Report on "International Conference on Advances in Geometry, Algebra, Analysis and Artificial Intelligence-2024 (ICAGAAAI-2024)"
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Report on
"International Conference on Advances in Geometry, Algebra, Analysis and Artificial Intelligence-2024 (ICAGAAAI-2024)"
(November 07-09, 2024)
Organized by
Department of Mathematics& Statistics, Integral University, Lucknow
Sponsored by Anusandhan National Research Foundation (ANRF) and Council of Scientific and Industrial Research (CSIR)

The **Department of Mathematics & Statistics at Integral University**, Lucknow, India, successfully organized the **International Conference on Advances in Geometry, Algebr** **Intelligence (ICAGAAAI-2024)** from **November 07 - 09, 2024**. This event, recognized as one of the most prestigious gatherings in the mathematical sciences, attracted scholars, professionals from around the world, serving as an ideal platform for exchanging ideas, discussing the latest research advancements, and exploring the future intersections of technologies.

The primary objective of ICAGAAAI-2024 was to create a forum for intellectual exchange, focusing on the latest advancements and ongoing research in the realms of **geometry, a** applications to **artificial intelligence** (**AI**). As mathematics plays an integral role in the development of AI and technological innovations, the conference sought to strengthen interdisciplinary research, and inspire new collaborations.

Highlights of the Conference:

The ICAGAAAI-2024 commenced with a ceremonious inaugural session, graced by the presence of esteemed dignitaries. The session began with the floral welcome of **Dr. Syed Nadee** Chancellor; **Prof. Javed Musarrat**, Hon'ble Vice Chancellor; **Prof. Zafar Ahsan**, Chief Guest; **Prof. Ayen Badawi**, Guest of Honor; **Prof. Abdul Rahman Khan**, Dean, Faculty **Ahmad**, Advisor to Chancellor, **Prof. Mobin Ahmad**, Head of Department of Mathematics & Statistics, following the Quranic citation by **Prof. M.H. Arif Nadvi**.

The inaugural session of the conference began with a Quranic citation, followed by a warm and encouraging welcome address from **Prof. Abdul Rahman Khan**, the Controller of Exam of Sciences. Prof. Khan expressed his optimism about the future of both the faculty and the university, emphasizing the importance of interdisciplinary collaboration in fostering re highlighted the significance of ICAGAAAI-2024 as a vital platform for exchanging knowledge and generating new ideas.

Prof. Aqil Ahmad, Advisor to the Chancellor, offered a detailed introduction to Integral University. He outlined the institution's notable achievements and its unwavering commitment innovation. Prof. Ahmad emphasized the university's vision to foster a research-driven culture and interdisciplinary collaboration. His speech highlighted the importance of such confere of science, engineering, and technology while building a strong academic community.

The Guest of Honour, **Prof. Aymen Badawi**, a Professor of Mathematics at the American University of Sharjah, delivered an engaging address on the evolving role of Mathematics an industry. He discussed the essential role of Algebra and Geometry in AI, as well as the significance of mathematical modeling in enhancing AI systems.

The Chief Guest, **Prof. Zafar Ahsan**, a renowned mathematician and expert in Geometry and AI, shared his deep insights into the evolution of Mathematical Sciences. Prof. Ahsan em concepts play a critical role in the development of AI, particularly in the mathematical frameworks that underpin AI algorithms.

In his insightful address, **Prof. Javed Musarrat**, the Honorable Vice Chancellor, elaborated on the confluence of Geometry, Algebra, Analysis, and Artificial Intelligence. He highligh where foundational mathematical principles meet cutting-edge technology, shaping the future of science, innovation, and social progress. Prof. Musarrat emphasized that the fusion of th role in addressing complex challenges and driving transformative advancements across various domains. During his speech, Prof. Musarrat congratulated the organizing committee and commitment to advancing these vital areas of study.

Dr. Syed Nadeem Akhtar, the Honorable Pro-Chancellor, concluding an insightful address on the importance of cutting-edge technologies like Artificial Intelligence. Dr. Akhtar stresse with Mathematical Sciences is essential for advancing research and development and for staying competitive in the global landscape of innovation. This combination of AI and Mathema breakthroughs in fields like data science, cryptography, and optimization, offering new avenues for scientific discovery and practical applications across industries. In his speech, I Convener and his entire team for their unwavering commitment to fostering collaboration and innovation.

The session concluded with a heartfelt presentation of mementos to the distinguished guests, as a token of appreciation for their valuable contributions to the conference. This gesture hig organizing committee for their support and insightful addresses.

