



**First Research Conference on Advances in
Information and Communication Technology
(RCAICT) 2022**

“Resilience through Intelligent Connectivity”

Proceedings

4th of October 2022

Department of Information and Communication Technology

Faculty of Technological Studies

University of Vavuniya

Sri Lanka

**First Research Conference on Advances in Information
and Communication Technology 2022
(RCAICT 2022)**

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Editor in Chief

Mr. V. Vinoharan

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Ms. P. Rukshani

Message from the Vice Chancellor

It gives me great pleasure to issue this congratulatory message for the 1st Research Conference on Advances in Information and Communication Technology-2022 (RCAICT 2022) of the Faculty of Technological Studies of the University of Vavuniya on the theme “Resilience through intelligent connectivity”.



The RCAICT provides a forum for academics and other professionals in the field of Information and Communication Technology to present their research to a wide audience of academic policy makers’ representatives from industry and students. The papers are peer reviewed prior to acceptance and published as an extended abstract in the conference proceeding. The proceeding is further embellished by the participation of an eminent keynote speakers with a proven track record of research in the identified theme.

The RCAICT is organized by a committee of young academics from the Faculty of Technological Studies of the University of Vavuniya. Faculty of Technological Studies is proud to host this important event and to provide University of Vavuniya permanent location as the venue. I hope that the distinguished delegates will have ample opportunities to deliberate upon a wide variety of tracks in the conference and thereby help enrich our knowledge in the area of technology development.

I would like to congratulate the conference committee and staff of the Faculty of Technological Studies for hoisting this event and I wish all the best in continuing its good work.

Prof. T. Mangaleswaran
Vice Chancellor
University of Vavuniya

Message from the Conference Chair

I am delighted and honored to bring this message to the Research Conference on Advances in Information and Communication Technology - 2022 (RCAICT 2022) as the Chair of the research conference. This year has been a significant year, as we the Faculty of Technological Studies of the University of Vavuniya, have decided to organize this very first research conference.



Our theme of “Resilience through Intelligent Connectivity” was created to leverage the distinguished gathering of professionals to bridge the gaps in Information and Communication Technology and to connect the gaps in a new and fresh way. This conference will provide valuable opportunities on top notch research, and showcasing innovative research that are utilizing revolutionary technologies.

I hope that this conference will allow the participants a productive discourse not only in aspiring excellence in their main field of interest, but also in gaining new ideas and opportunities for future technological collaboration. Further, we are delighted to have a distinguished group of keynote speakers. Their talks on various technologies will add a special touch to the conference.

I would like to take this opportunity to express my sincere gratitude to the conference committee and all the staff members of the Faculty of Technological Studies for planning and organizing the research conference.

I hope that you will enjoy this research conference and I look forward to meeting you physically in the Faculty of Technological Studies of the University of Vavuniya or virtually at RCAICT 2022.

Mr. S. S. Suthaharan

Conference Chair- RCAICT 2022

Faculty of Technological Studies

University of Vavuniya.

Message from the Convener

As the Convener of the RCAICT-2022, I am delighted and honoured to bring this message to the First Research Conference on Advances in Information and Communication Technology themed on Resilience through Intelligent Connectivity. The theme of the Conference draws the inspiration from the fact that we are moving at a very fast pace in this modern world of communication.



This year has been a significant year, as we the Department of Information and Communication Technology, Faculty of Technological Studies under the University of Vavuniya has decided to hold this first prestigious conference. The RCAICT-2022 is organized with the focus on disseminating the knowledge and initiating collaborations thus will help on transferring information and communication technologies. It will also deliver an outstanding platform for sharing outcomes from the researchers, industrialists and policy makers. This conference also obtained advices from reputed advisory panel to keep up the standard in the first conference itself and for better services in the future too. These all becomes viable now, as Sri Lanka has produced many leading professors and scientists, who are contributing tremendously in international forums. Further, contributions from the University of Vavuniya on the research and developments are gradually increasing.

