

Who Reviews the Reviewers? Generative AI, Peer Review and The Future of Scholarly Evaluation

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Peer review has long been the foundation of scholarly trust, but today it faces a fundamental tension: the volume and complexity of research are growing faster than the capacity of humans to review it rigorously, consistently and promptly. Generative artificial intelligence (GenAI) now enters this system not simply as a productivity tool, but as a potential participant in scholarly evaluation that capable of summarising manuscripts, identifying methodological weaknesses, generating review feedback and even evaluating the quality of human reviews. This leads to a provocative question for the future of scholarship: who reviews the reviewers when artificial intelligence begins to influence how knowledge is judged? Drawing on scholarly literature published between 2022 and 2026, this keynote examines what happens when GenAI becomes embedded in the peer-review process. Recent evidence reveals both extraordinary potential and profound limitations. Empirical comparisons of GPT-4 and human reviewers show important differences in

the issues identified, particularly in methodological assessment, questioning whether LLMs can replicate expert scholarly judgement. A 2025 Scientometrics review and a 2025 Information Fusion survey further demonstrate the rapid development of automated and AI-assisted approaches to scholarly evaluation, while studies of reviewers highlight unresolved concerns surrounding bias, transparency, confidentiality and accountability. Together, these findings suggest that the future of peer review is unlikely to be a simple choice between human and machine. Instead, emerging evidence points towards AI augmentation rather than AI replacement. A large-scale randomized study published in Nature Machine Intelligence in 2026 demonstrates that LLM-generated feedback can improve the specificity and actionability of human reviews. Yet this promise is accompanied by new vulnerabilities. Research published in Scientometrics in 2026 shows that hidden prompt injections embedded within manuscripts can manipulate AI-generated evaluations, revealing a new dimension of research-integrity risk. GenAI therefore has the potential not only to assist reviewers, but also to reshape the very mechanisms through which scholarly credibility is established. The keynote proposes a forward-looking framework for AI-mediated peer review, organised around five principles: human accountability, epistemic integrity, transparency, confidentiality and robustness. It asks not simply whether AI can review scholarly work, but what kind of peer review we want to create when machines become part of the process of judging knowledge. The central argument is that the future of scholarly evaluation should not be defined by replacing human reviewers with machines, but by designing human–AI systems that strengthen rigour while preserving independence, diversity, fairness and trust. Ultimately, the question is not only who reviews the reviewers? but who governs the intelligence that increasingly helps us decide what counts as credible knowledge?

Human Intelligence Meets Artificial Intelligence (Transforming Health care Without Losing the Human Touch)

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Artificial intelligence (AI) is increasingly utilized in healthcare for varied reasons, some of which are for diagnostic interpretation, screening, risk prediction, clinical decision support, research, education, and health-system management. Evidence from systematic reviews suggests that AI can improve diagnostic assessment, support early detection of disease, and increase health care efficiency. Artificial intelligence is transforming nursing globally by enhancing clinical decision-making, patient monitoring, documentation, and workforce efficiency. AI can support nurses in delivering safer, evidence-based care while reducing administrative burden and enabling earlier identification of patient deterioration. However, its implementation raises important concerns regarding privacy, and inequitable access. Globally, nurses must become active participants in AI development, governance,

education, implementation, and evaluation to ensure that technology strengthens the abilities of nurses and doesn't replace the human-centered care. The transition from research to practice remains constrained by several factors. These include privacy, incomplete date entry, training, inadequate digital infrastructure, implementation costs, and insufficient workforce competence. These challenges are especially important in low- and middle-income countries. Differences in connectivity, financing, technical expertise, and data availability may deepen existing inequities in healthcare access and quality. Health-professions education should respond by establishing structured AI competencies. These competencies should include data literacy, critical appraisal of model outputs, ethical and legal reasoning, and responsible use of generative AI. Educators need support to use AI appropriately in instruction, assessment, simulation, research, and clinical education. These applications must preserve academic integrity, professional accountability, and patient-centered care. Educational programs should prepare learners to recognize model limitations, communicate uncertainty, and identify harms associated with biased or poorly validated systems. Policy frameworks should establish enforceable requirements for data protection, transparency, explainability, accountability, safety, interoperability, procurement, workforce development, and post-deployment monitoring. Implementation should therefore include context-specific validation and meaningful stakeholder participation. Evaluation should extend beyond technical accuracy. It should examine patient safety, clinical effectiveness, cost-effectiveness, workflow and workforce effects, equity, patient experience, educational outcomes, and system sustainability. With human oversight, transparent governance, and continuous evaluation, AI can complement the existing systems and practices rather than replace professional judgment. It can strengthen health-system capacity and support more equitable and sustainable healthcare delivery.

Artificial Intelligence in Literary Translation from Urdu into Arabic: An Applied Experience in Translating "Dharti Ka Kal" by "Joginder Paul"

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The rapid development of artificial intelligence has introduced new possibilities for literary translation, while also raising questions about its ability to deal with the linguistic, cultural, contextual, and stylistic complexities of literary texts. This study evaluates the potential and limitations of artificial intelligence in literary translation from Urdu into Arabic through practical experience of translating Dharti Ka Kal, a short-story collection by the Urdu writer Joginder Paul, consisting of eleven stories. The study adopts an AI-assisted human translation approach. The initial translation of the Urdu text was generated with the assistance of ChatGPT and Gemini, followed by extensive human review, correction, contextual analysis, and literary

refinement. In some cases, the AI tools were also consulted after the initial translation to clarify highly specific expressions, analyze culturally embedded meanings, or identify and correct translation errors. The final Arabic version therefore represents a human translation developed with AI assistance rather than an unedited machine translation. Through the analysis of selected examples from the collection, the study identifies areas in which artificial intelligence demonstrated considerable effectiveness, including general comprehension, direct translation, handling of many grammatical structures, suggesting lexical equivalents, and reformulating expressions. At the same time, the translation experience revealed significant challenges requiring human intervention, particularly in culturally embedded expressions, including Swahili vocabulary; contextual and pragmatic issues, such as identifying the intended addressee and interpreting meaning in relation to the surrounding context; and linguistic issues involving omitted subjects, pronoun reference, and word order. The study argues that artificial intelligence can serve as a valuable and efficient assistant in literary translation, particularly during the initial stages of comprehension, drafting, and linguistic processing. However, the experience demonstrates that human intervention remains essential when translation requires deep contextual interpretation, cultural awareness, and sensitive literary judgment. The study thus presents AI not as a substitute for the literary translator, but as a powerful tool whose effectiveness depends on the translator's ability to critically evaluate, correct, and refine its output.

Transforming Global Challenges into Sustainable Solutions: The Power of Artificial Intelligence, Interdisciplinary Research, and International Collaboration

Kennedy Chibuzor Onyelowe

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This keynote examines how Artificial Intelligence, interdisciplinary research, and international collaboration can collectively transform complex global challenges into sustainable and inclusive solutions. Contemporary challenges, including climate change, food insecurity, environmental degradation, population growth, public health threats, infrastructure deficits, and rapid digital transformation, transcend national and disciplinary boundaries and therefore require integrated approaches. Artificial Intelligence offers powerful capabilities for accelerating scientific discovery, analysing complex datasets, improving prediction and decision-making, and developing intelligent solutions across agriculture, healthcare, engineering, environmental management, education, and other sectors. However, technology alone cannot address these challenges effectively. Interdisciplinary research is essential for integrating knowledge, methodologies, and perspectives from diverse fields to produce comprehensive and practical solutions. Equally important is international collaboration, which facilitates knowledge exchange, research capacity building, staff and student mobility, joint research, shared

infrastructure, and access to global funding opportunities. The keynote further emphasises the importance of responsible and ethical Artificial Intelligence founded on transparency, fairness, accountability, privacy, inclusiveness, and human-centred innovation. It argues that universities must prepare future researchers with technical competence, creativity, ethical leadership, digital literacy, and cross-cultural collaboration skills. Ultimately, sustainable global development will depend on connected research ecosystems that transform data into knowledge, knowledge into innovation, and innovation into lasting societal impact.

Existential Anguish and Enquiries into Truth in the Ghazals of Yās Yagāna Changezī

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Yās Yagāna Changezī, an idiosyncratic and provocative voice in modern Urdu poetry, subjects the rigid aesthetic structures and inherited philosophical assumptions of the classical ghazal to radical existential questioning. While traditional ghazal discourse predominantly rests upon quietist submission, divine surrender, or mystical ecstasy, Yagāna transforms this genre into an arena of confrontation that exposes individual tragedy, alienation, and ontological anguish in the pursuit of truth. This paper examines the central existential themes in Yagāna Changezī's ghazals and explores his interrogative stance toward truth. It investigates how the poet retains classical symbolic motifs—the tavern, preacher, lamentation, death, mirror, and caravan—while revitalizing them with existential restlessness and tragic consciousness. Human existence in Yagāna's poetic vision is defined not as a passive victim of fate, but as a tragic entity caught in the illusion of mistaking destiny for personal agency, yet driven to seek truth within the inner self. Through a text-based analysis of selected ghazals, this study demonstrates that Yagāna's engagement with mystical traditions represents an intellectual interrogation rather than unquestioning adherence. By exposing the tension between external forms and internal realities, Yagāna introduces a profound philosophical dimension to the Urdu ghazal.

Keywords: Yagana Changezi, Urdu Ghazal, Existentialism, Interrogative Poetry, Mystical Crisis, Modern Urdu Poetry, Ontological Anguish.

االسالمية الشريعة ضوء في االصطناعي الذكاء إستخدام

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، َالشريعةِ في ضوءِ االخالقيةِ الحوكمةَ ، وترسيخ االجتماعيِ فاهً الر ِ ،وتحقيقً سالمِ َض بال ن النهو إً ِظ الدي ِن، والنف ِس، والعقِل، ُعلى حف ليا لإلسالم إذ قامت الشريعةُ الع د من المقاصدُ ً عُ ي ِل االسالمية و ، الما ، ِ الرقمية . وفي ،عصِر الثورةِ والعدُل والتكافلُ مجتمِع يسوده االمن ِ في بناء ُسهم تُ ر ِض

ً وهي مقاصدِ والع ، من خالِل دعِمِ االنسانيةِ وخدمةُ ها لتعزيِز السالِم يمكن توظيف واعدة أداةٌ االصطناعيُ أصبح الذكاءِب الكراه خطاِ الحوا ، وتحسيِنِر بين ِ.الثقافات، ومكافحةِ ِت اإلنسانية والتطرف، والتنبِؤ باألزماِ يةِ جودة المجتمعي والرفاهِ المستدامةِ في تحقيِق التنميةُ ُسهم ، بما يِ واالجتماعيةِ والتعليميةِ ِت الصحية الخدما التيِ بالقيِم والمباد ِئ اأَلخالقيةً ِت ينبغي أن تكوَن منضبطةَ من هذه ِالتقنيا ن االستفادة أً َ غير ق رتها الشريعةً ر ُ ، وتحقيقِ ، وحفُظ الخصوصية االنسانيةِ الكرامةُ ؛ وصيانة ؛ُ وفي مقدمتها العدُل، والشفافية االسالميةُ بناءُ ِ يمكن ِالتقني دمِ والتقُّ الضرِر والظلِم. وبهذا التكامِل بين الهدِي الشرعيُ ، ومنعِ العامة ،المصلحةَ الذكاءُ ر ُسخ تٍ حضارية منظومة ِ، وترسيِخ لِم المجتمعيِ االنسان ِوتعزيِز أاَلمِن والسِ لخدمةً االصطناعي ا ً وعدًال وازدهار ً استقرار َ عالِم أكثر في بناء ، واإلسهامِ الرشيدةِ الحوكمة

Artificial Intelligence in History Writing and Teaching: Opportunities, Challenges, and the Future of Historical Scholarship

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Artificial Intelligence (AI) is rapidly transforming how knowledge is produced, interpreted, communicated, and taught. The discipline of History, traditionally grounded in the critical examination of primary sources, archival research, historiographical debate, and contextual interpretation, is also being reshaped by emerging AI technologies. This paper explores the implications of AI for history writing and teaching, with particular attention to the opportunities it offers and the intellectual, ethical, and methodological challenges it presents. In historical research and writing, AI can assist scholars in searching and organizing large archival collections, digitizing and analyzing historical texts, identifying patterns across extensive datasets, translating sources, comparing historiographical interpretations, and generating research leads. Digital humanities and AI-based tools can therefore expand the scope and efficiency of historical inquiry. However, AI-generated historical narratives also raise serious concerns regarding accuracy, source verification, bias, contextualization, authorship, intellectual integrity, and the potential reproduction of historical misconceptions. AI should therefore be understood not as a substitute for the historian but as an emerging research instrument whose outputs require rigorous human scrutiny and historiographical judgment. In history teaching, AI has the potential to facilitate personalized learning, interactive historical simulations, multilingual learning, automated feedback, and access to diverse sources and interpretations. It can encourage students to engage critically with competing narratives and develop new forms of historical inquiry. At the same time,

excessive dependence on AI may weaken students' abilities in close reading, source criticism, independent research, argumentation, and critical thinking. The paper argues for a human-centred and historically informed approach to AI, in which technological innovation complements rather than replaces the historian's intellectual role. The future of history will not be a simple choice between traditional scholarship and artificial intelligence; rather, it will require a productive partnership among historical imagination, critical methodology, archival evidence, and computational intelligence. The central challenge for historians and educators is therefore to develop the skills, ethical frameworks, and institutional practices necessary to use AI responsibly while preserving the fundamental principles of historical scholarship.

AI's Promise for Bridging Divides, Cultural Synergy, and Building Peace

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In an age when artificial intelligence (AI) crosses borders, its potential to bridge cultural, religious, and broader divides fuels expectations for global peace. This keynote scans AI's transformative role in promoting intercultural understanding, conserving legacy, and encouraging collective solutions to shared human challenges across diverse societies. Drawing on examples of trilingual AI schemes reducing language barriers in conflict resolution, AI-driven cultural protection plans safeguarding civilizations, and analytical models explaining resource clashes in vulnerable areas, this chat highlights AI's ability to increase social empathy and support. The speaker will explore how AI tools are being developed to ease cross-cultural dialogue, support positive outcomes, and enable peacebuilding efforts in regions like the Middle East, Africa, and Southeast Asia. Analytically, AI also holds promise for addressing misinformation and disinformation that fuel tensions between religions, cultures, and nations. By supporting fact-checking organizations, identifying harmful stories, and encouraging digital literacy, AI can help dismantle labels and shape hope through societies. The discussion will address both prospects and challenges, including ensuring reasonable access to AI technologies, addressing algorithmic bias that can reinforce divides, and adopting comprehensive governance frameworks. Case studies from initiatives like AI-powered conversion facilities in harmony talks and cultural AI podiums endorsing cross-border partnership will explain AI's role in promoting "peace-tech" innovation. The keynote claims that AI's real promise lies not in homogenization, but in celebrating and consolidating civilization's rich diversity. By planning AI schemes grounded in multicultural understanding and shared standards, we can connect tools that encourage a more musical world worldwide, where differences become strengths, not divisions. This talk offers universal stakeholders a vision of an AI future where

cultural and religious variety are paths to joint resilience, and where technology serves as a universal language for peace.

From Silicon to Sovereignty: Applied AI, the Global AI Stack, and Pakistan's Path Forward

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Artificial intelligence is often talked about as if it were a single technology. In reality it is a stack of interdependent layers: applications, large language models, compute infrastructure, processors and GPUs, and, underneath all of it, energy. Each layer has its own economics, its own bottlenecks, and its own questions about sovereignty. This keynote is delivered from the dual vantage point of academic research and applied industry deployment. It walks through the AI stack layer by layer, grounding each one with real-world case studies drawn from agentic AI, generative AI, computer vision, and data analytics, including systems built for automated claims assessment, industrial anomaly detection, and adaptive learning. The talk then turns to a question that matters for researchers and policymakers alike: where does Pakistan actually sit within this global AI stack today, and how can it make the most of the position it already holds? Pakistan is not starting from nothing. The country runs an AI-optimized data center in Karachi with roughly 3,000 GPUs, has newly launched enterprise GPU clusters that offer local, sovereignty-preserving compute, adopted a National AI Policy in 2025, and sits on a large pool of surplus and stranded electricity generation, particularly from Thar coal, that could be redirected toward power-hungry AI infrastructure. What is missing is not raw ingredients but a deliberate strategy for combining them: closer policy alignment between energy producers and compute operators, a workforce trained not just to use AI tools but to operate and govern the infrastructure underneath them, and a realistic sequence that adopts and adapts existing models before attempting to build frontier ones from scratch. Drawing on recent published analysis of Pakistan's AI capability gap, the talk argues for a hybrid strategy: use global AI tools wherever they are the efficient choice, and build sovereign capacity precisely where dependence turns into genuine risk, particularly in data governance, in critical public-sector applications, and in the compute layer itself. It closes with a practical, layer-by-layer agenda for turning what Pakistan already has, its talent, its policy direction, and its energy capacity, into one coherent national AI capability rather than a scattered set of pilot projects.

Gatekeepers of Ions: Functionalized UiO-66 Multilayers for Selective Separation

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Membrane-based ion separation is vital for sustainable brine treatment, yet distinguishing monovalent from divalent ions remains a challenge. We present

hybrid nanofiltration membranes fabricated by layer-by-layer deposition of PSS/PDADMAC polyelectrolytes with UiO-66 metal–organic frameworks functionalized by NH_2 and $COOH_2$ groups. The tailored MOF chemistry enhances charge interactions and steric control within the multilayers, enabling selective passage of monovalent ions while rejecting divalents. Structural analysis confirmed uniform assembly and MOF incorporation, while filtration tests demonstrated improved Mg^{2+}/Ca^{2+} rejection with maintained Li^{+} transport. This approach highlights the synergy of polyelectrolyte multilayers and functionalized MOFs as a versatile platform for next-generation membranes in resource recovery and advanced separations.

Keywords: Nanofiltration, Ion-Separation, Brine Treatment, Layer-by-Layer Deposition, Hybrid Membranes

AI Trends and Challenges in Engineering

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The fusion of artificial intelligence with electrical and computer engineering is revolutionizing the field through deep learning-driven signal processing, smart grid optimization, and the proliferation of AI integrated IoT devices that enable real-time analytics and predictive maintenance across industries. However, this rapid advancement is shadowed by formidable challenges, including algorithmic bias and the demand for transparent accountability, the energy and hardware bottlenecks of scaling complex models in resource-constrained environments, and the persistent threat of adversarial cyber-security breaches that jeopardize critical infrastructure. Addressing these issues demands more than incremental fixes; it requires a paradigm shift toward hardware-software co-design, where computer scientists and electrical engineers collaborate from the chip level upward to build energy-efficient, interpretable systems. Innovative strategies such as federated learning preserve privacy while reducing bandwidth, physics-informed neural networks embed physical laws into AI to compensate for scarce data, and digital twins provide safe sandboxes for stress-testing defenses against sophisticated attacks. Crucially, ethical considerations must be translated into quantifiable engineering constraints during the design phase, ensuring that decisions about load-shedding in smart grids or autonomous braking in vehicles are not only efficient but also demonstrably fair and safe. Interdisciplinary collaboration among engineers, ethicists, and policy-makers is therefore indispensable, moving beyond checklists to co-develop certification standards and proactive defense mechanisms that guarantee resilience. This holistic approach transforms challenges into design parameters, fostering technological innovation that is both powerful and principled. Ultimately, the responsible trajectory of AI in this domain hinges on collective ingenuity where rigorous validation, continuous adaptability, and ethical foresight are embedded at every stage of development. By treating

robustness, transparency, and sustainability as core engineering requirements rather than after-thoughts, the convergence of AI and electrical and computer engineering can unlock transformative societal benefits, from resilient energy networks to autonomous medical devices, while systematically mitigating the risks inherent in intelligent, interconnected systems.

Art Practice as a Research Method

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This keynote examines Art Practice as a Research Method, delineating key distinctions between practice-based and practice-led inquiry. It positions cinematic creation not merely as an artistic output, but as an autonomous epistemological site where research and practice converge. Through the lens of moviemaking, the address explores how the dynamic interplay of scriptwriting, cinematic form, and narrative content generates rigorous critical knowledge. Drawing directly upon the speaker's practice-as-research filmography, the presentation demonstrates how creative inquiry adapts to technological shifts. Rupay Aanay Paai (2019)—adapting Khwaja Ahmad Abbas's short story—illustrates literary screen adaptation as a method for investigating socio-economic realities and localized visual design. Ultimately, this keynote asserts that film practice functions as a vital methodology for de-colonial pedagogy, directly bridging academic research with the creative economy.

Sub-theme: To Advance Digital Media, Communication & Creative Innovation

ID-826410: Digital Islamic Calligraphy: Traditional Practices Through Emerging Technologies and Innovation

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Calligraphy is regarded as a spiritual form of Islamic art. Muslim calligraphers have practiced this tradition while exploring new approaches in every era. The transition from handwritten Quranic Manuscripts to machine-printed scripts demonstrates the tradition's capacity for innovation. The present digital era has given the calligraphy new avenues to develop while preserving it's established artistic tradition. With the widespread availability of graphic design software and online digital platforms, artists may now make exquisite Islamic calligraphy with digital tools. The present studio-research explored this potential by creating digital Islamic Calligraphy through graphic design software such as Adobe Photoshop and online platforms such as Canva. Among those was a calligraphic painting, in which a Sufi saint was digitally

rendered in Adobe Photoshop using a brush tool on a separate raster layer. This iconic figure was integrated with the Arabic word "Hu" as a compositional element. Another calligraphy was created in Canva. Disconnected Arabic letters (Huruf muqatta'at) were integrated from Canva's graphic elements and superimposed on abstract background. The third painting was digitally rendered in both Photoshop and Canva, variety of brushes along with drop shadow effect were used to render the Arabic text and overall design of the calligraphic composition. This studio-research concluded that digital calligraphy is an expeditious and flexible approach translating conceptual ideas into digital compositions. Digital design tools enable iteration and rapid rendering without the need to reconstruct the core elements of the composition.

Keywords: Digital Design, Digital Islamic Calligraphy, digital rendering, Adobe Photoshop, Canva

ID-826325: Digital Storytelling through AI-Generated Art: Enhancing Education, Culture and Religious Harmony among Students

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In today's interconnected world, Artificial Intelligence has emerged as a powerful tool for promoting education, cultural understanding, religious harmony, and human development through innovative teaching and learning practices. AI can serve as a foundational tool to promote cultural understanding and human development in the field of art and design, and educational institutions are increasingly adopting AI-based approaches to address global educational and social challenges. AI tools such as Leonardo AI, Gemini, and Claude are used to generate visual narratives, develop story concepts, and support creative content production among university students. As traditional teaching methods often struggle to engage students with cultural diversity and peaceful coexistence, this investigation proposes the use of AI-assisted visual storytelling to create meaningful digital artworks that encourage understanding, empathy, and respect for different cultures and religions. The study adopts a mixed-method approach. University students from diverse cultural and religious backgrounds are first encouraged to understand and then participate in the project. Primary data are collected through observation, semi-structured interviews, and evaluation of students' AI-generated artworks before and after the digital storytelling activities, with final artworks presented in digital display form. The expected outcomes include enhanced cultural awareness, greater appreciation of religious diversity, improved creative thinking, increased digital literacy, and a more engaging learning experience. The project also aims to encourage dialogue, empathy, tolerance, and social cohesion through visually engaging educational content. By integrating AI with art and design education, it seeks

to contribute to more inclusive education and support the achievement of sustainable human development through responsible AI integration.

Keywords: AI-Generated Art, Digital Storytelling, Education, Cultural Understanding, Religious Harmony, Art & Design, Human Development

ID-826421: From Architectural Heritage to Digital Textile Design: Conservation of Decorative Motifs of Palosi Piran Monuments

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In recent times, the preservation of cultural heritage depends not only on the conservation of physical monuments but also on their documentation, interpretation, and the creative use and transmission of traditional artistic heritage. The historic Palosi Piran monuments of Peshawar, Khyber Pakhtunkhwa, are a prime yet less-documented example of regional architectural heritage, including an exclusive collection of floral, vegetal, geometric, and stylized ornamental motifs that are a precious source of information about the artistic tradition and cultural identity of the region. The deterioration of these historic monuments, however, presents a challenge for the survival of these visual traditions, making it necessary to adopt new approaches for documenting and preserving them. This research examines the feasibility of using digital and AI tools for cultural heritage preservation by transforming the architectural decorative motifs of the Palosi Piran monuments into contemporary textile design. Using descriptive and practice-based approaches, selected motifs are systematically examined in terms of their formal qualities, composition, style, ornament, and cultural value, and then converted into contemporary textile designs through an integrated digital design process employing Adobe Photoshop, CorelDRAW, and Artificial Intelligence (AI) tools. Motif tracing, editing, composition, colour combination, layout, and repetition are accomplished with Photoshop and CorelDRAW, while AI supports creative exploration, variation, ideation, and visualization. The paper suggests that digital and AI technologies can complement traditional methods of heritage conservation through creative digital reinterpretation. Translating motifs from decaying architectural surfaces into contemporary textiles provides an alternative channel for preserving and transmitting their visual language beyond the original monument, while AI-enhanced design processes open possibilities for exploring varied compositions, colour combinations, and pattern constructions without losing originality. The proposed approach thus builds a productive connection between architectural heritage, digital technologies, artificial intelligence, and contemporary textiles.

Keywords: Palosi Piran Monuments, Decorative Motifs, Cultural Heritage Preservation, Digital Technology, Artificial Intelligence, Textile Design, CorelDRAW, Adobe Photoshop

ID-826153: Propaganda and Discourse Analysis of U.S. and Pakistani Media: Ukraine–Russia and Afghanistan War Perspective

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This study applies Chomsky and Herman's Propaganda Model, which argues that mass media, shaped by class and power dynamics, disseminate dominant beliefs through systematic filters. The research explores how these filters operate in Pakistan and the United States, particularly in framing international conflicts. Using a qualitative approach and content analysis, six leading news outlets like Dawn, Express Tribune, PTV News, Fox News, ABC News, and The New York Times were thoroughly examined. Prime-time news bulletins focusing on the Afghanistan and Ukraine-Russia wars were analyzed, with 646 keywords collected months before the last months of 2025. Thematic analysis highlights how media narratives reflect institutional agendas, shape public perception, and reinforce competing viewpoints within democratic contexts. In conclusion, the findings indicate that propaganda filters remain central in shaping conflict narratives across both countries. Greater media literacy and critical awareness are needed to help audiences recognize bias and selective framing. Future research should expand to digital and social media platforms to assess how computational propaganda intensifies these dynamics.

Keywords: Propaganda, Manufacturing Consent, Mass Media, Propagation, Advertising, Elite Media, Afghanistan War, Ukraine-Russia War.

ID-826194: Digital Innovation and Artificial Intelligence (AI) For Preserving Pakistani Textile Heritage: A Comparative Study Of Hand: Loom And Machine: Loom Ladies' Woven Shawls

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Artificial Intelligence (AI) is extensively transmuting the textile and fashion industries, becoming a strategic tool for designers, manufacturers, brands and marketers. Digital technologies are reshaping the fabric design process to maximize efficiency, which has traditionally depended on native and time-consuming manual practices, including surface decoration, material selection, and structural patterns. However, the major challenge persists in standardizing advanced technology with the cultural heritage preservation. A comparative study for the appraisal of quality parameters of ladies' woven shawls produced on hand and machine looms was conducted. The research methodology included a comprehensive assessment of areal density, thickness, ends/picks per inch, thermal resistance, and total hand value (THV). The findings revealed that hand-loom shawls had significantly higher GSM and thickness

than machine-made shawls. Conversely, machine-made shawls exhibited higher ends and picks per inch, showing increased fabric density. Thermal resistance of both the groups provided insignificant results. Hand-loom shawls achieved markedly higher total hand value scores, demonstrating superior tactile quality and visual appeal. Meanwhile, comfort properties of both types of shawls were highly significant contributing soft and comfortable fabric. In the era of Industry 4.0, the integration of artificial intelligence (AI) and textile manufacturing upsurges the capabilities of smart loom systems, leading to unprecedented efficiency, adaptability, and quality in textile production. Skilled artisans can work with digital technologies to create exclusive, superior woven shawls sustaining reliable quality evaluation, digital preservation of native weaving designs, virtual prototyping to reduce material waste, and data-driven product development. By supporting artisans, textile manufacturers and fashion marketers can use the superior tactile quality and aesthetic appeal of woven shawls to drive business growth, customer engagement, and cultural sustainability.

Keywords: Artificial Intelligence, Comfort, Cultural Preservation, Digital Innovation, Quality Assessment, Skilled Artisans, Textile Heritage, Woven Shawls.

ID-826292: Artificial Intelligence as a Tool for Protecting and Supporting Conflict Journalists

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As global efforts increasingly explore how artificial intelligence can be used to protect lives and promote peace, journalism from conflict zones remains one of the most direct and endangered frontlines in that effort. This study examines the lived experiences of eight Pakistani conflict journalists reporting from war zones, drawing on in-depth interviews and thematic analysis to surface the ethical, emotional, and professional challenges they face. Ten key themes emerged, including ethical dilemmas, censorship, emotional trauma, restricted access, safety concerns and lack of mentorship. Despite systemic shortcomings such as limited training & weak institutional support, their continued commitment to reporting from the frontlines reflects a deep sense of duty and resilience. The study argues that meeting the urgent need for better safety measures, training, and ethical guidance for Pakistan's war reporters will require more than policy reform alone. Furthermore, the study points to AI-enabled advancement in media, communication, and creative innovation as a critical, underexplored resource capable of strengthening journalist safety & sustaining peace-oriented reporting.

Keywords: AI, Conflict Reporting, Safety Concerns, Advancement in Media

ID-826321: The Advancement in the Digital Media, Mass Communication and the New Innovation of AI in All Communication Fields

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At the start of the 21st century, advancement in the media and communication is flowing like water flowing in the river. Information getting or identifying is very easy comparatively to the past centuries. Investigative reporting or journalism is a perfect form for getting the information and gaining the authentic proof of the further information of several news developments. After the arrival of digital media platforms, the authenticity or confirmation regarding any news developments is very challenging for the media practitioners. Propaganda is spreading like a fire in the forest among the digital media users. Some sensationalist users are using the propaganda effectively to build their arguments on the technical logic mode. But the professional media practitioners must not or should not spread the propaganda among the common users for any news developments. I think that AI emergence in the field of media and communication is inevitable. A lot of pros and cons of AI involvement in the field of reporting and investigative journalism, critical analysis, and framing arguments into narrative. As we know that, algorithmic bias is the main problem of today's media in the context of AI. As a student of mass communication, I am willing to address this core problem in my writing: 1) To conduct the seminars for the awareness of this core problem is invincible. 2) To be skilled media practitioners on the demands of AI is very important. 3) To give exercise them about the awareness and solving of this problem of competing with the propaganda is very essential to deal with the AI requirements about his caliber of transparency. AI is not a threat for the journalists. AI makes content creation in the easiest way. AI is increasing engagement on the various social media platforms. When it is applied ethically and thoughtfully, AI can enhance speed, depth and reach of journalism without compromising principles, truthfulness and credibility. AI is not changing the communication skills and techniques especially in the field of journalism. It is giving a new form of journalism and it is called "data journalism". It is supporting the insightful and comprehensive form of analysis where everybody wanting.

Keywords: Investigative Reporting, Digital Media, News Developments, Media Practitioners, Propaganda, Backend Optimization, Frontline Editorial Support, Audience Analytics, Sensationalist Users.

Sub-theme: To Advance Media, Communication & Creative Innovation

ID-826359: Development of Eco: friendly Non: Woven Fabric from Denim Waste Used as Thermal Insulating Material

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The textile industry yields a huge amount of denim waste (used in fabrication of jeans) each year, which contributes an environmental polluted landfill gathering. By incorporating all the sustainable parameters the recycling of waste product into non-woven textile material can be utilized as thermal insulating product. It has been found that mostly the conventional insulators are consuming petroleum-based materials causing harmful effects on environment and in turn on health. On the other hand, denim waste insulators will be originated from recyclable waste and the waste denim collection subjected to series of process i.e., Shredding, Cleaning and opening fibers, Formation of fiber layers and their Bonding using needle punching technique and finally the Creation of non-woven fabric sheets. Testing and evaluation were carried out on fibrous material such as thermal conductivity, thickness & density and strength by following standard procedures. The main objective was to manufacture a recycled denim waste into a natural recycled safe & non-toxic material that can be utilized as thermal insulation for assorted purposes like packaging, construction, biomedical products. The study will be helpful in reducing waste products from the landfills as well as decreasing air pollution created by burning of waste fabrics. The current study will promote circular economy and sustainable resource application, encourages eco-friendly lifestyle & generate job opportunities in waste collection & processing.

Keywords: Landfill, Denim, Sustainable Material, Eco-friendly, Non-woven Fabric, Needle Punching Technology

ID-826115: From Heritage to AI: Reviving Ajrak Motifs in New Colour Stories

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This paper aims to explore how consumers perceive Ajrak motifs created using AI tools with varying colour variations, and to assess the role of generative technology in opening up new creative possibilities and design efficiencies. It also examines the change in the way block prints are made and how they are printed nowadays with the advent of sublimation printing. Primary data was collected using a self-administered questionnaire filled by a

judgmentally selected sample in District Peshawar. Empirical results show that there exists a statistically significant correlation between consumer trend-awareness and the consumption of Ajrak designs derived from AI. This research investigates consumer acceptance of AI-recreated Ajrak patterns in new colours and shades, concluding that AI technology possesses significant potential to revolutionize the textile design industry in the future on a large scale. AI is a design catalyst that helps designers experiment with infinite visual variations in record time. This digital design transition is accompanied by an assessment of the technological transition from traditional hand block printing to sublimation printing. Among the District Peshawar population, the trend-conscious respondents are more open to the aesthetic of Ajrak developed by AI, as observed in a targeted and judgmental survey. The results show that embedding AI in the textile design process is an effective method for future large-scale production and modern textile design evolution.

Keywords: Generative AI, Pakistani Heritage, Modern Colour Palette, Contemporary Adaptation

ID-826305: Contemporary Veil Designing Using Traditional Swabi Chail Patterns Through Digital Modification Blended with Midjourney AI

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The current study examines the adaptation of traditional Swabi Chail motifs for modern fashion, bridging regional textile heritage with contemporary digital design. By pairing generative design tools (Midjourney AI) with precise digital editing (Adobe Photoshop), iconic cultural elements such as the semi-circle half-moon, sur gulay, and traditional dot patterns were recontextualized into dynamic surface patterns featuring rich, nature-inspired colour palettes. The developed patterns were digitally printed onto cotton and silk substrates to assess consumer response and material appeal. Survey data from 100 participants showed strong enthusiasm for the collection: 87% appreciated the authentic cultural reference to the Swabi Chail, while 94% favored incorporating these traditional motifs into contemporary dupattas and scarves. In particular, cotton fabrics featuring dark-background dot configurations received the highest user preference. Ultimately, the project underscores the potential of digital hybrid workflows to safeguard cultural identity while adapting heritage textiles for broader contemporary markets.

Keywords: Cultural Motifs, Swabi Chail, Midjourney AI, Adobe Photoshop, Digital Textile Design, Heritage Revival

Sub-theme: To Advance Intelligent Computing, Cybersecurity & Emerging Digital Technologies

ID-826062: Artificial Intelligence (AI): Driven Threat Intelligence: Countering Online Radicalization and Cyber Conflict for Global Peace

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Introduction: The expansion of digital technologies has transformed cyberspace into a critical arena where online radicalization, extremist propaganda, and cyber conflict threaten human life, social cohesion, and international peace. Traditional security approaches struggle to respond at the required speed and scale. Artificial Intelligence (AI) offers new opportunities to identify emerging threats before they escalate, positioning it as an enabler of human security and sustainable peace. Objective**:** This paper examines how AI-driven threat intelligence can counter online radicalization, disrupt extremist recruitment, and detect cyber threats early. It further explores AI's role in protecting human life, strengthening digital resilience, and promoting peace through proactive, ethical, and collaborative cybersecurity practices. Methodology**:** The study adopts a qualitative, conceptual approach based on a review of literature, case studies, and contemporary applications of AI in cybersecurity and counter-extremism. It develops a conceptual framework comprising three components: Natural Language Processing (NLP) for detecting extremist narratives, machine learning models for identifying patterns of radicalization and cyber threats, and automated threat intelligence-sharing mechanisms for collaboration among governments, technology platforms, and international partners. Results/Findings: The analysis indicates that AI-driven threat intelligence can strengthen early warning, support timely intervention, and protect vulnerable communities by disrupting pathways to radicalization and enhancing resilience against cyber threats. However, challenges remain, including algorithmic bias, privacy and human rights concerns, ethical governance, and limited technological capacity in developing countries. Technological innovation alone cannot ensure peace; its effectiveness depends on responsible governance, digital literacy, legal safeguards, and international cooperation. Conclusion: The paper argues that AI should be viewed not merely as a cybersecurity tool but as a strategic enabler of human security and peacebuilding. It recommends ethically integrating AI-driven threat intelligence into national cybersecurity strategies and global peace initiatives through multidisciplinary collaboration, offering a framework for protecting human life and fostering a peaceful, resilient digital future, particularly in developing countries.

Keywords: Artificial Intelligence; Threat Intelligence; Cybersecurity; Online Radicalization; Human Security

ID-826076: Machine Learning Based Structural Health Monitoring of Mechanical Components Using Vibration Analysis

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Unexpected failure of engineering structures and rotating machinery can lead to catastrophic accidents, economic losses, and threats to human safety. Traditional inspection methods rely on periodic maintenance and manual evaluation, which may fail to detect early-stage damage. This research proposes an Artificial Intelligence-based structural health monitoring framework for mechanical components using vibration response data. The methodology combines finite element-generated vibration datasets with machine learning classification algorithms to identify crack initiation, stiffness degradation, and structural anomalies. Multiple supervised learning models, including Random Forest, Support Vector Machine, and Artificial Neural Networks, are evaluated for fault detection accuracy. Feature extraction techniques such as Fast Fourier Transform and Wavelet Transform are employed to characterize vibration signatures before classification. The proposed AI framework enables continuous condition monitoring and predictive maintenance by automatically recognizing damage patterns. Results are expected to demonstrate improved diagnostic accuracy and faster fault identification compared with conventional threshold-based monitoring methods. The proposed system contributes to safer industrial operations, intelligent infrastructure, and reduced maintenance costs while minimizing unexpected failures. This research highlights the role of Artificial Intelligence in improving structural reliability and protecting lives through early detection of mechanical failures.

