



**Second Research Conference on Advances in
Information and Communication Technology
(RCAICT 2025)
“ICT Innovation and Emerging Technologies”**

Proceedings

September 3, 2025

Department of Information and Communication Technology

Faculty of Technological Studies

University of Vavuniya

Sri Lanka

**Second Research Conference on Advances in Information and
Communication Technology 2025**
(RCAICT 2025)

Proceedings of Research Conference on Advances in Information and Communication
Technology - 2025

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Published by

Department of Information and Communication Technology
Faculty of Technological Studies
University of Vavuniya
Pambaimadu
Vavuniya
Sri Lanka

ISBN – 978-624-6269-18-0



978-624-6269-18-0

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Editor-in-Chief

Mr. R. Sakuntharaj
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Message from the Vice Chancellor

It gives me great pleasure to issue this congratulatory message for the 2nd Research Conference on Advances in Information and Communication Technology 2025 (RCAICT 2025) of the Faculty of Technological Studies, University of Vavuniya, on the theme “ICT Innovation and Emerging Technologies”.



The

RCAICT provides a valuable platform for academics, researchers, industry professionals, and students to share their knowledge and present innovative findings in the rapidly evolving field of ICT. All submissions are peer-reviewed before acceptance and published as abstracts in the conference proceedings, which are further enriched by the contributions of eminent keynote speakers with outstanding achievements in the area of emerging technologies.

This year’s theme highlights the vital role of ICT innovations in shaping the future of industries, education, governance, and society at large. By exploring advancements such as Artificial Intelligence, Big Data, Internet of Things, Cybersecurity, and Cloud Computing, this conference creates opportunities for productive dialogue on how technological progress can be harnessed for sustainable growth and development.

The University of Vavuniya is proud to provide a permanent home for this important academic event and to support the Faculty of Technological Studies in its efforts to strengthen research culture and promote collaboration between academia and industry. I hope that distinguished delegates will gain meaningful insights from the diverse tracks of the conference and contribute to advancing the frontiers of ICT.

I warmly congratulate the organizing committee and staff of the Faculty of Technological Studies for their dedication and hard work in making RCAICT 2025 a reality, and I wish the conference every success in achieving its objectives.

Snr. Prof. A. Atputharajah
Vice Chancellor
University of Vavuniya.

Message from the Conference Chair

Theme: ICT Innovations and Emerging Technologies

It is with great pride and anticipation that I welcome you all to the 2nd Research Conference on Advances in Information and Communication Technology (RCAICT 2025), centered on the dynamic theme “ICT Innovations and Emerging Technologies”.



In this era of rapid technological evolution, such gatherings play a critical role in fostering collaboration, sharing knowledge, and driving innovation. As we stand on the frontier of digital transformation, emerging technologies like AI, block-chain, IoT, and quantum computing are reshaping industries, education, and everyday life.

This gathering is more than a showcase of research findings; it is a platform to connect minds, challenge ideas, and inspire action. Our goal is not only to understand the emerging technologies but to re-imagine how they can be responsibly and inclusively applied for the betterment of society.

I extend my sincere thanks to all speakers, researchers, industry partners, and participants for contributing your knowledge and passion. Together, let us embrace innovation with purpose and lead with vision as we navigate the future of ICT.

Wishing you an engaging and impactful conference experience.

Mr. V. Senthooran

Conference Chair (RCAICT 2025)

Faculty of Technological Studies

University of Vavuniya.

Message from the Convener

It is my privilege to welcome you to the Research Conference on Advances in Information and Communication Technology (RCAICT 2025), organized by the Department of Information and Communication Technology, Faculty of Technological Studies, University of Vavuniya. This year's theme, "ICT Innovation and Emerging Technologies," highlights the transformative role of innovation in shaping industries, advancing societies, and creating sustainable solutions in the digital era.



RCAICT has been established as a platform for disseminating knowledge, exchanging ideas, and fostering collaborations among researchers, academics, industry professionals, and policymakers. By bringing together diverse perspectives, this conference seeks to bridge the gap between theory and practice, and to encourage the adoption of emerging technologies for meaningful impact.

All accepted and presented papers will be published through the Faculty of Technological Studies, ensuring open access for future researchers and contributing to a growing repository of ICT knowledge.

