

2023 3rd International Conference on Advanced Research in Computing (ICARC 2023)

**Belihuloya, Sri Lanka
23-24 February 2023**



**IEEE Catalog Number: CFP23BM0-POD
ISBN: 979-8-3503-4738-8**

**Copyright © 2023 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP23BM0-POD
ISBN (Print-On-Demand):	979-8-3503-4738-8
ISBN (Online):	979-8-3503-4737-1

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

Contents

Organizing Committee	iii
Technical Program Committee	v
Editorial Board	vii
Advisory Panel	viii
Panel of Reviewers	ix
Message from the Vice Chancellor	xv
Message from the Dean of the Faculty	xvi
Message from General Chair - ICARC 2023	xvii
Keynote Address by Assistant Professor Madusanka Liyanage	xxiv
Keynote Address by Prof. Muttukrishnan Rajarajan	xxv
Plenary Speech by Prof. Prasad M. Jayaweera <i>Selection of Right Elevators for Right IR 4.0 Applications' Success</i>	xxvi
Plenary Speech by Dr. L. Ranathunga <i>Computational Creativity: Focuses Towards Creative Machines</i>	xxvii
Plenary Speech by Prof. A. Ramanan <i>Should I Learn Traditional Computer Vision Techniques in Deep Learning Era?</i>	xxviii
Plenary Speech by Dr. Sagara Sumathipala <i>The Role of Text Analytics and NLP in Transforming Human-Machine Communication</i>	xxix
Plenary Speech by Dr. Chathura Rajapakse <i>The Role of Prescriptive Analytics and Social Simulation</i>	xxx
Plenary Speech by Dr. Windhya Rankothge <i>The Strength behind Blockchain</i>	xxxi
Plenary Speech by Dr. V.G.T.N. Vidanagama <i>Towards Realization of an IoT Environment</i>	xxxii
Plenary Speech by Dr. Kasun Karunanayaka <i>Improving the Quality of Life of Elderly and Visual Impaired using Augmented Reality (AR)</i>	xxxiii
Plenary Speech by Dr. Jayalath Ekanayake	xxxiv
Plenary Speech by Dr. D.P. Nawinna <i>Advances in Software Requirements Engineering Research</i>	xxxvi
Plenary Speech by Assistant Prof Kalpani Manathunga <i>Technology Enhanced Learning for a Free, Safe and Sustainable World while Adopting with New Normal</i>	xxxvii

Plenary Speech by Ms. M.M.H.C.N. Mahalaksha
Digital Transformation of Utilities and the Research Avenues in Computing xxxviii

Plenary Speech by Dr. Pradeep Kalansooriya
Leveraging ICT for Climate Action: Advancing Sustainable Development in the Digital Era xxxix

Artificial Intelligence and Machine Learning Track

Identifying Unusual Human Movements using Multi-Agent and Time-Series Outlier Detection Techniques
P.P.G. Dinesh Asanka, Chathura Rajapakshe and Masakazu Takahashi 1 - 6

Human Stress Detection Based on Sleeping Habits Using Machine Learning Algorithms
J.G. Jayawickrama and R.A.H.M. Rupasingha 7 - 12

Path Planning for Moving Robots in an Unknown Dynamic Area Using RND-Based Deep Reinforcement Learning
J. Bodaragama and U.U.S. Rajapaksha 13 - 18

Fine-Tuning XLM-R for the Detection of Sinhala Hate Speech Content on Twitter and Youtube
Nirupama Rajapaksha, Supunmali Ahangama and Shalinda Adikari 19 - 23

Machine Learning Approach for Discovering Successful Books Based on the Achievement of Award-Winning
S.M.S.T. Wijekoon and R.A.H.M. Rupasingha 24 - 29

Melanoma Skin Cancer Classification with Explainability
L. Gamage, U. Isuranga, S.D. Silva and D. Meedeniya 30 - 35

Emotion Classification Comparison in Convolutional Neural Networks and Fuzzy Logics for Service Robotic Applications
Kumar Abhishek and E.J.G.S. Appuhamy 36 - 41

CRICSQUAD: A System to Recommend Ideal Players to A Particular Match and Predict the Outcome of the Match
E.L. Lekamge, K.R. Wickramasinghe, S.E. Gamage, T.M.K.L. Thennakoon, Prasanna S. Haddela and Sandamini Senaratne 42 - 47

Sentiment Analysis of Twitter Data on the Tourism Industry during the Covid-19 Pandemic
G.A.N. Priyamal and R.A.H.M. Rupasingha 48 - 53

Identification of Covid-19 using Speech Recognition and Convolutional Neural Networks
Tharanga Ranaweera and Kasun Karunanayaka 54 - 59