Keywords: Structural Health Monitoring, Machine Learning, Computational Mechanics, Vibration Analysis, Predictive Maintenance

ID-826108: AI: Based Approaches for Automated Software Testing: A Systematic Literature Review

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Software testing helps in ensuring software quality and reliability. The increasing complexity of software systems has made traditional testing approaches more time- and resource-consuming. Recently, Artificial Intelligence (AI), including Machine Learning (ML), Deep Learning (DL), Reinforcement Learning (RL), and Large Language Models (LLMs), has introduced new opportunities for automating and enhancing software testing activities. Regardless of the rising body of research in this area, present

evidence remains fragmented over different testing domains and AI techniques. This study presents a Systematic Literature Review (SLR) of AI-based approaches for automated software testing, following the guidelines proposed by Kitchenham and Charters. The review aims to identify the AI techniques employed in software testing, examine their applications in test case generation, test automation, defect detection, and regression testing, evaluate the metrics used to assess their effectiveness, and highlight current challenges and future research directions. A detailed search strategy was applied across key digital libraries, including IEEE Xplore, Scopus, SpringerLink and ScienceDirect, focusing on studies published between 2020 and 2026. The selected studies were screened using predefined inclusion and exclusion criteria and assessed through a quality evaluation process. Preliminary findings indicate a significant increase in the adoption of AI-driven testing approaches, particularly LLM-based and deep learning techniques, for generating test cases, improving test coverage, prioritizing regression tests, and detecting software defects. The review also reveals persistent challenges related to dataset quality, explainability, scalability, reproducibility, and industrial adoption. The findings provide a consolidated view of the current state of AI-assisted software testing and offer valuable insights for researchers and practitioners seeking to advance intelligent software quality assurance practices.

Keywords: Artificial Intelligence, Software Testing, Test Automation, Test Case Generation, Defect Detection, Regression Testing, Large Language Models, Systematic Literature Review

ID-826121: AI Driven Application Security Framework

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As enterprises are increasingly transitioning toward a cloud-first architecture with microservices, APIs, and artificial intelligence (AI)-enabled applications, the Application Layer has become the most targeted area for advanced and sophisticated cyber attacks. Recent cybersecurity reports have indicated an increase in application-layer attacks, including credential stuffing, business logic attacks, prompt injection against large language models (LLMs), insecure deserialization, SQL injection, XSS and RCE attacks. These types of attacks cause significant financial loss and disrupt operations. Traditional security methods such as firewalls and signature-based intrusion detection systems cannot effectively monitor the increasing number of evolving threats at the Application Layer because they are typically dynamic and context-specific. This paper outlines a proposal for an AI-driven Adaptive Security Framework for Applications. The Adaptive Security Framework uses Machine Learning, Behavioural Analysis and Threat Intelligence to continuously scan for, analyze, and respond to Application Layer attacks in real time. The framework also uses Static and Dynamic Application Analysis,

Runtime Monitoring, API Traffic Analysis, User Behavior Profiling, and Anomaly Detection to identify known and zero-day attacks. Additionally, this framework will leverage Retrieval-Augmented Generation (RAG) and Large Language Models (LLMs) to enable contextual threat analysis, automate vulnerability assessments, recommend mitigation strategies, and support incident response teams. To validate this framework, it will use real-world datasets from web applications, API traffic and cloud application logs, and will then evaluate performance by comparing the framework's ability to detect attacks with metrics such as detection accuracy, precision, recall, F1-score, false positive rate, response time and system scalability. The objective of the framework is that this intelligent application security solution will improve threat detection capabilities, reduce incident response time, and improve cyber-resiliency within modern enterprise environments.

Keywords: Application Security, AI Security, Machine Learning, Application-Layer Attacks, Web Application Security, API Security, Cloud Security.

ID-826205: Comparative Study of AI Engines and Professional Languages for Regression Modeling and Error Analysis

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The regression and correlation of multiple quantities are among the most basic statistical techniques commonly used for predictive and decision-making analysis and to measure relationship strength, respectively, across various fields of science. With the advancement of artificial intelligence and languages used for professional purposes, multiple forums can be used for regression modeling and analysis to evaluate the data. The analysis of water quality using the regression model provides new research options for engineering and environmental sciences to study the effect of environmental and climate changes over decades and to provide sustainable water resources for human and aquatic life. This study consists of a comparative analysis between the most used AI engines and programming languages like R, SPSS, MATLAB and Python based on their accessibility, limitations, performance, visual support, computational and modeling capabilities, implementation, and error production, using analysis of water quality as a case study. The findings will provide sufficient evidence for data scientists, practitioners, and researchers to use a suitable AI engine for relatively easy implementation with minimum errors in approximations.

Keywords: AI Engines; Regression; Correlation; Data Analysis

ID-826209: FHSS: Net: A Federated Hybrid Stress Scoring Framework for Privacy-Preserving Athlete Stress Detection Using MobileViT: Based Facial Expression Recognition

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Facial expressions provide a non-contact source of information that can be used to estimate an individual's affective state, making facial expression analysis potentially useful for monitoring stress during athletic activities. However, conventional facial expression recognition systems generally rely on centralized training, which requires sensitive facial data to be collected at a common location and may introduce privacy concerns. Recent Transformer-based approaches have improved facial expression recognition by modeling global facial relationships, but many remain computationally demanding and do not directly address privacy-preserving stress assessment. This paper presents FHSS-Net, a privacy-preserving framework that combines a lightweight MobileViT model, a Hybrid Stress Score (HSS), and federated learning for emotion-derived facial stress assessment. The MobileViT component first estimates probabilities for seven facial expressions. Rather than relying only on the dominant emotion, HSS combines the complete emotion probability distribution with stress-related emotion weights and an entropy-based confidence factor to produce a continuous stress score, which is subsequently mapped to low, moderate, and high stress categories. Federated Averaging (FedAvg) is then used to train the MobileViT model across five simulated clients without centralizing their facial images. Experiments on 35,887 FER2013 images show that centralized MobileViT achieves 66.91% emotion recognition accuracy and a 0.6436 macro-F1 score, while the federated model achieves 67.32% accuracy and 0.6495 macro-F1. For emotion-derived stress assessment, the centralized MobileViT-HSS configuration achieves 73.59% accuracy with a 0.7209 macro-F1, while the complete federated FHSS-Net achieves 71.09% accuracy and 0.6643 macro-F1. These results indicate that federated training can maintain competitive facial-expression performance while avoiding the need to pool raw facial images, although validation using physiological or clinically established stress labels remains an important direction for future work.

Keywords: Athlete Stress Monitoring, Facial Expression Recognition, MobileViT, Federated Learning, Hybrid Stress Score, Vision Transformers, Privacy-Preserving Machine Learning.

ID-826213: Algorithmic Epistemicides: Decolonizing AI Storytelling through Akbarian Ta'wil

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Artificial intelligence now writes, curates, and evaluates stories across publishing, digital platforms, and education. Because generative models do not construct original human arguments but merely compute probabilities over existing training corpora, they inevitably reproduce the structural biases of their data. When these corpora are dominated by Western popular fiction, AI systems encode a narrow, secular narrative logic that perpetuates epistemic violence. Consequently, this data-driven logic makes AI a powerful medium of coloniality: it normalizes plot structures, character arcs, and meaning-making that marginalize non-Western epistemologies and spiritual imaginaries. This paper examines that problem through a close reading of Dan Brown's The Lost Symbol alongside AI-driven narrative tools. The primary objective is to demonstrate how AI-mediated storytelling participates in epistemic extraction and to propose a decolonial hermeneutic that can reshape imaginaries of peace and human flourishing. Methodologically, the study combines qualitative literary analysis with critical AI studies, situating popular fiction and generative models within broader debates on decolonial AI and sociotechnical power. The theoretical framework centers Ibn ʿArabī's Akbarian ta'wil as a mode of interpretation that refuses closure, preserves pluriversal meaning, and resists the reduction of spiritual concepts into empty aesthetic signs. By placing ta'wil in direct conversation with AI narrative optimization, the paper argues that decolonial hermeneutics can unsettle colonial narrative defaults, protect the depth of Islamic conceptual worlds, and open alternative narrative designs that imagine peace beyond algorithmic limits.

Keywords: Decolonial AI, Critical AI Studies, Algorithmic Epistemicides, Akbarian Ta'wil, Epistemic Violence

ID-826264: Performance Analysis of Deep Learning Based Human Detection in Disaster Environments

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Introduction: Rapid and accurate human detection is crucial for effective disaster search and rescue (SAR) operations, where environmental complexity, debris, partial occlusion, and diverse imaging conditions make victim localization challenging. Although deep learning-based object detectors have demonstrated promising performance, their robustness across different disaster datasets remains insufficiently investigated. The use of artificial intelligence in such scenarios can support faster victim localization, helping protect lives and strengthen disaster response efforts from a global

perspective. Objective: This study evaluates YOLO-based human detection models using the Combination to Application (C2A) and Partially Occluded Person (POP) datasets. It examines how model architecture and dataset characteristics affect detection performance. The evaluation focuses on detection accuracy and the influence of dataset characteristics on model performance. Methodology: YOLOv8 and YOLOv9/YOLOv9e were trained on both C2A and POP datasets for 50 epochs. Performance was evaluated using Precision, Recall, mAP@0.50, and mAP@0.50:0.95. Training and validation losses were also analyzed to assess learning and convergence, with the best epochs identified for each metric. Results: On C2A, YOLOv9 achieved 86.41% Precision, 78.15% Recall, 82.15% mAP@0.50, and 56.62% mAP@0.50:0.95 at epoch 50, outperforming YOLOv8, which achieved 83.01%, 72.05%, 76.07%, and 47.98%, respectively, at epoch 48. On POP, YOLOv8 achieved 91.12% Precision, 80.63% Recall, 86.77% mAP@0.50, and 61.62% mAP@0.50:0.95 at epoch 41. YOLOv9e achieved 91.55% Precision, 79.38% Recall, 85.35% mAP@0.50, and 59.87% mAP@0.50:0.95 at epoch 46. Thus, YOLOv9 performed better on C2A, while YOLOv8 showed stronger overall performance on POP. Results also demonstrate that YOLO performance depends not only on the architecture but also on dataset characteristics such as occlusion, scene complexity, person size, and crowding. Thus, no single model can be considered best for all datasets. **Conclusion:** Cross-dataset evaluation shows that no single YOLO architecture consistently performs best. YOLOv9 performed better on C2A, while YOLOv8 performed better on POP, demonstrating the influence of occlusion, scene complexity, and dataset characteristics on detection performance.

Keywords: Environmental Complexity, Search and Rescue, Human Detection, Debris, Occlusion

ID-826269: AI: Based Intelligent Driver Assistance System with Real-Time Pashto Voice Alerts

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Road safety is one of the major challenges due to the increasing number of traffic accidents caused by missed or ignored traffic signs. Drivers often fail to notice important road signs while driving, which may lead to dangerous situations. The Driver Assistant with Pashto Alert is an artificial intelligence-based mobile application that helps in traffic sign recognition in real time through voice alerts in the Pashto language. Current navigation and driver assistant applications lack support for local languages like Pashto and depend on visual notification of drivers, which can often be overlooked, resulting in accidents. It is thus essential to develop a system that can provide traffic sign

recognition along with voice alerts in Pashto in real time to increase awareness among drivers. Various intelligent driver assistance systems have used deep learning algorithms like YOLO for real-time traffic sign detection and have provided visual or English voice notifications. But there have been very few systems that use Pashto voice alerts and custom datasets for local traffic signs. This paper proposes the development of an AI-driven Driver Assistant with Pashto Alert capable of recognizing traffic signs with the help of a deep learning model trained specifically for this task. Traffic signs recognized by the system are shown in a Flutter mobile app with the help of voice alerts in the Pashto language. The Driver Assistant system is designed to be a highly efficient, accurate, and convenient tool for drivers operating in Khyber Pakhtunkhwa province and other regions where the Pashto language is spoken. A YOLOv8-based object detection model is trained with an accuracy of 93.2 percent and converted into TensorFlow Lite (TFLite) format for mobile deployment. The model is integrated into a Flutter application that processes live camera input, detects traffic signs in real time, and plays the corresponding pre-recorded Pashto voice alerts to the driver.

Keywords: YOLOv8, Traffic Sign Detection, Driver Assistance System, Computer Vision, Deep Learning, TensorFlow Lite (TFLite), Flutter, Pashto Voice Alert, Real-Time Object Detection, Road Safety

ID-826270: The Impact of Dataset Complexity on Fairness Interventions in Computer Vision

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Introduction: Dataset complexity is an important factor influencing the fairness and reliability of computer vision systems. Variations in demographic composition, representation balance, and visual diversity can affect predictive performance and algorithmic fairness. However, most fairness intervention studies evaluate methods on benchmark datasets without systematically investigating how dataset complexity influences their effectiveness. Reliable and fair computer vision systems support the responsible use of AI for safer and more trustworthy technologies, contributing to the broader goal of protecting lives and promoting peace. Objective: This study investigates the impact of dataset complexity on the effectiveness and robustness of fairness interventions in computer vision by comparing two facial image datasets with different demographic characteristics, UTKFace and FairFace. Methodology: A ResNet-18 backbone was trained on both datasets using identical settings. Three fairness intervention strategies, Empirical Risk Minimization (ERM), Reweighting, and Adversarial Debiasing, were evaluated over 30 independent random seeds. Performance was measured using Classification Accuracy, Equal Opportunity (EO), Demographic Parity (DP), and Worst-Group Accuracy (WGA). Results**:** The results demonstrate that dataset complexity significantly influences the effectiveness of fairness interventions. Compared

with UTKFace, the more demographically diverse and balanced FairFace dataset reduced overall classification accuracy by approximately 2–3% but substantially improved fairness. EO decreased from approximately 0.24–0.77 on UTKFace to below 0.02 on FairFace, while WGA increased from approximately 0.84–0.89 to around 0.90. Furthermore, FairFace produced more consistent results across repeated runs, indicating greater robustness of fairness interventions on datasets with improved demographic representation. Conclusion: The findings demonstrate that dataset complexity is a critical determinant of fairness intervention performance. Evaluating fairness methods without considering dataset characteristics may produce incomplete conclusions regarding their effectiveness and generalizability. Incorporating dataset-aware evaluation into fairness assessment frameworks can support the development of more robust, equitable, and trustworthy computer vision systems.

Keywords: Computer Vision, Fairness, Fairness Interventions, Demographic Representation

ID-826289: ExamGuard: Vision: Based Smart Exam Hall Surveillance System

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It is very important for universities to make sure that exams are fair and honest. Usually teachers watch students take exams, which can be hard to do, and sometimes cheating can happen without anyone noticing. This research is about ExamGuard: Vision-Based Smart Exam Hall Surveillance System, which uses computers to watch exams and help invigilators make sure everything is in order. Most systems that watch students take exams are designed for online exams and simply use the student's webcam to keep an eye on them. Not many people have worked on ensuring fairness in exam halls where many students are taking the exam at the same time. To address this problem, ExamGuard uses Computer Vision and Deep Learning to look for cheating in live video from cameras. The system sends alerts, records what happens during the exam, and gives invigilators a website to monitor everything. The system is made up of several parts, including video acquisition, image enhancement, using YOLOv8 to detect objects, identifying suspicious behavior, sending alerts, and logging events. The system was built using Python, OpenCV, YOLOv8, TensorFlow, React.js, Node.js, Express.js, MongoDB and WebSocket, which makes it an effective and efficient way to monitor exams.

Keywords: Artificial Intelligence, Computer Vision, Exam Hall Surveillance, AI-Based Proctoring, YOLOv8, Deep Learning, Object Detection, Real-Time Monitoring, OpenCV, ExamGuard

ID-826297: From Prediction to Prevention: Myopia Calculator Transforming Eye Care

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Background: Myopia (nearsightedness) is increasing rapidly and is now a global public health challenge, considered an epidemic of this era. The Artificial Intelligence (AI)-powered Myopia Calculator is a predictive tool which estimates a person's risk of myopia development and its progression, and also offers suggestions for timely interventions. It uses demographic data, previous clinical ocular records, ethnicity and lifestyle factors to estimate an individual's risk of development and progression of myopia. This approach facilitates clinicians and parents in making decisions for the adoption of an exact treatment plan and helps in following the success of the treatment option. Objective: To integrate the Myopia Calculator into ophthalmology and optometry clinical practice for the early detection and management of myopia. Methodology: This is a review and presentation on the role of the AI-powered tool (Myopia Calculator) in prediction of near-sightedness and how it can help in reducing the global burden of blindness. The literature on myopia calculators, how they predict and help clinicians in clinical decision making, is reviewed to add current facts and figures with regard to the applications, advantages, and drawbacks of the myopia calculator in both ophthalmological and optometric practice. Results/Findings: The literature shows that myopia calculators give an estimation of myopia and its progression with clinical accuracy when certain validated datasets are used. It helps optometrists and ophthalmologists to identify individuals at high risk of myopia, supports advising the treatment option, and advises a follow-up plan. The integration of this tool into clinical practice will enhance the efficiency of practice in eye care. Conclusion: The Myopia Calculator helps clinicians in decision making regarding choosing the appropriate treatment plan to slow down myopia progression. These AI tools can shift myopia management protocols from prescribing simple spectacles to prevention and slowing of myopia. With implementation, this tool may improve clinical outcomes and ultimately reduce the burden of avoidable blindness.

Keywords: Nearsightedness, Myopia, Myopia Calculator

ID-826299: Rethinking PCOS Prediction Accuracy: A Rigorous, Leakage: Aware Evaluation of Machine Learning and Deep Learning Models

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Polycystic Ovary Syndrome (PCOS) is among the most prevalent hormonal disorders that occur in females of reproductive age, and an accurate diagnosis of PCOS is a very important factor in avoiding adverse effects in the future.

While numerous studies have applied machine learning (ML) and deep learning (DL) to PCOS prediction using clinical data, many report near-perfect accuracy (often exceeding 99%), raising concerns of data leakage from preprocessing steps applied before train-test splitting. This study presents a rigorous, leakage-free comparative analysis of ML and DL models for PCOS classification using a clinical dataset of 541 patients with 41 physical and hormonal features. Unlike prior work, all preprocessing, imputation, feature scaling, and SMOTE-based class balancing was fit exclusively on the training fold and applied to a held-out test set, ensuring an honest performance estimate. Four ML models (Logistic Regression, Random Forest, SVM, XGBoost) and two DL architectures (a fully-connected ANN and a 1D-CNN) were evaluated on accuracy, precision, recall, F1-score, and AUC-ROC, alongside training time, inference latency, and model size. The most effective model proved to be XGBoost, with an accuracy of 93.6%, F1-score 0.901, and AUC 0.963. It outperformed deep learning models like ANN and 1D-CNN, with minimal training time and faster inference. These findings suggest that reported almost-perfect accuracies in previous PCOS literature likely stem from methodological leakage. Additionally, traditional ML models remain a more practical, efficient choice for real-world clinical deployment than deep learning on this class of tabular data.

Keywords: Polycystic Ovary Syndrome (PCOS); Machine Learning; Deep Learning; Data Leakage; Comparative Analysis; Clinical Decision Support

ID-826301: Saliency: Consistent Chest Radiograph Classification for Trustworthy Explainable AI Under Domain Shift

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Deep learning models have achieved high diagnostic performance in chest radiograph interpretation; however, their limited interpretability remains a major barrier to clinical trust and deployment. Existing explainable Artificial Intelligence (XAI) methods often produce unfaithful explanations due to misalignment between model attention and pathological regions, rely on localization metrics that overlook clinical relevance, and rarely evaluate explanation robustness under domain or demographic shifts. This paper proposes a saliency-consistent chest radiograph classification framework that explicitly aligns model attention with clinician-annotated regions through a saliency-consistency regularization objective. The model is trained on the Medical Information Mart for Intensive Care Chest X-Ray dataset (MIMIC-CXR) and evaluated zero-shot on the CheXpert dataset and the National Institutes of Health ChestX-ray14 dataset, including sex- and age-based subgroup analyses to assess generalization across institutional and demographic shifts. In addition to diagnostic performance, we introduce a stability-degradation metric that quantifies explanation reliability by measuring the degradation of saliency localization across domains, and

compare the proposed framework with Gradient-weighted Class Activation Mapping (Grad-CAM) and Local Interpretable Model-agnostic Explanations (LIME). Based on the closest comparable attention-supervised studies, the proposed framework has achieved a diagnostic Area Under the Curve (AUC) of approximately 0.88 and improved localization accuracy over conventional post hoc explanation methods. The proposed stability-degradation metric further provides a quantitative benchmark for evaluating explanation robustness under distribution shift, advancing trustworthy medical imaging Artificial Intelligence.

Keywords: Explainable Artificial Intelligence, Medical Image Analysis, Deep Learning, Interpretability, Diagnostic Imaging, Clinical Trust, Domain Generalization

ID-826312: Educational Inequality in the Age of AI Autonomy: A Governance Perspective

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Introduction: Artificial Intelligence (AI) is transforming education by progressing from decision-support systems to autonomous systems capable of making educational decisions with minimal human intervention. As AI autonomy increases, decision-making gradually shifts from humans to machines, reducing meaningful human oversight. While this transition creates new opportunities for learning, it also introduces challenges. Well-resourced countries can adopt advanced AI through strong infrastructure and AI governance, whereas many developing regions face limited digital resources, weak policy frameworks, and inadequate oversight. They also bear a disproportionate share of AI's environmental costs. Although these issues have been widely studied, their relationship with increasing AI autonomy remains largely unexplored. Objective: This study examines the relationship between increasing AI autonomy and educational inequality. It synthesizes available data and international evidence to pinpoint the impact of AI autonomy across different aspects, and how Responsible AI can support equitable education. Methodology: The study uses systematic theory synthesis and documentary analysis of publicly available reports and policy documents from UNESCO, the International Telecommunication Union (ITU), the World Bank, and others. Evidence from these sources is synthesized to examine the relationship between AI autonomy and educational inequality. Results: The analysis consolidates a six-level AI autonomy continuum (L0–L5) from established taxonomies. It identifies three dimensions of educational inequality socioeconomic, ethical, and environmental that intensify as AI autonomy increases. The findings indicate that these inequalities are primarily driven by governance gaps rather than AI autonomy itself. Conclusion: The findings conclude that equitable AI adoption requires AI governance to evolve alongside increasing levels of AI autonomy. Addressing socioeconomic,

ethical, and environmental inequalities together is essential for responsible, trustworthy, and human-centered AI in education.

Keywords: AI Autonomy, Educational Inequality, AI Governance, Responsible AI

ID-826328: Cross-Domain Generalization Failure in Deepfake Detection Models: An Empirical Evaluation of Robustness Against Novel Generative Architectures

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The emergence of new generative architectures such as diffusion-based models and Generative Adversarial Networks (GANs) plays a significant role in the overall effectiveness of existing deepfake detection techniques, especially when applied to unknown generative methods. In this study, the performance of deep learning-based deepfake detectors is explored on the cross-domain generalization task, training on forgeries created by GANs and evaluating on diffusion-generated and real-world in-the-wild synthetic media. The detection models are trained on widely used GAN-based datasets such as FaceForensics++ and Celeb-DF, and cross-domain robustness is tested on the diffusion-based DiFF dataset and the in-the-wild Deepfake-Eval-2024 benchmark, which offers a challenging and realistic distribution shift across generative paradigms. CNN-based (Xception, EfficientNet), transformer-based, and CLIP-based detection architectures are trained and evaluated using standard forensic metrics like AUC, Precision, Recall, F1-score, and Equal Error Rate (EER), in addition to computational metrics like number of parameters and inference time. The study examines the performance degradation when switching between in-domain and cross-domain scenarios, and examines the extent to which particular architectural features can be adapted to GAN-to-diffusion generative shifts, as well as suggesting a mitigation approach based on domain adaptation. The results underscore the necessity of adopting techniques capable of operating adaptively across various domains while remaining robust when challenged with novel or evolving generative architectures, setting a foundation for a more generalisable, forensic-level deepfake detection framework that can be deployed in real-world and resource-constrained scenarios, such as the cybersecurity and digital-forensics ecosystem in Pakistan.

Keywords: Deepfake Detection, Cross-Domain Generalization, Diffusion Models, Digital Forensics

Sub-theme: To Advance Language Technologies, Communication & Literary Innovation

ID-826109: Language Matters: The Effect of Role Assignment and Politeness Strategies in Prompts on AI: Generated Discourse

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The emergence of Large Language Models (LLMs) has transformed human–computer interaction by making prompt design an important area of research. Previous studies have shown that politeness strategies and role prompting can separately influence LLM responses, but little attention has been paid to their blended effect from a linguistic perspective. This study investigates how the interaction of politeness and role assignment influences the discourse generated by ChatGPT and Claude. It adopts a mixed-methods comparative design, using Brown and Levinson's (1987) Politeness Theory as the primary theoretical framework and Speech Act Theory (Searle, 1969) and Frame Semantics (Fillmore, 1982) as supporting theories. A corpus of 120 AI-generated responses was produced using 60 prompts across ten different informational topics, with three role conditions (no role, primary school teacher, and university professor) and two politeness conditions (direct and polite requests). The findings show that role assignment and politeness strategies systematically affected register, level of complexity, audience adaptation, explanation strategy, interpersonal tone, and elaboration, and that ChatGPT and Claude adapted differently to the same prompt. These findings demonstrate that prompt design improves response quality and shapes AI-generated discourse differently, contributing empirical data to the growing fields of human–AI communication, discourse analysis, and pragmatics.

Keywords: Technology, Politeness Strategies, Prompt Design, Role Assignment, AI-Generated Discourse, Human-LLM Interaction, Discourse Analysis, Pragmatics

ID-826426: زبان و ادب: زبان کی ٹیکنالوجی، کمیونیکیشن اور ادبی جدت

ڈاکٹر بلقیس اختر

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اکیسویں صدی کا تیز رفتار تکنیکی انقلاب انسانی تہذیب کے تقریباً کسی بھی شعبے کو چھوڑے بغیر آگے بڑھا ہے، اور زبان و ادب بھی اسی دائرۂ اثر میں شامل ہیں۔ زبان، جو محض ابلاغ کا ذریعہ نہیں بلکہ تہذیبی شناخت، فکری ورثے اور تخلیقی اظہار کی نگہبان بھی ہے، آج مصنوعی ذہانت، ڈیجیٹل پلیٹ فارمز اور عصری ذرائع ابلاغ کے سنگم پر خود کو پاتی ہے، جس نے ایک

بے مثال نئے دور کا آغاز کیا ہے۔ یہ مقالہ اس بات کا جائزہ لیتا ہے کہ زبان کی ٹیکنالوجی بشمول قدرتی زبان کی پروسیسنگ، مشینی ترجمہ، صوتی شناخت اور ڈیجیٹل کارپورا نے کس طرح روایتی لسانی ڈھانچوں کو از سر نو متعین کیا ہے، اور نتیجتاً ادبی تخلیق، ترسیل اور مقالے میں یہ استدلال پیش کیا گیا ہے کہ ڈیجیٹل ذرائع استقبال کے عمل کو نئی شکل دی ہے۔ ابلاغ نے ادب کو تاریخ کے کسی بھی دور سے زیادہ قارئین کے قریب کر دیا ہے، جبکہ اسی کے ساتھ اصالت، تخلیقی گہرائی اور لسانی رچاؤ سے متعلق اہم سوالات بھی جنم لیے ہیں۔ سوشل میڈیا، بلاگز، آڈیو بکس اور مصنوعی ذہانت سے تخلیق شدہ متن کے وسیع پھیلاؤ نے ادبی جدت کے نئے امکانات کھولے ہیں، حتیٰ کہ اس نے روایتی ادبی اصناف اور اشکال کو نئے سرے تشکیل اور متعین بھی کیا ہے۔ کیفیتی و تجزیاتی طریقۂ کار اپناتے ہوئے، یہ تحقیق اردو زبان و ادب کے تناظر میں ٹیکنالوجی اور تخلیقیت کے مابین متحرک تعلق کا جائزہ لیتی ہے، اور اس نتیجے پر پہنچتی ہے کہ زبان کی بقا اور ادب کی ترقی کو یقینی بنانے کے لیے ضروری ہے کہ ٹیکنالوجی کو خطرہ سمجھنے کی بجائے ایک زرخیز اور امید افزا امکان کے طور پر اپنایا جائے۔

کلیدی الفاظ: زبان کی ٹیکنالوجی، ڈیجیٹل ابلاغ، ادبی جدت، اردو ادب، مصنوعی ذہانت

ID-826419: بدامنی کی وجوہات و محرکات: اکیسویں صدی کے اردو افسانے کے تناظر میں
Causes and Drivers of Unrest: In the Context of Twenty: First-Century Urdu Short Fiction

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بدامنی ایک ہمہ جہت اور پیچیدہ مسئلہ ہے، جسے صرف دہشت گردی یا تشدد تک محدود نہیں کیا جا سکتا؛ بلکہ اس کے پس منظر میں معاشی، سیاسی، مذہبی، سماجی اور نفسیاتی نوعیت کے گوناگوں عوامل کارفرما ہوتے ہیں۔ ان وجوہات کو سمجھنے، منظر عام پر لانے اور ان کے حل کے لیے بین الفکری مکالمہ ناگزیر ہے۔ اردو ادب بالعموم اور صنفِ افسانہ بالخصوص ہر دور میں معاشرتی ناہمواریوں اور بدامنی کے بنیادی اسباب کو بے نقاب کرنے میں متحرک رہے ہیں۔ اکیسویں صدی کے جدید تناظر میں، جہاں خطے اور دنیا بھر میں بدامنی کے اسباب میں بوقلمونی اور شدت آئی ہے، اردو افسانے نے ان نئے ابھرتے ہوئے محرکات سے بے اعتنائی نہیں برتی۔ اکیسویں صدی کے اردو افسانہ نگاروں نے نہ صرف بدامنی کی مختلف جدید صورتوں کو اپنا موضوع بنایا ہے بلکہ انسانی تحفظ، بقا اور امنِ عالم کی خاطر ان کے باطنی اسباب و محرکات کا عمیق تجزیہ بھی پیش کیا ہے۔ یہ تحریر اس بات کا جائزہ لیتی ہے کہ کس طرح اکیسویں صدی کا اردو افسانہ جدید دور میں بدامنی کے عوامل کی نشاندہی کر کے آگاہی اور حل کا راستہ ہموار کر رہا ہے۔

کلیدی الفاظ: اکیسویں صدی، اردو افسانہ، بدامنی، انسانی تحفظ، دہشت گردی، عدم تشدد، سماجی و معاشی محرکات، امن سازی

ID-826066: زبان کا آغاز و ارتقا، حال اور مستقبل

مستنصر حسین جامی
مائی (مسلم یوتھ) یونیورسٹی ، اسلام آباد

یہ مقالہ انسانی زبان کی ابتدا، اس کے ارتقائی سفر اور مستقبل کے امکانات کا جائزہ پیش کرتا ہے۔ مصنف کے مطابق زبان کا آغاز اشاروں، حرکات، تصاویر اور علامات سے ہوا، جو وقت کے ساتھ بولی، رسم الخط اور تحریری زبان میں تبدیل ہو گئی۔ انسانی تہذیب، مذاہب، فلسفہ،

تجارت، جنگوں اور سائنسی ترقی نے زبان کو نئے الفاظ، اصطلاحات اور اسالیب سے مالا مال کیا۔مقالے میں یہ مؤقف پیش کیا گیا ہے کہ جدید سائنسی و تکنیکی ترقی، مصنوعی ذہانت، کمپیوٹر، روبوٹس، ایموجیز، مشین لینگویج اور ڈیجیٹل ذرائع ابلاغ نے انسانی زبان کے استعمال کے انداز کو تبدیل کر دیا ہے۔ تحریر و تقریر کی جگہ تصاویر، علامات اور مختصر پیغامات زیادہ استعمال ہونے لگے ہیں، جس کے نتیجے میں زبان کی روایتی شکل محدود ہوتی جا رہی ہے۔ میری رائے ہے کہ اگر یہی رجحان برقرار رہا تو مستقبل میں انسانی زبان نجی معاملات تک محدود ہو سکتی ہے اور دنیا میں ایک ایسی عالمی مخلوط زبان وجود میں آ سکتی ہے جس میں مختلف زبانوں کے منتخب الفاظ، اشارے، رنگ، تصاویر اور ایموجیز شامل ہوں گے۔ یوں زبان کا ارتقا محض لسانی تبدیلی نہیں بلکہ سائنسی، سماجی اور ثقافتی عوامل سے جڑا ہوا ایک مسلسل عمل ہے۔ اس مقالے کے مرکزی مباحث کو سامنے رکھتے ہوئے دو مختصر سوالات موزوں رہیں گے :سائنسی و تکنیکی ترقی، مصنوعی ذہانت اور مشین لینگویج انسانی زبان کے مستقبل کو کس طرح متاثر کر رہی ہیں؟ انسانی زبان کا آغاز کن مراحل سے ہوا اور اس کے ارتقا میں کن عوامل نے بنیادی کردار ادا کیا؟

ID-826119: Exploring Learners' Motivation and Perceived Value of English Language Learning in the Age of Generative AI

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The increasing use of Generative Artificial Intelligence (GenAI) in higher education is influencing how students experience academic tasks such as writing, translating, grammar correction, summarizing, and vocabulary development. Although researchers have investigated the potential of GenAI to support English language learning and influence students' motivation, less attention has been given to whether the availability of GenAI for performing or supporting language-related tasks changes students' perceptions of the importance of developing English proficiency. This study aims to explore the perceived value of English language proficiency among English language learners, and their motivation and willingness to invest effort in English learning when GenAI can perform or support many related tasks. The data will be collected from 40 undergraduate students enrolled in a compulsory Foundation English course at a public sector university in Sindh, Pakistan. An open-ended questionnaire will be used as the research instrument, and the data will be coded and analyzed using thematic analysis to identify patterns in participants' perspectives on the value of language proficiency and their motivation to engage in language learning despite the availability of GenAI. The results of this study are expected to have implications for English language teachers seeking to develop students' language proficiency and to integrate GenAI into formal learning meaningfully.

Keywords: Generative AI, Motivation, Language Proficiency, Qualitative, Perceptions

ID-826134: Terraforming the Lyric: Language, Communication, and Formal Innovation in the Climate Poetry of You Are Here (2024)

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This study analyzes formal experimentation in You Are Here: Poetry in the Natural World (Limón, 2024), focusing on how it responds to the representational demands of the Anthropocene in the U.S. It suggests that the anthology is terraforming the lyric, remodifying inherited poetic forms via typographic and spatial experimentation, multilingual and collaborative composition, and technological mediation. This study explores four poems in particular, purposively selected from the first edition published by Milkweed Editions in association with the Library of Congress: Brenda Hillman's "Unendangered Moths of the Mid-Twentieth Century," Erika Meitner's "Manifesto of Fragility / Terraform," Craig Santos Perez, McDougall, No'u Revilla, and Jamaica Heolimeleikalani Osorio Naone Hall's "Aia i hea ka wai o Lahaina?," and Jake Skeets's "If Fire." An ecopoetic–ecolinguistic approach combines Morton's (2013) hyperobject, Nixon's (2011) slow violence, Stibbe's (2015) stories we live by, and ecocriticism and ecolinguistics. Thematic areas of close reading are typography, spatiality, multilingualism, code-switching, deixis, address, and technological mediation. Results reveal that these poems enact the climate crisis through the mediation of language, space, and collaboration. The study thereby helps advance the fields of ecocriticism and ecopoetics by highlighting a common set of formal strategies in response to climate conditions and by demonstrating the lyric's ability to depict planetary crisis effectively despite literary representational constraints.

Keywords: Literary Innovation, Ecopoetics, Anthropocene, Climate Poetry, Ecolinguistics

ID-826156: Artificial Intelligence and the Future of Urdu Literary Studies: Digitizing Text, Translation, and Critical Reception

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Background: Artificial intelligence and natural language processing (NLP) have transformed literary and linguistic scholarship worldwide, yet Urdu among the most widely spoken languages of South Asia remains a low-resource language in computational terms, with limited annotated corpora, inconsistent orthographic standards, and underdeveloped NLP tooling relative to major world languages. Objective: This paper examines the emerging role of AI-driven language technologies in advancing Urdu literary scholarship, translation studies, and critical reception, with particular focus on classical and canonical texts, and evaluates both the opportunities and risks these

technologies pose for preserving linguistic and cultural nuance. Methodology: The study adopts a qualitative, interpretive approach combining a review of current Urdu NLP and machine translation literature with close textual analysis of the challenges specific to Urdu script variability, orthographic standardization (rasm-ul-khat), and idiomatic translation. It further situates these technical findings within the digital reception of Urdu literary figures and within broader debates in translation studies and digital humanities. Findings/Discussion: Findings indicate that while AI tools including neural machine translation, stylistic and sentiment analysis, and digital archiving offer significant potential to expand global readership and preserve Urdu's literary heritage, current systems continue to struggle with morphological complexity, code-mixing, and idiomatic and cultural meaning, often producing translations that flatten authorial voice and cultural specificity. The paper argues that these limitations are not merely technical but carry pedagogical and ethical implications for how Urdu literature is read, taught, and represented globally. Conclusion: The paper concludes by advocating a collaborative framework between computational linguists and literary scholars that promotes peace and cross-cultural understanding by making Urdu's literary heritage more globally accessible, while safeguarding the linguistic and cultural integrity central to the Urdu literary tradition.

Keywords: Artificial Intelligence, Urdu Literature, Natural Language Processing, Machine Translation, Digital Humanities, Orthography.

ID-826161: Beyond the Turing Test: Generative AI and the Redefinition of Human Communication Paradigms

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Advances in Generative AI and Large Language Models (LLMs) are rapidly changing how people communicate across all types of relationships interpersonal, professional, and international and are beginning to blur the lines regarding whether people are communicating with humans or machines. This research uses both qualitative and quantitative approaches combining discourse analysis of conversations facilitated by AI and survey data from diverse user groups to examine three aspects of these changes: authenticity and trust in communication using AI, the development of hybrid human-AI communicative competence as a literacy skill, and the sociolinguistic implications of algorithmically-generated language on register, tone, and cultural nuance. While the use of AI has improved the speed, efficiency, and accessibility of communication for users who have difficulties with communication, such as non-native English speakers and individuals with communication-related disabilities, it has also introduced several potential problems related to linguistic homogenization (loss of diversity), loss of idiomatic richness, and lack of transparency. The article recommends that communicative competence be reconceptualized to include AI literacy, and it

provides pedagogy and policy recommendations offering important insights at the intersections of applied linguistics, human-computer interaction, and communication studies.

Keywords: Generative AI, Human-Computer Communication, Digital Literacy, Discourse Analysis, Sociolinguistics

ID-826210: Digital Hegemony and Surveillance: Discursive Construction of Linguistic Legitimization in Dave Eggers' The Circle (2013)

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Digital surveillance is a new form of hegemony that keeps a check not only on one's physical self but also on one's data self. By involving language in this process, people are taken into confidence that their physical, social, cultural and even psychological surveillance is essential to make this world a better place for future generations. Dave Eggers' novel The Circle (2013) depicts the same idea, where the giant tech company (The Circle) shows a glimpse of a transparent, futuristic world in which privacy has become a crime and tracking people through various apps is presented as the next step towards an ideal democracy. The study shows how language is legitimized for vested interests through various linguistic tactics involving authorization, moralization, rationalization and narrativization inculcating in people the concept that caring is sharing, secrets are lies, and surveillance is vital, while privacy is an antisocial activity that makes people mysterious and introverted, a tendency that runs counter to the dream of a safe and transparent world. The study aims to discover the various ways in which linguistic choices prove not only helpful in legitimizing the construction of a discourse but also desirable for such an achievement. Using the theoretical framework of Theo Van Leeuwen's discursive construction of legitimization, in collaboration with Norman Fairclough's three-dimensional model in Critical Discourse Analysis, the present research attempts to draw the conclusion that language plays a vital role in molding people by making them act in certain directions intended by The Circle, which claims to safeguard the futuristic world by taking digital control over them.