Following the memento presentation, **Prof. Mobin Ahmad**, the Convener of ICAGAAAI-2024, proposed the vote of thanks for this wonderful gathering. He expressed his sincere gratit Zafar Ahsan from AMU, Aligarh, for gracing us with his esteemed presence and sharing his valuable insights. Prof. Ahmad extended his heartfelt thanks to the distinguished Guest of H from American University of Sharjah, Saudi Arabia, for his support and contribution to the success of this conference. Prof. Ahmad also expressed his appreciation to all the speakers, pa their involvement and contributions, emphasizing the importance of such gatherings in advancing academic and research pursuits. He extended his sincere gratitude to the comm volunteers who worked diligently behind the scenes to ensure the seamless organization of this conference. Additionally, he specifically recognized the media personnel for their inva reach a wider audience with this event.

The **Three-Day** Conference was conducted in a **hybrid format**, offering both **in-person** and **virtual participation options**. This hybrid approach enabled a wider global audience to [...] conference, bridging geographical barriers and ensuring inclusivity for participants from diverse regions. The conference was structured to include **05 keynote addresses, 30 in[...] presentations**, all aimed at fostering collaboration and promoting innovation in the mathematical sciences.

Keynote Addresses: In this conference, **05 keynote addresses** were delivered by renowned experts. The details are given as:

Prof. Zafar Ahsan (Aligarh Muslim University, Aligarh, India) delivered his talk on General Relativity- A Fascinating Application of Riemannian Geometry. In his talk, he explored how the general theory of relativity links gravitation and space time. He also discussed the applications in black holes, gravitational lensing, the production and deletion of gravitational waves, the big bang, early universe, late universe, dark matter and dark energy etc.

Prof. Aymen Badawi (American University of Sharjah, UAE) delivered his talk on the complete integral closure of a commutative φ-ring. In this talk, he explored the complete integral closure of φ-ring. His talk was met with enthusiastic engagement as he first developed the concept of integral closure of a commutative ring.

Prof. Bayram Sahin (Ege University, Izmir, Turkiye) explored the Casorati Inequalities along Riemannian submersion and Riemannian manifolds. He discussed the role of Casorati Inequalities for characterization of submanifolds. He further explored its application in the investigation of Riemannian submersion and Riemannian maps.

Prof Mohammad Ashraf (Aligarh Muslim University, Aligarh, India) delivered his talk on the topic Nonlinear Generalized Lie-type Derivations on Algebras. He discussed the concept of Lie structure of an algebra, Lie n derivation and R-linear mappings and their applications on various algebraic structures . Further he explored the developments in the study of Lie structure and also highlighted some future research problems.

Prof Inan Unal (University of Munzur, Tunceli, Turkiye) delivered his talk on the topic Differential Geometry and Artificial Intelligence. In his talk, he explained the concepts of differential geometry and its intersection with AI. He also discussed how these concepts can be applied to enhance AI models and broaden the scope of their applications.

Invited Talks: In the conference, more than **30 invited talks** were delivered by distinguished speakers including Prof. Viqar Azam Khan (Aligarh Muslim University), Prof. Mehme[...] Turkiye), Prof. Ali Hafiz Hakimi (Jazan University, Saudi Arabia), Prof. Nita H. Shah (Gujarat University, Ahmedabad, India), Prof. Manoj Kumar Yadav (Harish Chandra Institute, [...] Srivastava (DDAU, Gorakhpur, University, India), Prof. Om Praksh (Indian Institute of Technology, Patna, India), Prof. Rakesh Kumar (Punjabi University, Punjab, India), Dr. Muslim M[...] Abdul Haseeb (Jazan University, Saudi Arabia). These addresses highlighted the interdisciplinary nature of Mathematics and artificial Intelligence.

Research Paper Presentations: The conference provided a platform for more than **60 research papers** to be presented, showcasing a wide range of innovative research. These [...] challenges in **geometry, algebra, analysis**, and their integration with **AI**. The research topics ranged from advanced theories in mathematical structures to practical AI applications such [...] networks, and data analytics. Presenters had the opportunity to engage with the global audience, receive constructive feedback, and initiate collaborations with fellow researchers.

One of the central themes of the conference was the growing need for **interdisciplinary collaboration** between mathematics and AI, which was successfully achieved during the [...] continue to evolve, their interdependence has become more evident in solving global challenges. In these three days, the conference highlighted how mathematical models and AI algor[...] other in fields such as healthcare, finance, climate change, and security.

The conference also reinforced the critical importance of **mathematics** and **AI** in solving complex global problems, with a focus on their interdisciplinary applications. Looking ahead, t[...] the conference will undoubtedly lead to **further research breakthroughs** and practical innovations in both fields, ensuring that the conference's outcomes contribute significantly to th[...] mathematical and AI theory and practice.

By promoting these connections and advancements, **ICAGAAAI-2024** has successfully laid the foundation for **future innovations** in both mathematics and artificial intelligence, ensu[...] at the forefront of addressing complex global challenges.

Some Glimpses of ICAGAAAI-2024:

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