Chronic Kidney Disease Detection Using Machine Learning Algorithms: A Sri Lankan Study
D.V. Dissanayake, S. Sobana, B. Yogarajah and R. Nagulan 60 - 65

Red Onion Price Factors Correlation Identification and Price Prediction Using Multiple Machine Learning Models for Jaffna District Sri Lanka
S. Mithuna, J.K.D.B.G. Jayaneththi and T. Sajarupan 66 - 71

Accuracy Comparison between Recurrent Neural Networks and Statistical Methods for Temperature Forecasting
Isurika Adikari, Sumudu Lakmali, Praveen Dhananjaya and Damayanthi Herath 72 - 77

Ontology Based Restaurant Recommendation Approach 78 - 83
H.M.R.L. Bandara and L. Ranathunga

Automatic Emotion Recognition System: A Cross Culture Study between Tamil and Russian Speaking Children 84 - 89
Ruban Nersisson, Prithiraj Bhuyan, A. Mary Mekala and Elena Lyakso

Computer Vision and Image Processing Track

Automated Radiology Report Generation using Transformers 90 - 95
Wimukthi Nimalsiri, Mahela Hennayake, Kasun Rathnayake, Thanuja D. Ambegoda and Dulani Meedeniya

Reconstruct Damaged Sinhala Handwritten Characters by Guided Edge Linking Approach 96 - 101
Iresha Madhuwanthi and Lochandaka Ranathunga

Plant Leaf Recognition Using Texture, Colour and Vein Density Features 102 - 107
S.W. Athapaththu and U.A.P. Ishanka

Article Elements Recognition of Old Sinhala Newspapers using Vision Heuristic Algorithm 108 - 113
G.D.S. Nirmani and Lochandaka Ranathunga

Damaged Sinhala Handwritten Character Location-Identification using Neighbour Mapping 114 - 119
Viraj Lakshitha, Iresha Madhuwanthi and Lochandaka Ranathunga

Text Analytics and Natural Language Processing Track

TacoSi: A Sinhala Text to Speech System with Neural Networks 120 - 124
Tharuka Kasthuri Arachchige and Ruwan Weerasinghe

Evaluating the Economic Disparities in the World: Sentiment Analysis on Central Bank Speeches from Third World and First World Countries 125 - 129
Krish Vazirani

Early Detection of Sinhala Fake News in Social Media 130 - 135
Sandunika Hathnapitiya, Supunmali Ahangama and Shalinda Adikari

Swa-Bhasha: Romanized Sinhala to Sinhala Reverse Transliteration Using a Hybrid Approach 136 - 141
T.G.D.K. Sumanathilaka, R. Weerasinghe and H.Y.P.P. Priyadarshana

Twitter Mining for Detecting Home Violence 142 - 147
S. Adeeba, Kuhaneswaran Banujan, B.T.G.S. Kumara and Zhenni Li

Influence Rank of Hate Users in Twitter: An Analysis during Sri Lanka's Political and Economic Crisis 148 - 153
Suresha Perea, Indika Perera and Supunmali Ahangama

Tamil Grammarly – A Typing Assistant for Tamil Language using Natural Language Processing 154 - 159
Praveen Mahadevan, Parameswaran Srihari, Krishnathasan Seyon, Parthipan Vasavan and Rubaa Panchendrarajan

Data Analytics Track

- Classification of Batters Format-wise Based on Ball-wise Striking Performance
D.Y. Jayasinghe, R.M. Silva and C.L. Jayasinghe 160 - 165
- Electric Vehicle Charging Scheduling using Branch and Cut Algorithm
Adhyan Vijeta Mittal, Animisha Sharanappa, Konish Bagchi, Senthil Prabu Ramalingam and P.K. Shanmugam 166 - 171

Parallel and Distributed Computing Track

- Security Issues and Mitigation Mechanisms in Distributed Systems
V.N. Mahaliyanaarachchi 172 - 177

Internet of Things and Applications Track

- Real-time Vehicular Pollution Detection Model using IoT and Distributed Streaming Techniques
S.T. Rakkesh, A.R. Weerasinghe and R.A.C. Ranasinghe 178 - 183
- Smart Waste Segregation for Home Environment
Muhammed Rijah and P.K.W. Abeygunawardhana 184 - 189
- Two-Factor Commissioning for Thread Protocol
Gopinath Sittampalam, Suneth Namal and Roshan Ragel 190 - 195