Keywords: Digital Surveillance, Dave Eggers, The Circle, Legitimization, Privacy, Van Leeuwen

ID-826281: Reinscribing the Orient in the Age of AI: A Neo: Orientalist Analysis of Western Bestselling Afghan Narratives

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In the field of literary research, Artificial Intelligence (AI) has introduced a new paradigm alongside the traditional method of close reading and critical

analysis. This paper aims to investigate the potential of applying AI-powered textual analysis, a combination of disciplines in the fields of digital humanities and postcolonial literary studies, in order to enrich the process of identifying and interpreting neo-Orientalist discourses in the bestsellers of the Afghan context in the West. The study examines the nature of Afghan diasporic fiction, not only in relation to Edward Said's theory of Orientalism but also to the theories of Lisa Lau (re-Orientalism) and Hamid Dabashi (the "native informer") that affect the negotiation of authenticity, cultural representation, and Western readership. The corpus is made up of the novels by Khaled Hosseini, The Kite Runner (2003) and A Thousand Splendid Suns (2007), and the novel by Nadia Hashimi, The Pearl That Broke Its Shell (2014), all successful in Western literary markets. It is an interpretive, qualitative study in theory, which employs the technique of thematic coding and discourse mapping using artificial intelligence to identify the continuity of representation of violence, gender oppression, religious extremism, ethnic conflict, cultural backwardness, and the civilizing discourse of the West. The use of AI as an analytical tool to organize textual evidence and to identify lexically and thematically recurring commonalities and themes is accompanied by interpretative authority based on postcolonial literary criticism. This synergic approach emphasizes the application of a computational approach not as a replacement for a critical reading approach, but as a support for a systematic approach to reading the text. Recent scholarship has demonstrated the potential for AI to enrich literary criticism in a manner structured around literary analysis of texts, while more recent research on neo-Orientalism has attempted to problematize the commercial viability and ideological formation of the post-9/11 Afghan text. The paper posits that these narratives challenge "Orientalist" stereotypes from the "insider" perspective and simultaneously reinforce "neo-Orientalist" narratives that identify Afghanistan as a perpetually violent place, a place of oppression of women, and a place of cultural otherness. The research is interdisciplinary in nature, drawing together the existing body of literature on representation in literary scholarship and addressing the concerns of teachers and scholars about digital humanities and the ethical implications of using AI tools in humanities research to produce a new approach.

Keywords: Neo-Orientalism, Artificial Intelligence (AI), Digital Humanities, Afghan Narratives

ID-826288: Do I Also Have the Right? Analyzing Educational AI Tools for Conflict: affected Regions

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Millions of children worldwide are unable to attend school because of war, conflict, and forced displacement, and many are asking whether AI can help reach them. Recently, we have begun to see AI-based tools that help these

children learn. Some are made for children to use directly, and some are made to help their teachers instead. The AprendIA programme uses AI primarily to assist teachers in locations such as Nigeria, Bangladesh, and the Democratic Republic of Congo. Another programme, Can't Wait to Learn, gives children in locations such as Jordan, Lebanon, Sudan, and Uganda access to tablet-based learning games. The objective of this research is to discover whether these tools reach the children who require them, or whether some children are being missed. To achieve this, the study will examine five aspects of each program: whether children have access to the devices required, whether it functions without a constant internet connection, whether it supports the languages and school lessons that children actually use, whether both boys and girls can access it equally, and whether it is designed to be accessible for disabled children too. This study aims to compare these two approaches to show what is working well, the gaps that remain, and what a fairer, more considerate AI learning tool could look like for conflict-affected children. Ultimately, this study aspires to feed into a larger conversation about how AI, if deliberately designed, can help protect every child's right to learn, even in the most difficult circumstances, and help build peace in the long run.

Keywords: AI, AprendIA, Can't Wait to Learn, Education, Equal Rights, Conflict, Displacement.

ID-826363: The Role of Artificial Intelligence in Urdu Literature

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In the 21st century, mobile phones, the internet, social networking websites, computers and information technology have seen a great deal of innovation. In the second decade of the 21st century, the echoes of a new technique began to be heard all over the world, which was called artificial intelligence; it seeks to replicate human intelligence. If we examine the impact of artificial intelligence on Urdu literature, there are many examples of it in Urdu literature as well. With its help, many foreign literatures are translated into the Urdu language, but this translation is not in accordance with the author's intention because it is not a literal translation. This makes it difficult to reach the spirit of the creation. Literature is the expression of human feelings and emotions; therefore, samples of art can be produced through artificial intelligence, but a true reflection of human emotions is not possible because the machine is unable to understand human inner emotions. In the future, it is expected that novels, fiction and poetry will also be created through artificial intelligence. Apart from this, to evaluate the quality of these literary works, software will be created which will provide research and critical analysis of these works. In this way, the reputation of human writers and creators may decrease, and jobs in various literary institutions may also decline. In short, it can be said that artificial intelligence can have a profound impact on literature in the future.

Keywords: Artificial Intelligence, Global System, Global Village, Mobile Phone, Internet, Social Network, Urdu Literature

ID-826380: مصنوعی ذہانت اور بین الثقافتی مکالمہ (زبانوں کے فاصلے کم کرنے کے نئے امکانات کے تناظر میں)

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زبان صرف اظہار خیال کا ذریعہ نہیں بلکہ کسی قوم کی تہذیب، تاریخ، روایات اور اجتماعی شناخت کی آئینہ دار بھی ہوتی ہے۔ مختلف زبانوں کے درمیان موجود لسانی فاصلے بعض اوقات ثقافتوں کے باہمی فہم اور مکالمے میں رکاوٹ بن جاتے ہیں۔ موجودہ دور میں مصنوعی ذہانت نے اس فاصلے کو کم کرنے کے لیے نئے امکانات پیدا کیے ہیں۔ زیرِ نظر مقالہ مصنوعی ذہانت کے ذریعے مختلف زبانوں کے ترجمے، زبان سیکھنے، معلومات کی ترسیل اور مختلف ثقافتوں کے درمیان رابطے کے امکانات کا جائزہ لیتا ہے۔ مقالے میں اس امر پر توجہ دی گئی ہے کہ مصنوعی ذہانت کس طرح مختلف زبانیں بولنے والے افراد کو ایک دوسرے کے خیالات، ادب، روایات اور ثقافتی اقدار سمجھنے میں معاونت فراہم کر سکتی ہے۔ بالخصوص اردو اور دیگر زبانوں کے درمیان ترجمے کی سہولت عالمی سطح پر اردو ادب اور ثقافت کے تعارف کے نئے دروازے کھول سکتی ہے۔ تاہم مصنوعی ترجمے کے دوران الفاظ کے ساتھ وابستہ ثقافتی مفاہیم، محاورات اور جذبات کے درست انتقال کا مسئلہ بھی موجود ہے۔ اس لیے ٹیکنالوجی کے استعمال کے ساتھ انسانی فہم، لسانی مہارت اور ثقافتی شعور کی اہمیت برقرار رہتی ہے۔تحقیق اس نتیجے کی طرف اشارہ کرتی ہے کہ مصنوعی ذہانت مختلف زبانوں اور ثقافتوں کے درمیان دیواریں کھڑی کرنے کے بجائے پل کا کردار ادا کر سکتی ہے۔ اگر اسے انسانی اقدار، ثقافتی احترام اور لسانی تنوع کو ملحوظِ خاطررکھتے ہوئے استعمال کیا جائے تو یہ بین الثقافتی مکالمے کو فروغ دینے، باہمی فہم کو بہتر بنانے اور عالمی سطح پر پرامن معاشرت کے قیام میں مؤثر کردار ادا کر سکتی ہے۔

مصنوعی ذہانت، بین الثقافتی مکالمہ، لسانی ٹیکنالوجی، ترجمہ، ثقافتی تنوع، کلیدی الفاظ: عالمی رابطہ، لسانی فاصلہ۔

ID-826381: The Effects of Artificial Intelligence (AI) on Literature

ادب پر مصنوعی ذہانت (اے آئی) کے اثرات

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مصنوعی ذہانت (اے آئی) اکیسویں صدی کا ایک پیچیدہ اور حیرت انگیز معمہ ہے، جسے سمجھنے کے لیے عالمی سطح پر مختلف سیمینار اور کانفرنس منعقد ہو رہے ہیں جس میں بڑے بڑے علمائے ادب اور ماہرین فن اپنے خیالات اور تجربات کا اظہار کر رہے ہیں۔ مصنوعی ذہانت (اے آئی) ایک جدید سائنسی مشین ہے، جو انسان ہی کے ذہن کا پیداوار ہے جس میں اس کے علم و عقل کا عکس ایک منفرد انداز میں پایا جاتا ہے۔ اب سوال یہ ہے کہ ایک مشین جو احساسات و جذبات سے قطعی عاری ہو کر بہترین افسانے، شاعری اور فن پارے تخلیق کرسکتی ہے تو پھر تخلیقیت کی کیا حیثیت ہے؟ مصنوعی ذہانت کی آمد نے تخلیقی ذہن رکھنے والے ادباء و شعرا کی پریشانیوں میں اضافہ کردیا ہے۔ مصنوعی ذہانت کی تخلیقات اس شخص کو

راتوں رات شہرت کی اونچائیوں پر پہنچا دیتا ہے جو اس کا صحیح استعمال جانتا ہو۔ اس سوال کو سمجھنے کے لیے ہمیں ادب کے مزاج اور اس کے آفاقی قدروں کو سمجھنا ہوگا۔ اگر کوئی ادیب یا شاعر اپنے احساسات و جذبات، تجسس اور سماجی قدروں کو زندہ رکھتا ہے تو کوئی بھی مشین اس کی جگہ نہیں لے سکتی، اگر اس کا رشتہ زندگی اور کائنات سے کٹ جاتا ہے تو اس کی تخلیقیت خود بخود ختم ہو جاتی ہے۔ عظیم شاعر یا ادیب وہ ہوتا ہے جو اپنی فطری صلاحیتوں کو بروئے کار لاکر لکھے تو اس کا ادب پارہ کلاسیکیت کا درجہ اختیار کرلیتی ہے۔ حقیقت یہ ہے کہ تخلیقی صلاحیتیں ہر تخلیق کے بعد مزید نکھرتی ہے اور صدیاں گزر جانے کے بعد بھی لوگ اس سے حظ اٹھاتے ہیں۔ غالب، میر، اقبال کی شاعری آج بھی لوگ پڑھ رہے ہیں اور اس سے مستفید ہورہے ہیں۔ یہ کہنا بجا ہوگا کہ تخلیقی ذہن رکھنے والا شخص زیادہ طاقتور ہوتا ہے۔ مصنوعی ذہانت (اے آئی) کی تخلیقات کی گونج عارضی ہوتی ہے وہ دوام حاصل نہیں کرسکتی جو ایک تخلیقی ادیب حاصل کرتا ہے۔

کلیدی الفاظ: تخلیقیت، ادب، مصنوعی ذہانت، آفاقیت

ID-826385: The Role of Artificial Intelligence in the Advancement of Language Technologies

لسانی ٹیکنالوجیز کی ترقی میں مصنوعی ذہانت کا کردار

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پہلے زبان کی ٹیکنالوجی صرف بڑی زبانوں تک محدود تھی۔ اب مصنوعی ذہانت کی وجہ سے چھوٹی اور مقامی زبانوں کو بھی ڈیجیٹل دنیا میں جگہ مل رہی ہے۔ مصنوعی ذہانت اب صرف لفظ بہ لفظ ترجمہ نہیں کرتے، بلکہ سیاق و سباق، محاورے اور لہجے کو بھی سمجھتے ہیں۔ اردو، پشتو، سندھی، بلوچی جیسی زبانوں کے لیے بھی با محاورہ ترجمہ ممکن ہوا ہے۔ اس سے واٹس ایپ، ویب سائٹس اور تعلیمی مواد ہر کسی کی اپنی زبان میں دستیاب ہو رہے ہیں۔ ایک پشتو بولنے والا پشاور میں بیٹھ کر اپنی آواز سے اردو یا انگریزی میں نوٹ لکھوا سکتا ہے۔ اس سے خواندگی کی رکاوٹ کم ہوئی ہے۔ مواد کی تخلیق میں مصنوعی ذہانت اساتذہ، مصنفین اور صحافیوں کو ان کی اپنی زبان میں مضامین، سبق اور کہانیاں بنانے میں مدد دیتا ہے۔ جب لوگ ایک دوسرے کی زبان میں فوراً بات کر سکیں تو خوف اور دوری کم ہوتی ہے۔ ثقافت تک رسائی سے اب آپ کورائی ڈرامے کے سب، عربی شاعری کی تشریح، یا جاپانی تاریخ کا خلاصہ اپنی زبان میں لے سکتے ہیں۔ تعلیم اور مکالمہ: آن لائن کلاسز اور فورمز میں مصنوعی ذہانت ریئل ٹائم کیپشن اور ترجمہ دے رہا ہے۔ پشاور کا طالب علم برازیل کے پروفیسر کا لیکچر براہ راست اردو میں سن سکتا ہے۔ اس سے علم کی اجارہ داری ٹوٹ رہی ہے۔ اس لیے مقامی ماہرینِ لسانیات اور کمیونٹی کا کردار اب بھی سب سے اہم ہے۔ اور ہمیں یہ بھی دیکھنا ہے کہ ٹیکنالوجی ثقافت کو یکساں نہ بنا دے، بلکہ تنوع کو محفوظ رکھے۔

کلیدی الفاظ: مصنوعی ذہانت، لسانی ٹیکنالوجی، ثقافت

ID-826217: The Role of Artificial Intelligence in Literary Interpretation: Possibilities, Impacts, and a Critical Evaluation

ادب کی تفہیم میں مصنوعی ذہانت کا کردار: امکانات، اثرات اور تنقیدی جائزہ

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اکیسویں صدی میں مصنوعی ذہانت نے علم کے تقریباً ہر شعبے کو اپنی گرفت میں لے لیا ہے اور ادب کا مطالعہ بھی اس اثر سے محفوظ نہیں رہا۔ خاص طور پر مصنوعی ذہانت متن کو

پڑھنے، سمجھنے اور پرکھنے کے عمل میں شامل ہو رہی ہے اور اس شمولیت کے نتیجے میں ادب کے دیرینہ اور عزیز تصورات پر سوالات جنم لے رہے ہیں۔ جیسے تخلیقی صداقت، مصنف کی حیثیت، اور معنی کی تشکیل جیسے بنیادی مسائل۔ مصنوعی ذہانت اور ادب کا رشتہ نیا نہیں۔ مصنوعی ذہانت کے بانی ایلن تورنگ کے ابتدائی تجربات میں بھی زبان، قصہ گوئی اور شاعری کو مرکزی حیثیت حاصل تھی۔ آج مصنوعی ذہانت نے ادبی محققین کو "بعید مطالعہ" (Distant Reading) اور رائے کے تجزئے (Sentiment Analysis) جیسے آلات فراہم کرتی ہے جو ہزاروں متون میں وسیع رجحانات دکھاتے ہیں۔ اس کے بعد گوگل کا اینگرام ویور مصنوعی ذہانت کا اس حوالے سے اہم آلہ (Tool) ہے جو صدیوں میں الفاظ کے استعمال کی تبدیلیوں کا نقشہ کھینچتا ہے۔ یہ آلات ادبی نقاد کا متبادل نہیں بنتے بلکہ محض اس کے دائرہ نظر کو وسیع کرتے ہیں۔ جبکہ تفہیم، تاریخی شعور اور جمالیاتی حس کا اصل کام اب بھی انسانی قاری ہی کے ذمے رہتا ہے۔ مصنوعی ذہانت کا یہ کردار تخلیقی صداقت کے حوالے سے سوالات کو جنم دیتا ہے۔ مصنوعی ذہانت کی تحریر خواں کتنا ہی رواں ہو، حقیقی جذباتی گہرائی یا صداقت حاصل نہیں کر سکتی کیونکہ اس کے پیچھے کوئی جیا ہوا تجربہ موجود نہیں ہوتا۔ یہی وجہ ہے کہ مصنوعی ذہانت کو تحقیقی معاون کے طور پر استعمال کرنا، مواد اکٹھا کرنے، ترتیب دینے یا حقائق کی تصدیق کے لیے درست اور مفید سمجھا جاتا ہے۔ لیکن مصنوعی ذہانت سے تحریر تیار کروا کر محض الفاظ کی ہیر پھیر یا ترتیب بدل کر اسے اپنی اصل تحقیق کے طور پر پیش کرنا علمی دیانت کی سنگین خلاف ورزی ہے۔

کلیدی الفاظ: مصنوعی ذہانت، ادب، تخلیقی صداقت، بعید مطالعہ، علمی دیانت

ID-826259: Beyond Automation: Reorganizing the Social, Cultural, and Creative Conditions of Language Technologies

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Language technologies do not merely accelerate communication; they reorganize the social, cultural, and creative conditions under which meaning is produced, contested, and authorized in moments of crisis. Drawing on translation studies, narrative theory, discourse analysis, and postcolonial literary critique, this paper examines how machine translation, large language models, and generative systems reshape the politics of voice, the ethics of translation, and the narrative architectures of peace and conflict. Tools that promise cross-border accessibility and early warning also risk linguistic standardization, the flattening of minoritized dialects, the erasure of untranslatability, and the quiet reproduction of colonial epistemic hierarchies. Case studies ranging from UN predictive platforms and the VIEWS forecasting system to AI-assisted mediation experiments and kinetic targeting systems such as Project Maven illustrate the dual capacity of these technologies to amplify or silence localized, culturally situated speech. The paper argues that a genuinely human-centred approach must treat language technologies as literary and cultural infrastructures systems that participate in the making of narrative, identity, and moral community rather than as neutral instruments of efficiency. Only by centring linguistic justice, translational ethics, and the creative agency of speakers can artificial intelligence support rather than displace the human practices of judgment, empathy, and cultural plurality on which durable peace depends.

Keywords: Language Technologies, Translation Ethics, Narrative Theory, Discourse Analysis, Linguistic Justice, Epistemic Injustice, Postcolonial Studies, Peacebuilding, Human-Centred AI

ID-826240: Artificial Intelligence as a Tool of Digital Hegemony: Digital Surveillance, Telescreens and Censorship in Orwell's 1984

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This paper attempts to present the other side of the picture that is often neglected the impact of Artificial Intelligence, through its sophisticated tools, on human lives in the renowned work 1984 by George Orwell. The novel realistically unmasks the digital hegemony that is carried out through digital surveillance, telescreens, and constant censorship that rob humans of their socio-cultural freedom and privacy. In the postmodern age of so-called democracy and human rights, the impact of artificial intelligence comes up as a bane instead of entirely a boon, in the form of deep and constant censorship 24/7. The study, therefore, argues, with the support of the portrayal and manifestation of fictional scenes from the acclaimed novel, that digital surveillance and censorship have robbed humans of their freedom, creativity, diversity, and privacy that are the fundamental requisites of a progressive society. This leads to an institutional suppression that is a big threat to the identity of citizens of different fictional states represented in the novel. The theoretical framework of biopolitics by Michel Foucault is chosen by the study in order to unearth how modern dictatorial states and institutions operate for the pursuit of their vested interests by usurping the fundamental human rights and liberty.

Keywords: AI, Digital Surveillance, Hegemony, Biopolitics, Censorship, Bane, Telescreens

ID-826296: Artificial Intelligence and Urdu Literature

مصنوعی ذہانت اور اُردو ادب

انجم شازیہ

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انسان کو ربِّ باری تعالیٰ نے زمین پر اپنا نائب مقرر کر کے اپنی بہت سی صفات ودیعت کی ہیں، جن میں تخلیق بھی شامل ہے۔ رب کی اس صفت کا حضرتِ انسان نے خوب خوب فائدہ اٹھایا اور اپنی ذہانت اور علمیت کے بل بوتے پر کارہاے نمایاں سر انجام دیے، جن میں ایک اہم ایجاد مصنوعی ذہانت ہے۔ عہدِ حاضر میں مصنوعی ذہانت انسانی زندگی کے ہر شعبے پر اثر انداز ہو رہی ہے تو پھر ادب اس کی دست برد سے کیسے بچ سکتا ہے۔ مصنوعی ذہانت ایک مشینی دماغ رکھتی ہے۔ یہ تجزیہ کر سکتی ہے، مطلوبہ اسلوب نقل کر کے اختیار کر سکتی ہے، یہ ترجمہ بھی کر سکتی ہے، دیے ہوئے مواد کو ترتیب بھی دے سکتی ہے اور ادب کے ذخیرے کو محفوظ بھی کر سکتی ہے؛ لیکن کیا اس کے پاس دل ہے؟ جذبات اور وجدان سے یہ واقف ہے؟ یہ انسانوں کی طرح جذباتی اور روحانی تجربات سے گزر سکتی ہے؟ ان تمام سوالات کے جوابات آج کا تخلیق کار، نقاد اور قاری تینوں تلاش کر رہے ہیں۔ میں اپنے مقالے میں انہی

سوالات کے جواب تلاش کرنے کی کوشش کروں گی، جو ادب خاص طور پر اُردو ادب سے وابستہ ہر ذہن میں جنم لے رہے ہیں کہ میدانِ ادب میں مصنوعی ذہانت کو کس مقام پر رکھنا ہے۔ اس سے تخلیق کا کام لینا ہے؟ اس سے تفہیم کا کام لینا ہے؟ یا اس کو بالکل ردّ کر دینا ہے؟

کلیدی الفاظ: مصنوعی ذہانت، اُردو ادب، ادبی تخلیق، جذبات و وجدان، ترجمہ، تنقید

Sub-theme: To Build Smart Infrastructure, Advance Sustainable Engineering & Strengthen Disaster Resilience

ID-826087: Field: Theoretic Digital Twins: A Conceptual Framework for Distributed, Interacting Subsystem Modeling in Spacecraft

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Modern spacecraft comprise tightly coupled thermal, power, attitude determination and control, propulsion, structural, and communication subsystems whose interactions become increasingly complex as missions demand greater autonomy and operational resilience. These subsystems are usually modeled as independent components linked by hardwired interfaces, facilitating convenient data exchange but offering only a partial description of interdependencies that evolve continuously and of disturbance propagation throughout the integrated system. In this work, we present a conceptual framework for reinterpreting spacecraft digital twins in the mathematical language of field theory, which we call the Field-Theoretic Digital Twin (FTDT). The framework models subsystem states as distributed state fields with interactions governed by coupling relationships, and localized anomalies as excitations of the field that propagate through the coupled system. The proposed framework is mathematically expressed as a set of coupled field equations describing the evolution of subsystem state fields and their interactions. A calibration mechanism analogous to renormalization is used to continuously refine model fidelity using telemetry, allowing the digital twin to adapt as spacecraft dynamics change over the mission lifetime. A representative case study is presented, showing propagation of a localized thermal disturbance across the power and attitude control subsystems, highlighting the framework's ability to capture distributed interactions that are difficult to describe with the traditional modular approach. Computational aspects are also discussed, distinguishing regimes where classical computation suffices from regimes where emerging quantum-inspired computational approaches may aid highly coupled state evolution. FTDT is not an attempt to make spacecraft obey quantum-mechanical laws, nor an attempt to apply strong-interaction field theory outside its domain of validity; rather, it offers a unifying conceptual language for next-generation predictive, resilient, and autonomous spacecraft digital twins.

Keywords: Digital Twin, Field-Theoretic Digital Twin, Spacecraft Systems, Coupled Field Theory, State Field Modeling, Quantum-Inspired Modeling

ID-826100: Artificial Intelligence: Based Multi: Objective Energy Management for Sustainable Smart Microgrids: A Critical Review and Future Research Directions

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With the fast spread of renewable energy sources and battery energy storage in microgrids, microgrid energy management becomes a complicated multi-objective optimization problem involving the minimization of economic cost, the maximization of renewable energy sustainability, and the maximization of operational reliability. This paper provides a critical review of two recent, up-to-date optimization techniques published in the Journal of Energy Storage and Renewable Energy. The first approach uses the Golden Jackal Optimization technique to minimize the operational cost of hybrid microgrids; the second approach introduces the Slime Mould Algorithm to simultaneously optimize operational cost, emissions, battery size and reserve capacity. The review compares their optimization mechanisms, modelling assumptions, computational efficiency and practical applications. It identifies a number of ongoing research gaps, including lack of consideration of renewable uncertainty, lack of battery life-cycle degradation modelling, lack of artificial-intelligence-based prediction, lack of adaptive online system control, lack of integration with electric vehicles and carbon-tax mechanisms, and lack of simulation-based validation. Based on the review findings, a conceptual model is proposed that considers artificial intelligence, predictive analytics, and an advanced multi-objective optimization model to improve the sustainable operation of microgrid energy management under uncertain operating conditions. The study provides valuable insights and future research directions for researchers and practitioners.

Keywords: Microgrid, Energy Management, Multi-objective Optimization, Renewable Energy, Battery Energy Storage System, Artificial Intelligence, Smart Grid, Sustainability

ID-826103: Performance Optimization of FrGeCl3: Based Perovskite Solar Cells through the Engineering of Charge Transport Layers

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The development of inorganic metal halide perovskite solar cells (PSCs) for practical applications is still hindered by the use of the toxic heavy metal lead (Pb). This work investigates the optoelectronic properties and solar cell potential of the lead-free cubic perovskite $FrGeCl_3$ and presents its suitability

as an eco-friendly material. The material has a direct energy gap of 1.14 eV and good mobility and absorption properties, making it a promising material for optical and electronic device applications. Four new heterostructure configurations are explored systematically for the first time, using CuSTO and WS_2 as electron transport layers (ETLs) and nPb and Cu_2O as hole transport layers (HTLs). Some of the most important parameters, such as layer thickness, doping concentration, defect densities, back-contact reflectivity and operating temperature, are further optimized for the study. The CuSTO/$FrGeCl_3$/nPb architecture with a carbon back contact shows excellent photovoltaic performance, with a Voc of 0.81 V, Jsc of 40.7 $mA \cdot cm^{-2}$, a FF of 84.4%, and an outstanding PCE of 28.05%. These cells showed results significantly better than those of previous single-absorber $FrGeCl_3$ solar cells. Notably, all four configurations show power conversion efficiencies (PCE) above 25%, indicating good device robustness. In addition, the study investigates temperature effects and defect sensitivity at the interfaces. In conclusion, it provides a comprehensive design strategy and presents novel combinations of materials for the use of non-toxic, high-performance $FrGeCl_3$-based PSCs, which will help further the development of sustainable photovoltaic materials.

Keywords: Perovskite, Solar Cell, Lead-Free, Charge Transport Layer

ID-826141: Physics: Informed Neural Networks for Fast Stress Prediction in Computational Mechanics

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Finite Element Analysis is widely employed for structural analysis; however, high-fidelity simulations require significant computational resources. Recent advances in Artificial Intelligence provide opportunities to develop surrogate models capable of approximating mechanical responses with substantially lower computational cost. This study investigates the application of Physics-Informed Neural Networks (PINNs) for predicting stress distributions in engineering structures. Unlike conventional neural networks, PINNs incorporate the governing equations of solid mechanics into the training process, enabling physically consistent predictions while requiring fewer labeled datasets. Numerical datasets generated from finite element simulations are used to train and validate the proposed model. Model performance is evaluated using stress prediction accuracy, displacement error, computational efficiency, and convergence behavior. Results indicate that PINNs achieve high prediction accuracy while reducing computational time compared with conventional finite element simulations. The proposed framework enables rapid structural assessment during design optimization, digital twins, and real-time engineering decision-making. Applications include aerospace, automotive, biomedical implants, and smart infrastructure. This study demonstrates that integrating Artificial Intelligence with computational

mechanics can significantly improve engineering analysis efficiency while maintaining physical reliability.

Keywords: Physics-Informed Neural Networks, Computational Mechanics, Finite Element Analysis, Artificial Intelligence

ID-826146: AI: Assisted Topology Optimization for Lightweight and Crashworthy Automotive Components

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The increasing demand for lightweight and energy-efficient vehicles requires innovative structural design methodologies that maintain crashworthiness while minimizing material usage. Conventional topology optimization methods are computationally intensive because they require repeated finite element simulations during optimization. This study proposes an Artificial Intelligence-assisted topology optimization framework that combines deep neural networks with finite element analysis to predict optimal structural layouts with significantly reduced computational cost. A dataset consisting of optimized mechanical components under various loading conditions is generated using numerical simulations. A convolutional neural network is trained to establish relationships between loading conditions, boundary constraints, and optimized material distributions. The AI model subsequently predicts near-optimal topologies without performing complete iterative optimization. Performance is evaluated using compliance, mass reduction, stress concentration, and prediction accuracy. Preliminary findings indicate that the proposed framework can reduce optimization time by over 80% while maintaining structural performance comparable to traditional optimization methods. The proposed methodology has applications in automotive, aerospace, and civil infrastructure, where rapid structural optimization contributes to sustainable manufacturing, reduced carbon emissions, and improved occupant safety. This work demonstrates how Artificial Intelligence can transform computational mechanics into an intelligent design tool for next-generation engineering systems.

Keywords: Artificial Intelligence, Topology Optimization, Deep Learning, Computational Mechanics, Finite Element Analysis

ID-826162: Design and Development of a Solar: Powered Food Dehydration Chamber

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Food dehydration is an effective method of preserving agricultural products by reducing their moisture content and extending shelf life. This study presents the design, fabrication, and performance evaluation of an indirect

solar-powered food dehydration chamber developed as a sustainable and energy-efficient food preservation system. The chamber, with overall dimensions of 58 cm × 42 cm × 32 cm, was designed using SolidWorks CAD software and fabricated using honeycomb paperboard insulated with 25 mm thick Jumbolon closed-cell foam to minimize conductive heat losses. The drying system was powered by a 100 W solar photovoltaic system and integrated with a DC heating element, an automatic temperature controller, and an exhaust fan to provide controlled drying conditions. The fabricated prototype closely matched the CAD design, demonstrating successful translation from digital design to physical implementation. Performance testing showed that the chamber temperature increased from 34.5 °C to the operating set point of 65 °C within 25 minutes and subsequently maintained a stable temperature range of 63–65 °C for 3 hours and 25 minutes using only the 100 W heating element. The results demonstrate that the proposed system provides stable thermal performance and offers a compact, cost-effective, and environmentally friendly solution for food dehydration, particularly for rural and off-grid applications.

Keywords: Renewable Energy, Food Dehydration, Thermal Performance

ID-826200: AI: Assisted Design and Performance Optimization of a Compact Sandblasting Machine for Efficient Rust Removal

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This study presents the design, fabrication, and experimental evaluation of a compact sandblasting machine for efficient rust removal from metallic workpieces. The air-to-abrasive mixture chamber was fabricated using a cylindrical vessel through cutting and welding processes, while two blasting nozzles with outlet diameters of 0.08 in and 0.10 in were manufactured using lathe machining. Experimental investigations were conducted to evaluate the influence of nozzle diameter on rust removal efficiency. Results revealed that the 0.10 in nozzle achieved faster rust removal due to its higher air-abrasive flow rate and larger surface coverage, whereas the 0.08 in nozzle provided more controlled blasting with a lower flow rate but required a longer processing time. To enhance process efficiency, an artificial intelligence-based machine learning model is proposed to analyze experimental data and predict the optimal operating parameters, including nozzle diameter, air pressure, abrasive flow rate, and exposure time, for different rust conditions. The AI-assisted optimization enables improved process planning, reduced material consumption, and enhanced cleaning efficiency while minimizing operational cost. The compact design of the machine ensures portability, making it suitable for small workshops and field maintenance applications. The integration of experimental validation with AI-driven process optimization provides a practical framework for developing intelligent and efficient surface treatment systems for industrial applications.

Keywords: Sandblasting Machine, Rust Removal, Abrasive Blasting, Nozzle Diameter, Machine Learning, Artificial Intelligence, Process Optimization, Surface Treatment

ID-826243: Knowledge: Informed Interpretable Machine Learning for Resilience Assessment and Maintenance Prioritization of Urban Water Distribution Networks

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Ageing urban water distribution networks are critical infrastructure systems that face increasing challenges due to ageing pipelines, environmental deterioration, hydraulic loading, and limited maintenance resources. This study develops a knowledge-informed interpretable machine learning approach for pipe-level resilience assessment and maintenance prioritization using field data from 2,000 pipe segments in eastern China. Engineering information, including pipe characteristics, environmental conditions, hydraulic factors, historical failures, and maintenance indicators, was integrated into a unified predictive framework. Five machine learning models Random Forest, Support Vector Machine, Extreme Gradient Boosting, Light Gradient Boosting Machine, and a weighted RF–SVM ensemble were developed to estimate pipe failure probability and remaining service life. Explainable machine learning using SHAP analysis was employed to identify dominant deterioration factors and improve model transparency. Furthermore, a composite Resilience Index was formulated by integrating structural integrity, operational capacity, adaptability, and recovery potential to support maintenance prioritization. The results demonstrate that pipe age, material type, soil corrosivity, historical failure records, and operating pressure are key factors influencing pipeline vulnerability. The proposed approach provides an interpretable decision-support tool for identifying vulnerable pipe segments and improving resilience-oriented maintenance planning in urban water distribution networks.

Keywords: Urban Water Distribution Networks; Interpretable Machine Learning; Pipe Failure Prediction

ID-826275: Benchmarking Machine Learning Algorithms for Non: Linear Boundary Value Problems in Complex Fluids

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Non-linear boundary value problems (BVPs) arising in engineering science, particularly in complex fluid dynamics, present significant challenges due to their nonlinear nature, high-order overheads, and slow convergence rates when addressed with traditional classical numerical and analytical techniques.

Classical techniques often face convergence problems when the order of the BVP is more or less than the number of boundary conditions, along with sensitivity to prior guesses and inadequate robustness; hence, an effective and consistent solution technique is needed to overcome the strong nonlinearity of the problem, guarantee stable convergence, and provide accurate solutions over a wide range of governing physical parameters. Unlike traditional output strategies, machine learning algorithms provide convincing, effective, and accurate outputs for complex, strongly nonlinear phenomena. This study provides a comprehensive comparative performance evaluation of Artificial Intelligence methodologies such as supervised learning (Artificial Neural Networks and Support Vector Machines) and ensemble algorithms (Random Forest and AdaBoost) for solutions of non-linear BVPs. The proposed framework trains each model on governing differential relationships to predict fluid flow characteristics and higher-order derivatives with high fidelity. Validated against established numerical and analytical benchmarks, the models will be evaluated on predictive accuracy, computational speed, convergence rate, and generalizability to determine the optimal AI architecture. The comparative findings reveal clear performance trade-offs, demonstrating that machine learning can serve as a robust, accurate, and scalable alternative to traditional numerical solvers in computational fluid dynamics.

Keywords: Non-linear Boundary Value Problem; Ensemble Learning; Supervised Learning; Predictive Accuracy

ID-826322: Enhanced Short: Term Load Forecasting in Smart Grids Using a Deep Learning Model with CNN: GRU

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Short-term load forecasting (STLF) helps in making necessary adjustments in the supply of electrical power against varying demands, and it is therefore important in recent times for economic efficiency and operational reliability in power systems. Traditional models are normally unable to effectively capture the complex temporal and spatial dependencies in time-series data. This paper introduces a hybrid model combining the features of a Convolutional Neural Network (CNN) and a Gated Recurrent Unit (GRU) to promptly model the temporal dependencies, thereby improving the performance of load forecasting while achieving lower values of RMSE, MAE, and MAPE.

Keywords: Machine Learning, CNN-GRU, Short-Term Load Forecasting

ID-826324: Socio: Technical and Policy Frameworks for Integrating AI: Powered Automated Waste Sorting in Developing Economies: A Case Study of Pakistan's Municipal Solid Waste Systems

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Municipal solid waste (MSW) generation in Pakistan is around 48.5 million tons per annum, with low source-segregation, high moisture content, and close to 100% dependence on open dumping and informal scavenging. The use of artificial intelligence (AI), computer vision, and robotics technologies in material recovery facilities (MRFs) in high-income countries has transformed these operations, but systemic infrastructural and socio-economic factors hinder the direct application of these technologies in the Global South. This research provides a detailed analysis of the feasibility, roadblocks, and policy needs for integrating AI-based automated waste sorting systems into Pakistan's metropolitan waste systems (e.g., SSWMB and LWMC). It aims to systematically synthesize recent case studies from the developing world on clean-tech solutions and to pinpoint two critical local barriers: the "data deficit" in the case of highly contaminated, organic-heavy waste streams, and the operating risk of AI infrastructure on the regional power grid. This study also tackles the largely ignored socio-economic aspect of automation in an active informal sector. Instead of suggesting a disruptive approach of full automation, we introduce a new "Inclusive Human-in-the-Loop" approach. This model forms a structure that can formalize the local scavenger community, in which manual labor is placed at the initial point of the supply chain, while high-precision, toxic, and secondary recyclable segregation are done using power-limited edge devices of AI. The paper reconciles the potential of machine learning with the new environmental policies in Pakistan, providing a recipe for municipal actors to follow to achieve an economically equitable circular economy.

Keywords: Municipal Solid Waste; Artificial Intelligence; Computer Vision; Informal Sector; Waste-Pickers; Environmental Policy

ID-826214: Smart Road Networks: The Use of AI and ITS for Safer Urban Mobility

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Road traffic crashes cause around 1.19 million deaths every year, with the greatest impact on low- and middle-income countries. Rapid urban growth and increasing traffic demand require smarter and more effective road safety

solutions than traditional traffic management. This paper explores how Artificial Intelligence (AI) and Intelligent Transportation Systems (ITS) can work together to improve road safety under the Safe System Approach. This approach recognizes that human errors are unavoidable and focuses on designing safer roads that reduce the risk of serious crashes. ITS technologies, such as adaptive traffic signals, automated incident detection, and connected vehicle systems, help monitor and manage traffic in real time. AI further strengthens these systems by analyzing traffic data to identify accident-prone locations, predict crash risks, manage traffic flow, and monitor driver behavior. Technologies including machine learning, LiDAR, and IoT sensors support faster and more accurate decision-making for safer transportation. The paper also discusses the challenges of applying these technologies in developing countries, where poor road infrastructure, limited enforcement, and insufficient traffic data remain major issues. Despite these challenges, integrating AI and ITS provides a practical pathway toward Vision Zero, aiming to reduce road deaths and serious injuries while promoting safer, smarter, and more sustainable urban mobility.

Keywords: Smart Road Networks, Intelligent Transportation Systems, Artificial Intelligence, Safe System Approach, Road Safety, Machine Learning, Vision Zero, Urban Mobility

ID-826344: Shake Table Testing of Timber Structure with Brick Infills

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Timber-framed construction with brick masonry is a traditional construction system that has been historically used in earthquake-prone regions. The study explores the potential of timber-framed brick masonry as a resilient traditional construction system through controlled shake table testing. The work focuses on the development and testing of a representative timber-framed brick masonry model under dynamic excitation. The experimental program provides an opportunity to examine the suitability of traditional timber masonry construction for seismic applications and contributes to the broader understanding of traditional earthquake-resistant construction systems.