This conference will publish all accepted and presented papers in the online platform through the website of the Faculty of Technological Studies as these papers will be copyrighted to the University of Vavuniya. This will help the future researchers to obtain the related research papers easily for their researches. This conference also focused on connecting the industry together with the researchers from the Universities and all research institutions. In overall, this conference will be serving for disseminating the knowledge, gained through research, and initiate industrial collaborations for sustainable development. In particular, I thank the committee for their prudent advice and clear suggestions on organizing the conference. All recognition should go to the committee members who have all worked extremely hard on the details of important aspects of the conference programs. A note of appreciation to the eminent keynote speakers and academia for their thorough and timely reviewing of the papers. Most of all, I thank you, the presenters, for enriching the conferences by your presence. I hope you will enjoy the content, renew old fellowships, make new fellowships, get new ideas, and above all, have a great deliberation.

Mr. V. Senthoooran

Convener- RCAICT 2022

Faculty of Technological Studies

University of Vavuniya.

Message from the Editor in Chief

The conference committee and authors of the Research Conference on Advances in Information Communication Technology (RCAICT) 2022 are eagerly awaiting for the publication of the first conference proceedings on October 4, 2022, as scheduled. I am grateful to the organizer for suggesting my name for the committee since it is an honor for me to have been chosen as the Editor of the RCAICT2022 conference proceedings.



In particular, working with the secretary of the conference committee makes me very happy. The secretary is devotedly working to ensure that the conference proceedings progress successfully.

The RCAICT 2022, a national conference, also got submissions from other universities and institutions in Sri Lanka, demonstrating the scope of the conference among potential scholars. A comprehensive review procedure was applied to all submissions; it began with checking for concerns with conformity and plagiarism. I want to express my gratitude to the reviewers and the editorial committee who contributed significantly to the review process by giving the authors insightful criticism.

I would also want to take this opportunity to thank our Dean of the Faculty of Technological Studies and the Convener of RCAICT 2022 for their tremendous support, strategies, and expertise that enabled us to make significant progress during the reviewing process. Last but not least, I would like to congratulate the authors that was published in these proceedings.

Mr. V. Vinoharan

Editor-in-Chief- RCAICT 2022

Faculty of Technological Studies

University of Vavuniya.

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- Ms. T. Rajeetha, Department of Computer Science and Informatics, Uva Wellassa University of Sri Lanka, Sri Lanka.

Computational Intelligence

Prof. Rajesh R.

Department of Computer Science, Central University of Kerala, India

Achieving significance and precision together in real life computational automation is one of the most difficult task. So in real life applications when you compromise between precision and significance, certain level of uncertainty comes in. There are three types of uncertainties, namely, stochastic uncertainty (for eg. throwing a die/coin), linguistic uncertainty (for eg. low price, tall tree, huge stone) and informational uncertainty (for eg. honesty, creditworthiness, brilliant). Another two types of problem that we see in real life is vagueness and ambiguity. Whenever, we have these types of uncertainties, ambiguity and vagueness in systems, computational intelligence techniques like fuzzy logic, evolutionary algorithms and neural network will help to make the systems work better than conventional systems. The computational intelligence techniques have large number of applications across the disciplines including life-critical medical applications.

This talk will focus on the applications and the key aspects of implementing computational intelligence.

Sustainable Internet of Things

Prof. Xavier Fernando

Ryerson University, Canada

The Internet of Things (IoT) has been changing the way we live. It plays a key role in transforming society to create an interconnected globe. The world is increasingly populated with sensors and connected devices that automatically communicate, make decisions and perform complex tasks. IoT nodes could be sophisticated servers like autonomous vehicles that fuse information from a multitude of sensors plus 5G++ wireless networks and perform control operations in seconds. On the other hand, they could also be simple sensing devices like smart meters or roadside cameras. Nevertheless, their contribution is valuable. Artificial Intelligence and Machine Learning algorithms play a vital role in analyzing the humongous amount of data to draw meaningful conclusions.

Currently an estimated 50 Billion IoT nodes exist and this number could double in 2-3 three years. There are a few issues in realizing a sustainable IoT system. Mainly, in the realms of spectrum availability and energy sustainability. It is interesting to note, compared to the energy consumed by IoT, energy saved by the deployment of intelligent IoT solutions in other areas is huge. In this presentation a few approaches to address the spectrum crunch, namely the Cognitive Radio approach and Optical-Wireless, especially Visible Light Communication (VLC) approach will be discussed. Also, energy saving and harvesting approaches to reduce the carbon footprint IoT ecosystem will be highlighted.

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