PREFACE TO THE EDITION

The continuous advancement of Artificial Intelligence has significantly expanded the scope of contemporary research, particularly in the areas of machine learning, intelligent systems, uncertainty estimation, and human–AI interaction. As intelligent technologies increasingly influence critical decision-making, multimodal communication, and autonomous operations, the need for reliable, interpretable, and responsible AI research becomes increasingly important. It is with great pride and academic enthusiasm that we present the latest issue of the **Eduschool Journal of Artificial Intelligence Research (EJAIR)**, featuring scholarly contributions that explore important challenges and emerging directions in modern Artificial Intelligence.

This issue reflects the interdisciplinary nature of Artificial Intelligence by bringing together research on adversarial robustness, conformal prediction, multimodal representation learning, embodied AI, and scalable oversight. The articles collectively examine the reliability, interpretability, adaptability, and responsible development of intelligent systems across diverse computational and real-world applications.

A significant focus of this issue is the development of robust and reliable machine learning systems under changing data conditions. The study on adversarial robustness under distribution shift presents a unified framework connecting natural distribution changes, out-of-distribution detection, and adversarial attacks, while proposing an evaluation protocol to examine classifiers and their detection mechanisms as an integrated system. Equally important is the exploration of uncertainty estimation in high-stakes decision-making. The contribution on conformal prediction examines finite-sample coverage guarantees, calibration procedures, and practical limitations under distribution shifts and subgroup variations, highlighting the importance of interpretable prediction sets in medical, financial, and safety-critical applications.

The issue further explores the advancement of multimodal representation learning through modality-agnostic embeddings that enable cross-modal retrieval across images, text, audio, video, and sensor data. The research examines alignment strategies, representation geometry, retrieval challenges, and scalable search mechanisms, offering valuable insights into the development of universal representations across different modalities. Another important theme addressed in this volume is grounded language generation in embodied AI systems. The article investigates how sensory perception, action-conditioned meaning, and situated language contribute to meaningful interaction with the physical world, while examining existing architectures, available datasets, grounding failures, and emerging research challenges.

Collectively, the contributions in this issue highlight the growing importance of reliability, interpretability, multimodal understanding, and scalable supervision in advancing Artificial Intelligence. The studies presented here provide valuable analytical perspectives and proposed frameworks that encourage further investigation into the technical, practical, and ethical dimensions of intelligent systems.

We extend our sincere gratitude to all authors, reviewers, editorial board members, and contributors whose dedication and scholarly commitment have made this issue possible, strengthening EJAIR as a platform for meaningful academic exchange and innovative research in Artificial Intelligence.

We hope that this issue will inspire researchers, academicians, practitioners, and students to explore emerging research directions and contribute to the development of reliable, interpretable, and responsible Artificial Intelligence systems.

Dr. Juby George
Chief editor

CONTENTS

SL. NO.	TITLE	AUTHOR	PAGE NO.
1	Adversarial Robustness Under Distribution Shift: A Unified View of Detection and Defense	Tintu George	1-8
2	Conformal Prediction for Interpretable Uncertainty in High-Stakes Decision Making	T Ramaprabha	9-16
3	Cross-Modal Retrieval with Modality-Agnostic Embeddings Towards Universal Representation Learning	Rejina P V	17-23
4	Grounded Language Generation from Raw Sensory Input in Embodied AI Systems	Manasy Jayasurya	24-30
5	Scalable Oversight for Advanced AI: Recursive Reward Modeling and Debate	Raji N	31-38