Keywords: Shake Table Testing, Traditional Construction, Seismic Resilience, Earthquake Engineering

ID-826338: Predictive AI Framework for Cascading Landslide and Seismic Risk Evaluation of Slopes and Buildings in Mountainous Terrains

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In northern Pakistan, mountainous regions encounter severe compound risks from rainfall-triggered slope instabilities and intense seismic events, threatening slope integrity, foundation systems, and surrounding civil infrastructure. Traditional civil engineering evaluations typically analyze slope stability and structural seismic vulnerability in isolation, leaving a crucial methodological gap regarding the synthesis of soil-structure interaction within machine-learning-driven multi-hazard assessment platforms. Addressing this challenge, this study formulates an integrated, artificial-intelligence-assisted predictive framework to concurrently estimate landslide susceptibility, structural seismic response, and overall infrastructure vulnerability in complex terrain. Utilizing a case study in northern Pakistan as a primary baseline due to its historical landslide inventory and high seismic exposure, spatial datasets including high-resolution digital elevation models, precipitation records, satellite imagery, and historical earthquake catalogs were aggregated inside a Geographic Information System (GIS) environment, alongside geotechnical parameters and structural modeling of representative reinforced-concrete frame buildings. By implementing Random Forest and XGBoost ensemble learning techniques, the framework maps slope failure probabilities, estimates structural damage states, and establishes a consolidated infrastructure risk index. Validated against historic ground failure inventory and seismic records through rigorous cross-validation techniques, the model produces high-resolution spatial vulnerability maps. The resulting predictive approach bridges geotechnical and structural engineering domains, offering urban planners, engineers, and disaster management agencies an actionable, data-driven system to optimize structural resilience and prioritize disaster mitigation interventions across vulnerable mountainous landscapes.

Keywords: Multi-hazard Risk Assessment; Landslide Susceptibility; Soil-Structure Interaction; Machine Learning; Artificial Intelligence

ID-826072: Advancing Sodium: Ion Energy Storage: Integrating High: Performance Electrode Engineering with Predictive Diagnostics and Thermal Safety Frameworks

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Sodium-ion batteries (SIBs) are becoming an energy-storage choice for the sustainable and cost-effective use of abundant sodium in nature instead of lithium-ion batteries. Today, however, their commercialization is gridlocked by several key research gaps. On the material side, apart from the slow Na^+ transport kinetics, poor electronic conductivity, and large volume change during cycling, there are no high-performance electrode materials readily available. In particular, the issue of irreversible structural phase transition and high air sensitivity of layered oxide cathodes has not been solved. High reversible capacity and high initial Coulombic efficiency, combined with

scalable and environmentally friendly synthesis routes, is one of the great challenges in the case of hard carbon anodes. Additionally, there are very limited data and design guidelines on how to optimize electrode densification for high mass-loading SIB cathodes. Experimental research on the characteristics of thermal runaway and the transport behavior of flue gas under full-scale energy-storage conditions is still relatively rare at the system level. More extensive baseline characterization of cell-to-cell variation is required for commercial Na-ion production and safe deployment. These are the areas that have been explored over the recent past using novel material engineering and diagnostics. For cathodes, some strategies include substituting trace amounts of strontium, high-entropy engineering, "turning waste into treasure" surface coatings, and dual-stage coatings, which have achieved good stabilization of crystal structures and rate capacity. For anodes, the "disordered–ordered" microcrystalline structure of bituminous coal and zinc-templating approaches are more capable of storing sodium and are more sustainable. In addition, there have been significant developments in systems engineering, such as designing electrolytes with molecular descriptors for low-temperature operation, BiLSTM-based state-of-health prediction, and multi-objective optimization of the reaction zone, which are helping to close the gap with commercial lithium-ion technologies. All these advances represent a technical base for the global conversion to sodium-based electrochemical energy storage.

Keywords: Sodium-Ion Batteries (SIBs), Electrode Materials, Layered Oxide Cathodes, Hard Carbon Anodes, Material Engineering

Sub-theme: To Drive Business Innovation, Digital Economy & Sustainable Growth

ID-826028: The Role of Green Human Resource Management in Promoting Sustainable Business Practices

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Environmental degradation, resource depletion, and mounting regulatory pressure have pushed organizations across the globe to rethink the way they manage their people and their operations. Within this context, Green Human Resource Management (GHRM) has emerged as a strategic approach that aligns human resource functions such as recruitment, training, performance appraisal, and rewards with environmental objectives. Although the concept has attracted growing academic attention over the past decade, empirical evidence from developing economies, and Pakistan in particular, remains limited. This study was designed to examine the effect of GHRM on sustainable business practices (SBP) among employees and managers working in Pakistani organizations, and to identify which GHRM practices contribute

most strongly to sustainability outcomes. A quantitative, cross-sectional survey design was adopted. Data were collected from 250 employees and managers using a structured questionnaire built on a five-point Likert scale ranging from strongly disagree to strongly agree. The questionnaire consisted of three sections: demographic information; an eight-item GHRM scale covering green recruitment, training, appraisal, rewards, management support, paperless work, energy saving, and environmental culture; and an eight-item SBP scale covering waste reduction, resource efficiency, sustainability integration, regulatory compliance, performance improvement, continuous improvement, customer perception, and competitive advantage. Respondents were selected through convenience sampling from a range of organizations and job levels. The collected data were analyzed using reliability analysis, descriptive statistics, Pearson correlation, independent samples t-tests, one-way analysis of variance, and simple linear regression. The sample comprised 170 male respondents (68.0%) and 80 female respondents (32.0%), with the largest age group falling between 41 and 50 years (41.2%). Respondents were fairly evenly distributed across job positions, including officers, supervisors, managers, and executives, and most held a graduate or postgraduate qualification. Both measurement scales demonstrated excellent internal consistency, with Cronbach's alpha values of 0.939 for GHRM and 0.958 for SBP, well above the commonly accepted threshold of 0.70. Descriptive results indicated that respondents held moderately favorable perceptions of both GHRM practices and sustainable business practices in their organizations, with composite mean scores of 3.56 for GHRM and 3.56 for SBP on the five-point scale, suggesting room for improvement in the consistency and depth of green HR implementation. The correlation analysis revealed a very strong, positive, and statistically significant relationship between GHRM and SBP ($r = 0.977$, $p < 0.001$). Simple linear regression confirmed that GHRM is a significant predictor of sustainable business practices, explaining approximately 95.5% of the variance in SBP ($R^2 = 0.955$, $F = 5233.44$, $p < 0.001$), with each one-unit increase in GHRM practices associated with a corresponding increase in sustainable business practices. Independent samples t-tests and one-way ANOVA further indicated that perceptions of GHRM and SBP did not differ significantly by gender or age group, suggesting that the relationship between green HR practices and sustainability outcomes is broadly consistent across demographic segments of the workforce. These findings provide strong empirical support for the hypothesis that Green Human Resource Management has a significant positive effect on sustainable business practices, and they extend the GHRM literature by offering context-specific evidence from the Pakistani business environment, where research of this kind remains relatively scarce. The results suggest that when organizations embed environmental considerations into recruitment, training, appraisal, and reward systems, and when management actively encourages eco-friendly behavior, employees are more likely to perceive their organizations as pursuing sustainability in a meaningful and integrated way.

Practically, the study offers guidance for human resource managers and business leaders seeking cost-effective, people-centered pathways toward improved environmental performance. It also carries implications for policymakers interested in encouraging green transformation in emerging markets. Limitations related to the cross-sectional design, convenience sampling, and self-reported measures are discussed, along with directions for future research, including the examination of mediating and moderating variables such as employee green behavior, organizational culture, and top management commitment.

Keywords: Green Human Resource Management, Sustainable Business Practices, Environmental Performance, Employee Perceptions, Regression Analysis

ID-826096: Bridging Values and Action: Cognitive, Normative, and Trust: Based Drivers of Plastic Waste Recycling Behavior in an Emerging Economy

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Background: Plastic waste has emerged as one of the most acute sustainability crises of the twenty-first century, with global plastic waste generation exceeding 350 million tons annually and recycling rates persistently below 10%. In rapidly urbanizing emerging economies such as Pakistan, where regulatory enforcement remains nascent and recycling infrastructure is severely constrained, transitioning toward a circular plastics economy is both a policy imperative and a consumer behavior challenge. Despite growing scholarly interest in pro-environmental behavior, the cognitive, normative, and trust-based psychological mechanisms that govern plastic waste recycling behavior in resource-constrained contexts remain inadequately theorized and empirically underexplored. Objective: Drawing on the Value–Belief–Norm (VBN) framework, this study examines how environmental values, perceived economic benefits of recycling, trust in recycling systems, and new ecological paradigm beliefs jointly shape private-sphere plastic waste recycling behaviors among consumers in Pakistan's emerging urban economy. Methodology: This study employed a quantitative, cross-sectional research design. The population comprised urban consumers in Pakistan engaged in household plastic waste disposal and recycling decisions. Data were collected from 200 respondents using a purposive sampling technique, via a structured online survey questionnaire employing validated multi-item Likert-type scales adapted from prior VBN literature. Data were analyzed using structural equation modeling (SEM) to test the hypothesized relationships. Results: The results reveal that environmental values, perceived economic benefits of recycling, trust in recycling systems, and new ecological paradigm orientation significantly predict plastic waste recycling behaviors, with trust in recycling

systems and ecological beliefs emerging as the strongest predictors. Originality: These findings advance the VBN literature by demonstrating its applicability to plastic waste recycling in a resource-constrained, high-uncertainty institutional environment, and offer actionable insights for policymakers and sustainability marketers seeking to activate value-aligned behavioral change. The study contributes an integrative, empirically validated framework for understanding the antecedents of circular economy participation at the consumer level in underexplored emerging-economy contexts.

Keywords: Plastic Waste Recycling Behaviors, Value–Belief–Norm (VBN) Theory, Circular Economy, Pro-environmental Behavior, Emerging Economy

ID-826022: Impact of Digital Innovation and Online Shopping Experience on Purchase Intention with a Mediating Role of Brand Love

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Purpose: This research investigates how digital innovation and online shopping experience influence purchase intention in e-commerce, with brand love serving as an emotional mediating mechanism. Methodology: A quantitative, cross-sectional design was adopted using structured questionnaires distributed to 200 online shoppers in Pakistan who had made at least one e-commerce purchase within the preceding six months. Structural Equation Modeling (SEM) via SmartPLS 4 was employed for hypothesis testing and mediation analysis. Findings: The results confirm that both digital innovation and online shopping experience positively influence brand love, which in turn significantly drives purchase intention. Brand love fully mediates the relationship between digital innovation and purchase intention, and partially mediates the relationship between online shopping experience and purchase intention. Digital innovation demonstrated a large effect size ($f^2 = 0.394$) on brand love, while brand love exerted a dominant effect ($f^2 = 0.497$) on purchase intention. Implications: The study provides actionable insights for e-commerce managers to design digitally innovative, emotionally resonant platforms. Firms should invest in AI-driven personalization and experiential design to cultivate brand love and, through it, stronger purchase intention. Originality: This study is among the first to integrate the Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), and Emotional Attachment Theory within a unified framework for Pakistani e-commerce consumers, explicitly testing brand love as a mediator between technological experiences and behavioral purchase outcomes.

Keywords: Digital Innovation, Online Shopping Experience, Brand Love, Purchase Intention, Structural Equation Modeling, E-Commerce, Pakistan

ID-826365: Artificial Intelligence for Supply Chain Management: An AI: Based Supplier Selection and Recommendation System

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Selecting the right supplier is an important part of supply chain management because companies need to compare suppliers based on different factors such as cost, quality, delivery, reliability, and risk. Traditional supplier selection can be difficult and time-consuming because users have to compare several suppliers and decide which factors are more important. This research presents the design and development of an AI-based supplier selection system that helps users compare suppliers and receive a suitable supplier recommendation based on their priorities. In the first phase, a complete backend system will be developed using FastAPI and SQLite. The backend will manage supplier information and provide APIs for adding, updating, deleting, and retrieving supplier records. The database will store important supplier details such as cost, quality, delivery performance, reliability, and risk. A Streamlit interface will also be developed to allow users to enter supplier information and view the results. The system will then be extended with an AI-based decision-making component. The model will analyze the suppliers' data and evaluate suppliers across multiple criteria. Users will be able to change the importance of different criteria according to their requirements. For example, a user can give more importance to quality than cost, and the system will update the supplier ranking based on these priorities. The system will also provide an understandable explanation for the final recommendation by showing which factors had the greatest influence on the result. This allows users to not only see which supplier is recommended but also understand why the supplier was selected. Overall, this work aims to provide a practical and user-friendly AI decision-support system that makes supplier comparison and selection easier, more flexible, and more transparent.

Keywords: Artificial Intelligence, Supplier Selection, Multi-Criteria Decision Making, FastAPI, SQLite, Streamlit, Supply Chain Management

ID-826330: Effective Leadership Traits and Strategies: Managing Supply Chains During High: Pressure Times

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Objective: Over the past century, an uncertain international environment due to pandemics and conflicts has repeatedly disrupted supply chain systems, revealing their vulnerabilities. The role of leadership during times of crisis has been a central focus in organizational and management research. The question is whether a certain leadership style and approach is enough to tackle such high-pressure times, or whether there are effective leadership traits and

preferred strategies, across leadership styles, to ensure operational continuity of supply chains during high-pressure times due to pandemics or geopolitical situations. The objective of this research is to identify relevant leadership traits and approaches to handle high-pressure times. Method: The most distinctive features of leadership styles mentioned in the literature were included in the questionnaire, along with strategies frequently cited in the literature to mitigate disruptions. For additional consideration, supply chain managers were asked to mention and rank any trait or strategy not listed. Food supply chains were considered as the target population, with supply chain members located in the context of a developing country. A descriptive quantitative approach with Relative Importance Index (RII) analysis was employed, which sought to work out a framework under which a leader can be helped to follow a certain type of strategy with a few noteworthy leadership skills. Key Findings: The research highlights that supply chain resilience, while difficult to achieve, can be reached to a certain level but cannot be a fail-safe arrangement; the leadership and strategy used are very important. The results show that leadership has far greater importance in crisis situations for dealing with a disruptive environment. Leadership traits such as coordination, problem-solving, and staying calm under pressure were identified as the most critical. Managers' most preferred strategies during high-pressure times include cross-functional coordination, alternate logistics, business continuity planning, and maintaining safety stock. Significance: The study provides a new way to approach leadership. Normally, leadership is studied based on styles such as transformational, transactional, and others defined by dominant traits and management approaches. This research proposes that leaders should be practical and move across various categories of leadership styles depending on the business environment. Leadership traits and strategies are required by the environment, ranging from low disturbances to highly volatile times where the supply-demand balance fluctuates, causing supply chain disruptions. A certain leadership trait, whether assigned to a transformational or transactional leader, instantly becomes relevant when a disruption of magnitude hits the supply chain; similarly, certain strategies become more effective when dealing with high uncertainty. Thus, there are dominant traits and choices of mitigation strategies that matter for supply chain managers to come out of high-pressure times. Supply chain managers need to use traits flexibly instead of compartmentalizing themselves within a single leadership style.

Keywords: Leadership Traits and Strategies, Supply Chain Resilience, Crisis Management, Relative Importance Index (RII), Food Supply Chains.

ID-826143: Driving Business Innovation through Digital Entrepreneurship: An Assessment of Digital Entrepreneurial Challenges Faced by Women Entrepreneurs in Pakistan

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Digital entrepreneurship has become one of the most relevant avenues for economic participation and business development, especially for women who need flexible and accessible sources of income. However, many obstacles still hinder women entrepreneurs in Pakistan from succeeding in the entrepreneurial journey. This research aims to explore how economic, social, technological, and regulatory obstacles affect the success of women's digital entrepreneurship in Pakistan. A quantitative research approach was used, and a structured questionnaire was shared with female entrepreneurs using digital platforms such as Facebook, Instagram, TikTok, YouTube, and e-commerce platforms. The study adopted a positivist philosophy, a deductive approach, and a cross-sectional research design. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS software. The results indicate that social and regulatory difficulties have a substantial impact on the success of female digital entrepreneurs, whereas economic and technological difficulties do not. The findings suggest that cultural norms, family constraints, social pressure, and regulatory challenges continue to be significant barriers to the entrepreneurial development of women in Pakistan. The study adds to the existing literature on digital entrepreneurship by providing empirical evidence based on the Pakistani context and offers helpful insights for policymakers, educational institutions, and support organizations. It suggests the formulation of gender-sensitive policies, better regulatory support, improved networking opportunities, and targeted empowerment programmes to build a more inclusive digital entrepreneurial ecosystem for women in Pakistan.

Keywords: Digital Entrepreneurship, Female Entrepreneurs, Pakistan, Social Challenges, Regulatory Challenges, Technological Challenges, Economic Challenges, SmartPLS, Entrepreneurial Success

Sub-theme: To Enhance Education, Culture & Human Development

ID-826415: Artificial Intelligence, Islamic Finance, and Sustainable Peace: A Jurisprudential Study

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Further to the already significant contributions of AI to the modern financial industry — enabling increased productivity of financial transactions, higher standards of financial risk management, and improved financial performance — AI is playing a definitive role in Islamic Finance by offering new ways to promote observance of Shariah, enhance financial inclusivity, combat financial fraud, and build better corporate governance; yet it poses ethical challenges and difficult legal questions of transparency, accountability, and responsibility. In this context, this research explores the role of Artificial Intelligence in Islamic Finance towards promoting sustainable peace, grounded in Islamic Jurisprudence (Fiqh) and the objectives of Islamic law (Maqāṣid al-Sharīʿah). It ultimately seeks to establish how the implementation of AI can contribute to a strong, ethical Islamic financial industry that fosters greater financial equality, stability, and social harmony — hence, sustainable peace. The in-depth critical interrogation adopts a qualitative doctrinal approach to the central and secondary Islamic sources, the rulings of classical jurists, and pertinent literature on AI, Islamic finance, and finance ethics. The various roles of AI are measured against the fundamental Islamic principles of ʿadl (justice), maṣlaḥah (public interest), ḥifẓ al-māl (preservation of wealth), and darʾ al-mafāsid (prevention of harm). Sustainable peace is here understood as achieving economic stability through peaceful, non-violent means with an equitable redistribution of wealth; it presupposes trust and transparency between parties, facilitated by an efficient AI-based financial system capable of detecting and preventing fraud, providing equitable access to Islamic finance products, and ensuring transparency in all dealings. It is hoped that, through the establishment of a workable AI-governance framework for Islamic Finance, the sector can open new avenues for sustainable peace via better implementation of Sharia-based principles, the development of Islamic financial products, and stronger fraud protection across the Muslim Ummah.

Keywords: Artificial Intelligence (AI); Islamic Finance; Sustainable Peace; Islamic Jurisprudence (Fiqh); Maqāṣid al-Sharīʿah; AI Governance; Finance Ethics

ID-826425: ایجوکیشن اور ہیومینیٹیز: تعلیم، ثقافت، مذہبی ہم آہنگی، اور انسانی ترقی
Education and the Humanities: Enhancing Learning, Culture, Religious Harmony, and Human Development

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روز افزوں متنوع اور باہم مربوط دنیا میں، تعلیم، ثقافتی فہم، مذہبی ہم آہنگی اور انسانی ترقی کو مزید فروغ دینا پرامن اور کثیر الجہتی معاشروں کی تعمیر کے لیے ایک اہم اور فوری تقاضا بن چکا ہے۔ تعلیم اور علومِ انسانیت فردی کردار کی تعمیر، اجتماعی ثقافت کی پرورش اور تہذیبی پیش رفت میں کلیدی حیثیت رکھتے ہیں، اور یہی وہ مضبوط بنیاد ہے جس پر ایسے معاشرے تشکیل پاتے ہیں۔ یہ مقالہ تعلیم، ثقافتی تحفظ، بین المذاہب و مذہبی ہم آہنگی اور جامع انسانی ترقی کے مابین پیچیدہ باہمی تعامل کا جائزہ لیتا ہے، اور اس نکتے پر زور دیتا ہے کہ یہ تمام شعبے فطری طور پر ایک دوسرے سے جڑے ہوئے ہیں۔ اس میں یہ بھی جائزہ لیا گیا ہے کہ تعلیمی نظام، جب انسانی اقدار سے مالا مال ہو، تو کس طرح رواداری، باہمی احترام اور سماجی ہم آہنگی کے فروغ کے لیے ایک مؤثر محرک کا کردار ادا کر سکتا ہے۔ مقالے میں ثقافتی ورثے اور مذہبی فہم کے انسانی ترقی کو آگے بڑھانے میں کردار کا بھی جائزہ لیا گیا ہے، اور اس نکتے پر اصرار کیا گیا ہے کہ پائیدار ترقی محض مادی یا معاشی نمو سے یقینی نہیں بنائی جا سکتی، بلکہ اس کے لیے اخلاقی شعور، ثقافتی حساسیت اور بین المذاہب مکالمے کی پرورش لازمی ہے۔ کیفیتی و تشریحی طریقۂ کار بروئے کار لاتے ہوئے، یہ تحقیق تعلیمی فلسفے، ثقافتی مطالعات اور تقابلی مذہبیات کے زاویوں سے سماجی ہم آہنگی کو درپیش عصری خطرات بشمول بڑھتی ہوئی عدم برداشت، ثقافتی زوال اور جدید نصاب میں علومِ انسانیت کی سکڑتی ہوئی موجودگی کا جائزہ لیتی ہے۔ تحقیق اس نتیجے پر پہنچتی ہے کہ علومِ انسانیت پر مبنی تعلیم پر نئے سرے سے توجہ جو ثقافتی شعور اور مذہبی کثرتیت کو باہم پیوست کرے ہمدرد، باشعور اور سماجی طور پر ذمہ دار شہریوں کی تشکیل کے لیے ناگزیر ہے۔
کلیدی الفاظ: تعلیم، ثقافتی ورثہ، مذہبی ہم آہنگی، انسانی ترقی، علومِ انسانیت

ID-826019: Artificial Intelligence and Human Creativity
مصنوعی ذہانت ،تخلیقی عمل اور ادب پر اثرات

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This research paper elucidates the fundamental distinctions between Artificial Intelligence (AI) and the human creative process, and examines the resulting implications for literature in light of these distinctions. The central questions addressed are: Can AI be truly creative, or is it merely a rearrangement of existing data? Can prose or poetry generated by AI be considered literature? And can AI preserve the subtlety and delicacy inherent in the creative act? The study establishes that AI, at its core, operates through the identification and recombination of patterns embedded within data, whereas human creativity emerges from emotion, existential struggle, historical consciousness, and an inner spiritual fervor. This divergence is substantiated through a comparative

analysis of Faiz Ahmed Faiz's poetry and an AI generated poem on the same theme revealing that while human creation possesses depth, layered meanings, and a resonance that invites repeated reading, the AI generated text remains superficial, emotionally hollow, and algorithmically calculated. The paper concludes that literary works produced by AI do not fall within the traditional domain of literature; rather, they warrant distinct classifications such as "machine literature" or "human machine literature." The most significant impact of AI on literature is that it has sharpened the distinction between the authentic and the imitative, between depth and superficiality. For writers and poets whose work is rooted in genuine personal experience and original sensibility, AI poses no existential threat it may serve as a supplementary tool. However, for those whose creativity relies on imitation and surface level expression, AI presents a serious challenge. Ultimately, the paper argues that AI is not a replacement for human creativity but a new medium or instrument. The future of literature lies not in resisting AI, but in establishing a conscious and balanced coexistence with it.

مقالہ بعنوان" مصنوعی ذہانت ،تخلیقی عمل اور ادب پر اثرت " مصنوعی ذہانت (AI) اور انسانی تخلیقی عمل کے بنیادی امتیازات کو واضح کرتا ہے اور ان امتیازات کی روشنی میں ادب پر مرتب ہونے والے اثرات کا جائزہ بھی پیش کرتا ہے۔ مقالے کے مرکزی سوالات ہیں : کیا AI حقیقی تخلیق ہے یا محض ڈیٹا کی ترتیب نو؟ کیا سے تخلیق شدہ نثر یا شاعری کو ادب کہا جا سکتا ہے؟ اور کیا تخلیقی عمل کی لطافت و نزاکت کو برقرار رکھ سکتا ہے؟ ماخوذ نتائج کے مطابق مصنوعی ذہانت دراصل ڈیٹا میں پوشیدہ نمونوں کی شناخت اور ان کی ترتیب نو کا عمل ہےجبکہ انسانی تخلیق جذبات، وجودی کشمکش، تاریخی شعور اور باطنی سوز و درد سے جنم لیتی ہے۔ اس فرق کو فیض احمد فیض کی نظم اور AI سے تخلیق کردہ ہم موضوع نظم کے تقابلی تجزیے سے مزید تقویت دی گئی ہے جہاں انسانی تخلیق میں معنوی گہرائی، تہہ داری اور بارخوانی کی کیفیت پائی جاتی ہے وہی AI کی تخلیق سطحی، بے روح اور حسابی ہی رہتی ہےمقالہ یہ نتیجہ اخذ کرتا ہے کہ AI سے تخلیق شدہ متن روایتی ادب کے دائرے میں نہیں آتا بلکہ اسے "مشینی ادب" یا "انسانی مشینی ادب" جیسی علیحدہ اصطلاحات دی جانی چاہئے۔ ادب پر AI کا سب سے اہم اثر یہ ہے کہ اس نے اصلی اور نقلی، گہرائی اور سطحیت کے درمیان فرق کو مزید نمایاں کر دیا ہے۔ یہ ٹیکنالوجی ان ادیبوں کے لیے خطرہ ہے جن کا تخلیقی عمل تقلید اور سطحیت پر مبنی ہے جبکہ حقیقی تخلیقی روح رکھنے والے اسے ایک معاون آلے کے طور پر استعمال کر سکتے ہیں۔ حتمی نتیجہ یہ ہے کہ AI انسانی تخلیق کا متبادل نہیں بلکہ ایک نیا وسیلہ ہے اور ادب کا مستقبل اس ٹیکنالوجی کے خلاف جنگ میں نہیں بلکہ اس کے ساتھ ایک نئے شعوری توازن میں ہے کلیدی الفاظ: مصنوعی ذہانت،تخلیقی عمل،روحِ ادب،ادیب کے شعوری و لاشعوری محرکات،ادب کی شعریات اور مصنوعیت،مصنوعی ذہانت اور تخلیقیت میں بنیادی امتیازات۔

ID-826050: The Impact of Artificial Intelligence Use on Teachers' Effectiveness: The Mediating Role of Teachers' Digital Competence

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The integration of Artificial Intelligence (AI) into higher education has transformed teaching practices by enhancing instructional planning, classroom delivery, assessment, and student engagement. This study examined the impact of Artificial Intelligence use on teachers' effectiveness, with teachers' digital competence serving as a mediating variable. Guided by the positivist research philosophy, the study employed a quantitative, cross-sectional research design. The population comprised 335 faculty members of Gomal University, Dera Ismail Khan, Pakistan. A sample of 182 teachers was determined using Slovin's formula. The researcher developed a structured questionnaire to measure Artificial Intelligence use, teachers' digital competence, and teachers' effectiveness. The instrument was validated using the Content Validity Ratio (CVR), while Cronbach's Alpha was employed to determine internal consistency. The reliability coefficients were .837 for the Artificial Intelligence Use Scale, .782 for the Teachers' Effectiveness Scale, and .811 for the Teachers' Digital Competence Scale, indicating satisfactory reliability. Data were analyzed using descriptive and inferential statistics. Pearson correlation was applied to examine the relationships among the variables, linear regression was used to assess the predictive effect of Artificial Intelligence use on teachers' effectiveness, and mediation analysis was conducted using the Baron and Kenny (1986) model to examine the mediating role of teachers' digital competence. The findings revealed that Artificial Intelligence use had a significant positive impact on teachers' effectiveness. Furthermore, teachers' digital competence significantly mediated the relationship between Artificial Intelligence use and teachers' effectiveness, suggesting that teachers with stronger digital competencies are better able to integrate AI technologies into their instructional practices, thereby enhancing their teaching effectiveness. The study recommends strengthening teachers' digital competencies through continuous professional development and institutional support to maximize the educational benefits of Artificial Intelligence in higher education.

Keywords: Artificial Intelligence Use, Teachers' Effectiveness, Teachers' Digital Competence, Higher Education

ID-826057: Religious Studies and AI: Role of AI in Restoration and Conservation of Buddhist Artefacts

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With advancement in artificial intelligence, the field of cultural heritage in terms of restoration and conservation has been transformed. Innovative tools for documentation, restoration, preservation, and analysis have been provided. Buddhism, an important religion with great artistic treasure, offers many artefacts including sculptures, manuscripts, murals, stupas, temples, and ritual objects, which have been challenged by environmental degradation, natural disasters, urbanization, and human conflicts. Simultaneously, AI offers technologies like machine learning, computer vision, and deep learning, which aid in restoration and conservation as well as in enhancing research in Buddhist studies. This paper examines the applications of AI in the conservation of Buddhist artefacts and analyzes its impact on Buddhist-related religious studies. It concludes that AI not only improves conservation but also expands scholarly understanding of Buddhist history, iconography, and textual traditions.

Keywords: Artificial Intelligence, Buddhist Artefacts, Buddhist Religious Studies, Conservation, Preservation

ID-826125: Paradox of Proximity: Impact of AI Usage on Student: Teacher Relationship in Higher Education

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This study employed a quantitative, cross-sectional, correlational-predictive design to examine the impact of artificial intelligence (AI) tool usage on the student-teacher relationship among undergraduate students (N = 360, M = 24.49) in universities of Islamabad, Pakistan. The objectives of the study were assessing AI usage prevalence and its associations with relational closeness, conflict, and dependency. Data were collected from a sample of 360 undergraduate students across public and private universities in Islamabad. Data analysis revealed substantial AI adoption, with a surprisingly strong, positive relationship between AI usage and perceived closeness ($r = .928$, $p < .001$), contradicting the initial hypothesis of a negative association. Hierarchical regression indicated significant predicted relational dependency from AI usage, accounting for 6% unique variance ($\Delta R^2 = .060$, $\beta = .559$, $p < .001$). Private university students reported significantly higher levels of closeness, conflict, and dependency compared to their public university counterparts ($t = -21.32$, $p < .001$). Furthermore, academic discipline significantly moderated the AI-closeness relationship ($\Delta R^2 = .012$, $\beta = -1.267$,

$p < .001$), indicating a difference in the nature of the relationship between the Sciences and Social Sciences/Humanities. The findings indicate that AI is not a socially isolating force or a cause of relational deterioration in educational settings; instead, it is integrated into relational dynamics, albeit in ways that vary by institutional type and academic discipline. Its usage is associated with increased dependency and greater perceived closeness. The findings suggest that students' engagement with AI is for deeper understanding and academic guidance, thereby changing the dimension of the teacher-student relationship. The implications of the findings are critical for policy development, andragogic practice, and curriculum design in higher education institutions, highlighting the importance of conscious integration of AI literacy into teaching and of managing the evolving expectations and dependencies introduced by AI into the student-teacher relationship.

Keywords: Artificial Intelligence, Student-Teacher Relationship, Higher Education, Relational Dependency, Academic Discipline, Public vs. Private Universities, Pakistan

ID-826126: Impact of Personality Traits on Counterproductive Work Behavior among the Administrative Staff of Public Sector Organizations

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Background: Personality relates to variations between individuals in distinctive patterns of thinking, feeling, and behavior. The Big Five personality trait model, with the acronym OCEAN, is used for measuring and describing personality traits, grouping variation into five factors: Openness to experience (intellectual curiosity and creativity), Conscientiousness (self-discipline, responsibility, striving for accomplishment), Extraversion (tendency to participate in group activities and appear dominant), Agreeableness (tendency to be sympathetic and cooperative), and Neuroticism (a psychological state stirred by surrounding events). Over recent years, counterproductive work behaviors (CWBs) have become more prevalent in organizations, leading to adverse outcomes and detrimental effects on institutions. CWBs are intentional activities that cause the organization or its members harm, resulting in dysfunctional behavior. The aim of this study is to identify specific dimensions of personality and their impact on counterproductive work behavior. Objective: To investigate the impact of the Big Five personality traits on counterproductive work behavior, and to determine gender differences in personality traits among administrative staff in public sector organizations. Methodology: This study is quantitative, cross-sectional, and correlational. Yamane's (1967) sampling formula will be used on a sample of 267 participants selected through simple random sampling. Data will be collected using the 44-item Big Five Inventory (John & Srivastava, 1999), the 32-item Counterproductive Work Behavior Checklist (Spector & Bauer, 2010), and a demographic questionnaire. Statistical

analysis, including correlation coefficient and regression analysis, will be performed to evaluate the relationships among personality traits and counterproductive work behavior. Findings: As this study is currently in progress, data collection and statistical analyses have not yet been completed. The findings are expected to provide empirical evidence regarding the role of the Big Five personality traits in counterproductive work behavior among administrative staff in Pakistan's public sector organizations. Conclusion: This study will assist public sector organizations in recruitment, selection, and the development of strategies to help in behavioral management to reduce counterproductive work behavior among administrative employees. The study is expected to contribute to the organizational psychology literature by addressing an important contextual gap in Pakistan.

Keywords: Big Five Personality Traits, Counterproductive Work Behavior, Administrative Staff, Public Sector Organizations

ID-826181: Developing a Framework for AI: Integrated Inter: disciplinary Education in a Virtual Learning Environment (AI: VLEF)

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The purpose of this research study was to develop a framework for an AI-Integrated Virtual Learning Environment (AI-VLEF) used in modern, tech-based interdisciplinary education systems. A Virtual Learning Environment Framework (VLEF) integrated with AI would provide an ideal platform for implementing interdisciplinary learning theories and for facilitating education within the constructivist paradigm. The proposed framework combines diverse theoretical notions and perspectives to explain how AI-integrated virtual environments would improve the teaching-learning process, alternative patterns of assessment, creativity and critical thinking, collaboration in a community of practice, and higher-order thinking for problem solving through the use of multiple disciplines. The objective of the study was to integrate the interrelated concepts to build a network for identifying the constructs and themes in an AI-integrated interdisciplinary education system at the higher level. The study is significant because it provides a theoretical background for interdisciplinary education and training in blended or online learning systems with the use of AI. The methodology used by the researcher was qualitative, constructive, and interpretive, based on the literature on the topic. The data were analyzed and interpreted for results and conclusions. On the basis of the results, findings, and conclusions, the researcher has made suggestions and recommendations for providing education and training in an AI-integrated interdisciplinary learning environment using the proposed framework, which was named the AI-Integrated Virtual Learning Environment Framework (AI-VLEF).

Keywords: Artificial Intelligence, Multi-disciplinary Education, Virtual Learning Environment Framework (VLEF), AI-integrated Inter-disciplinary Education System

ID-826189: Affectra: An AI: Driven Mobile Educational Technology for Quantifying Academic Anxiety to Operationalize Extraneous Cognitive Load

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Background: Study anxiety is accepted as a significant source contributing to extraneous cognitive load, which adversely affects students' academic performance. Its classification is fundamental to educational psychology. Existing approaches, which rely predominantly on self-report measures, can provide objective and evidence-based classification within authentic learning environments if augmented with Artificial Intelligence. Objective: To develop an AI-enabled educational technology mobile application, Affectra, that not only classifies academic anxiety but also operationalizes the latent construct of extraneous cognitive load through multimodal computational analytics. Methodology: Data were collected from university students aged 18–25 years. They first completed validated educational and social assessments to establish their academic-social profile. They were then engaged in different cognitive simulations, during which key physiological signals (heart, skin, and respiration) were measured using wearable biosensors. These physiological measures, manifesting their cognitive burden, were integrated to construct multimodal educational feature vectors representing the psychophysiological manifestations of academic anxiety and the associated extraneous cognitive load. A state-of-the-art supervised machine learning model was subsequently trained on these multimodal data to generate probabilistic estimates of anxiety severity. Results: Affectra shows a mean classification accuracy of 91% and precision of 92%, demonstrating high predictive multilevel classification for academic anxiety severity into low, medium, and high categories. It generated 95% Highest Density Intervals (HDIs) for every prediction, providing an interpretable estimate of measurement uncertainty by identifying the most credible range of plausible anxiety values, thus enhancing the precision and reliability of classification. Conclusion: Affectra demonstrates that, by operationalizing the latent construct of extraneous cognitive load through multimodal educational evidence, the proposed approach extends the measurement capabilities of Cognitive Load Theory while complementing subjective self-report instruments. The findings highlight the potential of explainable AI to support evidence-based educational practice, personalized learning, and learner well-being.

Keywords: Educational Psychology; Anxiety; Artificial Intelligence

ID-826206: Institutional Internal Quality Assurance Assessment Practices and Student Satisfaction

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Universities are under increasing pressure to maintain academic quality while responding to the expectations of students and other stakeholders. Although quality assurance has become an established component of Pakistan's higher education system, limited empirical research has examined how institutional quality assessment practices influence students' perceptions of their educational experience. This study investigates whether quality assurance activities carried out under the Self-Assessment Report (SAR) framework are associated with student satisfaction across higher education institutions. Data were collected through an online survey completed by university administrators together with student representatives selected using a proportionate stratified sampling technique. After checking the returned questionnaires for completeness, 112 responses satisfied the study requirements and were included in the final analysis. Statistical computations were performed with SPSS Version 20, and regression modelling was used to examine the association between the variables. The results suggest that institutional quality initiatives and student satisfaction were both viewed as moderate by the participants. Universities that demonstrated stronger implementation of quality assurance processes also tended to receive more favorable evaluations from students. These findings indicate that sustained institutional commitment to quality management can strengthen organizational effectiveness while improving the learning experience. The evidence generated by this investigation may assist higher education institutions in refining quality assurance policies and supporting informed planning for continuous institutional improvement.

Keywords: Internal Quality Assurance, Higher Education, Student Satisfaction, Quality Enhancement Cells, Self-Assessment Report, Pakistan.

ID-826253: Artificial Intelligence as a Catalyst: Enhancing Education, Culture, and Human Development in the Digital Age

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Education is fundamental to the social continuity and human development of societies. Artificial Intelligence (AI) is one of the great players in a fast-changing world, transforming technology and changing the delivery of knowledge, its transmission, cultural values, and the intellectual and social growth of individuals. This qualitative study aims to understand the multifaceted and complex effects of AI on teaching and learning, and how AI

can be used to protect and preserve cultural heritage and to foster inclusive human development. The study adopts an interpretivist qualitative method with in-depth interviews and thematic analysis of educators' and learners' attitudes toward the potential of using AI-supported pedagogy to improve critical thinking, personalization, and cross-cultural understanding. Results show that, if used wisely, AI can improve access to quality education, differentiated instruction, and opportunities for cultural exchange and dialogue in more diverse learning settings. The study also brings to light conflicts between the efficiency of technology and human-rooted values, and development that cannot be limited to the optimization of algorithms. Education is highlighted throughout this study as a key mediator between technology, culture, and sustainable human development; it is important to remember that the potential of AI is not about replacing intelligent decision-making, but about supporting it while respecting and preserving humanity and culture. The study concludes with recommendations for educators, policymakers, and institutions who wish to apply AI tools sustainably, responsibly, and effectively to education, culture, and sustainable human development.

