

PREFACE TO THE EDITION

It is with great pleasure that we present the latest issue of the Eduschool Journal of Computer Science Research Studies (EJCSRS). This issue brings together a diverse collection of scholarly contributions that explore emerging paradigms, advanced architectures, and transformative technologies shaping the future of computer science. The selected articles reflect the rapid evolution of computing systems and the growing need for solutions that combine correctness, security, scalability, performance, and resilience.

The issue opens with an insightful examination of advanced type systems, exploring dependent types, linear types, and effect systems as mechanisms for achieving compile-time correctness guarantees. The article highlights how modern programming language research is extending the capabilities of type systems beyond error detection toward formal verification and functional correctness.

Reliability engineering in large-scale distributed environments is addressed through a comprehensive study of chaos engineering practices. By focusing on controlled fault-injection experiments, blast-radius management, and automated rollback mechanisms, the article demonstrates how organizations can proactively improve system resilience and prepare for unexpected operational failures.

The growing importance of analytical data processing is reflected in a detailed exploration of column-oriented database architectures. Through an analysis of ClickHouse and DuckDB, the study investigates vectorized execution, late materialization, and compression strategies that enable high-performance analytics on massive datasets.

Another significant contribution examines memory-safe systems programming and the migration of critical infrastructure from traditional C and C++ environments to Rust. The discussion offers valuable insights into ownership models, interoperability challenges, incremental migration strategies, and the broader implications of memory safety for modern software security.

Cloud-native computing receives focused attention through an in-depth comparative analysis of service mesh architectures in multi-cluster Kubernetes environments. By evaluating Istio and Linkerd, the article provides important perspectives on traffic management, security, observability, and operational trade-offs in contemporary microservices ecosystems.

Collectively, the articles in this issue demonstrate the breadth and dynamism of contemporary computer science research. They address foundational theoretical advances alongside practical engineering solutions, offering valuable knowledge for researchers, practitioners, educators, and students alike. As computing systems become increasingly interconnected, intelligent, and security-conscious, the themes explored in this issue provide important insights into the technologies that will shape the next generation of digital innovation.

We extend our sincere appreciation to all authors, reviewers, and editorial board members whose dedication and expertise have made this publication possible. We hope that the contributions presented herein stimulate further research, foster interdisciplinary dialogue, and inspire continued advancements in the field of computer science.

Dr. Sr. Mini T V
Chief editor

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