Human-Computer Interaction Track

- An Efficient Knock Code Decoding Approach to Assist the People with Communication Impairments
S. Pabasara and T. Kokul 196 - 201
- Re-evaluating Keystroke Dynamics for Continuous Authentication
Dilshan Senarath, Sanuja Tharinda, Maduka Vishvajith, Sanka Rasnayaka, Sandareka Wickramanayake and Dulani Meedeniya 202 - 207
- Virtual Reality Based Approaches for Post Ischemic Stroke Rehabilitation: Current Practices and Future Perspectives
B.C. Wickramasinghe, K.A.K.T. Karunanayaka, H.K.T.C. Halloluwa and A.D. Cheok 208 - 213
- A Comprehensive Review on Speech Synthesis using Neural-Network Based Approaches
N.N. Perera and G.U. Ganegoda 214 - 219

Knowledge Management and Information Systems Track

- Effects of the Organizational Knowledge Management Systems on Psychological Well-Being Among Employees in Private Large-Scale IT Organizations in Sri Lanka
K.D.B. Aratthanage and J. Wijekoon 220 - 225
- Factors Affecting ERP Systems Adoption in Organizations in the Face of Economic Crisis: A Systematic Literature Review
N.B. Opatha and A.S. Withanaarachchi 226 - 231

Role of Blockchain Technology in ERP Systems for a Transparent Supply Chain: A Systematic Review of Literature
Ruwanthi Perera, K.R. Nawurunnage, Sanjaya Chathuranga, Ruwan Wickramarachchi and Amila Withanaarachchi 232 - 237

Travel Recommendation System for Domestic Travelers in Sri Lanka
R.P.E.I. Premakumara, J.B. Ekanayake and A.M.D.B. Nawarathna 238 - 243

Software Engineering Track

Code Clone Detection Using Boosting Algorithms
M.V. Thanoshan, K. Banujan, B. T. G. S. Kumara, S. Prasanth, Zhenni Li and Incheon Paik 244 - 249

Technology-enhanced Learning and Teaching Track

Developing Coordinate Conversion Mobile Application for Geomatics Education
A. Hussaini, L. Huang and K.K.W. Tang 250 - 255

Investigating the Learner Perception on Massive Open Online Courses (MOOCs) : A Case Study from Sri Lanka
T.A. Gamage, E.R.C. Sandamali and L.P. Kalansoriya 256 - 261

Twitter Sentiment Analysis and Topic Modeling for Online Learning
H.W.K. Sajinika, S. Vasanthapriyan and P.M.A.K. Wijeratne 262 - 267

Methodological Approach for the Quality Assurance of Virtual Platforms Delivering Short-Term Online IT Courses
B.A. Munasinghe, M.P.A.W. Gamage and P.P.G. Dinesh Asanka 268 - 273

Industry Research and Development Track

TQM and Green Supply Chain Management Practices on Supply Chain Performance of Third-Party Logistics Services in Sri Lanka: A Systematic Review of Literature
K.R. Nawurunnage, A.P.K.J. Prasadika, and A.N. Wijayanayake 274 - 279

Risk Analysis on Green Supply Chain Management: A Systematic Literature Review
G.A.P.A.A. Jayasinghe, A.P.K.J. Prabodhika, and A.N. Wijayanayake 280 - 285

Key Technologies and Critical Success Factors of Industry 4.0 for the Sri Lankan Apparel Manufacturing Sector: A Systematic Literature Review
A.S. Withanaarachchi and A.M.H. Silva 286 - 291

Developing a Predictive Model to Forecast Optimal Production Quantity under Uncertainty: A Systematic Literature Review
W.D.A.P. Gunasekara, K. Chathurangi, and A. Wijayanayake 292 - 297

Application of the Shapley Value on Energy and Power Allocation in a Deficit Power Environment
K.S. Kumar and G.G. Krishnan 298 - 303

Open Track

Driving Innovative Culture with Emotional Intelligence <i>Azra Rizwi and Shashika Lokuliyana</i>	304 - 309
Review of Social Media's Impact on Initial Coin Offerings <i>Sarangani Sivarajah and Supunmali Ahangama</i>	310 - 315
Traffic Collision Avoidance with Vehicular Edge Computing <i>Ravishka Hasarinda, Theekshana Tharuminda, Kapila Palitharathna and Sampath Edirisinghe</i>	316 - 321
Fine-tuned CNN-based Sri Lankan Currency Note Detection Method for the Visually Impaired People Using Smartphones <i>A.S.K. Perera and G.S.N. Meedin</i>	322 - 327
Determining the Relationship between Organizational Characteristics and Digital Transformation Strategies – A Systematic Literature Review <i>H.Y.A. Kodithuwakku and R. Wickramarachchi</i>	328 - 333