Keywords: Artificial Intelligence, Education, Culture, Human Development, Qualitative Research, Pedagogical Innovation

ID-826254: Pakistan's Educational Trichotomy: Challenges and the Way Forward

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The education system of Pakistan has evolved greatly from what it was at the time of independence; however, the system has not been able to deliver the intended objectives expected from a robust educational setup. The education system of any country is aimed at the attainment of certain social and economic goals pinned upon higher literacy rates. An effective educational setup produces an educated population, leading to intellectually capable human capital with greater social awareness in addition to their domain or field knowledge. Development and wellbeing in the modern world revolve around technological advancement, which is also the consequence and corollary of a progressive educational system. A well-established and potent system of education warrants social and economic inclusion, financial prosperity, and a skilled workforce, eventually leading to the overall welfare of the masses. The system of education inherited at the time of the country's existence was modeled around different tiers and educational subsystems, including religious seminaries (madrasahs), governmental educational institutions, and private educational institutes. The paper discusses the current situation of education in the country by shedding light upon the problems, challenges, and prospects in the context of education's existing triple-tier

structure encompassing the national, religious, and transnational educational streams. The paper also presents recommendations to achieve potential success based upon a powerful educational setup to ultimately guarantee a prosperous nation.

Keywords: Education System, Pakistan, Higher Education, Transnational Education, Religious Education, Education Problems, Recommendations

ID-826280: Exploring Nurse Educators' Views on Artificial Intelligence Technology: A Qualitative Approach

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Aim: This study explored nurse educators' perceptions of artificial intelligence technologies in nursing education, identifying challenges, benefits, and areas for improvement. Background: Rapid advances in artificial intelligence are reshaping healthcare and nursing education. Understanding nurse educators' perspectives on artificial intelligence integration is essential to adapt curricula and train future nurses effectively. Methods: A qualitative phenomenological approach was used to examine the experiences of 12 nurse educators from multiple institutions. Data were collected through semi-structured interviews and analyzed using thematic analysis. Transcripts were coded, and emerging themes were refined to ensure accurate representation of participants' perspectives. Results: Analysis of the interviews revealed nine themes: (1) awareness of artificial intelligence technology, (2) use of artificial intelligence technology in nursing education, (3) challenges and barriers to the use of artificial intelligence technology, (4) student adaptation and preparation, (5) student motivation, (6) collaboration and multidisciplinary learning, (7) the role of the educator, (8) ethical concerns, and (9) future studies and suggestions. While educators expressed positive attitudes toward artificial intelligence, their limited knowledge remained a key barrier. They emphasized the need for institutional support, training, and ethical guidance. Concerns about infrastructure and interdisciplinary collaboration were also noted. Without targeted investment, effective integration of artificial intelligence into nursing education remains limited. Conclusion and Implications: This study provides valuable insights into nurse educators' views on artificial intelligence in nursing education. While recognizing its potential to enhance learning, educators highlighted the need for structured training programs, institutional support, and ethical considerations. The findings emphasize the importance of integrating artificial intelligence responsibly into nursing curricula to prepare future nurses for technology-driven healthcare environments.

Keywords: Artificial Intelligence, Nurse Educators, Nursing Care, Nursing Education, Perceptions

ID-826310: The Role of Artificial Intelligence in the Understanding of Literature and Its Effects on Literature

ادب کی تفہیم میں مصنوعی ذہانت کا کردار اور ادب پر اثرات

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دورِ حاضر میں مصنوعی ذہانت کا عمل دخل محض معاشی، کاروباری یا صنعتی شعبوں تک محدود نہیں رہا، بلکہ یہ ہمارے سماجی ڈھانچے، فکری نظام، روزمرہ زندگی اور زبان و ادب کی نئی تفہیم و تشریح تک پھیل چکا ہے۔ یہ ایک عہد ساز قوت کے طور پر ابھری ہے جو ہمہ گیر سطح پر نئے تہذیب و تمدن اور نئے تہذیبی ڈھانچے کی داعی ہے۔ انسانیت کو اس سے خطرات بھی ہیں اور فائدے بھی۔ عالمی امن، بنیادی انسانی حقوق کا تحفظ اور تہذیبی خوش حالی تب تک ممکن نہیں جب تک انسان کا اخلاقی شعور اور فکری بصیرت بیدار نہ ہو۔ تاریخ شاہد ہے کہ شعور و آگاہی اور اخلاقی احوال کی اصلاح میں ادب نے گراں قدر کردار ادا کیا ہے۔ زیرِ نظر مضمون میں یہ واضح کیا گیا ہے کہ مصنوعی ذہانت کس طرح ادب، تخلیق اور تحقیق کی نئی راہیں کھول کر سماجی، انسانی اور اخلاقی اقدار کو فروغ دے رہی ہے۔ اس مطالعے میں امر قابلِ توجہ ہے کہ زبان کے نئے الگورتم، ایل ایل ایم ایس، اور الگورتمی تحلیل نے کلاسیکی ادب، پرانے مخطوطات کی قرات، عالمی سطح پر خود کار ترجمہ کاری اور متن کے باریک بین تجزیے کو نیا تحرک اور انقلابی جہت دی ہے۔ مصنوعی ذہانت کی بدولت عالمگیر سطح پر مختلف زبانوں میں تخلیق ہونے والا ادب اب عام قاری کی رسائی میں ہے۔ یوں ثقافتی و جغرافیائی حد بندیوں کو توڑ کر ادیب اور دانشور آپس میں مکالمے کی راہ ہموار کر رہے ہیں۔ مختلف تہذیبوں کا ادب جب سرحد پار پہنچتا ہے تو قوموں اور انسانوں میں بیگانگی کی فضا دور ہوتی اور ہم آہنگی پیدا ہوتی ہے۔ یوں ثقافتی و لسانی تعصبات کو دور کرکے عالمی امن کو فروغ دیا جا سکتا ہے۔ اے آئی کے فروغ سے پیدا ہونے والے گہرے فکری، فلسفیانہ اور اخلاقی سوالات کا بھی زیرِ نظر مضمون میں محاکمہ کیا گیا ہے۔ خاص طور پر اس بات کا جائزہ لیا گیا ہے کہ کیا مصنوعی ذہانت کا فراہم کردہ مشینی ڈیٹا انسانی تخلیق کے جمالیاتی لمس کا نعم البدل ہو سکتا ہے۔ تکنیکی تجزیہ کاری اور انسانی ذہن کی تجزیہ کاری میں کیا ایک جیسے جمالیاتی عناصر کار فرما ہوتے ہیں؟ اے آئی اور انسانی ذہن کے درمیان فرق کو تلاش کرنا ضروری ہے تاکہ انسان کے اصل خلاقی جوہر کی انفرادیت کو محفوظ کیا جا سکے۔ اس نکتے کو بھی بیان کیا گیا ہے کہ اے آئی کو انسانی ذہن و ادب کے لیے ایک معاون کار کی حیثیت سے استعمال کیا جانا چاہیے نہ کہ اسے تمام تر خلاقیت کا منبع سمجھ لیا جائے۔

کلیدی الفاظ: مصنوعی ذہانت، ادبی تحقیق و ترجمہ، انقلابی الگورتم، انسانی تخلیق و جمالیات، اخلاقی و فکری اثرات

ID-826313: ثانوی سطح پر جماعتی تدریس میں مصنوعی ذہانت کا کردار

ظفر اقبال
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ثانوی سطح کی تعلیم میں جماعتی تدریس Cooperative Learning ایک مؤثر حکمت عملی ہے۔ چوتھے صنعتی انقلاب اور مصنوعی ذہانت AI کی آمد کے بعد اس تدریسی طریقے میں بنیادی تبدیلیاں آئی ہیں۔ یہ تحقیق ثانوی سطح پر جماعتی تدریس میں AI کے کردار، فوائد، چیلنجز اور عملی اطلاق کا جائزہ لیتی ہے۔ تحقیق سے ظاہر ہوتا ہے کہ AI ٹولز جیسے ChatGPT, Adaptive Learning Platforms, AI-based Group Formers طلبہ کی گروپ تشکیل، نگرانی، فوری فیڈبیک اور انفرادی ضروریات کے مطابق کام تقسیم کرنے میں مدد دیتے ہیں۔

ID-826348: The Effect of Digital Human Resource Management in Enhancing Employee Digital Performance: Investigating the Role of Employee Digital Engagement and Task Technology Fit

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The proposed research focuses on exploring how digital human resource management (DHRM) impacts employee digital performance in higher education institutions (HEIs) through digitized HR practices and procedures, with the relationship mediated by employee digital engagement and task technology fit. Drawing on the Resource-Based View (RBV) and Job Demands-Resources (JD-R) theory, the study adopted a quantitative research design to test the hypothesized relationships among DHRM, employee digital engagement, task technology fit, and employee digital performance, based on the analysis of data through Structural Equation Modeling (SEM). Findings show that the relationship between digital human resource management and employee digital performance is significantly mediated by employee digital engagement. This relationship is further explained by effective alignment between tasks and technological capabilities. This paper integrates RBV and JD-R theory to demonstrate the role of digital employee engagement and task technology fit in linking digital human resource management with employee digital performance in higher education institutions. The study provides valuable insights into how digitized human resource systems and technology-enabled work environments can enhance faculty performance through digital transformation.

Keywords: Digital Human Resource Management (DHRM), Employee Digital Engagement, Task Technology Fit, Employee Digital Performance

ID-826377: Morphological Properties of Laser: Irradiated Biomaterials

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On heating di-calcium phosphate dihydrate ($CaHPO_4 \cdot 2H_2O$) to 750°C, β-$Ca_2P_2O_7$ is obtained. The materials were then pressed at 4 tons for 5 minutes to prepare pellets. The pellets were dried at 120°C in a vacuum chamber for 4 hours. The material was sintered in a muffle furnace at 450°C for 24 hours, which resulted in a grey-colored γ-$Ca_2P_2O_7$ phase. The pellets were prepared from di-calcium phosphate dihydrate (triclinic $2CaHPO_4 \cdot 2H_2O$) powder and used to obtain three different phases gamma, beta, and alpha which were obtained at 450°C, 750 °C, and 1050 °C respectively.The pellets, with a mean thickness of 0.12 cm, were characterized by monochromated X-ray diffraction and high-resolution optical microscopy. Before sintering, micro-cracks were frequently seen on the pelleted surfaces, but these cracks disappeared after sintering at 750°C. The grey-colored gamma phase was found to be harder

than the white-colored beta phase. SEM images were also recorded for the 450 °C and 750 °C pellets sintered for different periods, along with laser irradiation using an Nd:YAG laser with specific specifications.

Keywords: Sintering, Morphological Properties, Grey Phase, Calcium Phosphate, $CaHPO_4$

ID-826389: Literature, Humanity and Artificial Intelligence: An Intellectual Dialogue

ادب، انسان اور مصنوعی ذہانت: ایک فکری مکالمہ

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مصنوعی ذہانت نے موجودہ دور میں انسانی زندگی کے مختلف شعبوں کے ساتھ ساتھ ادب کے میدان کو بھی متاثر کیا ہے۔ آج اے آئی نہ صرف ادبی متون کو سمجھنے، ان کا تجزیہ کرنے اور تحقیق میں معاونت فراہم کرنے کی صلاحیت رکھتی ہے بلکہ تخلیقی تحریر میں بھی استعمال ہو رہی ہے۔ اس صورتِ حال نے ادب، انسانی تخلیق اور مصنوعی ذہانت کے باہمی تعلق پر غور کرنے کی ضرورت پیدا کر دی ہے۔ زیرِ نظر مقالے میں اس بات کا جائزہ لیا جائے گا کہ مصنوعی ذہانت ادب کی تفہیم اور تخلیق میں کس حد تک معاون ثابت ہو سکتی ہے اور اس کے استعمال سے انسانی تخلیق کی انفرادیت، ادبی احساس اور تخلیقی اختیار کے حوالے سے کون سے نئے سوالات پیدا ہوتے ہیں۔ مقالہ اس نکتے کو بھی واضح کرے گا کہ مصنوعی ذہانت انسانی تخلیقی صلاحیت کا مکمل متبادل نہیں، بلکہ ایک معاون ذریعہ ہے۔ اس لیے ضروری ہے کہ مصنوعی ذہانت سے فائدہ اٹھاتے ہوئے انسانی احساس، تجربے، تخیل اور فکری آزادی کو بنیادی حیثیت حاصل رہے۔ یوں ادب، انسان اور مصنوعی ذہانت کے درمیان تعلق کو مقابلے کے بجائے ایک ایسے فکری مکالمے کے طور پر دیکھا جا سکتا ہے جو ادبی مطالعے اور تحقیق کے لیے نئے امکانات پیدا کرتا ہے۔

کلیدی الفاظ: مصنوعی ذہانت، ادب، انسانی تخلیق، تخلیقی اختیار، فکری مکالمہ

ID-826251: The Role of Artificial Intelligence in Literary Interpretation / Effects of Artificial Intelligence on Literature

ادب کی تفہیم میں مصنوعی ذہانت کا کردار / مصنوعی ذہانت کے ادب پر اثرات

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مذکورہ موضوع کے تناظر میں اول، مصنوعی ذہانت کے تنقیدی مباحث پر روشنی ڈالی جائے گی، نیز انہی مباحث کا احاطہ کیا جائے گا جو اُردو ادب کی تفہیم کے ضمن میں تاحال سامنے آئے اور جو تخلیقی ادب کی تفہیم کے سلسلے میں اہمیت کے حامل ہیں۔ ان میں مصنوعی ذہانت سے متعلق اُردو ادب میں اہم کتب، مقالات، سیمینار اور مذاکرات کا تنقیدی محاکمہ پیشِ نظر رہے گا، جو موضوع کے متنوع پہلوؤں کا احاطہ کرتا ہے۔ دوم: راقم مقالے میں تنقیدی انداز میں اپنی رائے بھی قلم بند کرے گا کہ مصنوعی ذہانت تنقیدی اور تخلیقی ادب کی تفہیم میں کس انداز میں مؤثر ثابت ہوتی ہے، یا مصنوعی ذہانت کس خاص انداز میں تخلیق کاروں اور ادب میں معاون ثابت ہو سکتی ہے؟ اس مقالے میں تنقیدی انداز میں خصوصاً یہی نکتۂ نظر پیش کیا جائے گا کہ مصنوعی ذہانت نے تخلیقی ادب کے معیار پر کس انداز میں اثرات مرتب کیے، یا یہ معلومات کو مرتب کرنے سے آگے تک سفر طے کر کے ادب اور تخلیق کی دنیا میں اہم مقام حاصل کر رہی ہے۔

کلیدی الفاظ: مصنوعی ذہانت، ادبی تفہیم، تخلیقی ادب، تنقید، ادبی معیار

ID-826383: ثقافتی ورثے کے تحفظ میں مصنوعی ذہانت کا کردا

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مصنوعی ذہانت اکیسویں صدی کی ایک حیرت انگیز ایجاد ہے۔ اسے عام طور پر AI کہا جاتا ہے۔ اس نے انسانی کے کئی ایک پہلوؤں کو متاثر کیا ہے۔ صحت،زراعت،صنعت،تعلیم،تحقیق، معاش،معاشرت عرض زندگی کے ہر شعبے میں اس کے اثرات نمایاں طور پر نظر آتے ہیں ۔زندگی کے دیگر شعبوں کی طرح مصنوعی ذہانت ہمارے ثقافتی ورثے کے تحفظ میں بھی اہم کردار ادا کرتی ہے۔پرانے امارات تصاویر مخطوطات اڈیوز اور ویڈیوز ریکارڈنگ وغیرہ کو اس کی مدد سے صاف کیا جاتا ہے جو ایک نئی اور جدید صورت میں ہمارے سامنے ا جاتی ہے ۔پرانے اور قدیم متون جسے پڑھنے میں دشواری کا سامنا کرنا پڑ رہا ہو کو اس کی مدد سے سکین کر کے پڑھنے کے قابل بنایا جاتا ہے۔اس طرح زبان ہماری ثقافت کا ایک اہم حصہ ہے دنیا میں زمانے قدیم سے ہزاروں زبانیں بولی جاتی ہیں ان میں کچھ زندہ ہے اور کچھ رفتہ رفتہ معدوم ہوتی جا رہی ہے مصنوعی ذہانت کے ذریعے ان معدوم زبانوں کے تخلیقی ذخیرے کو محفوظ کیا جاتا ہے اس طرح وہ زبان معدوم ہونے سے بچ جاتی ہے۔لوگ ادب یا لوگ کہانیاں بھی ہماری ثقافت کا ایک اہم جز ہے. جو کہانیاں ہم بزرگوں سے سینہ بسینہ سنتے چلے ا رہے ہیں ان کہانیوں کو مصنوعی ذہانت کے ذریعے محفوظ کیا جاتا ہے اور اس کو متن میں منتقل کر کے پڑھنے کے قابل بنایا جاتا ہے۔تاریخی عمارات بھی ہمارے ثقافتی ورثے کا اہم حصہ ہے۔ اگر ان امارات کو قدرتی افات کی وجہ سے نقصان پہنچا ہو تو مصنوعی ذہانت کی مدد سے اس کی تصاویر بنا کر دوبارہ ڈیزائن کیا جاتا ہے اور اس کو اپنی اصلی حالت میں لایا جاتا ہے۔ اسی طرح زندگی کے اور بھی بہت سارے شعبوں کو مصنوعی ذہانت متاثر کرتی ہے جو ہمارے ثقافتی ورثے سے تعلق رکھتی ہے غرض زندگی کے باقی شعبوں کی طرح مصنوعی ذہانت ہمارے ثقافتی ورثے کے تحفظ میں بھی اہم کردار ادا کرتی ہے مصنوعی ذہانت چونکہ انسان کی جگہ نہیں لے سکتی کیونکہ یہ انسان ہی کی بنائی ہوئی ہے ثقافتی ورثے کا تحفظ بالاخر انسانوں نے ہی کرنا ہے۔لیکن اگر غور کیا جائے تو مصنوعی ذہانت جدید دور کی ایک اہم ایجاد ہے اور جدید دور میں ثقافتی ورثے کے تحفظ میں یہ انسانوں کی بھرپور مدد کرتی ہے اور ثقافت ورثے کے تحفظ میں اپنا بھرپور کردار ادا کرتا ہے۔

ID-826246: Artificial Intelligence for Religious Harmony and Peacebuilding: Opportunities, Challenges, Risks, and Ethical Governance in a Digitally Connected World

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Artificial Intelligence (AI) is transforming societies by reshaping communication, education, governance, and intercultural interactions. In the context of increasing religious diversity and global interrelation, AI presents significant opportunities to promote interfaith dialogue, mutual understanding, and sustainable peace. AI-powered translation systems, educational platforms, sentiment analysis, and conflict-prediction tools can facilitate communication across religious communities and counter hate

speech. However, these benefits are accompanied by substantial challenges, including algorithmic bias, misinformation, digital manipulation, surveillance, ethical concerns, and the amplification of religious polarization. Religious harmony and peace building are essential for social cohesion and sustainable development. Peacebuilding through interfaith understanding is vital to prevent conflict and build resilient, inclusive societies. In light of this, the role of emerging technologies such as Artificial Intelligence becomes significant. This paper critically examines the role of AI in fostering religious harmony and peacebuilding while highlighting its associated risks and ethical implications. It argues that the effectiveness of AI relies not only on technological innovation but also on ethical governance, inclusive data practices, transparency, and accountability to ensure responsible use in a digitally connected society. The paper concludes by proposing a human-centered ethical framework for responsible AI that supports social cohesion, protects religious freedom, and contributes to lasting peace.

Keywords: Artificial Intelligence, Religious Harmony, Peacebuilding, Ethics, Algorithmic Bias, Interfaith Dialogue, Human Development, Digital Governance

ID-826224: The Role of Artificial Intelligence in Literary Interpretation and Its Effects on Literature

ادب کی تفہیم میں مصنوعی ذہانت کا کردار اور ادب پر اثرات

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مصنوعی ذہانت اکیسویں صدی کی ایک اہم سائنسی پیش رفت ہے، جس نے حیاتِ انسانی کے مختلف شعبوں کے پیش پیش ادب کو بھی متاثر کیا ہے۔ ادبی متون کی تفہیم، تجزیہ اور تشریح میں مصنوعی ذہانت نے نئے امکانات کو جنم دیا ہے۔ یہ وسیع ادبی سرمایہ قلیل وقت اور منظم انداز سے پیش کرتی ہوئی متون کے درمیان ربط قائم کرتی ہے۔ مختلف ادبی رجحانات کی نشاندہی کے ساتھ محقق کو ایسے نکات تک رسائی فراہم کرتی ہے، جن تک روایتی طریقۂ تحقیق سے پہنچنے میں طویل مدت درکار ہوتی ہے۔ اس طرح مصنوعی ذہانت ادبی تحقیق، تدریس اور تنقید میں ایک مؤثر معاون کے طور پر سامنے آئی ہے۔ ادب کی تفہیم صرف الفاظ کے ظاہری مفہوم تک محدود نہیں بلکہ اس میں متن کے تہذیبی، تاریخی، نفسیاتی اور سماجی پس منظر، علامات، استعارات، اسلوب اور تخلیقی جمالیات کو سمجھنا بھی شامل ہے۔ مصنوعی ذہانت ان تمام پہلوؤں کا تجزیہ کرکے قاری کو متن کے مختلف زاویوں سے آگاہ کرتی ہے۔ یہ ادبی رجحانات کا تقابلی مطالعہ، اسلوبی خصوصیات کی شناخت اور مختلف نظریات کی روشنی میں متن کی تعبیر پیش کرنے میں معاون ثابت ہوتی ہے۔ اسی وجہ سے اساتذہ، طلبا اور محققین کے لیے تحقیق کا عمل نسبتاً آسان اور منظم ہو گیا ہے۔ ادب بنیادی طور پر انسانی احساس، تجربے، وجدان اور تخلیقی شعور کا مظہر ہے۔ اگرچہ مصنوعی ذہانت زبان کے نمونوں کی بنیاد پر معیاری متن تخلیق کر سکتی ہے، لیکن وہ انسانی جذبات، داخلی کیفیات، روحانی واردات اور تخلیقی کرب کو مکمل طور پر محسوس نہیں کر سکتی۔ اسی لیے مصنوعی ذہانت سے تخلیق ہونے والا ادب اکثر اس جذباتی صداقت، انفرادیت اور جمالیاتی گہرائی سے محروم رہتا ہے، جو ایک حقیقی ادیب کی تخلیق کا امتیاز ہوتی ہے۔ مصنوعی ذہانت کے بڑھتے ہوئے استعمال سے بعض خدشات بھی وابستہ ہیں۔ اگر ادیب، طالب علم اور محقق اپنی فکری محنت اور تنقیدی بصیرت کے بجائے مکمل طور پر مصنوعی ذہانت پر انحصار کرنے لگیں تو تخلیقی صلاحیت،

آزادانہ فکر اور تحقیقی معیار متاثر ہو سکتا ہے۔ اس کے علاوہ مصنوعی ذہانت کی فراہم کردہ معلومات ہمیشہ قطعی یا مستند نہیں ہوتی، اس لیے ان کی جانچ اور تنقیدی جائزہ لینا ضروری ہے۔ حقیقت یہ ہے کہ مصنوعی ذہانت ادب کی خدمت کے لیے ایک مؤثر اور مفید ذریعہ ہے، نہ کہ انسانی ذہن کا متبادل۔ ادب کی اصل روح انسانی احساس، تخیل، تجربے اور جمالیاتی شعور میں مضمر ہے، جب کہ مصنوعی ذہانت اس روح کو سمجھنے اور اس کی تفہیم کو وسعت دینے کا ایک معاون وسیلہ ہے۔ لہٰذا ادب کے فروغ کے لیے ضروری ہے کہ مصنوعی ذہانت سے فائدہ اٹھاتے ہوئے انسانی تخلیقی صلاحیت، تنقیدی شعور اور تحقیقی دیانت کو ہمیشہ بنیادی حیثیت دی جائے۔ یہی متوازن رویہ ادب کی بقا، ارتقا اور معنوی وسعت کا ضامن بن سکتا ہے۔

کلیدی الفاظ: مصنوعی ذہانت، ادبی تفہیم، ادبی تحقیق، تنقید، تخلیقی شعور

ID-826345: Artificial Intelligence in Higher Education: A Qualitative Exploration of Merits, Demerits, and Future Perspectives

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The adoption of artificial intelligence (AI) has brought revolutionary change in higher education. It has brought changes to instructional design, assessment and evaluation techniques, and the relationships between teachers and educational scholars. The objective of the study was to explore the perceptions and attitudes of educational scholars and university teachers regarding the use of artificial intelligence in higher education, identify the merits and demerits of AI usage, examine the perception of educational scholars and university teachers on AI integration, develop a comprehensive SWOT analysis of AI integration in Khyber Pakhtunkhwa universities of Pakistan, and suggest actionable recommendations for policymakers, administrators, and faculty members regarding the strategic and ethical integration of AI in higher education. The population and sample of the study were based on the responses of educational scholars and teachers from seven different universities of Khyber Pakhtunkhwa, Pakistan. Through purposive and snowball sampling techniques, the data was collected from the target population of seven universities: Sarhad University of Science and Information Technology, Qurtuba University of Science and Information Technology, Institute of Management Sciences (IM Sciences) Peshawar, University of Peshawar, University of Engineering and Technology (UET) Peshawar, Shaheed Benazir Bhutto University, and The University of Agriculture Peshawar. The methodology of the study was a qualitative research design based on a phenomenological approach. Semi-structured interviews were conducted with a focused group of 84 participants, comprising 42 educational scholars and 42 university teachers from both public and private sector universities. Thematic analysis was employed as the primary analytical approach, following the six-phase framework developed by Braun and Clarke. Six major themes were identified: personalized learning and academic efficiency; ethical concerns and academic integrity; infrastructure and access to AI; pedagogical transformation and faculty adaptation; critical thinking and cognitive development concerns; and

institutional policy and governance gaps. It was inferred that educational scholars perceived AI as an efficient learning tool that provided ready-made information without struggle, whereas teachers used AI as an instructional, assessment, and evaluation tool for their academic development. Both scholars and teachers depended on AI tools mainly to handle current and upcoming problems, which raised concerns about weakening their critical thinking, creativity, and self-productivity. They developed AI skills through informal, self-directed learning without training provided by the universities, and often believed in AI-provided information without proper verification. It is recommended that policymakers, university administrators, and faculty members organize comprehensive AI literacy programmes, ethical governance guidelines, infrastructure investment, and curriculum design, and use SWOT analysis to synthesize strategic implications and future research directions for AI integration in public and private sector universities.

Keywords: Artificial Intelligence, Higher Education, Khyber Pakhtunkhwa Universities, Educational Scholars' Perceptions, Teachers' Perspectives, Thematic Analysis, SWOT Analysis, Future of Education

ID-826245: Poems Created by Artificial Intelligence and Us

مصنوعی ذہانت کی تشکیل کردہ نظمیں اور ہم

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زبانوں کی ادبیات کا ارتقاء شاعری کا مرہونِ منت ہے۔ اردو شعر گوئی کی روایت میں شاعر کہیں تلمیذ الرحمان، حکیم اور کہیں مستقبل کے امکانات کا پیش بین یعنی دانشور قرار دیا گیا۔ شاعر یا تو ہوتا ہے یا نہیں ہوتا۔ حتیٰ کہ علمِ عروض کی درستی بھی غیر شاعر کو شاعر نہیں بنا سکتی۔ مذکورہ معروضات اردو شعری روایات میں مختلف زمانوں میں منفرد انداز میں پیش کی گئی ہیں، ان سے ہماری سماعتیں اور ذہن روشن ہیں، لیکن اکیسویں صدی کی تیسری دہائی کا آغاز مصنوعی ذہانت کے معرکۃ الآراء نمونوں اور اس کے ذریعے کیے جانے والے تجربات سے ہو رہا ہے۔ بقول شاعر ؎ "محوِ حیرت ہوں کہ دنیا کیا سے کیا ہو جائے گی"۔ دنیا بھر میں مصنوعی ذہانت سائنس اور ٹیکنالوجی کے میدان میں نت نئے حوالوں سے نمایاں کردار ادا کر رہی ہے۔ اس کا کردار اب سماجی علوم اور تدریس پر بھی اثر انداز ہوتا دکھائی دیتا ہے۔ زبان و ادب کا شعبہ بھی مصنوعی ذہانت کے تجربی دور سے گزر رہا ہے۔ افسانوی نثر کے ساتھ ساتھ شاعری میں بھی تجربے کیے جا رہے ہیں۔ شعری واردات جو قلبی اور تجربی احساسات کی مرہونِ منت تھیں، اب مصنوعی ذہانت کی ترقی سے شاعر اپنی قلبی واردات کو پرومپٹ کی صورت ایک کلک پر کسی بھی شعری ہیئت میں حاصل کر سکتا ہے۔ اردو ادب میں اس کا اولین تجربہ ڈاکٹر افتخار شفیع نے "فہمیدہ صنائی" کے عنوان سے مصنوعی ذہانت کی نظموں کے تحت کیا۔ ادبی حلقوں میں ان نظموں کا ظہور ایک تلاطم اور نئے سوالات و مباحث کا نکتۂ آغاز بنا۔ ان نظموں کے اثرات ہماری معاشرتی زندگی اور ذہنی و فکری سطح پر کس حد تک مرتب ہو رہے ہیں؟ کیا مستقبل میں ایسے مزید تجربات کی گنجائش رہے گی؟ کیا شعر گوئی کا اختصاص اب انسانی ذہنوں سے روبوٹ کو منتقل ہو گا؟ ان سوالات کے جوابات کے ساتھ اس مقالے کی تسوید کی جائے گی، جب کہ اردو زبان میں مصنوعی ذہانت کی کارکردگی ادبی سطح پر پرکھنے کا احوال تحقیقی سطح پر دیکھا جائے گا۔

کلیدی الفاظ: مصنوعی ذہانت، اردو شاعری، تخلیقِ نظم، شعری واردات، ادبی تجربہ

ID-826384: Cultural Heritage Preservation and Artificial Intelligence

ثقافتی ورثے کی بقا اور مصنوعی ذہانت

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انسانی تہذیب کی تاریخی یادداشت کو محفوظ بنانے اور آئندہ نسلوں تک منتقل کرنے میں مصنوعی ذہانت ایک انقلابی قوت کے طور پر ابھری ہے۔ وقت گزرنے کے ساتھ قدرتی آفات، ماحولیاتی اثرات اور انسانی غفلت کے باعث تاریخی عمارات، نایاب مخطوطات اور نادر الوجود زبانوں کو شدید خطرات لاحق ہیں۔ ایسے میں ڈیجیٹل آرکائیونگ اور کمپیوٹیشنل لسانیات جیسے جدید الگورتمز قدیم ترین اور بوسیدہ دستاویزات کی خودکار پڑھت، زبانوں کی قواعدی ساخت کے تحفظ، اور تاریخی مقامات کی ورچوئل ری کنسٹرکشن میں کلیدی معاون ثابت ہو رہے ہیں۔ یہ ٹیکنالوجی نہ صرف مادی اثاثوں بلکہ لوک داستانوں، صوتی آرکائیوز اور غیر مادی ثقافتی روایات کی بقا میں بھی نمایاں کردار ادا کر رہی ہے۔ الگورتمز کی مدد سے قدیم زبانوں اور تلفظ کو جمع کر کے ان کے صوتی و تحریری خزانے مرتب کیے جا رہے ہیں، جبکہ سیٹلائٹ امیجری اور کمپیوٹر وژن کے ذریعے زمین کے نیچے پوشیدہ آثارِ قدیمہ کی نشاندہی بھی ممکن بنائی جا رہی ہے۔ اس طرح جدید ٹیکنالوجی ماضی اور مستقبل کے درمیان ایک مضبوط پل کا کام دے رہی ہے۔ تاہم، اس پیش رفت کے ساتھ تاریخی اصلیت کی تحریف، الگورتم کی حد بندیوں اور تکنیکی وسائل کی عدم مساوات جیسے اخلاقی و عملی مسائل بھی جڑے ہوئے ہیں۔ اس لیے ضروری ہے کہ مصنوعی ذہانت کا استعمال علمی دیانت، اخلاقی ضوابط اور انسانی تدبر کے ساتھ کیا جائے۔ اگر اس ٹیکنالوجی کو درست سمت میں ڈھالا جائے تو یہ ثقافتی و تہذیبی شناخت کو عالمگیر سطح پر پائیدار اور محفوظ بنانے کا بہترین ذریعہ ہے۔

کلیدی الفاظ: انسانی تہذیب، تاریخ، مصنوعی ذہانت

Sub-theme: To Enhance Smart Agriculture, Environmental Sustainability & Food Security

ID-826035: AI: Assisted Molecular Docking Framework for Enhancing Wheat Disease Resistance and Sustainable Crop Protection

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Wheat represents one of the world's most critical staple crops, yet its productivity faces considerable threats from fungal pathogens including rust and blight diseases. Conventional breeding strategies and chemical control methods present significant limitations regarding time requirements, financial investment, and environmental sustainability. This research introduces an artificial intelligence-assisted molecular docking framework designed to expedite the identification of bioactive compounds capable of enhancing wheat disease resistance while promoting sustainable crop protection. The proposed methodology integrates machine learning-based virtual screening with molecular docking simulations to systematically evaluate interactions between candidate compounds and target proteins associated with major wheat pathogens. Artificial intelligence models are employed to predict

binding affinity, molecular stability, toxicity profiles, and biological activity, substantially reducing the number of compounds requiring expensive computational docking and laboratory validation. Molecular docking analysis is subsequently performed on selected pathogen-relevant proteins, with the resulting ligand-protein complexes evaluated using binding energy metrics, hydrogen bond interactions, and structural compatibility assessments. The artificial intelligence-assisted workflow facilitates rapid prioritization of compounds demonstrating potential anti-fungal activity and improved plant compatibility. The anticipated outcomes encompass substantially increased screening efficiency, minimized computational expenses, and accelerated discovery of environmentally friendly crop protection agents. Through the synergistic integration of artificial intelligence technologies, molecular docking methodologies, and computational modeling approaches, this framework contributes meaningfully toward enhanced food security, sustainable agricultural development, and climate-resilient wheat production systems, demonstrating how artificial-intelligence-driven computational approaches effectively support precision agriculture and safeguard human livelihoods through improved resilience of essential food crops.

Keywords: Artificial Intelligence, Molecular Docking, Wheat Crop, Disease Resistance, Precision Agriculture, Computational Biology, Sustainable Agriculture

ID-826092: Beyond Ear Tags: AI: Driven Retinal Recognition for Secure and Sustainable Livestock Management

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Background: Millions of cattle are stolen, misidentified, and succumb to disease outbreaks each year, with little detection mainly because livestock identification is still carried out using damaging, easily removed, and obsolete techniques like ear tagging and branding. Nature, however, has the perfect answer: the retinal vascular pattern is a biometric marker as unique and permanent as a human fingerprint, and has remained completely unexploited in practical livestock applications until now. Objective: This study proposes an intelligent, non-invasive cattle identification system that reads this hidden biological fingerprint to provide identification accuracy that surpasses existing standards and tackles the recurring data-scarcity issue that has long constrained the field. Methodology: To reveal fine retinal vascular detail, retinal fundus images representing 10 cattle identities were preprocessed using green-channel extraction, CLAHE enhancement, denoising, and morphological filtering. The dataset's limited real-world data was addressed using StyleGAN2-ADA's ability to generate realistic synthetic retinal images, thereby increasing its diversity. The network used is an EfficientNetV2-S with Squeeze-and-Excitation attention, trained using a two-phase approach

(frozen-backbone warm-up and full fine-tuning), augmented by cosine annealing warm restarts, weighted sampling, label smoothing, and test-time augmentation. Results: This system outperformed the current state-of-the-art mark of 95% across accuracy, precision, recall, and F1 score, and significantly beat traditional methods such as SVM, KNN, K-Means, and ResNet50. Conclusion: This approach has the potential to create a scalable, welfare-focused, and fraud-proof solution for smarter livestock management, thereby directly contributing to AI's role in ensuring a more secure food supply and safeguarding rural livelihoods worldwide.

Keywords: Cattle Identification; Retinal Biometrics; EfficientNetV2; StyleGAN2-ADA; Precision Livestock Farming; Smart Agriculture; Food Security

ID-826273: Impact of Land Use/Land Cover Change on Land Surface Temperature in Bahawalpur District Using Machine Learning Algorithms

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The environment of Bahawalpur district is undergoing changes due to rapid urbanization and shifting land-use patterns in agriculture, which may have implications for land surface temperature (LST) and the ecological stability of the adjacent Cholistan desert fringe. Understanding this relationship is essential in an area already under extreme summer temperatures and the pressure of desertification. The present study aims to use the Support Vector Machine (SVM) machine learning algorithm to classify multi-temporal Landsat satellite images (Landsat 5-TM / 7-ETM+ / 8-9 OLI) across the last two to three decades in Bahawalpur District into various land use/land cover (LULC) classes such as built-up area, agriculture/vegetation cover, bare soil, and water bodies. Landsat's thermal bands will be processed using the standard retrieval algorithm to obtain LST, while various spectral indices such as NDVI, NDBI and NDWI will be calculated to understand the relationship between land-cover change and seasonal land surface temperature patterns. A Cellular Automata–Logistic Regression (CA-LR) model will then be used to project future LULC and LST patterns for the years 2035 and 2045, and to forecast the potential future evolution of urban growth and thermal stress. The study will likely find a clear and direct relationship between built-up area, loss of agricultural and vegetated area, and increase in surface temperature of Bahawalpur district. The findings will provide evidence-based inputs for urban planners and policymakers to support sustainable land management, protect agricultural livelihoods, and reduce the risks to human health and well-being due to climate change.

Keywords: Land Use/Land Cover Change, Land Surface Temperature, Machine Learning, SVM, CA-LR, Bahawalpur, Cholistan, Urban Heat Island

ID-826336: AI-Based Spatio-Temporal Assessment of Rangeland Dynamics and Future Livelihood Vulnerability Prediction in Cholistan Desert, Pakistan

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The Cholistan Desert is one of the biggest arid rangeland systems of South Asia and has a livestock-based economy, with a pastoral population heavily dependent on natural vegetation. Increased climatic variability, recurrent droughts, degradation of land resources, and changing land-use patterns have led to a dramatic shift in pasture availability and productivity, creating obstacles to livestock sustainability and rural livelihoods. The objective of this study is to create an AI-driven geospatial model to evaluate the long-term dynamics of rangelands, estimate the degree of rangeland degradation over time, and understand the potential impact of rangeland degradation on the economy of the livestock sector in Cholistan from 1990 to 2025. Multi-temporal satellite data from Landsat (1990–2025) and Sentinel-2 (2015–2025) will be combined with climate data such as precipitation, temperature, and drought indices to measure changes in vegetation conditions and pasture productivity. A comprehensive Rangeland Health Index (RHI) will be created using a combination of vegetation indices (NDVI, EVI, SAVI, NDMI), land surface temperature (LST), rainfall variability, and drought indices. Spatial patterns will be detected and identified using advanced machine learning techniques such as Random Forest, Gradient Boosting, and deep learning models to assess future rangeland conditions under various climate scenarios and identify degradation hotspots. The results will be combined with data on livestock population and the distribution of pastoral communities to estimate the economic consequences of rangeland degradation on the population. Livestock farming especially milk, meat, and wool production is the most important source of income in pastoral households, which rely on the availability of toba water and grazing; therefore, spatial and temporal decreases in pasture productivity pose a direct threat to their grazing capacity, herd sustainability, and household food security. The study will produce a Livelihood Vulnerability Index that combines projected rangeland conditions with livestock carrying capacities to identify areas at increased risk of income loss and food insecurity under projected climate and degradation conditions. This economic impact is directly associated with the socio-economic resilience of the nomadic and semi-nomadic population of Cholistan and can be used as a decision-support tool for sustainable grazing management and livestock-based livelihood planning in the region.