I extend my sincere gratitude to the advisory panel, keynote speakers, reviewers, and organizing committee for their dedication to upholding the quality of this conference. Most importantly, I thank the presenters and participants whose contributions enrich this forum.

I trust that RCAICT 2025 will inspire new ideas, foster impactful collaborations, and advance the frontiers of ICT innovation. I wish you a productive and intellectually rewarding conference.

Ms. K. Keerththana

Convener (RCAICT 2025)

Faculty of Technological Studies

University of Vavuniya.

Message from the Editor-in-Chief

It is with great pleasure that I welcome you to the Proceedings of the 2nd Research Conference on Advances in Information and Communication Technology (RCAICT 2025), organized by the Faculty of Technological Studies, University of Vavuniya.

RCAICT is envisioned as a premier platform for researchers, academics, students, and industry professionals to present and discuss advances in Information and Communication Technology (ICT).



With its focus on “ICT Innovation and Emerging Technologies”, this year’s conference highlights the pivotal role of ICT in shaping sustainable, scalable, and future-ready solutions to address both regional and global challenges.

We are delighted by the overwhelming response to RCAICT 2025, with submissions spanning a wide range of disciplines. Each abstract underwent a rigorous review process to ensure originality, academic quality, and alignment with the conference theme. Reviews were conducted through a double-blind process by experts representing universities and research institutions. In cases where reviewers’ opinions diverged, a third reviewer was consulted, and the final decision was made by the Editorial Board. This meticulous evaluation has ensured that only high-quality contributions are included in this volume.

The conference features research presentations across diverse tracks, including Artificial Intelligence and Machine Learning, Network Technologies and Cyber Security, Multimedia and Gaming Technologies, Software Systems Technologies, Sensor and Embedded Systems, ICT Law, ICT Industry Innovations, and ICT Education. Collectively, these tracks underscore the breadth of ICT research and its vital role in driving innovation and development.

I extend my sincere gratitude to all authors for their valuable contributions, to the reviewers for their constructive feedback, to the organizing committee for their tireless efforts, and to the University of Vavuniya for its unwavering support. I am confident that this conference will inspire meaningful discussions, foster collaborations, and encourage innovative thinking that advances the frontiers of ICT.

Finally, while the editorial team and reviewers have worked diligently to ensure quality and accuracy, responsibility for the content of each abstract rests solely with the respective authors. On behalf of the Editorial Board, I warmly welcome you to RCAICT 2025 and wish you a productive and intellectually stimulating conference experience.

Mr. R. Sakuntharaj
Editor-in-Chief (RCAICT 2025)
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Keynote Speech



Trustworthy Generative AI in Higher Education: From Quick Wins to Guardrails

Prof. Roshan G. Ragel
Department of Computer Engineering,
Faculty of Engineering,
University of Peradeniya,
Sri Lanka.

Generative AI has moved from novelty to basic infrastructure in a short time. In our universities, it already shapes how students read, draft, code, search, and study. The question is not whether to allow it, but how to guide it toward real learning and trustworthy research. My argument is simple and practical: match AI use to pedagogy, protect academic integrity through assessment design rather than detection, and build a few habits that make responsible use normal.

Learning improves when tools support thinking rather than replace it. Well-designed activities use AI to help with ideas, feedback, translation, coding help, and literature review while keeping the student's reasoning visible. The focus should shift from producing a single polished answer to demonstrating the process, critique, and iteration involved. Ask students to compare model outputs with sources, justify their choices, and reflect on limits. Tasks that reward surface features will invite shortcuts. Detection tools are unreliable and often mislead us. A better answer is an assessment that demands explanation, evidence, and original judgment.

Trust depends on a few non-negotiables. Be transparent about when and how AI contributed to the work, for both students and staff. Attribute sources and check claims. Protect privacy by keeping sensitive data out of prompts unless there is explicit consent and proper safeguards. Keep access fair so students without devices, connectivity, or language advantages are not left behind. Evaluate routinely. Measure effects on learning, quality of feedback, time saved, and integrity incidents. Share results so practice can improve across departments.

For researchers, the promise is speed with scrutiny. Models can accelerate the process of scanning the literature, coding, and drafting, but they also make things up, amplify bias, and confuse authorship. A sound workflow pairs structured prompts with verification steps, correct citation, and human judgment. There is strong scholarly work to be done on model reliability in academic tasks, support for bilingual and low- resource languages, domain-specific retrieval, and ethics education that is taught inside disciplines rather than as an abstract topic.