Keywords: GeoAI, Rangeland Dynamics, Remote Sensing, Google Earth Engine, Machine Learning, Livelihood Vulnerability Index, Climate Change, Cholistan Desert

ID-826347: Climate Threshold Effects on Wheat Production and Food Security in Khyber Pakhtunkhwa, Pakistan: Killing Degrees, Collapsing Yields, and the AI Early Warning Imperative

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Wheat is the most important staple crop in Pakistan, and Khyber Pakhtunkhwa (KPK) province is one of the most climate-vulnerable zones for wheat production in the country. Increasing temperatures, rising heat stress, and unpredictable precipitation patterns are risking wheat yields across the diverse agro-climatic zones of KPK. Yet, the exact mechanisms, thresholds, and spatial patterns of this climate-yield relationship are overlooked at the district level. This study explored the non-linear impacts of extreme heat stress, compound climate stress, and water deficit on wheat yield in KPK using a district-level panel dataset for 8 districts with 805 observations over a 23-year period (2000–2022). The data include high-resolution climate data obtained using Google Earth Engine (GEE), MODIS Land Surface Temperature, ERA5-Land reanalysis, and agricultural production statistics. The study is based on the theoretical framework of the extended agricultural production function, crop ecophysiological threshold theory, and the Climate-Food-Conflict Nexus framework. It employs Panel Fixed Effects regression (with HC3 robust standard errors), Killing Degree Days (KDD) threshold analysis, and compound-stress interaction models to identify the critical temperature thresholds at which wheat yield collapses non-linearly. Importantly, this study uses a Random Forest (RF) machine learning model to develop district-level yield-collapse probability scores, creating an AI-driven early warning system to identify districts at greatest risk of food insecurity in the next season. Results from the study confirm that KDD > 40 °C significantly reduces wheat yield ($\beta = -0.363$, $p < 0.05$) in KPK, while excess rainfall as a flood-stress signal destroys yield independently ($p < 0.01$). The AI model shows a dual vulnerability structure: lowland districts (Charsadda, Peshawar) are vulnerable to heat-driven collapse, while upland districts (Upper Dir, Batagram) are vulnerable to cold- and frost-driven collapse. This finding has direct implications for differentiated, district-specific food security policy. The study demonstrates how artificial intelligence can reduce rural vulnerability and promote peace in a region where food insecurity and social instability are deeply entangled, by linking climate prediction to pre-emptive food security intervention.

Keywords: Wheat Yield, Killing Degree Days (KDD), Climate Threshold, Panel Fixed Effects, Random Forest, Food Security, Early Warning System, Artificial Intelligence, Heat Stress, Agro-Climatic Zones

ID-826390: Development of an IoT: Based Intelligent Soil Fertility Assessment and Crop Suitability Recommendation System

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Soil fertility depends on multiple interacting properties such as pH, electrical conductivity, NPK, moisture, and temperature. However, conventional soil testing typically reports these as separate, uninterpreted values. This paper presents a low-cost, portable IoT system that addresses this gap: a detachable multi-parameter soil probe connected to an ESP32 unit measures all seven parameters and transmits them wirelessly, after a 32–40 second stabilization period, to a mobile application. The application's core contribution is a Soil Fertility Index (SFI), computed as a weighted sum of standardized 0–10 parameter scores, together with a crop-suitability module that ranks candidate crops against crop-specific requirement ranges and returns the top three matches with individual suitability scores. Unlike a black-box output, each score is paired with an explanation identifying the parameters that most helped or limited it. The computational model was evaluated against reference measurements, achieving $R^2 \approx 0.96$ and MAE ≈ 0.13, indicating strong agreement between predicted and reference values. These results support the feasibility of combining embedded sensing, weighted data fusion, and explainable recommendation in a single field-deployable decision-support platform, while further validation on a larger, more diverse dataset is needed to establish generalization.

Keywords: Soil Fertility Index, Crop Suitability, Internet of Things, ESP32, Soil Sensors, pH, Electrical Conductivity, NPK, Machine Learning, Decision Support System, Smart Agriculture, Explainable AI

Sub-theme: To Foster Global Peace, Sustainable Development & Interdisciplinary Innovation

ID-826039: The AI Paradigm in Pharmaceuticals: Assessing the Impact of Artificial Intelligence on Organizational Success and Employee Outcomes in Khyber Pakhtunkhwa

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As pharmaceutical organizations increasingly consider adopting artificial intelligence (AI), the data presented in this article cover the direct impact between AI adoption and employee engagement. Accordingly, this manuscript considers AI adoption as the predictor and employee engagement as the outcome; constructs not measured in the current dataset — such as strategic

planning, organizational success, and employee or organizational performance — are not tested. A total of 300 pharmaceutical employees in Khyber Pakhtunkhwa (KP), Pakistan, were selected to complete a quantitative cross-sectional survey. The measures comprised 10 items for AI adoption and 12 items for employee engagement (vigor, dedication, and absorption). Cronbach's alpha was excellent for both constructs: AI adoption (0.952) and employee engagement (0.917). Moderate AI adoption (M = 3.411, SD = 0.705) and moderate-to-high employee engagement (M = 3.529, SD = 0.500) were observed. Pearson correlation revealed a positive relationship between AI adoption and employee engagement ($r = 0.575$, $p < 0.01$), and simple linear regression showed that AI adoption significantly predicted employee engagement ($B = 0.408$, $\beta = 0.575$, $t = 12.145$, $p < 0.001$), explaining 33.1% of the variance ($R^2 = 0.331$; $F = 147.508$, $p < 0.001$). The results indicate that AI can enhance employee engagement when used as a tool for work in a pharmaceutical company, contributing empirically to the literature on AI-at-work in a developing regional pharmaceutical context.

Keywords: Artificial Intelligence Adoption; Employee Engagement; Pharmaceutical Sector; Khyber Pakhtunkhwa; Digital Transformation; Work Engagement

ID-826203: Autonomous Weapons and Civilian Protection: Exploring the Adequacy of International Humanitarian Law in Regional Conflict Contexts

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The increasing deployment of autonomous weapons systems in contemporary warfare prompts critical questions about whether current International Humanitarian Law (IHL) sufficiently protects civilian lives. This paper asks to what extent the IHL principles of distinction, proportionality, and precautions in attack may still be practically effective when targeting decisions are increasingly being made or executed by autonomous systems. Using recent developments in regional conflict environments, including documented cases of civilian harm resulting from technology-mediated targeting operations, the paper examines the civilian protection challenges posed by autonomous targeting systems in practice. It argues that while the existing IHL rules are theoretically applicable, they are subject to considerable implementation gaps when applied to systems where compliance with humanitarian obligations depends on the operational environment. The paper then explores whether the ongoing international debates on autonomous weapons governance, including debates in the Group of Governmental Experts in the CCW and the UN General Assembly, sufficiently address these implementation gaps, or whether higher legal standards are necessary. It provides a perspective from conflict-affected regional states that are still under-represented in the mainstream discourse on autonomous weapons law.

Keywords: Autonomous Weapons, International Humanitarian Law, Civilian Protection, Weapons Governance, Regional Conflict

ID-826308: Exploring the Application of AI in Education and Its Potential to Advance Quality Education Through an Interdisciplinary Lens, Aligned with the United Nations Sustainable Development Goals

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With the rapid progress of Artificial Intelligence (AI), education is turning into a different landscape, enabling opportunities for enhancing learning, teaching, and professional development. But the successful integration of AI into schools is not a process that can be achieved solely by technology adoption; rather, it requires collaboration between educators, technology specialists, policymakers, and teacher education institutions. The emphasis is on the importance of interdisciplinary collaboration to ensure that teachers are equipped to leverage AI effectively and responsibly, and to foster the development of inclusive and sustainable education through the integration of technology. The study evaluates the role of AI in enhancing teacher readiness and pedagogical practices in secondary schools in Karachi, Pakistan, in line with the conference theme "To Attain United Nations Sustainable Development Goals through Interdisciplinary Collaborations." It primarily supports Sustainable Development Goal (SDG) 4, which encompasses inclusive, equitable, and high-quality learning, while also highlighting the need for collaboration between education and government authorities as well as technology experts in developing teachers' digital skills, thereby contributing to SDG 17 (Partnerships for the Goals). The study explores the relationships between the variables of AI awareness, perceived usefulness, perceived ease of use, teacher readiness, and pedagogical adaptation, with a focus on the conceptual frameworks of the Technology Acceptance Model (TAM) and the Technological Pedagogical Content Knowledge (TPACK) model. A quasi-experimental, mixed-method pre-test and post-test design will be used. The changes in teachers' readiness before and after a professional development intervention will be measured by quantitative data gathered from a structured questionnaire, whereas the qualitative data will be gathered through interviews focusing on teachers' experiences, challenges, and perceptions of integrating AI into their classroom practice. The expected results indicate that the integration of interdisciplinary work and professional development focused on the use of AI can have a significant impact on enhancing teachers' confidence, pedagogical choices, ethical reflection, and innovation in the classroom. The study provides practical suggestions for curriculum developers, teacher educators, educational leaders, and educational policymakers who aim to follow the path of sustainable digital transformation in education by improving the capacity of teachers to apply AI in teaching and learning. The research joins the global conversation on AI in

the context of sustainable development, showing that human-centric technological innovation, alongside interdisciplinary collaboration, is necessary to reach the SDGs. It confirms the need to empower teachers using AI not just as an educational imperative but as a strategic way to create resilient, inclusive, and future-ready societies.

Keywords: Artificial Intelligence (AI); AI-Enabled Teaching; Sustainable Development Goals (SDGs); Interdisciplinary Collaboration; Teacher Readiness; Quality Education (SDG 4); Pedagogical Adaptation

Sub-theme: To Promote Peace, Social Well-being & Ethical Governance

ID-826424: Promoting Peace, Social Well: being, and Ethical Governance

امن، سماجی بہبود اور اخلاقی حکمرانی کا فروغ

ستارہ ارشد

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ایسے دور میں جب دنیا بڑھتے ہوئے تنازعات، وسیع ہوتی سماجی تفاوت اور اداروں پر عوامی اعتماد کے مسلسل زوال کا مشاہدہ کر رہی ہے، امن، سماجی بہبود اور اخلاقی حکمرانی کا فروغ عصرِ حاضر کے سماجی علوم کی تحقیق میں سب سے اہم اور فوری تقاضوں میں شمار ہوتا ہے۔ یہ مقالہ امن سازی، سماجی بہبود اور اخلاقی اصولوں پر استوار حکمرانی کے مابین باہم گندھے ہوئے تعلق کا جائزہ لیتا ہے، اور اس نکتے پر اصرار کرتا ہے کہ دیرپا امن، سماجی انصاف اور ادارہ جاتی جوابدہی کو یقینی بنائے بغیر حاصل نہیں ہو سکتا۔ عمرانیات، علومِ سیاسیات اور امورِ عامہ کے کثیر الجہتی نقطۂ نظر کو اپناتے ہوئے، یہ تحقیق اس بات کا تجزیہ کرتی ہے کہ تنازعات کے حل کے طریقہ کار، جامع سماجی فلاحی پالیسیاں اور شفاف حکمرانی کے نظام کس طرح مل کر سماجی استحکام اور انسانی وقار کے تحفظ میں کردار ادا کرتے ہیں۔ مقالے میں جدید حکمرانی کے ڈھانچوں میں اخلاقی معیارات کے بتدریج زوال اور اس کے پسماندہ و کمزور طبقات پر غیر متناسب اثرات کا بھی جائزہ لیا گیا ہے، اور اس بات پر زور دیا گیا ہے کہ ایسے پالیسی فریم ورک ناگزیر ہیں جو مساوات، جوابدہی اور شراکتی حکمرانی کو اپنے مرکز میں رکھیں۔ کیفیتی و تقابلی تجزیاتی طریقۂ کار بروئے کار لاتے ہوئے، یہ تحقیق ظاہر کرتی ہے کہ حقیقی سماجی بہبود محض انتظامی کارکردگی سے برقرار نہیں رکھی جا سکتی بلکہ بنیادی طور پر انصاف، شفافیت اور اخلاقی ذمہ داری میں پیوست حکمرانی پر منحصر ہوتی ہے۔ مقالہ اس نتیجے پر اختتام پذیر ہوتا ہے کہ امن اور سماجی بہبود کی ترقی کے لیے ایک بنیادی تبدیلی درکار ہے ایسے اخلاقی بنیاد پر قائم حکمرانی ماڈلز کی طرف، جو انسانی بہبود، سماجی ہم آہنگی اور ادارہ جاتی دیانت کو پالیسی سازی کے عین مرکز میں رکھیں۔

کلیدی الفاظ: امن کا فروغ، سماجی بہبود، اخلاقی حکمرانی، سماجی انصاف، ادارہ جاتی جوابدہی

ID-826427: Artificial Intelligence and International Peace and Security

مصنوعی ذہانت اور بین الاقوامی امن و سلامتی

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سائنسی و تکنیکی ترقی کے ثمرات تک رسائی کو ہمیشہ سے ایک بنیادی انسانی حق تصور کیا جاتا رہا ہے، اور مصنوعی ذہانت (Artificial Intelligence) موجودہ دور کی سب سے اہم اور بااثر ابھرتی ہوئی ٹیکنالوجیز میں سے ایک ہے۔ اس کا دائرہ کار محض تکنیکی اور انجینیئرنگ کے شعبوں تک محدود نہیں بلکہ علومِ انسانیت اور سماجی علوم تک بھی گہرائی سے پھیلا ہوا ہے، جس کے بین الاقوامی امن و سلامتی پر گہرے اثرات مرتب ہوتے ہیں۔ یہ مقالہ مصنوعی ذہانت کی دوہری نوعیت کا جائزہ لیتا ہے یعنی یہ کس طرح عالمی استحکام کے لیے ایک ممکنہ خطرہ بھی ہے اور ایک طاقتور ذریعہ بھی۔ ایک طرف، مصنوعی ذہانت بین الاقوامی سلامتی کے لیے سنگین چیلنجز پیش کرتی ہے۔ اس کا فوجی نظاموں میں بڑھتا ہوا استعمال مہلک خودمختار ہتھیاروں کے وجود میں آنے کا خدشہ پیدا کرتا ہے جو مؤثر انسانی کنٹرول سے باہر ہو سکتے ہیں، جبکہ سائبر جنگ میں اس کا اطلاق بڑے پیمانے پر سائبر حملوں، غلط معلومات کی مہمات اور اہم قومی انفراسٹرکچر پر حملوں کے خطرے کو بڑھا دیتا ہے۔ دوسری طرف، اگر ذمہ داری سے استعمال کیا جائے تو مصنوعی ذہانت انسانی تحفظ، بہبود اور ترقی کو بہتر بنانے کی زبردست صلاحیت رکھتی ہے۔ یہ مالیاتی نظم و نسق کو نئی شکل دینے، معاملاتی غلطیوں کو کم کرنے، اور امراض کی ابتدائی تشخیص و جدید جینیاتی تجزیے کے ذریعے صحت کے شعبے میں انقلابی تبدیلی لانے کی صلاحیت رکھتی ہے، جو لاکھوں انسانی جانیں بچا سکتی ہے۔ ان شعبوں کے علاوہ، مصنوعی ذہانت سفارت کاری اور تنازعات کی روک تھام کے میدان میں بھی قیمتی پیش گوئی کی صلاحیت پیش کرتی ہے یہ سیاسی پیش رفت، معاشی رجحانات اور ابھرتے ہوئے تنازعات کا تجزیہ ان کے شدت اختیار کرنے سے پہلے ہی ممکن بناتی ہے۔ ایسی بصیرت بین الاقوامی اداروں کو بروقت سفارتی مداخلت کرنے اور عالمی امن سازی کی کوششوں کو آگے بڑھانے کے قابل بنا سکتی ہے۔ یہ تحقیق اس نتیجے پر پہنچتی ہے کہ اگرچہ مصنوعی ذہانت ترقی اور امن کے بے مثال مواقع فراہم کرتی ہے، تاہم اس کا محفوظ، اخلاقی اور ذمہ دارانہ استعمال مربوط عالمی طرزِ حکمرانی اور مسلسل بین الاقوامی تعاون کا متقاضی ہے۔

کلیدی الفاظ: مصنوعی ذہانت، بین الاقوامی سلامتی، خودمختار ہتھیار، تنازعات کی روک تھام، عالمی طرزِ حکمرانی، اخلاقی حکمرانی

ID-826037: The Role of Artificial Intelligence in Protecting Human Life and Establishing Global Peace (A Global Perspective)

انسانی زندگی کے تحفظ اور عالمی امن کے قیام کے لیے مصنوعی ذہانت کا کردار (عالمی تناظر میں)

سید طاہر علی شاہ
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اکیسویں صدی میں مصنوعی ذہانت (Artificial Intelligence) نے انسانی زندگی کے تقریباً تمام شعبوں میں نمایاں اثرات مرتب کیے ہیں۔ صحت، تعلیم، معیشت، دفاع، ماحولیات اور ابلاغ عامہ سمیت مختلف میدانوں میں مصنوعی ذہانت نے نئے امکانات پیدا کیے ہیں۔ عالمی سطح پر امن کے قیام اور انسانی جانوں کے تحفظ کے لیے بھی مصنوعی ذہانت کو ایک مؤثر ذریعہ

تصور کیا جا رہا ہے۔ یہ تحقیق مصنوعی ذہانت کے ان پہلوؤں کا جائزہ لیتی ہے جو انسانی زندگی کے تحفظ، تنازعات کی روک تھام، علمی امن کے فروغ اور عالمی ہم آہنگی کے قیام میں معاون ثابت ہو سکتے ہیں۔ ساتھ ہی اس کے ممکنہ خطرات اور اخلاقی چیلنجز کا تنقیدی جائزہ بھی پیش کیا گیا ہے جو مصنوعی ذہانت کے پیشِ نظر انسانی معاشروں کو در پیش ہے یا ہوگا۔

کلیدی الفاظ: مصنوعی ذہانت، عالمی امن، انسانی تحفظ، علمی امن، ٹیکنالوجی، اخلاقیات، تنازعات کا حل

ID-826107: Different Narratives of the Afghan War: In the Context of the Urdu Novel

افغان جنگ کے مختلف بیانیے: اردو ناول کے تناظر میں

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جنگ اور امن انسانی تاریخ کے دو ایسے متضاد مگر ہم رشتہ استعارے ہیں جن کے گرد ہر دور کے ادب نے اپنا بیانیہ تشکیل دیا ہے۔ افغان جنگ، جو چار دہائیوں پر محیط رہی، محض ایک عسکری و سیاسی واقعہ نہیں رہی بلکہ بیانیوں کی ایک کشمکش بن گئی کسی کے نزدیک یہ "جہاد" تھی، کسی کے نزدیک "دہشت گردی کے خلاف عالمی جنگ"، کسی نے اسے محض "فساد" قرار دیا تو کسی نے عالمی و مقامی طاقتوں کی "مفاداتی جنگ" ثابت کیا۔ اس طویل اور پیچیدہ جنگ نے انسانی معاشرے کو گہرائی سے متاثر کیا۔ حساس ترین فکری طبقے سے تعلق رکھنے والے اردو ناول نگاروں نے اس عہدِ آشوب کی ہولناکیوں، انسانی المیوں اور سیاسی محرکات کو شدت سے محسوس کرتے ہوئے اسے تخلیقی سطح پر منتقل کیا۔ اردو ناول نے اس جنگ کو محض دو مخالف گروہوں کا سادہ تصادم سمجھنے کی بجائے زمینی حقائق، پیچیدہ انسانی نفسیات اور کثیرالجہت بیانیوں کے آئینے میں دیکھا ہے۔ زیرِ نظر مقالے میں قلعہ جنگی، گل مینہ، پس آئینہ، پہاڑوں کا بیٹا، یہ پالا ہے، نیلی بار، وجود، میں دہشت گرد ہوں؟، دہشت زدہ گرد اور کیمپ سمیت ان نمائندہ اردو ناولوں کا تجزیاتی مطالعہ پیش کیا جائے گا جن میں افغان جنگ کو کسی نہ کسی صورت میں موضوع بنایا گیا ہے۔ یہ مقالہ اس امر کا احاطہ بھی کرے گا کہ کس طرح اردو ناول نے رسمی اور نظریاتی بیانیوں سے ماورا ہو کر ایک فکری، فنی اور انسان دوست تناظر تشکیل دیا ہے۔ مقالے کا بنیادی نکتہ یہ ہے کہ یہ تخلیقی متون نہ صرف اس دور کے تاریک حقائق کے سچے راوی ہیں بلکہ عالمی امن، فکری توازن اور انسانی بقا کی تلاش کے معتبر استعارے بھی ہیں۔

کلیدی الفاظ: افغان جنگ، اردو ناول، بیانیہ، جہاد، دہشت گردی، فساد، مفاداتی جنگ، جنگ و امن، انسانی نفسیات، مزاحمتی ادب

ID-826032: Understanding When and Why Adults Seek Emotional Support from AI Chatbots: A Mixed: Methods Study in Pakistan

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Background: Artificial intelligence (AI) is increasingly used in mental health care and emotional support. AI chatbots provide accessible, immediate, and anonymous support. Some individuals use them because of fear of judgment, embarrassment, or mental health stigma. However, little research has examined the circumstances influencing AI chatbot use for emotional support in Pakistan. Objectives: This study examined the circumstances in which

adults sought emotional support from AI chatbots, the factors influencing this choice, and users' perceptions of their role in supporting emotional well-being. Methodology: A mixed-methods design was employed. Data were collected from 30 adults in Pakistan using an online questionnaire with demographic, Likert-type, and open-ended items. Quantitative data were analyzed using descriptive statistics, and qualitative data using thematic analysis. Results: A total of 30 adults participated. Participants used AI chatbots because of their availability, accessibility, privacy, and non-judgmental communication, especially when human or professional support was unavailable. Thematic analysis identified three themes: (1) using AI chatbots to cope with stress and emotional challenges; (2) privacy and non-judgmental communication; and (3) immediate availability, guidance, and accessibility. Participants viewed AI chatbots as a complementary source of emotional support rather than a replacement for human relationships or professional mental health care. Conclusion: AI chatbots may provide valuable complementary emotional support, particularly when human support is unavailable. However, participants viewed AI chatbots as a supplement rather than a replacement for human relationships and professional mental health services. These findings may inform psychologists, mental health professionals, and policymakers about the role of AI chatbots in supporting emotional well-being in Pakistan.

Keywords: Artificial Intelligence, AI Chatbots, Emotional Support, Mental Health, Pakistan

ID-826084: Students' Perceptions of Ethical Governance for the Use of Artificial Intelligence: Evidence from University Students in Pakistan

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This study of postgraduate students in Pakistan aims to explore perceptions of ethical governance for the use of AI in academic settings. Artificial intelligence has become an important part of students' academic lives, and this study aims to investigate how postgraduate students value the ethical use of AI. The study population consisted of university students in Pakistan, and data were collected from a sample of 300 university students representing different disciplines. Cluster sampling was employed, and the Statistical Package for the Social Sciences (SPSS, version 24.0) was used for analysis. Appropriate statistical tests were employed, such as the t-test, means, and standard deviations. The validity and reliability of the questionnaire were assessed through expert opinion and a pilot test with 20 students. The results showed that postgraduate students did not lack awareness about AI but needed to learn about its ethical use and governance. The results also indicated that students consider artificial intelligence important for their studies and research; however, they expressed concerns about data privacy, transparency, algorithmic bias, and the absence of institutional policies. The study strongly

called for ethical guidelines, faculty training, and a suitable framework to regulate the use of AI in universities. This research contributes to the growing discourse on AI ethics in education by providing empirical evidence from a developing-country context. The study offers strategies to improve learning practices and knowledge of governance among students, and recommends that universities in Pakistan develop policies of ethical governance and ensure responsible, student-centered, and fair implementation.

Keywords: Artificial Intelligence, Ethical Use, Student Perception, Governance, Ethical Dilemmas

ID-826085: Assessing the Impact of Artificial Intelligence on Human Protection and Peace Promotion: Perception of AI: Aware Professionals in KPK

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There are many artificial intelligence applications currently shaping human lives, all used in the modern world to protect human life and promote peace and harmony. The purpose of this study was to understand how artificial intelligence can be used to support peace and to save human lives. The study employs a qualitative method, conducting 10 in-depth interviews with AI-aware faculty members affiliated with public and private-sector universities in KPK. The data were analyzed through manual thematic analysis. The findings showed that there are several artificial intelligence applications such as AI-based fire detection, AI-based prevention systems, AI-based predictive policing, AI-based prediction systems, and AI-based emergency response systems all of which are used to protect human life. Moreover, artificial intelligence is also used to promote peace, such as misinformation detection systems, hate speech detection systems, peacekeeping intelligence systems, cross-cultural communication tools, and AI-based education and awareness platforms. This research showed that artificial intelligence has significant potential to promote peace and save lives. In this scenario, the main issue is the misuse of artificial intelligence applications, which raises ethical considerations that must prioritize human betterment. This study has critically highlighted, for policymakers, educators, and curriculum developers, the potential harms arising from the misuse of AI applications such as plagiarism, bias, and a lack of integrity in order to protect lives and promote peace.

Keywords: Artificial Intelligence, AI Professionals, Human Protection, Peace

ID-826101: Between Mourning and Mobilization: Public Art as Peace Discourse in Pakistan's Twin Cities and Lahore

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The employment of painting, murals, and community art projects by visual artists, muralists, and arts groups in Lahore, Islamabad, Rawalpindi, and Peshawar to address violence and promote tolerance, peace, and religious harmony is examined in this essay. Instead of viewing "peace art" in Pakistan as a single, cohesive movement, the paper contends that at least three different models can be found in these four cities: a grassroots, participatory model carried out by feminist and interfaith collectives operating in Lahore, Rawalpindi, and Islamabad; an institutional, trauma-commemorative model exemplified by exhibitions held in Islamabad following acts of terrorism; and a historical, state-commissioned mural tradition rooted in Lahore. The article also examines Peshawar's more complex situation, where artists from other places have frequently used the city's suffering as the topic of their work while Peshawar's own art community has suffered due to strife and conservatism. The study concludes that visual peace art in Pakistan is most successful as a tool for peacebuilding when it is community-based and participatory, and is most susceptible to becoming symbolic or performative when it is primarily motivated by state or corporate sponsorship. This conclusion is based on journalistic accounts, NGO reports, and art-historical sources.

Keywords: Peace, Pakistan, Art and Peace, Twin Cities, Peace Art

ID-826116: AI Consciousness to Protect Humanity and Promote World Peace

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The distinction between intelligence and consciousness is becoming urgent and crucial nowadays, as according to neuroscience, intelligence is just outward doing or performance, while consciousness is inner experience. Artificial Intelligence is transforming and revolutionizing human lives in many ways medicine, the health industry, cybersecurity, defense, disaster management, rescue and search, transportation, the public safety sector, and much more. But another very important use of AI is protecting human lives globally and promoting peace in the world. This article discusses this crucial aspect of AI to explore how it can be useful to promote universal peace and tranquility. It is very important to set ethical rules and moral boundaries for artificial intelligence so that it can be used positively. As atomic bombs can bring horrible destruction if given into the wrong hands, similarly Artificial Intelligence, without proper ethical guidance, can result in dangerous

outcomes. AI consciousness needs to be emphasized according to religious or spiritual patterns, and especially Islamic patterns, in the Muslim world. The main theme of this paper is to take this "intelligence" to a higher level of "wisdom"; until then, AI should be treated just as an "intelligent" agency and not a "conscious" one. This paper highlights the significance of consciousness in general, and AI consciousness in particular, to enhance the application of AI in daily life. New AI tools like CogSolv and CogResolv are discussed, which are used to solve conflicts and disagreements among different people. A qualitative approach is implemented in this study, containing a critical analysis of the new technology and innovative ideas regarding the implementation of AI consciousness. Descriptive, analytical, and comparative analysis of technical and intellectual conceptualizations is conducted to highlight the positive aspects of AI. This study contributes to a growing body of interdisciplinary research in academia and to a deeper understanding of the useful outcomes of AI.

Keywords: AI Consciousness, CogSolv, CogResolv, Innovation, Wisdom, Neuroscience

ID-826128: Artificial Intelligence, Gender Equality and Digital Social Protection: An Intersectional Analysis of Women's Access to Public Services in Pakistan

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Artificial Intelligence (AI) has drastically altered the social landscape of the economy, government, education, healthcare, employment, and social relations worldwide. In developing countries like Pakistan, AI and gender equality have become more significant due to the presence of gender injustice in every socio-economic, educational, and institutional environment. This study aims to discuss the prospects, challenges, and implications for gender equality and social inclusion in Pakistan from a sociological perspective by addressing the potential of AI. The research method used was a qualitative approach to secondary data from peer-reviewed journal articles, scholarly books, policy papers, government publications, and international organisations' reports. A thematic analysis of existing evidence revealed commonalities across four themes: artificial intelligence and gender equality; digital transformation and algorithmic bias; social inclusion; and technological governance. Feminist Theory, Intersectionality Theory, the Social Construction of Technology (SCOT), and Social Inclusion Theory guided the analysis of the interaction between technological innovation and current social structures. The results showed that AI education tools, digital healthcare, fintech, and online business opportunities can help improve the socioeconomic inclusion of women and mitigate traditional barriers to socio-economic development. The study recommends building gender-sensitive policies, governance, and digital infrastructure; investing in girls' STEM

education and digital literacy on AI; and increasing the involvement of women in AI research, innovation, and decision-making as essential to the successful integration of AI into Pakistan's development agenda. In conclusion, responsible and inclusive AI governance is needed to ensure that social justice, gender equality, and sustainable progress are championed by technological advancement rather than perpetuating current forms of exclusion and inequality in the context of Pakistan.

Keywords: Artificial Intelligence; Gender Equality; Social Inclusion; Algorithmic Bias; Digital Divide; Women's Empowerment; Digital Transformation

ID-826145: AI: Assisted Diplomacy: Changing Dynamics of Conflict Resolution and International Mediation

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The rapid integration of artificial intelligence into diplomatic practice is reshaping the processes through which conflicts are analysed, negotiated, and mediated. Diplomacy is emerging with AI-powered tools for early warning, strategic analysis, multilingual communication, stakeholder mapping, and negotiation preparation. This study explores the evolving role of AI-assisted diplomacy in conflict resolution and international mediation, focusing on its impact on the effectiveness of diplomacy, the role of human actors, ethical considerations, and the legitimacy of peace processes. The study is based on a qualitative research design that incorporates comparative case study, policy-document analysis, and thematic analysis of selected AI-supported diplomatic and mediation practices. The theoretical framework combines Conflict Transformation Theory and the Human-Centred AI approach, enabling the study to evaluate whether technological interventions merely improve procedural efficiency or contribute to deeper, inclusive, and sustainable conflict transformation while preserving human judgement and accountability. The discussion shows that AI can strengthen diplomatic preparedness, improve access to complex conflict data, facilitate broader participation, and enhance mediation support; however, algorithmic bias, data asymmetry, misinformation, privacy concerns, technological dependency, and unequal digital capacity may undermine neutrality and trust. This research calls for a human-centred governance framework of AI-assisted diplomacy based on transparency, accountability, meaningful human oversight, conflict sensitivity, data protection, inclusivity, and international ethical standards. It concludes that AI should complement rather than replace diplomatic judgement, with technological innovation remaining subordinate to human responsibility, political legitimacy, and the imperatives of sustainable peace.

Keywords: AI-Assisted Diplomacy, Algorithmic Mediation, Conflict Transformation, Predictive Diplomacy, Ethical AI Governance, Human–AI Collaboration

ID-826241: Artificial Intelligence as an Instrument of Peace: Promoting Social Well: Being and Ethical Governance in the Digital Age

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Artificial intelligence (AI) is increasingly influencing the ways societies address conflict, improve public welfare, and strengthen systems of governance. This paper explores the opportunities and challenges associated with integrating AI into peacebuilding, social development, and ethical governance. Employing a qualitative desk-based approach, the study synthesizes evidence from international policy frameworks, United Nations publications, UNESCO guidelines, and interdisciplinary academic literature. The analysis focuses on three interconnected dimensions: the application of AI in conflict prevention and peacebuilding through predictive analytics and early-warning mechanisms; its contribution to enhancing social well-being by improving healthcare, social protection, and public service delivery; and the importance of governance frameworks that promote transparency, accountability, fairness, and meaningful human oversight. The study contends that AI can make a significant contribution to peaceful and inclusive societies only when its development and implementation are guided by ethical principles, inclusive policymaking, and effective regulatory mechanisms. Conversely, inadequate governance may enable AI systems to intensify misinformation, expand intrusive surveillance, reinforce existing inequalities, and produce biased or discriminatory outcomes. The paper therefore emphasizes the need for collaborative governance involving governments, researchers, international organizations, and technology developers to ensure that AI serves the public interest. It concludes by presenting policy recommendations that support the responsible use of AI in advancing the objectives of Sustainable Development Goal 16 (Peace, Justice and Strong Institutions) while promoting human security, institutional trust, and sustainable peace. By integrating technological innovation with social science perspectives, this study contributes to the growing field of PeaceTech and highlights the importance of ethical AI governance in fostering resilient and inclusive societies.

Keywords: Artificial Intelligence; Peacebuilding; Social Well-Being; Ethical Governance; AI Ethics; Conflict Prevention; Digital Peace; Sustainable Development Goal 16

ID-826378: Harmonizing Artificial Intelligence with Maqāṣid al-Sharīʿah: An Islamic Ethical Framework for Protecting Human Life and Fostering Global Peace

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Artificial Intelligence is changing how the world handles healthcare, security, and governance. But while these tools offer many benefits, they also raise serious questions about ethics and human rights. This paper looks at these questions through the lens of Islamic jurisprudence, specifically focusing on a classical concept known as Maqāṣid al-Sharīʿah the higher goals of Islamic law. With reference to the basic sources of Fiqh, Maqāṣid al-Sharīʿah focuses on protecting five core human needs: faith, life, intellect, family, and property. Scholars like Al-Ghazālī and Al-Shāṭibī developed this framework centuries ago, and it remains highly relevant today. This paper explores how these five principles can act as a practical guide for developing and regulating modern AI. For example, AI used in hospitals to predict diseases can be seen as a tool to protect human life (Al-Nafs). Similarly, AI used to detect fake news or hate speech can be viewed as a way to protect the human intellect (Al-ʿAql) and promote social peace. However, this paper does not ignore the downsides. It also discusses the real dangers of AI, such as biased algorithms, privacy leaks, and autonomous weapons. These issues directly conflict with the Islamic duty to prevent harm. The research relies on a qualitative approach, using the Quran, Hadith, and modern studies on AI ethics to build its argument. Ultimately, the paper argues that Islamic ethics are not outdated; instead, they provide a solid, flexible foundation for ensuring that AI serves humanity in a just and peaceful way. This paper contributes to the conversation on how religion and technology can work together for global peace.

Keywords: Artificial Intelligence, Maqāṣid al-Sharīʿah, Islamic Bioethics, Global Peace, Technological Governance, Human Life.

ID-826287: Barriers to Inter: University Sports Engagement in Conflict: Affected Districts of Southern Khyber Pakhtunkhwa: Implications for Peace Promotion

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Purpose: This study examined the barriers limiting university participation in Higher Education Commission (HEC) inter-university sports championships in the southern districts of Khyber Pakhtunkhwa, and considered what reduced participation means for sport's peace-promoting potential in the region. Method: Annual participation records maintained by the two host institutions, Gomal University Dera Ismail Khan and Kohat University of Science and

Technology, were analyzed for the period 2022 to 2025. The study covered all nine universities (seven public, two private) constituting Zone A, supplemented by accounts from directors of sports. Findings: Only four of the nine universities entered the championships, competing in six of the events offered annually. Four recurring barriers emerged: delays in financial approval, law-and-order conditions, inadequate transport, and limited availability of playgrounds and courts. Conclusion: Persistently low participation reflects institutional and security constraints rather than student disinterest. Implications: Ring-fenced sports budgets, shared transport arrangements, and security-informed scheduling may improve participation, strengthening sport's contribution to youth engagement and social cohesion in a region affected by prolonged insecurity.

Keywords: Promote Peace, Social Well-being, Institutional Governance, Sport Participation, Higher Education Commission

ID-826316: Investigating the Ethical Use of Artificial Intelligence by LIS Researchers in the Light of UNESCO AI Ethics Principles

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Artificial Intelligence (AI) is being adopted at a rapid pace in academia, in turn raising ethical concerns around accountability, transparency, academic integrity, and the responsible use of AI. However, there is still a lack of empirical research on the ethical application of AI in Pakistan. The purpose of this study was to examine how researchers use AI responsibly and how to expand the ethical use of AI in academic research by LIS researchers in Khyber Pakhtunkhwa (KP), Pakistan. The conceptual framework was based on the UNESCO Recommendation on the Ethics of Artificial Intelligence. A convergent parallel mixed-methods research design was used. The total population of LIS researchers in three universities was 267, all of whom were surveyed; 195 (73%) completely returned and valid questionnaires were collected. The quantitative data were analyzed using descriptive statistics, an independent-samples t-test, and one-way ANOVA, while the qualitative responses were analyzed thematically. The results for both Accountability and Responsibility ($M = 4.20$, $SD = 0.84$) and Human Oversight ($M = 4.13$, $SD = 0.93$) indicated positive attitudes towards ethical research with AI. Conversely, lower scores were obtained for Transparency ($M = 3.69$, $SD = 1.07$) and Academic Integrity ($M = 3.59$, $SD = 1.13$), indicating problems implementing ethical ideas in research practice. There were no statistically significant differences in awareness of the UNESCO AI ethics principles based on gender, qualification, research experience, or institutional affiliation (all $p > .05$); the mean score was moderate ($M = 3.86$, $SD = 1.08$). Qualitative findings indicate that disclosure uncertainties, algorithmic hallucinations, fabricated references, data privacy, and a lack of institutional policies are

challenges in the responsible use of AI. This is one of the first studies on the ethical use of AI with respect to the dimensions of Transparency, Inclusion, and Participation in UNESCO's AI Ethics Framework for academic LIS researchers in Khyber Pakhtunkhwa, Pakistan. The results can be used as evidence for the formulation of AI governance policies, common guidelines for disclosure, and AI ethics education to encourage transparent, responsible, and trustworthy AI-assisted research.

Keywords: Artificial Intelligence, AI Ethics, LIS Researchers, UNESCO

ID-826342: Exploring Barriers and Facilitators to Male Participation in Gymnastics for All in Pakistan: A Gender Equity Perspective

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Background: Male participation in Gymnastics for All (GfA) in Pakistan remains critically underrepresented, reflecting a confluence of socioculturally entrenched gender norms, infrastructural deficits, and policy vacuums. Despite the inclusive mandate of GfA as a non-competitive, health-promoting movement, its uptake among Pakistani males is disproportionately low a phenomenon inadequately examined in existing literature. Objective: This study aimed to systematically explore the perceived barriers and facilitators influencing male participation in GfA activities in Pakistan through a gender equity lens. Methods: A constructivist qualitative design was employed, utilizing semi-structured in-depth interviews with 12 purposively selected participants comprising male gymnasts, coaches, parents, sports administrators, and policy stakeholders. Data were analyzed using Reflexive Thematic Analysis (RTA) guided by the theoretical frameworks of Bourdieu's Field Theory, Connell's Theory of Masculinities, and Self-Determination Theory (SDT). Results: Seven overarching themes emerged: (1) sociocultural stigma and hegemonic masculinity; (2) religious misconceptions; (3) infrastructural and resource deficits; (4) policy and governance gaps; (5) absence of male role models and media visibility; (6) motivational facilitators including athletic performance and health benefits; and (7) the catalytic role of institutional support. Barriers were predominantly structurally embedded and ideologically reinforced, while facilitators operated at interpersonal and organizational levels. Conclusions: The findings underscore the necessity for multi-level interventions integrating culturally sensitive policy reform, community engagement, and targeted sport development programs. This study advances the GfA discourse by providing the first empirically grounded, theoretically situated analysis of male gymnastic participation within a South Asian Islamic socio-political context, offering a replicable framework for comparable low-to-middle-income country (LMIC) settings.

Keywords: Gymnastics for All (GfA), Male Participation, Gender Equity in Sport, Sociocultural Barriers, Masculinity Norms in Pakistan, Reflexive Thematic Analysis (RTA).

Sub-theme: To Strengthen Justice, Public Policy & Responsible Governance

ID-826030: Algorithmic Accountability for Justice and Responsible Governance: A Comparative Cyber Law Analysis of Pakistan, India, and Singapore

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Artificial intelligence (AI), machine learning, and algorithmic decision-making have changed the face of modern governance and raised intricate legal issues regarding transparency, explainability, accountability, due process, and fundamental rights in both public administration and judicial systems, within the context of digital governance and law enforcement. While there are various international instruments that promote human-centered and accountable AI such as the UNESCO Recommendation on the Ethics of Artificial Intelligence, the OECD Principles for Responsible Use of AI, the Council of Europe Framework Convention on Artificial Intelligence, and UN digital governance initiatives Pakistan lacks a unified legal approach to algorithmic accountability. This paper discusses the potential of algorithmic accountability in achieving justice and responsible governance by using a comparative cyber law analysis of Pakistan, India, and Singapore. It critically examines constitutional guarantees, cyber law, AI governance, data protection regimes, judicial developments, and international regulation, applying a qualitative doctrinal and comparative approach. It shows that, while institutional frameworks of AI governance have been established in both India and Singapore with transparency obligations, explanation standards, algorithmic impact assessments, regulatory sandboxes, independent oversight, and strong accountability measures, Pakistan's fragmented legal architecture lacks comprehensive AI legislation, strong institutional supervision for AI, meaningful regulatory measures to counter algorithmic bias, and an enforceable accountability mechanism. Based on these comparative learnings, the paper proposes a normative model for Pakistan grounded in constitutionalism, the rule of law, human rights, judicial oversight, the use of AI auditing, transparency-by-design, human-in-the-loop governance, and an independent Algorithmic Accountability Authority. It recommends that these principles be integrated into the cyber law regime of Pakistan in order to enhance access to justice, promote responsible digital governance, and ensure trustworthy, rights-based AI.

Keywords: Algorithmic Accountability, Artificial Intelligence Governance, Cyber Law, India, Pakistan, Singapore

ID-826041: Digital Legal Governance: Using AI to Bridge Implementation Gaps of International Marine Plastic Conventions in Pakistan

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Marine plastic pollution has emerged as a critical environmental challenge that threatens marine biodiversity, public health, and sustainable economic development. Although Pakistan is a party to several international environmental agreements addressing marine pollution, significant implementation gaps remain due to fragmented legal frameworks, weak institutional coordination, limited monitoring capacity, and inadequate enforcement mechanisms. This study examines how artificial intelligence (AI) can strengthen digital legal governance to enhance the implementation of international marine plastic conventions in Pakistan. Employing a qualitative doctrinal research design, the study analyzes international legal instruments, national environmental legislation, policy documents, and recent developments in AI-enabled environmental governance. The findings suggest that AI technologies including predictive analytics, satellite and remote sensing, automated compliance monitoring, and intelligent legal decision-support systems can improve regulatory oversight, facilitate real-time monitoring of marine pollution, strengthen evidence-based policymaking, and enhance institutional accountability. The study concludes that integrating AI into Pakistan's environmental governance framework can significantly reduce implementation gaps, improve compliance with international obligations, and support the achievement of sustainable marine environmental management. The proposed framework offers practical policy recommendations for developing an effective AI-driven digital legal governance system for marine plastic pollution control.

Keywords: Artificial Intelligence (AI); Digital Legal Governance; Marine Plastic Pollution; International Environmental Law; Marine Plastic Conventions; Environmental Compliance; Pakistan; Environmental Governance; Sustainable Development; Policy Implementation

ID-826123: Responsible Artificial Intelligence Governance: An Islamic Ethical Framework for Strengthening Justice, Public Policy, and Global Peace

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Artificial Intelligence is transforming contemporary society by improving healthcare, education, banking, transportation, agriculture, security, and public administration. Its capacity to enhance efficiency, support informed decision-making, and strengthen public services offers significant opportunities to protect lives and promote sustainable development. However, the rapid advancement of AI has also raised serious ethical concerns, including algorithmic bias, discrimination, privacy concerns, misinformation, limited transparency, and weak accountability. These challenges highlight the urgent need for responsible AI governance guided by sound ethical principles. This study examines how Islamic ethical principles can contribute to responsible AI governance, exploring how the Holy Quran, the authentic Sunnah of Prophet Muhammad (PBUH), the Seerah, and the objectives of Islamic law provide practical guidance for addressing ethical challenges associated with modern AI technologies. The research adopts a qualitative, descriptive, and analytical approach. Data were collected from primary sources, including the Holy Quran, authentic Hadith, and classical Islamic teachings, as well as secondary sources such as books and international AI governance frameworks, including UNESCO and OECD guidelines, and analyzed through content and comparative analysis. The findings indicate that Islamic values such as justice, trust, accountability, consultation, privacy, and public welfare closely align with the principles of responsible AI governance. Furthermore, Islamic ethics offers a stronger moral foundation by emphasizing accountability to Allah and responsibility toward society. The study concludes that integrating these ethical principles into AI governance can strengthen justice, protect human rights, improve public policy, encourage the ethical development and use of AI, and contribute to protecting lives and promoting lasting global peace.

Keywords: Artificial Intelligence, Responsible AI Governance, Islamic Ethics, Justice, Public Policy, AI Ethics, Privacy Protection, Global Peace

ID-826132: Artificial Intelligence, Digital Social Protection for Women's Safety and Human Security: A Gender: Responsive Public Policy Perspective from Pakistan

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Artificial intelligence (AI) is rapidly reshaping public governance and service delivery, with the potential to increase public sector efficiency in administration and to inform decision-making with evidence. The use of AI in digital governance and social protection programmes provides a great opportunity for boosting women's safety, social inclusivity, and human security in Pakistan. This study investigates the contribution of AI and digital social protection (DSP) to improving women's safety and human security from a gender-responsive public policy standpoint in Pakistan. The problem has been addressed using a qualitative explanatory research design based on

extensive secondary data analysis of peer-reviewed journal articles, government policy reports, and publications from national and international organisations. Thematic analysis has been employed to bring together policy trends, opportunities, and challenges. The results show how AI-based digital governance has enhanced the efficiency, transparency, and accessibility of social protection systems via digital ID, biometric verification, digital cash transfer systems, and digital payment systems, which have helped increase financial inclusion and access to public services for women. The findings suggest strengthening AI regulation, extending the coverage of digital literacy programs, bridging the digital gender divide, advancing cybersecurity capabilities, increasing women's involvement in digital governance, and fostering gender-inclusive digital social protection. Through the responsible use of technologies, AI can be applied together with inclusive public policy and human security measures to promote the safety, social justice, and sustainable development of women in Pakistan.

Keywords: Artificial Intelligence; Digital Social Protection; Women's Safety; Human Security; Gender-Responsive Public Policy; Digital Governance; Gender Equality

ID-826193: Governing the Guardian: Responsible AI Governance and Public Policy for Protecting Lives and Promoting Peace

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The rapid proliferation of artificial intelligence (AI) technologies in security, humanitarian, and peacebuilding fields is outpacing the governance systems designed to guide their safe deployment. This paper evaluates conditions to ensure responsible AI governance and policy-making for protecting lives and advancing peace, based on a qualitative research design built around semi-structured interviews with policymakers, multilateral officials, AI ethics and safety researchers, humanitarian technologists, and civil society organizations. Thematic analysis of the data revealed six key themes: fragmented accountability, a trust gap between technologists and affected communities, fears about the dual-use potential of AI, unequal global capacity, normative fragmentation among jurisdictions, and diverging interpretations of "meaningful human control." The study concludes that responsible governance of AI is not about formulating new principles which are widely accepted internationally anyway but about implementing them in legally binding, locally contextualized, and well-resourced policy measures. The paper ends with a policy framework focused on four aspects of AI governance: accountability, participation, interoperability, and capacity-building.

Keywords: Responsible AI Governance; Public Policy; Peacebuilding; Human Security; Qualitative Research; Stakeholder Interviews; Global AI Ethics.

ID-826201: AI for Peacebuilding and Social Cohesion: Opportunities and Challenges in Pakistan

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Pakistan's struggles with sectarian tension, ethnic division, and extremist messaging have become harder to manage in a time of growing internet access and vast, unchecked online material. As a result, some have begun looking toward Artificial Intelligence for help in conflict resolution and trust-building, but there is still little clear evidence for its use. This paper studies both sides of the debate to assess what AI can realistically do. It is a qualitative study drawing on policy documents, comparative examples from conflict-affected regions, and existing literature on AI governance to understand how these technologies would fit into Pakistan's social and institutional demands. The paper covers four themes: early conflict detection, dealing with online extremism, moderating platform content, and using technology to build trust. The findings suggest that machine learning systems can scan social media and news in real time to help detect rising hate speech and misinformation before harm occurs. Because Pakistan has many spoken languages, there should be dedicated systems for Urdu, Punjabi, Pashto, Sindhi, Balochi, and other regional languages to help identify radicalization, support counter-messaging efforts, and gain local trust. Such tools could help locate high-tension areas and open safe routes for dialogue between communities. The paper does not hide the real problems these tools raise: there is little localized data, which prevents training systems with full societal representation and can directly amplify existing societal grievances; there are no clear legal frameworks governing AI use, opening the door to surveillance, harm to the right to privacy, and the possibility that such tools could be used to silence opposition rather than build trust. Pakistan's digital divide low internet access, low digital literacy, and gender-based gaps in access means the communities most in need of these interventions may be excluded from them entirely. Automated systems also fail to reliably distinguish legitimate political speech from extremist views, which can erode public trust in these platforms over time. The paper's central argument is that AI's role in building peace will remain limited unless it is guided by rights-based governance; it should complement traditional methods of conflict resolution rather than replace them, supported by data protection laws and genuine input from affected people. The paper calls for a joint stakeholder body to oversee the ethical use of AI, investment in local-language technology, and targeted programs to reduce the digital gap between communities. AI cannot replace grassroots peacebuilding efforts, but it can play a supporting role when introduced with careful planning, real safeguards, and a genuine commitment to the cause.

Keywords: Artificial Intelligence, Peacebuilding, Social Cohesion, Pakistan, Conflict Prevention, AI Governance, Digital Divide

ID-826220: AI for Protecting Lives and Promoting Peace: Strengthening Justice, Responsible Governance and Public Policy through Human Rights and Legal Frameworks

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Artificial Intelligence (AI) has become a life-changing capability that can save lives, improve public services, reinforce justice systems, and foster peace globally. Conversely, the rapid adoption of AI in governance, law enforcement, healthcare, security, and public decision-making raises significant legal, ethical, and policy-related dilemmas. This research seeks to explore how to ensure that AI systems are transparent, accountable, fair, and human-centered through the lens of legal frameworks and public policy. The method adopted for this study is doctrinal and comparative legal research, which examines models that operationalize the governance of AI, as well as international regulatory principles and human rights protection principles. It suggests that technological innovation and fundamental rights namely privacy, equality, due process, and access to justice are vital elements of good AI governance. The study highlights the significance of current legal frameworks in addressing algorithmic bias, the risks of automated decision-making, and the potential for misuse of modern AI technologies. Further, the paper examines the application of AI in the positive aspects of peacebuilding in terms of early warning, conflict prevention, disaster response, and better public service delivery. It underscores the importance of partnership between governments, legal actors, technology practitioners, and international organizations to develop responsible AI policies. The implementation of AI has the potential to save lives and build peace, but this can only be realized through tangible legal principles, ethical norms, and inclusive public policies. To ensure that AI respects human rights, promotes democracy, and fosters sustainable global peace, a human-rights-based governance framework is crucial.

Keywords: Artificial Intelligence, Responsible Governance, Public Policy, Rule of Law, Human Rights, Algorithmic Accountability, Global Peace

ID-826282: Factors Influencing Physical Activity Participation: A Case Study of District Muzaffarabad

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This study investigated the key factors influencing physical activity participation among school-going children in District Muzaffarabad. The research focused on interpersonal, organizational, and policy-level factors, aiming to identify major barriers and supportive elements within school and

home environments. A descriptive cross-sectional survey design was used, and data were collected through a structured questionnaire from 342 respondents, including parents, teachers, and school principals. The questionnaires (WHO 2018, CDC 2020, NASPE 2019) addressed both demographic details and specific items related to physical activity. Data analysis was conducted using SPSS version 26, applying descriptive statistics and inferential tests including t-tests and ANOVA. Findings revealed that interpersonal factors, especially support from parents, peers, and teachers, played the most significant role in promoting children's participation in physical activities. However, organizational challenges such as lack of school resources, limited time, and gender-based disparities posed significant hurdles. At the policy level, inadequate funding, weak implementation of guidelines, and minimal government attention were key concerns, particularly in rural and underfunded schools. The study concludes that improving physical activity participation among children requires joint efforts at the family, school, and government levels. Recommendations include inclusive school policies, increased funding for physical education, regular monitoring, and awareness programs for stakeholders to create an active and supportive environment for children in Muzaffarabad.

Keywords: Physical Activity Participation, Interpersonal Factors, Organizational Factors, Policy Factors, Demographic Factors

ID-826175: Institutional Readiness before Artificial Intelligence: A Governance Framework for AI: Assisted Judicial Reform in Pakistan

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Courts around the world are under growing pressure to improve efficiency without compromising fairness or judicial independence. Artificial intelligence is increasingly presented as part of that solution. Most governance frameworks therefore ask the same question: how can AI be used responsibly? Pakistan's National Guidelines for Use of Artificial Intelligence in Judicial Institutions follow this direction by setting out ethical principles for judicial AI. Yet they also expose a different question, one that receives much less attention: how should a court decide that it is institutionally ready to adopt AI at all? Pakistan offers a useful setting in which to examine that question. Judicial reform, digital transformation, and AI governance are unfolding at the same time, making it possible to look not only at technological change but also at the institutions expected to manage it. This study uses comparative qualitative policy analysis to examine Pakistan's National Guidelines alongside the OECD AI Principles, the UNESCO Recommendation on the Ethics of Artificial Intelligence, and selected international frameworks for judicial AI. Rather than comparing ethical standards alone, it asks what these documents assume about the institutions responsible for implementing them. Those assumptions reveal an important gap. The frameworks describe how AI

should operate once it enters judicial institutions. They say much less about the institutional conditions that ought to exist before deployment. Transparency, accountability, explainability, and human oversight all depend on courts having the capacity, credibility, and public confidence to give those principles practical effect. Without that foundation, ethical safeguards risk becoming commitments on paper rather than practices that shape public experience. One finding became increasingly difficult to ignore. Although these frameworks differ in important respects, they repeatedly return to the same institutional foundations: transparent administration, accountable decision-making, meaningful human oversight, reliable digital governance, and sustained public engagement. Those foundations provide a more valuable way of judging judicial readiness for AI than technological capability alone. Technical safeguards such as explainable AI still matter, but they cannot substitute for institutions that lack credibility or public trust. Current discussions about judicial AI mostly ask how courts can govern artificial intelligence responsibly. An equally important question has received far less attention: are judicial institutions themselves ready to govern it? Institutional readiness should be assessed before technological readiness, because the legitimacy of judicial AI depends as much on the institutions that govern it as on the technology itself.

Keywords: Artificial Intelligence; Judicial Reform; Institutional Readiness; AI Governance; Public Policy; Pakistan

ID-826031: AI: Enabled Autonomous ASAT Weapons: Legal Gaps Under Article IV of the Outer Space Treaty

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The 1967 Outer Space Treaty (OST) stands as the constitutional foundation of international space law, yet its Article IV prohibition on weapons of mass destruction (WMD) in Earth orbit reflects the technological assumptions of the Cold War era not the realities of 2026. This Article is silent on both non-WMD weapons and artificial intelligence (AI)-enabled autonomous systems. This legal gap has become critical as states develop AI-powered anti-satellite (ASAT) weapons capable of autonomous target selection and engagement. Two fundamental questions arise under current law. First, does Article IV's prohibition on "weapons" apply to AI systems that are not physical objects? The treaty does not define "weapon." Second, who bears state responsibility under Article VI when an autonomous AI system causes damage without direct human command? The Liability Convention assumes human decision-making. This research analyzes the intersection of AI autonomy and the non-WMD gap in space law. It argues that existing treaty language is inadequate to assign liability for AI-caused damage. Proposed reforms include amending the Liability Convention to explicitly address AI systems and establishing a

"meaningful human control" threshold for autonomous space weapons under Article IV.

Keywords: AI-Enabled Autonomous Weapons, Anti-Satellite Weapons (ASATs), Outer Space Treaty Article IV, Autonomous Weapons Systems (AWS), International Space Law

ID-826339: Ribā in Digital Finance: A Fiqh: Based Analysis of Interest: Bearing Loans, Credit Cards, Buy: Now: Pay: Later Services, and Fintech Models

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Digital financial services are rapidly expanding, changing how people and businesses access credit, pay debts, and make payments. At the same time, new financial instruments like interest-based digital loans, credit cards, Buy-Now-Pay-Later (BNPL) schemes, digital lending platforms, and other fintech services present new challenges regarding their ability to fit within Islamic commercial law (fiqh al-muʿāmalāt) and Sharīʿah principles. In this study, we explore the idea of ribā in the context of today's digital finance, examining the contractual arrangements, financial arrangements, and sources of gain of different modalities of digital credit. It separates legally permissible service charges and deferred-payment transactions from those prohibited due to an increase in terms resulting from loans or debt. The research is based on the Qurʿān, Sunnah, classical Islamic jurisprudence, contemporary fatāwā, and Sharīʿah standards to assess whether contemporary financial products constitute ribā, gharar, or other impermissible (haram) transactions. Credit card interest, late-payment fees, BNPL schemes, digital lending costs, and algorithmic lending fees are all given special attention. The study also examines the difficulties of fintech innovation in relation to Sharīʿah compliance and suggests principles for designing digitally enabled financial products that maintain consistency with Sharīʿah law. The results indicate that digital finance is not merely a question of technology but of the types of contractual relationships, financial returns, debt, and risk allocation. The study emphasizes the necessity of enhancing Sharīʿah governance, clarity of contractual arrangements, and the innovation of models in Islamic fintech to offer alternative solutions to interest-based digital finance.

Keywords: Ribā; Digital Finance; Islamic Fintech; Sharīʿah Compliance; Fiqh al-Muʿāmalāt

ID-826379: Regulating Framework for Artificial Intelligence in Pakistan: Lessons from the European Union Legislation and the UNESCO Recommendation on the Ethics of Artificial Intelligence

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The introduction of Artificial Intelligence in all spheres of life such as governance and public administration, healthcare, education, law enforcement, and judicial systems holds innumerable public service delivery options and opportunities for sustainable development. But the rapid use of AI also presents a number of legal and ethical challenges regarding privacy, algorithmic bias, accountability, transparency, discrimination, and the safeguarding of fundamental human rights. Most importantly, in Pakistan the dependency on AI technology is growing, yet there is a wide gap in the country's legal and regulatory framework to regulate the development and responsible use of the technology. Existing legislation, which includes the Digital Nation Pakistan Act 2025, the National Artificial Intelligence Policy 2025, the Prevention of Electronic Crimes Act 2016, and other digital policy initiatives, remains insufficient to address the complex challenges created by the irresponsible use of AI. This paper examines the current legislation and legal framework in Pakistan regarding Artificial Intelligence and discusses a normative framework framed in light of the European Union AI legislation and UNESCO's Recommendation on the Ethics of Artificial Intelligence. A doctrinal and comparative legal research methodology will be employed to critically analyse the risk-based regulatory model of the EU AI regulations alongside UNESCO's human-rights-centered ethical principles. The study will also assess their compatibility with the existing legal regime and AI regulatory framework in Pakistan. The paper highlights the main regulatory shortcomings in the areas of transparency and accountability, data protection and privacy governance, non-discrimination principles, and institutional oversight. The study argues that Pakistan should implement a context-sensitive AI regulation strategy that allows for the utilization of the technology while simultaneously promoting innovation and development and ensuring the protection of democratic principles and constitutional rights. It recommends establishing an AI-specific legislative framework, compulsory AI risk assessment for critical systems, independent regulation, greater transparency requirements, and higher protection standards against discriminatory use of AI and opaque decision-making processes. This paper complements and expands on the domestic legal realities to enrich the ongoing discussion on the governance of AI in developing countries. It also offers realistic recommendations for building a legal framework that is based on democratic principles, protects and respects fundamental rights, and is human-centric, to promote justice and advance responsible governance.

Keywords: Artificial Intelligence, AI Governance, Pakistan, EU AI Legislation, UNESCO Recommendation on the Ethics of AI, Human Rights, Public Policy, Responsible Governance

Sub-theme: To Transform Healthcare, Life Sciences & Public Well-being

ID-826405: Role of Physical Therapist in the Treatment of Osteoarthritis

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Background: Osteoarthritis (OA) is a common chronic musculoskeletal condition characterized by pain, joint stiffness, reduced mobility, and functional limitations. It can significantly affect an individual's quality of life and ability to perform daily activities. Objective: This abstract aims to describe the role of physical therapists in the management and treatment of osteoarthritis. Methods: Physical therapy management of OA includes patient assessment, therapeutic exercise, manual therapy, education, activity modification, and individualized rehabilitation programs. Physical therapists assess pain, joint range of motion, muscle strength, flexibility, balance, gait, and functional limitations to develop appropriate treatment plans. Results: Regular physical therapy can help reduce pain and stiffness, improve joint mobility, increase muscle strength, enhance balance and functional capacity, and promote independence in daily activities. Therapeutic exercises — including strengthening, aerobic, flexibility, and neuromuscular exercises — are particularly important, while patient education and weight-management guidance further support long-term symptom control and adherence to physical activity. Conclusion: Physical therapists play an important role in the conservative management of osteoarthritis. An individualized, evidence-based rehabilitation program can reduce symptoms, improve physical function, and enhance quality of life. Early referral to physical therapy and continued patient participation are essential components of effective long-term OA management.

Keywords: Osteoarthritis, Musculoskeletal Condition, Joint Stiffness, Functional Limitations, Patient Education, Weight Management

ID-826027: 4D Label: Free Ubiquitinomics Reveals Keratin and Cytoskeletal Modification Signatures Associated with Cashmere Goat Skin Biology

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The production of cashmere fibers in goats is primarily determined by secondary hair follicles and the keratinization of skin tissue and fibers, yet little is known about the post-translational regulation mechanisms of cashmere goat skin. To explore ubiquitination in the skin tissue of Inner Mongolia cashmere goats and Boer goats, we performed 4D label-free quantitative ubiquitinomics. Skin tissue samples from three biological replicates of each group were studied by enriching ubiquitinated peptides via immunoaffinity purification using beads coated with antibodies specific to di-glycine lysine modification, followed by analysis on a timsTOF Pro2 LC-MS/MS. After database search using FragPipe/IonQuant, we found 8,606 ubiquitination sites for 2,734 proteins. Comparing Inner Mongolia cashmere goat and Boer goat skin, we found 160 nominally differentially abundant ubiquitination sites, of which 10 were up-regulated in the cashmere goat group and 150 down-regulated. Motif analysis revealed conserved sequence motifs around modified lysines. Among the functions of identified proteins, we found keratin intermediate filaments, cytoskeletal structure, skin barrier formation, protein degradation, and adhesion processes. Protein-protein interaction analysis revealed KRT1, KRT5, KRT10, KRT14, vimentin, and ACTA1 as central structural proteins in the differentially modified protein network. Overall, altered ubiquitinated peptide abundance in keratin and cytoskeletal proteins may be associated with structural protein regulation and secondary hair follicle-related skin biology. This study provides a ubiquitinomics resource for future validation and functional studies on cashmere fiber development in small ruminants.

Keywords: Cashmere Goat, Ubiquitinomics, 4D Label-Free Proteomics, Keratin, Cytoskeleton, Secondary Hair Follicle, Fiber Development

ID-826093: From Molecular Interaction to Metabolic Response: Evaluation of a Standardized Garcinia cowa Leaf Extract

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Diabetes mellitus remains a major metabolic disorder characterized by persistent hyperglycemia, dyslipidemia, impaired insulin regulation, and

progressive organ dysfunction. This study investigated the therapeutic potential of a chamuangone-enriched fraction obtained from the leaves of Garcinia cowa Roxb., a Southeast Asian medicinal plant traditionally associated with diabetes management. The enriched fraction was produced through microwave-assisted extraction and chromatographic purification, while high-performance liquid chromatography was used to confirm and standardize its chamuangone content. A multidisciplinary evaluation was undertaken using computational, biochemical, and animal-based approaches. Computational findings demonstrated a stable interaction between chamuangone and α-glucosidase, whereas its association with pancreatic lipase was comparatively weaker. These observations corroborated the in vitro α-glucosidase and pancreatic lipase inhibitory profile of the extract. In streptozotocin-induced diabetic rats, 28-day repeated oral administration of the standardized extract ameliorated the levels of FBG, HbA1c, insulin, lipid profile, body mass index, food/water consumption, and hepato-renal functional biomarkers. The findings indicate that the chamuangone-enriched extract may exert antidiabetic activity through modulation of glucose metabolism, digestive enzyme activity, lipid homeostasis, and systemic metabolic function. Further pharmacological and clinical investigations are warranted to determine its translational potential.

Keywords: Green Extraction, Plant-Based Alternative Therapy, BCG-Economy Model, Garcinia cowa, Antidiabetic

ID-826148: Living with Childhood Congenital Heart Disease: Parental Experiences, Stressors, and Coping in a Low: Resource Setting in Pakistan

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Background: Congenital heart disease (CHD) has caused a significant psychosocial and economic burden for families worldwide. Most research has focused on high-income countries, while in Pakistan about 60,000 children are born with CHD each year. Although parental psychosocial experiences have been widely investigated in high-income countries, little qualitative evidence exists from low-resource settings such as Pakistan. This study explored the psychosocial experiences, stressors, coping strategies, and support needs of parents caring for children with CHD in Pakistan. Methods: A descriptive qualitative design was conducted using Braun and Clarke's Reflexive Thematic Analysis, informed by the Transactional Model of Stress and Coping. Twenty parents were recruited through purposive sampling at the Peshawar Institute of Cardiology, Pakistan, between October 2025 and February 2026. Semi-structured interviews were conducted in Urdu or Pashto and analyzed using a six-phase reflexive thematic analysis approach. Results:

Four interrelated themes were identified: (1) emotional and psychological burden characterized by diagnostic shock, anxiety, and fear of mortality; (2) illness- and treatment-related stressors including visible symptoms, delayed diagnosis, and complex referral pathways; (3) socioeconomic burden involving financial hardship, loss of income, and caregiving responsibilities; and (4) coping and resilience strategies, including religious faith, family and community support, peer experiences, treatment adherence, and access to financial assistance. Conclusion: Caring for a child with CHD in Pakistan involves complex interactions between emotional distress, structural healthcare barriers, and socioeconomic constraints. Despite these challenges, parents demonstrated resilience through culturally embedded coping mechanisms. The findings highlight the need for family-centred, culturally sensitive psychosocial support integrated within pediatric cardiac care services in low-resource settings.

Keywords: Congenital Heart Disease, Pakistan, Parental Experiences, Qualitative Research, Stress and Coping

ID-826152: First-Aid Training for Rural Pakistan in Their Indigenous Languages Using VR

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Geographical isolation, poor infrastructure, and a lack of health workers are significant obstacles to emergency medical response in rural Pakistan. The rate of deaths increases following an injury, and some of these deaths can be avoided with proper first aid. The problem of low literacy rates and inadequate educational materials in native regional languages poses tremendous challenges for conventional first-aid practice. This paper demonstrates a novel, low-cost, and offline Virtual Reality (VR) training system, designed especially for rural communities in Pakistan. The system provides realistic, high-fidelity simulation modules for the seven most frequent local medical emergencies: bone fracture, penetrating trauma (stab wounds using wood or metal instruments), venomous snake bite, scorpion sting, cardiopulmonary resuscitation (CPR), drowning, and severe heat stroke. It also features fully localized audio narration in local languages such as Punjabi, Pashto, Sindhi, Balochi, and Saraiki to tackle literacy problems, alongside an easy-to-use icon-based player interface that requires no complex gaming controllers. Furthermore, the software architecture is optimized for low-spec mobile VR platforms, such as Google Cardboard, allowing it to run on regular smartphones without depending on cellular networks or the internet. This approach offers clear advantages over normal text-oriented or lecture-based teaching methods because of its language-specific and engaging nature, leading to improved procedural memory, reaction time, and motor memory.

Keywords: First-Aid, VR Training, Local Languages, Google Cardboard, Offline

ID-826154: Design and Optimization of a Low-Cost, Edge: AI Governed Smart Tourniquet for Automated Hemostasis Control

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Penetrating trauma-associated arterial hemorrhage continues to be a major cause of avoidable death in remote, low-resource areas where emergency medical response is significantly delayed. Although the manual combat tourniquet is a life-saving device, it is often used by untrained rural bystanders, with catastrophic secondary complications possible such as under-tightening leading to exsanguination (death) or over-tightening that crushes the nerves, causing necrosis of the affected limb. This paper presents the mechanical design, kinematic optimization, and algorithmic framework of an ultra-low-cost smart tourniquet for decentralized emergency care. The heart of the mechanical system is a high-torque GA12-N20 miniature DC geared motor, which provides high torque with a low current draw, used in combination with a passive Nitinol shape-memory alloy wire as an emergency release mechanism. To safely control this mechanical system, an ESP32-WROOM-32E microcontroller with an Edge-AI system is embedded. Real-time physiological telemetry is collected through a sensor fusion layer comprising two types of sensors: the flexible film force sensor RP-C18.3 underlying the band and an optical sensor cluster of distal MAX30102 photoplethysmograms (PPGs). These inputs directly feed into a lightweight, embedded neural network classification model in real time. The algorithm calculates the exact time of arterial occlusion based on blood flow patterns and changing pressure wave profiles, then commands the GA12-N20 mechanical assembly to lock at the minimum effective pressure (MEP) needed to stop the bleed without damaging the underlying neurovascular tissue. This mechatronic actuator can deliver the required circumferential force of 600 N even under extreme environmental conditions (above 45 °C), offering a cost-effective mechatronic solution that can be widely adopted by marginalized communities for safe and autonomous hemorrhage control.

Keywords: Smart Tourniquet, GA12-N20 Motor, PPGs, Flexible Film Force Sensor, Edge-AI

ID-826164: Predicting Patient Outcome in Critical Care Units Using Machine Learning: Enhancing Modified Early Warning Systems in Nursing Practice

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Introduction: A critical care unit is a specialized hospital unit in which patients are closely monitored for life-threatening conditions. Timely and precise prognosis in ICUs can significantly improve patient management decisions and resource utilization. Vital signs are monitored and clinical deterioration is assessed using the Modified Early Warning Score (MEWS) and other scoring systems; however, their effectiveness is limited by linear risk assumptions. Objective: To compare the performance of several machine learning models in terms of accuracy, area under the curve (AUC), sensitivity, and specificity in predicting ICU outcomes, and to assess the interpretability of the models using a visualization tool. Methodology: The dataset consisted of 1,740 ICU patients' online data with 14 clinical variables, preprocessed by handling missing data, encoding, standardization, and applying SMOTE for class balancing. The dataset was divided into training and testing sets for model development. Five machine learning algorithms Random Forest, Decision Tree, XGBoost, KNN, and Logistic Regression were implemented and evaluated using accuracy, precision, F1-score, ROC-AUC, ROC curves, and recall. Results: All five models were assessed for performance. XGBoost reported high accuracy (91%) and AUC (0.94). Logistic Regression also showed good accuracy (86%) compared with the Decision Tree and KNN models. Conclusion: The study concluded that XGBoost and Logistic Regression are the best models to predict patient deterioration on the basis of early warning signs. Further studies are recommended on real patients in the local context of Peshawar, Pakistan.

Keywords: ICU Patient Outcomes, Machine Learning, XGBoost, Random Forest, Early Warning System, Clinical Decision Support, Predictive Modeling, Healthcare Analytics

ID-826184: Factors Associated with Self: Care Behaviors Among Mountain Dwellers with Coronary Artery Disease

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Background: Coronary artery disease (CAD) is a serious public health concern. In Gilgit-Baltistan, this challenge is severe due to rugged terrain, harsh climatic conditions, and limited cardiac facilities. Self-care can improve public health; however, regions like Baltistan lack empirical evidence. The study aims to evaluate the factors associated with self-care behaviors (SCBs) among patients with CAD living in Baltistan. Methods: An analytical cross-

sectional study was performed between March and July 2026 in Skardu, among 414 hospitalized adult patients with CAD, recruited via consecutive sampling. A structured questionnaire covering demographic, clinical, environmental, lifestyle, and self-care variables was used for data collection. Relevant permissions were obtained. Descriptive statistics and multiple linear regression were performed for data analysis. Results: Of the 414 patients, 63.3% were men; the mean age was 56.93 years (SD = 10.92), 72.7% were unemployed, and 59.7% lived in a joint family. In 92.5% of cases, a family member had an active role in patient treatment. Patients used baking soda for cooking (78.3%) and drank an average of 3 cups of salty tea. Difficult access to health facilities was reported by 76.1%, at an average distance of 75.35 km (SD = 46.69) from a cardiac facility. The average length of hospital stay was 3.61 days (SD = 1.76); hypertension was present in 50.2%, average triglycerides were 270.34 (SD = 100.10), and average ejection fraction was 51.23 (SD = 8.83). Self-care was poor (< 70) across maintenance, monitoring, and management domains. Low education level, living in a nuclear family, the role of family members in treatment, use of apricot oil, drinking salty tea, passive smoking, difficult access and distance from a cardiac facility, high BMI and triglyceride levels, low ejection fraction, and unemployment were significantly associated with self-care behaviors. Conclusion: Patients with CAD in Baltistan present unique factors affecting their self-care behaviors. A multi-layered, context-specific intervention is needed to improve self-care and reduce the burden of CAD in Baltistan.

Keywords: Coronary Artery Disease, Self-Care Behaviors, Cardiovascular Disease, Gilgit-Baltistan, Pakistan

ID-826185: Illness Perception, Self: Management, and Associated Factors among Adult Village Residents with Type 2 Diabetes in Dir

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Background: Type 2 diabetes mellitus (T2DM) has been a major public health challenge over the past decade in Pakistan, particularly in rural communities where limited healthcare resources and diabetes education hinder effective disease management. This study examined illness perception, self-management practices, and the factors associated with both among adults with T2DM in rural Dir, Khyber Pakhtunkhwa. Methods: A cross-sectional survey with an analytical approach was adopted. A calculated sample of 355 adults with T2DM was recruited from the outpatient department of DHQ Hospital Timergara, Dir Lower, using convenience sampling. Data were collected through a structured, interview-based questionnaire encompassing the Urdu version of the Brief Illness Perception Questionnaire, diabetes self-care activities, and sociodemographic and clinical variables. SPSS v26.0 was used for analysis. Results: Participants (mean age 58.16 ± 12.95 years; 181 males [51.0%], 174 females [49.0%]; 51.8% with no formal education; 61.4%

middle income) perceived diabetes as moderately threatening (mean BIPQ = 57.25 ± 9.64/80). There was high adherence to medications (mean 6.58/7 days), poor self-monitoring of blood glucose (mean 1.19/7 days), and poor structured exercise (mean 0.50/7 days). There was no significant relationship between illness perception and self-management for age, diabetes duration, HbA1c, or BMI (all $p > .05$). Education was the sole predictor of illness perception ($B = 2.26$, $p < .001$) and self-management ($B = 2.99$, $p < .001$), while income was the sole predictor of self-management ($B = -4.10$, $p < .001$). There was a moderate positive correlation between illness perception and self-management ($r = .517$, $p < .001$). Conclusion: Diabetes self-management among rural adults with T2DM appears to be influenced more by educational and socio-economic factors than by clinical characteristics. Strengthening low-literacy, family-centred diabetes education and improving access to self-monitoring resources may enhance diabetes outcomes in underserved rural communities.

Keywords: Type 2 Diabetes Mellitus; Illness Perception; Self-Management; Self-Care; Rural Population; Khyber Pakhtunkhwa

ID-826187: Synthesis of a New Class of Indole Acetic Acid Sulfonate Derivatives as Ectonucleotidase Inhibitors

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Ectonucleotidase inhibitors (ENPPs, e5′NT (CD73), and h-TNAP) are potential therapeutic candidates for the treatment of cancer. Adenosine, the cancer-developing and growth moiety, is the resultant product of these enzymes. The synthesis of small molecules that can inhibit ENPPs, ecto-5′-nucleotidase, and h-TNAP has been used in traditional attempts to reduce adenosine levels. In this research work, a short and interesting method for developing substituted indole acetic acid sulfonate derivatives (5a–5o) non-nucleotide-based small molecules is presented, and their inhibitory potential against recombinant h-ENPP1, h-ENPP3, h-TNAP, h-e5′NT, and r-e5′NT was investigated. Their overexpression in the tumor environment leads to high adenosine levels that result in tumor development and immune evasion; therefore, selective and potent inhibitors of these enzymes would be expected to decrease adenosine levels and manage tumor development and progression. The intended outcome led to the discovery of new potent inhibitors such as 5e (IC50 against h-ENPP1 = 0.32 ± 0.01, 58-fold increase relative to suramin), 5j (IC50 against h-ENPP3 = 0.62 ± 0.003, 21-fold increase relative to suramin), 5c (IC50 against h-e5′NT = 0.37 ± 0.03, 115-fold increase relative to sulfamic acid), 5i (IC50 against r-e5′NT = 0.81 ± 0.05, 95-fold increase

relative to sulfamic acid), and 5g (IC50 against h-TNAP = 0.59 ± 0.08, 36-fold increase relative to levamisole). Molecular docking studies revealed that these inhibitors induced favorable interactions with key active-site amino acids. Enzyme kinetic studies revealed that potent compounds such as 5j and 5e blocked these ectonucleotidases competitively, while compounds 5e and 5c presented an uncompetitive binding mode, and 5g revealed a non-competitive mode of inhibition.