The Sri Lankan context makes this practical. Our universities work with tight budgets, diverse student preparation, and multilingual needs. These constraints can become advantages if we choose clarity over complexity. Light policies written in plain language, clear course-level guidance, and shared examples will travel faster than big systems. Faculty development works best through small cohorts who teach

their peers, keep prompt libraries, and curate discipline-specific cases. Students should work in pairs to co-design policies, test tools, and document what responsible use looks like from their side of the classroom. What should change this academic year is modest but impactful. Course outlines should state what AI use is allowed and how to disclose it, in simple words. At least part of the assessment should make the process visible through oral defenses, versioned drafts, notebooks, or short reflective memos. Instructors should build the habit of asking students to check model outputs against authoritative sources and explain any differences. Departments should collect basic evidence on what helps and what harms, and share it openly, including failures. Libraries can lead on source quality, citation integrity, and the design of retrieval that grounds answers in approved material.

The call to action is clear. Treat generative AI as a literacy to be taught, not a threat to be policed: reward reasoning and evidence over polish. Build habits of disclosure, verification, and respect for privacy. Invest in faculty and student capacity through peer teaching rather than one-off workshops. Study the impact with the same seriousness we expect in our research, and let those results guide policy. If we do this, we will not only protect academic standards, we will raise them by creating space for deeper inquiry, better feedback, and more inclusive participation in the life of the university.

Keynote Speech



Future of Speech Technology and AI: Integrating Voice with Intelligent Systems

Prof. Eliathamby Ambikairajah
Former Deputy Vice Chancellor (Innovation and Enterprise),
University of New South Wales (UNSW),
Sydney, Australia.

In this keynote, I will discuss how speech, the most natural form of human communication, conveys far more than just words. Embedded within speech are rich layers of information such as a person's unique identity (voice print), emotional state, cognitive load, mental health indicators such as depression and, of course, language itself. Just as the human system has a transmitter (speech production from the mouth) and a receiver (the ear and brain), speech technologies attempt to capture and interpret these complex voice signals. Traditionally, the receiver has been modelled in two stages: the front-end, which functions like the ear by extracting relevant characteristics from the speech signal and the back-end which acts like the brain, performing classification and interpretation.

Research into this type of modelling began in the early 1950s, laying the foundation for modern AI-based speech processing. Over time, these traditional systems evolved into today's powerful end-to-end machine learning models, where the front end and back end are no longer treated separately but are integrated into a single unified system. This raises an important question: are end-to-end machine learning systems superior to the traditional frontend and back-end approach? In this keynote, I will explore the advantages of integrated end-to-end models and their ability to automatically learn relevant features and optimise performance across the entire system and as well as their limitations, including issues of transparency, interpretability and robustness.

Ultimately, this talk will highlight how the evolution from early models to modern end-to-end systems is transforming the way we process, interpret and apply speech technology in real-world applications. While integrated end-to-end systems have achieved remarkable progress, they also have significant limitations. Once trained, their parameters are essentially fixed and retraining requires large amounts of new data. In contrast, biologically inspired front-end and back-end models are inherently adaptive. The human auditory system, for example, constantly adjusts to its environment: our ears adapt to background conditions and noise, enabling us to focus on and enhance a speaker's voice even in challenging acoustic settings. Machine-learned systems, however, often fail under such noisy conditions because they lack this adaptive capability.

In this talk, I will discuss why incorporating an adaptive front-end is essential for the next generation of end-to-end systems. Such adaptability will enable speech technologies to perform reliably in noisy and dynamic environments, bringing them closer to the robustness of human hearing. Speech technology now

enables recognition, synthesis, authentication, and emotion detection, transforming the way we interact with devices. Looking ahead, it promises seamless conversational AI, real-time translation, healthcare diagnostics and inclusive systems for all languages, thus making speech not just a tool for communication, but a bridge between humans and intelligent systems.

Another promising future direction is the use of end-to-end models for binaural hearing. By learning from signals captured at both ears, these systems could separate voices and enhance speech even when many people are talking at the same time. This approach could greatly improve hearing aids, cochlear implants, and everyday listening devices, enabling users to focus on the speaker they want to hear in noisy and challenging environments.

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