Keywords: Cancer, Adenosine, Indole Derivatives, Ectonucleotidases

ID-826202: Factors Influencing Self: Care Behaviors in Patients with Hemodialysis

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Background: Chronic kidney disease is an increasing global health burden, with a rising prevalence in Asia and Pakistan. End-stage renal disease often requires hemodialysis. Effective self-care and patient education are essential for improving treatment outcomes and quality of life in these patients. Aim: The purpose of this study was twofold: firstly, to measure levels of self-care and self-efficacy, and secondly, to identify factors associated with self-care among patients undergoing hemodialysis. Methods: An analytical cross-sectional study was conducted at the Kidney Hospital, Swat. Data were collected from 349 patients using validated Urdu versions of the Self-Care Inventory and Self-Efficacy Scales through interviewer-administered questionnaires. Results: Of the 349 patients, 66.2% (n = 231) were men, 86.5% (n = 302) were married, 66.8% (n = 233) had no formal education, 67.3% (n = 235) lived in an extended family system, and only 9.2% (n = 32) required family support for daily activities. Regarding clinical variables, 67.9% (n = 237) had hypertension, and 32.1% (n = 115) had hypertension and diabetes. Mean Hb was 8.6 g/dL and creatinine 9.4 mg/dL. A high proportion, 71.6% (n = 250), of patients showed inadequate self-care maintenance. Inadequate self-care behavior scores (≤ 70) included physical activity, routine health checkups, monitoring medication side effects, and seeking guidance from health professionals. Significant determinants of self-care were sex, education level, monthly income, family structure, and family support ($p < 0.05$). Conclusion: A considerable proportion of patients reported inadequate self-care in maintenance, monitoring, and management, although they reported high self-efficacy. Sociodemographic variables primarily affect self-care behaviors. Patient-centered approaches can improve self-care in patients undergoing hemodialysis.

Keywords: Chronic Kidney Disease, Hemodialysis, Self-Care, Self-Efficacy

ID-826212: Symptom Management, Urgent Care Utilization, and Self: Care Behaviors among Patients with Coronary Heart Disease: A Prospective Cohort Study

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Background: The growing coronary heart disease (CHD) incidence and sustained prevalence remain a global challenge, impacting healthcare costs and clinical outcomes. Self-care can improve clinical outcomes; however, few studies have described self-care behaviors, symptom management, and urgent care visits in the Pakistani context. Aim: This study aims to determine cardiac symptom experience, symptom management strategies, urgent care visits, and behaviors associated with self-care in CHD. Methods: A prospective cohort design was used. A total of 354 patients with CHD participated and were followed for 90 days to evaluate urgent care utilization, cardiac symptom experience, and symptom aversion strategies as outcomes. Data were collected from May 1 to December 30, 2024, using validated Urdu instruments: the Self-Care of Coronary Heart Disease Inventory, the Self-Care Self-Efficacy Scale, the Generalized Anxiety Disorder-7, the Patient Health Questionnaire-9, the Charlson Comorbidity Index, and socio demographic and clinical variables. Results: Of 354 patients, 57.6% were men and 42.4% were women. Among them, 33.3% resided in villages, 35% used public transport to visit the hospital, 37% were cigarette smokers, and 46% led a sedentary lifestyle. The comorbidity index was 3.59 (SD = 1.24), with anxiety at 13.98 (SD = 3.45) and depression at 16.15 (SD = 1.41). Of the sample, 175 patients experienced cardiac symptoms. To avert cardiac symptoms, 163 preferred rest. Patients used a combination of strategies along with rest: turmeric tea (n = 15), medicines (n = 155), medicines and prayer (n = 55), medicines and hospital visits (n = 75), and medicine, prayer, and hospital visit (n = 24). The cardiac self-care behaviors of the patients were below the adequacy threshold (< 70). Conclusion: Cardiac self-care behaviors were inadequate, with patients relying on rest, non-evidence-based remedies, and delayed hospital visits. Structured, culturally sensitive self-care education, routine anxiety/depression screening, and community-based interventions targeting smoking, sedentary lifestyle, and transport barriers are recommended.

Keywords: Coronary Heart Disease; Symptom Recognition; Symptom Management; Self-Care; Urgent Care Visits

ID-826236: Flavonoid Glycosides from Clematis graveolens: Isolation, Structural Characterization, and Antiglioma Evaluation through In Vitro, In Vivo, and In Silico Approaches

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The current study aimed to isolate and characterize phytocompounds with potential antiglioma properties from Clematis graveolens, a wild climber traditionally known for its antitumor properties. The crude methanolic extract of the plant was fractionated using various organic solvents and screened for antiglioma activity against 1321N and U87 cell lines. Among the fractions tested, the ethyl acetate fraction exhibited the highest cytotoxicity, with an IC50 value of 32.21 ± 2.48 µg/mL. In vivo studies, such as carrageenan-induced inflammation and tail thrombosis experiments in mice, validated the anti-inflammatory and antithrombotic properties of the bioactive fractions. The results demonstrated significant anti-inflammatory effects at higher doses, and the average thrombus length decreased gradually with increasing concentration of C. graveolens crude extract and its fractions. Using a combination of preparative HPLC and column chromatography, four flavonoid-type compounds were isolated and structurally elucidated through 1H-NMR, 13C-NMR, and UHPLC-MS analyses from the bioactive fraction: apigenin-7-O-(6″-O-4-coumaroyl)-β-D-glucopyranoside (1), apigenin-6-O-glucoside (2), apigenin-7-O-glucoside (3), and kaempferol-7-O-rutinoside (4). The isolated compounds were further evaluated for antiglioma activity against U87 cell lines using both tetrazolium and resazurin reagents. Compound 4 demonstrated the most potent inhibitory effect, reducing cell viability by approximately 48% at 400 µM, while Compounds 1 and 2 inhibited 30% and Compound 3 showed 25% inhibition at the same concentration. These findings suggest that C. graveolens is a promising source of bioactive flavonoid glycosides with potential antiglioma properties.

Keywords: Phytoconstituents, Antiglioma Activity, Anti-inflammatory Activity, Chromatographic Techniques

ID-826295: Patient Acceptance of Health Information Technology in Developing Countries

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Researchers have established the capability of Health Information Technology (HIT) to enhance quality, efficiency, outcomes, and patient safety while simultaneously reducing healthcare costs. Regrettably, HIT technologies are either inadequately employed or not broadly accessible. In order to evaluate the degree of their existence and the technology utilized in their development, this article reviews a few HIT systems that are currently in use. To identify the gaps in this field and provide a remedy, works pertaining to HIT system

adoption were also examined. The shortage of these systems, particularly in developing nations, the poor acceptance rate of HIT systems, and the paucity of research on patient acceptance of HIT systems are among the issues identified by this review. Studying the elements that influence patient acceptability of HIT systems, and taking these factors into account when creating the systems, will help overcome the aforementioned limitations. We propose a conceptual model of HIT adoption in developing countries based on the Technology Acceptance Model (TAM), one of the most common models for investigating users' perceptions and acceptance of information systems (IS) / information technology (IT).

Keywords: Health Information Technology, Technology Acceptance Model, Patient Acceptance, Developing Countries

ID-826311: Exploring the Lived Experiences of Cancer Patients Rejected for Treatment at Shaukat Khanum Memorial Cancer Hospital and Research Centre, Peshawar

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Introduction: Cancer is one of the major problems globally, affecting individuals not only physically but also psychologically. Treatment is very expensive, and some private-sector hospitals in Pakistan refuse cancer patients in advanced stages of the disease. Objective: This study aimed to explore the lived experiences of cancer patients rejected for treatment at Shaukat Khanum Memorial Cancer Hospital and Research Centre. Methodology: This was a qualitative phenomenological study carried out at Hayatabad Medical Complex, Peshawar, over a total of six months. A total of 15 participants were included all aged more than 18 years and who had been rejected for treatment at Shaukat Khanum Memorial Cancer Hospital and Research Centre. Data were collected using a semi-structured interview guide and analyzed using thematic analysis. Results: Thematic analysis yielded five themes: desire for dignity and compassionate care; coping mechanisms and sources of strength; emotional trauma; financial strain and healthcare inequality; and stigma and social rejection. Conclusion: The study concluded that patients rejected for treatment at Shaukat Khanum Memorial Cancer Hospital and Research Centre go through a variety of difficult experiences. They experience trauma from not being treated like a normal human being, and due to the expensive treatment, they even sold their assets to compensate for the treatment cost. Patients engaged in different activities to manage their lives and overcome their psychological distress.

Keywords: Cancer, Treatment, Lived Experiences, Cancer Patient, Rejected Treatment, Denied Treatment

ID-826356: Exploring Automation Bias Due to Artificial Intelligence in Clinical Practice

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Background: Generative artificial intelligence (AI) is increasingly used in clinical training, where rapid access to information may support decision-making but may also encourage automation bias and over-reliance, particularly under pressure. Objective: To explore medical residents' experiences, perceptions, and contextual factors influencing reliance on generative AI during clinical training. Methodology: A qualitative exploratory study used semi-structured, in-depth interviews with 15 final-year residents from three tertiary teaching hospitals in Peshawar, Pakistan. Participants represented Medicine and Allied and Surgery and Allied specialties. Interviews were transcribed verbatim and analyzed inductively using Braun and Clarke's six-step thematic approach. Analysis generated 1,435 coded segments, refined into 32 subthemes and eight overarching themes. Results: Eight themes described residents' experiences: general experiences with AI in clinical training, perceived benefits, psychological and environmental pressures, educational gaps, navigating trust and reliance, risks and errors of AI, patient safety, and ethical and accountability issues. Residents valued AI for speed, accessibility, broader diagnostic perspectives, academic support, and reduced cognitive load. Time pressure and fatigue increased the temptation to rely on AI. Participants nevertheless described active verification against textbooks, guidelines, protocols, and senior advice. Experiences with incorrect medication doses, misleading assessments, and outdated or irrelevant information reinforced caution. Residents reported no formal AI training and raised concerns about patient safety, accountability, privacy, consent, and transparency. Conclusion: Residents use generative AI as a supportive tool rather than a substitute for clinical judgment, but current use occurs without structured institutional guidance. Medical training programs should incorporate AI literacy, verification skills, patient-safety safeguards, and clear accountability frameworks to reduce automation bias while preserving independent clinical reasoning.

Keywords: Artificial Intelligence; Automation Bias; Clinical Training; Patient Safety; Residents

ID-826335: Conversational AI for Healthcare: A Voice: Based Appointment Management System

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Managing patient appointments in public hospitals remains a major challenge, especially in institutions like Mardan Medical Complex, where traditional phone-based and manual methods cause long waiting times, errors, and limited accessibility. This research presents the design and development of an AI-powered voice agent that allows patients to schedule, cancel, and inquire about appointments using natural spoken language. In the first phase, a complete backend system was built using FastAPI and SQLite. It supports three core operations: booking a new appointment, cancelling an existing one, and listing appointments for a selected date. A Streamlit interface was also developed for testing the APIs. The database stores patient name, reason for visit, appointment time, and cancellation status. The system is then extended into a conversational voice agent that combines speech-to-text, a language model for intent understanding, and text-to-speech for generating spoken replies. This enables patients to interact with the system without web forms or human operators. Expected benefits include faster appointment handling, reduced staff workload, and better accessibility for patients. The modular design also allows future extension into a web portal. Overall, this work offers a practical application of conversational AI for healthcare appointment management in regional medical facilities.

Keywords: Conversational AI, Voice Agent, Medical Appointment System, FastAPI, Speech-to-Text, Text-to-Speech, Healthcare Automation

ID-826394: Pharmacogenomic Insights into Amlodipine Response: The Role of CACNA1D, CACNA1C, and TRIB3 Variants in Hypertensive Patients

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Hypertension affects over 1.28 billion individuals worldwide, yet response variability to calcium channel blockers (CCBs) like amlodipine remains a challenge. While pharmacogenomic studies have implicated genetic polymorphisms in treatment outcomes, the combined effects of multiple variants remain unclear. This study investigates the influence of CACNA1D (rs3774426), CACNA1C (rs2239050, rs7311382), and TRIB3 (rs2295490) variants, individually and in combination, on the antihypertensive response to amlodipine. A total of 133 hypertensive patients from Khyber Pakhtunkhwa, Pakistan, receiving amlodipine monotherapy were genotyped using ARMS-PCR and Sanger sequencing. Blood pressure response was defined as post-

treatment systolic blood pressure (SBP) ≤140 mmHg and diastolic blood pressure (DBP) ≤90 mmHg. Statistical analyses were adjusted for age, gender, BMI, dose, family history of hypertension, and dietary habits. The CACNA1D rs3774426 TT genotype was significantly associated with non-response in 35 patients, showing higher SBP than the CC genotype (n = 69). Conversely, the CACNA1C rs2239050 GG genotype (n = 67) was linked to improved SBP and DBP control compared to the CC genotype (n = 25). Combined genotype models (CACNA1D–CACNA1C and CACNA1D–CACNA1C–TRIB3) showed strong unadjusted associations but lost significance after adjustment. These findings highlight the role of CACNA1D rs3774426 in predicting amlodipine non-response and demonstrate the potential of genetic screening for optimizing antihypertensive therapy. Integrating pharmacogenomics into clinical practice could enhance personalized treatment strategies, improving outcomes in hypertensive patients.

Keywords: Pharmacogenomics, Amlodipine, Hypertension, CACNA1D, CACNA1C, TRIB3, Calcium Channel Blockers, Personalized Medicine

ID-826357: Awareness, Applications, and Barriers to Artificial Intelligence Usage in Pediatric Surgery: A National Cross-Sectional Survey in Pakistan

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Background: Artificial intelligence (AI) is expanding across surgical practice, but safe adoption depends on clinician readiness, institutional access, and training. Evidence on AI use among pediatric surgeons in Pakistan remains limited. Objective: To assess awareness, current applications, perceived barriers, and training needs related to AI among pediatric surgeons in Pakistan. Methodology: A national descriptive cross-sectional online survey was conducted from August to September 2025 among all 270 members of the Association of Pediatric Surgeons of Pakistan. A structured questionnaire assessed AI familiarity, clinical and research use, institutional availability, perceived barriers, and training needs. Responses were anonymized and analyzed using descriptive statistics with item-specific denominators. Results: Forty-three surgeons responded, giving a response rate of 15.9%. Most were somewhat familiar with AI (27/43, 62.8%), while 10/43 (23.3%) reported being very familiar. Clinical use of AI was reported by 14/43 (32.6%), compared with 25/43 (58.1%) who used AI for research or academic writing. Only 3/43 (7.0%) reported access to AI-integrated tools at their hospitals. Support for incorporating AI into postgraduate training was reported by 31/42 (73.8%), and 39/42 (92.9%) expressed interest in an AI workshop or webinar. Lack of awareness and lack of training were the most frequently reported barriers, each selected by 32/41 (78.0%) respondents. Conclusion: Pediatric surgeons in Pakistan show moderate AI awareness and strong interest in

structured training, but clinical adoption and institutional access remain limited. Safe integration requires practical training, clear governance, and hospital-level support so that AI strengthens clinical decision-making without compromising patient safety.

Keywords: Artificial Intelligence; Pediatric Surgery; Clinical Adoption; Training; Pakistan

ID-826364: Overexpression of ImSyGII under Single and Double Promoters Manifests Increased Sugar Contents in Transgenic Sugarcane

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Sugarcane is grown around the world to meet the sugar demand of the industrial sector. The current sugar recovery percentage in sugarcane cultivars is low, which demands scientific efforts to improve it. Multiple approaches were adopted to enhance sugar contents in commercial sugarcane plants in contrast to conventional plant breeding methods. The exploitation of biotechnological methods and exploration of isomaltulose synthase genes presented a promising solution to increase the existing low level of sugar recovery percentage in Saccharum officinarum L. Isomaltulose synthase gene II (ImSyGII) was employed and integrated into a plant expression vector driven under leaf- and stem-specific promoters, terminated by the nopaline synthase gene, in the cloning strategy shown in the present study. Three gene constructs were developed in various combinations driven under the promoters Zea mays ubiquitin and Cestrum Yellow Leaf Curl Virus in single and double combined stacked systems. Transformation was executed in multiple formats single-transformed events, double-promoter transformation events, and triple-construct stacked promoters in sugarcane-induced calli via the particle gene gun. The transformation of ImSyGII in sugarcane genotype HSF-240 was confirmed by molecular gene analysis, while expression quantification was determined through real-time PCR. Furthermore, HPLC was used to detect the increased amounts of isomaltulose in transgenic sugarcane juice. The present work upheld enhanced ImSyGII expression in leaves owing to the use of the ubiquitin promoter, while the Cestrum Yellow Leaf Curl Virus promoter enhanced gene expression in sugarcane stems. The employment of three gene constructs collectively produced elite sugar lines with more than 78% enhancement in whole sugar recovery percentage. The mature internode proved highly efficient and receptive to the production of isomaltulose. Quantifications and sugar content evaluations upheld an increased Brix ratio in transgenic sugarcane lines compared to control lines.

Keywords: Sugarcane, Sucrose, Isomaltulose, Isomerases, HPLC, Promoters

ID-826376: Self-efficacy and Self-care Behaviors Among Patients with Primary Percutaneous Coronary Intervention

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Background: Cardiovascular diseases, particularly coronary artery disease, are a leading cause of global mortality. Despite advancements in treatment, including primary percutaneous coronary intervention (PCI), poor self-care behaviors post-PCI contribute to high readmission rates and recurrent myocardial infarction. Aim: The study was conducted to evaluate the self-care behaviors and self-care self-efficacy among patients who had undergone primary PCI and to explore the factors associated with their self-care practices. Methods: This study employed an analytical cross-sectional design and was carried out at Hayatabad Medical Complex (HMC), Peshawar. Data were obtained from 337 patients with coronary heart disease using pre-validated Urdu versions of the Coronary Heart Disease Inventory. Patients were selected through consecutive sampling using a researcher-administered questionnaire. SPSS v26.0 was used for analysis. Results: Among 337 participants, inadequate levels of self-care were identified across all assessed domains: poor self-care maintenance 96.8% (n = 316), poor self-care monitoring 98.2% (n = 331), and inadequate cardiac self-care self-efficacy 81.9% (n = 276). Regression analysis revealed significant associations between self-care behaviors and several sociodemographic and clinical characteristics, including having a healthcare professional in the family, chronic kidney disease, number of medications, discharge education, and body mass index ($p < 0.05$). Self-care self-efficacy demonstrated positive correlations with self-care maintenance ($r = 0.64$), monitoring ($r = 0.67$), and management ($r = 0.56$), and emerged as a significant predictor of self-care behaviors across the three domains. Conclusion: A high proportion of patients reported inadequate behavior across all self-care domains. Sociodemographic variables primarily influence self-care behaviors. Patient-centered approaches are recommended to improve self-care behaviors and clinical outcomes among patients who received percutaneous intervention.

Keywords: Self-Care, Self-Care Behaviors, Self-Efficacy, Percutaneous Coronary Intervention, Percutaneous Coronary Revascularization

POSTER PRESENTERS

Sub-theme: To Transform Healthcare, Life Sciences & Public Well-being

ID-826065: Association between Stress and Competency among Undergraduate Nursing Students at Sarhad University, Peshawar

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Background: The stress that undergraduate nursing students encounter is usually high owing to academic, clinical, and personal demands. Excessive stress may adversely affect learning, decision-making, and performance, while safe practice depends on nursing competency encompassing knowledge, skills, and attitudes. The relationship between stress and competency needs investigation to enhance student outcomes and readiness for the professional environment. Objective: This study aimed to determine the association between stress and competency among undergraduate nursing students at Sarhad University, Peshawar. Methodology: This was an analytical cross-sectional study carried out at the Institute of Nursing Sciences, Sarhad University of Science and Information Technology, Peshawar. Data were collected from 206 undergraduate nursing students (3rd, 5th, 6th, and 7th semesters) who had completed at least one semester of clinical training and provided written consent. The study was approved by the Board of Advanced Studies and Research (BOASAR) and the Ethical Research Committee. Data were collected using two adopted questionnaires and analyzed using SPSS Version 26. Results & Conclusion: No statistically significant association was found between stress and competency. Moderate levels of stress exist among nursing students but do not diminish the development of competency. Competency levels increased with academic progression, highlighting the role of semester advancement and clinical exposure in strengthening students' skills and confidence, and appeared unrelated to demographic characteristics except semester of study. Overall, the study underscores the need for nursing programmes to build competence while also equipping students with resilience to manage stress effectively.

Keywords: Stress, Competency, Undergraduate Nursing Students, Association

ID-826131: An Explainable Hybrid CNN: LSTM Framework for Automated Diabetes Detection from Unstructured Clinical Notes

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Diabetes is a significant public health problem worldwide and at the regional level, and a large proportion of cases remain undiagnosed. Physician narratives make up more than 80% of clinically relevant information in Electronic Health Records (EHRs) and are difficult to classify with existing rule-based systems. The limited number of positive diabetic cases (8.5% of the data) also creates a challenge due to high class imbalance. To tackle these challenges, we introduce a novel end-to-end, explainable NLP solution for automated diabetes diagnosis from unstructured clinical notes. We used systematic text pre-processing, feature engineering with TF-IDF, and data balancing with SMOTE to overcome class imbalance. We conducted a detailed comparative evaluation of machine learning baselines (Logistic Regression, Random Forest, XGBoost, Multinomial Naive Bayes, and SGD Classifier) and deep learning baselines (1D-CNN, LSTM, GRU, Bi-LSTM, DAN, and Hybrid CNN-LSTM). The results indicate that deep learning models consistently outperform traditional ones, with the Hybrid CNN-LSTM performing best at 93% accuracy, 93% recall, 91% precision, and 91% F1-score. We surpass the black-box nature of the Hybrid CNN-LSTM by adding an Explainable AI (XAI) module based on LIME and SHAP for token-level attribution, pinpointing clinically relevant risk words and boosting interpretability for clinicians. In contrast to structured tabular data or limited-interpretability approaches, this study provides a highly successful and interpretable pipeline for unstructured clinical text a crucial step toward trustworthy and explainable Clinical Decision Support Systems (CDSS).

Keywords: Electronic Health Records (EHR), Natural Language Processing (NLP), Diabetes Detection, Hybrid CNN-LSTM, Explainable AI (XAI), SMOTE, Clinical Decision Support Systems

ID-826183: AI: Generated Designing in the Surface Beautification of Therapeutic Footwear

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The art of fashion designing is dedicated to the construction of design, aesthetics, and natural glory in clothing and everyday accessories. Footwear is a necessary part of the wardrobe, and designing it is a challenging and diverse field of fashion, more so when designing

specialized functional shoes. Foot problems are common in the general population, ranging from simple conditions to complex diseases and joint deformities such as peripheral neuropathy; consequently, designing footwear for the diabetic foot has been narrowly addressed by fashion designers. Therapeutic footwear is initially made for protection, comfort, pressure redistribution, and stability for patients with various foot-related conditions. Although functional performance is the principal consideration, aesthetic appearance also plays an important role in consumer acceptance, confidence, satisfaction, and willingness to use the footwear dependably. Conventional therapeutic footwear is often perceived as bulky, unattractive, or medical in appearance, creating a gap to explore novel approaches that improve visual aesthetics without compromising primary function. Artificial intelligence (AI) offers new opportunities in footwear design by enabling data-driven personalization generating designs, image analysis, colour prediction, pattern generation, and rapid visualization of alternatives. This research explores the application of AI in the surface beautification of therapeutic footwear using a mixed-method approach: review of literature, analysis of existing therapeutic footwear, collection of user preferences, an AI-generated design framework that embeds therapeutic requirements, and evaluation by the end user. The research aims to develop an AI-assisted design framework that integrates therapeutic requirements with aesthetic appeal, contributing toward footwear that is functional, comfortable, visually appealing, personalized, and socially acceptable.

Keywords: Therapeutic Footwear, Surface Beautification, Footwear Design, Generative AI, Personalization, User Acceptance

ID-826190: AI: Assisted Mesh Repair and Structural Viability Testing for Intricate Three: Dimensional (3D) Printed Textile Embellishments

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Incorporating 3D printing technology for decorative textiles like laces is a game changer toward customized, single-piece embellishment. Guipure a lace with floral and geometric motifs connected by stitches without a net background is opted as an inspiration for lace making using 3D printing technology. The study targets two points: to explore the basic process of 3D printing followed by designing on digital design applications and printing embellishments, and to analyze its acceptability as 3D-printed lace. However, such intricate designs use ultra-thin geometries (usually <0.5 mm) that push beyond the physical limitations of the 3D printer and Fused Deposition Modeling (FDM). Standard slicing software employs rigid, fixed rules to identify threshold geometries, leading to a time-consuming process of gaps and layer

separations that eventually cause failed print jobs. Corrections are usually done by manually sculpting the mesh and scaling the model, wasting time and material through trial-and-error, and common machines like the Ender 3 and CR-10 take several hours to run even a single small sample. With the help of artificial intelligence (AI), this trial-and-error loop can be fixed, as AI can detect gaps, weak points, and sub-thresholds in the geometry and deliver accurate analysis of material and mesh repair before final production. AI can analyze optimized settings of design geometry by controlling thickness, layer separation, nozzle diameter, and material used, reducing errors and automatically fixing the geometry before the final print. Thus, the proposed framework creates a path toward zero-waste rapid prototyping and supports personalized manufacturing in wearable additive manufacturing, demonstrating how artificial intelligence and sustainable 3D printing can function as an integrated digital ecosystem for the future of textile and fashion embellishment.

Keywords: Additive Manufacturing, 3D-Printed Textiles, AI Mesh Repair, Failure Prevention, Creality Ender 3/CR-10, Prototyping Efficiency

ID-826211: AI: Assisted Smart Textile Design: Multi: Criteria Evaluation of Woven Winter Fabrics

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Exciting opportunities exist for enhancing material selection and promoting sustainable product development when intelligent decision-making techniques are incorporated into textile engineering. The Analytic Hierarchy Process (AHP) and the Preference Ranking Organization Method for Enrichment Evaluation (PROMETHEE) are two decision-making techniques used in this study to rank and assess woven winter textiles according to their effectiveness and comfort. As the basis for upcoming AI-assisted textile design, the suggested technique demonstrates the significance of structured decision analysis. Both objective and subjective criteria were used to evaluate eight woven fabric samples with different weft yarn compositions, including fabric mass per unit area, heat resistance, tensile strength, rip strength, pilling resistance, drapability, and smoothness. The results demonstrated that, because of its well-balanced mechanical, thermal, and sensory properties, the micro-polyester/cotton blended fabric (F7) had the highest preference score. This finding suggests that the reliability and objectivity of fabric selection can be enhanced by combining structured decision-support techniques with experimental textile testing. The study also demonstrates how effective it is to integrate traditional textile engineering into intelligent design frameworks. The suggested approach offers a solid foundation for

upcoming uses of data-driven material selection, artificial intelligence, machine learning, and predictive analytics in consumer-focused and sustainable textile design.

Keywords: AI-Assisted, AHP, PROMETHEE, Woven Fabrics, Comfort, Multi-Criteria Decision-Making, Sustainable Textile Design

ID-826239: Innovation through Digital Design in the Era of Artificial Intelligence: Elevating Gandharan Heritage for Cultural Sustainability in Pakistan's Fashion Industry

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Pakistan's rich cultural heritage has long served as a valuable source of inspiration for artistic expression and fashion design. Digital design is being used to modernize sustainable fashion by transforming ancient Gandharan motifs using 3D modeling, AI-assisted textile printing, and virtual prototyping. AI is rapidly transforming the creative industry through advancements in digital workflows, design processes, and sustainable innovation aiding trend forecasting, personalization, and resource optimization while digital tools such as CAD allow designers to precisely and creatively reinterpret cultural heritage. This study aimed to develop and evaluate heritage-inspired embroidered apparel by integrating Gandharan motifs with Computer-Aided Design (CAD) technology and traditional hand embroidery, offering a creative approach to heritage preservation and sustainable fashion. An exploratory mixed-methods approach was employed using primary and secondary data. Gandharan motifs were identified from historical artifacts and digitally refined using CAD software before being translated into innovative hand-embroidered patterns for women's garments. The developed prototypes were evaluated using a self-structured questionnaire administered to 100 participants. The findings revealed strong consumer acceptance: 78% of teenage respondents recognized the importance of traditional motifs in preserving cultural heritage, while 93% of all participants agreed that Gandharan-inspired embroidery makes a significant contribution to cultural sustainability. This study demonstrates that integrating digital design with traditional hand embroidery provides an effective approach to revitalizing the Gandharan artistic heritage while promoting cultural sustainability in contemporary fashion, offering practical insights for designers, educators, researchers, and industry stakeholders.

Keywords: Creative Innovation, Cultural Sustainability, Heritage Preservation, Gandharan Art, Computer-Aided Design (CAD), Hand Embroidery, Sustainable Fashion, Textile Design

ID-826242: Digital Literacy and Academic Performance among Undergraduate Nursing Students at Sarhad University of Science and Information Technology, Peshawar: A Correlational Study

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Background & Objectives: Digital literacy has become a crucial competency for nursing students, influencing not only their learning outcomes but also their preparedness for professional practice in a progressively digital healthcare environment. The study aimed to assess the level of digital literacy among undergraduate nursing students at the Institute of Nursing Sciences, Sarhad University, Peshawar, and to measure its correlation with academic performance. Methods: A correlational study design was used to determine the correlation between digital literacy and academic performance. A total of 207 participants were included from the Institute of Nursing Sciences, Sarhad University, Peshawar. The study was approved by the ethical research committee of the university, and consent was granted by all participants. The Digital Literacy Scale was used to collect data. Results: Among 207 students, 87.9% of the participants were male and 12.1% were female, with a mean age of 21.9 years. The majority (54%) had moderate digital literacy, followed by high (52%) and low (4%). No association was found between socio-demographic factors and digital literacy, while an association was found between digital literacy and prior training in digital skills (P = 0.015). A weak positive correlation was found between digital literacy and academic performance. Conclusion: A moderate level of digital literacy was found, with a weak positive correlation with academic performance. The study recommends integrating digital literacy training into nursing curricula, supported by workshops and faculty development programmes to strengthen digital learning practices.

Keywords: Digital Literacy, Academic Performance, Digital Skills, Nursing Students

ID-826261: TrustCare-CDSS: A SHAP-LIME Explainable Framework for Trustworthy Heart Disease Prediction

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Cardiovascular disease remains a major global health challenge, making timely and dependable risk assessment essential for improving clinical outcomes. Although machine learning models have demonstrated considerable potential for heart disease prediction, their limited interpretability can hinder clinical acceptance, particularly when predictions influence medical decisions. To address this limitation, this

study proposes TrustCare-CDSS, a trustworthy and explainable clinical decision support framework that integrates predictive modeling with interpretable artificial intelligence. The proposed framework employs Extreme Gradient Boosting (XGBoost) as the primary prediction model and incorporates SHapley Additive exPlanations (SHAP) and Local Interpretable Model-Agnostic Explanations (LIME) to investigate the reasoning behind individual predictions. Publicly available heart disease datasets will be utilized for data preparation, feature processing, model development, and performance assessment. Predictive performance will be evaluated using accuracy, precision, recall, F1-score, and the area under the receiver operating characteristic curve (ROC-AUC). SHAP will provide an overall understanding of feature contributions across the dataset, while LIME will generate case-specific explanations for individual predictions, making the system's outputs more understandable and useful to healthcare professionals. The expected outcome is an interpretable and reliable AI-assisted decision support framework that can support early identification of patients at elevated risk of heart disease while improving transparency in machine learning-based clinical assessment. By bringing together predictive performance, local and global explanations, and trustworthy AI principles, the study seeks to contribute toward the responsible application of artificial intelligence in healthcare.

Keywords: Heart Disease Prediction, Clinical Decision Support System, Explainable AI, XGBoost, SHAP, LIME, Trustworthy Artificial Intelligence, Healthcare Analytics

Sub-theme: To Build Smart Infrastructure, Advance Sustainable Engineering & Strengthen Disaster Resilience

ID-826372: Crack Detection in Concrete Structures Using Convolutional Neural Networks

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During the lifetime of concrete structures, they are exposed to various kinds of deterioration, and one of the most visible symbols of failure is cracking. It is important to identify these cracks in a timely manner, as they can be harmful due to the entrance of moisture and other harmful agents that penetrate the concrete and can cause further failure. Generally, inspection is done visually, which is a lengthy process and consumes a large amount of time while examining mega-structures. This research presents findings for the automated identification of failures and cracks in concrete elements. A Convolutional Neural Network (CNN) model was

created and systematized using images from the HRCDS dataset. A total of 10,000 images were selected for processing before training the model. The process included image compression, reduction, and other operations, followed by data augmentation to increase variation in the training data. A ResNet-based architecture was adopted to learn impressive and representative features through residual links. Regularization was incorporated into the network to decrease the over-fitting observed during early stages. Data containing almost 1,000 images was used independently to evaluate the performance of the selected model. The obtained accuracy of the model reached 97.2%, precision was 96.5%, F1-score was 96.1%, and ROC-AUC was 0.991. Results obtained from the conventional method of image processing were comparatively lower, with 78.3% accuracy obtained on the same dataset using Canny edge detection. Threshold-based techniques also yielded lower performance. The results clearly show that the CNN-based approach can be more effective, beneficial, and useful. However, on irregular surfaces, very fine crack identification is still difficult to detect and can be confused with similar features such as shadows and rust stains. The reliability of the system under practical inspection could be improved with more diverse field images.

Keywords: Convolutional Neural Network; Crack Detection; Concrete Structures; Data Augmentation; Image Classification; Deep Learning

ID-826315: AI-Based Autonomous Biodegradable Waste Management Robot

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The rapid increase in biodegradable waste such as dry leaves, grass residue, and organic debris has become a major environmental concern in parks, gardens, universities, roadsides, and public areas. Traditional waste collection methods mainly depend on manual labor, which is time-consuming, labor-intensive, and inefficient for large outdoor environments. To address these challenges, this project presents the design and development of an eco-friendly biodegradable waste management system based on Artificial Intelligence, Robotics, Computer Vision, and Embedded Systems. The proposed system is designed so that a robot can detect and pick up biodegradable waste from its surroundings using object detection and autonomous navigation. The robot comprises a Raspberry Pi 4, Arduino, USB camera, HC-SR04 sensors, DC motors, an IBT-2 motor driver, a relay-controlled rotating brush, a battery, and a collection chamber. OpenCV was used to deploy a custom YOLO-based deep learning model on the Raspberry Pi for real-time detection of dry leaves, with detected leaves triggering movement commands transmitted to the Arduino for motor control, obstacle avoidance, and brush

activation. The system demonstrated a detection confidence level of up to 90–94% under optimal lighting conditions, with precision decreasing as the distance of the object increased. The autonomous robot was successfully demonstrated under various outdoor settings, reliably avoiding obstacles while collecting biodegradable waste. The offered system presents a convenient, low-cost, and environmentally safe solution for autonomous biodegradable waste management, confirming the prospects of using intelligent systems for waste management in smart cities, universities, parks, and gardens.

Keywords: Artificial Intelligence, Biodegradable Waste, Waste Management, Robotics, Computer Vision, Embedded Systems, YOLO

Sub-theme: To Transform Healthcare, Life Sciences & Public Well-being

ID-826396: Self-Doped Polyaniline/V_2O_5 Nanocomposites for Room: Temperature Gas Sensing

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Biomarker gases such as ammonia, acetone, and ethanol in exhaled breath can indicate diseases including diabetes, kidney, and liver disorders. Conventional detection methods such as GC-MS and IR spectroscopy are expensive and complex, so solid-state sensors offer a cost-effective alternative. Polyaniline (PANI) detects gases at room temperature, while vanadium pentoxide (V_2O_5) offers a high surface area, layered structure, and redox activity ($V^{5+} \leftrightarrow V^{4+}$). The synergistic p–n heterojunction between p-type PANI and n-type V_2O_5 enhances charge transfer and gas-sensing response. V_2O_5 nanoparticles were synthesized by a hydrothermal method and PANI by in-situ oxidative polymerization of aniline, followed by conversion to the emeraldine base. Composites containing 33, 50, and 67 wt% V_2O_5 were fabricated by sonication-assisted solution blending in propanol and deposited on interdigitated copper electrodes. The nanocomposites were characterized by FTIR, XRD, SEM, and EDX, confirming successful formation of the PANI/V_2O_5 heterojunction with an average V_2O_5 crystallite size of about 80 nm. The PANI/50 wt% V_2O_5 heterojunction exhibited a 90.77% response to 50 ppm ammonia and a sensitivity of 1.7342 % ppm^{-1} nearly 57× higher than pristine PANI and about 10× higher than pure V_2O_5 with excellent selectivity, linearity ($r = 0.9956$), and stability, a response time of 257 s and a recovery time of 37 s. Ammonia showed the highest response among the tested gases (ethanol 33.03%, methanol 18.25%, propanol 10.17%, acetone, and chloroform 7.15%). The results demonstrate that self-doped PANI/V_2O_5 nanocomposites are promising materials for selective, room-temperature

ammonia sensing with potential applications in non-invasive disease diagnosis.

Keywords: Polyaniline, Vanadium Pentoxide (V_2O_5), Nanocomposites, Room-Temperature Gas Sensing, Ammonia, p–n Heterojunction, Biomarker Gases

ID-826392: DNA Barcoding: A Short: Sequence Molecular Tool for Rapid Species Identification

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DNA barcoding is a short-sequence molecular tool for rapid, standardized species identification. Earth is home to an estimated 8.7 million eukaryotic species, yet the majority remain undescribed, and traditional taxonomy relies on morphology, which is often unreliable for juveniles, damaged specimens, processed products, or cryptic species that look nearly identical. DNA barcoding identifies species using a short, standardized region of DNA much like a retail barcode identifies a product by matching the sequence from an unknown specimen against a curated reference library of barcodes from known species. The workflow involves sample collection, DNA extraction, PCR amplification using universal primers, sequencing, and comparison against reference databases such as BOLD or GenBank. Standard barcode markers include the mitochondrial COI gene in animals, the rbcL and matK genes in plants, and the ITS region in fungi. Because the marker region is short (roughly 400–800 base pairs) and flanked by conserved sequence, the same universal primers amplify it across huge swaths of the tree of life, while tolerating partial degradation in older or processed samples. Applications include discovering and cataloguing new and cryptic species, monitoring endangered and invasive populations, detecting illegal wildlife trade and seafood or herbal product fraud, and assessing ecosystem health through environmental DNA (eDNA) from soil or water. High-throughput metabarcoding further allows researchers to read barcodes from many organisms in a single bulk or environmental sample, turning routine biodiversity surveys into a fast, non-invasive process. Advances in sequencing have pushed the per-specimen cost from roughly $30 in the early 2000s to about $1 today. The approach is objective and standardized, independent of life stage or tissue condition, and increasingly low-cost at scale, though it requires comprehensive, well-curated reference libraries and offers limited resolution for very recently diverged or hybridizing species. Future directions include portable real-time field sequencers, AI-assisted matching for large barcode datasets, citizen-science reference networks, and closing coverage gaps for under-studied taxa. Overall, DNA barcoding provides a fast, reproducible bridge between molecular data and species-level identification for biodiversity discovery, wildlife forensics, and conservation monitoring worldwide.

Keywords: DNA Barcoding, Species Identification, COI Gene, Metabarcoding, Environmental DNA (eDNA), Biodiversity, BOLD, Conservation

Conference Statistics

Participants

International……..……..…..026
National……..……..…....253

Abstracts

Abstracts Received6…….037
Abstracted Accepted……....278
Registrations……..……...136

Posters

Posters Received……..……..……...089
Posters Accepted……..……..……..….024
Registrations……..……..……..……...012

Summary

Total Abstracts and Posters Received…….726
Total Abstracts and Posters Accepted…… 302
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