

2025 21st IEEE International Colloquium on Signal Processing & Its Applications (CSPA 2025)

**Pulau Pinang, Malaysia
7-8 February 2025**



**IEEE Catalog Number: CFP2579G-POD
ISBN: 979-8-3315-2220-9**

**Copyright © 2025 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:	CFP2579G-POD
ISBN (Print-On-Demand):	979-8-3315-2220-9
ISBN (Online):	979-8-3315-2219-3
ISSN:	2836-418X

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

Table of Contents

	Page
<i>Organizing Committee</i>	iii
<i>Reviewers</i>	iv
<i>Table of Contents</i>	vii
<i>Paper Title & Authors</i>	
Refreshing Idea on Fourier Analysis Fumihiko Ishiyama	1
Theoretical and Computational Study of Nonlinear Series Expansion for Nonlinear System Identification Fumihiko Ishiyama	5
Analytical Characterization of Aquilaria Species Essential Oils Using Advanced Chromatographic Techniques based on GC-MS and GC-FID Nur Athirah Syafiqah Noramli, Noor Aida Syakira Ahmad Sabri, Muhammad Ikhsan Roslan, Nurlaila Ismail, Zakiah Mohd Yusoff and Mohd Nasir Taib	10
A Bibliometric Analysis of IoT-Integrated Wearable Systems for Healthcare: Trends, Collaborations and Research Gaps Ahgalya Subbiah	16
Data Driven Traffic Density Monitoring: A UAV and ResNet50 Deep Learning Framework Saddaf Rubab, Fida Hussain Dahri, Ghulam E. Mustafa Abro, Nooritawati Md Tahir and Muhammad Javed	22
A Simheuristic Approach Cooperating Skill Optimization Algorithm with Ordinal Optimization Shih-Cheng Horng and Shieh-Shing Lin	27
Design and implementation of IoT-Based Smart Fuel Monitoring System Islam Mohamedalfatih Ahmed Abdalmerged, Safaa Najah Saud Al-Humairi, Asmaa Mahfoudh Hezam Al-Hakimi and Aparna Kumari	32
Machine Learning-Based Exploratory Analysis of Fall Risk Classification in Older Adults Nurul Earliana Nordin, Abdul Hadi Abdul Razak, Khairul Khaizi Mohd Shariff and Azliyana Azizan	38
Vulnerabilities in Government Mobile Applications: Evaluating the Security of Mobile Apps in Indonesia and Malaysia Asmaa Mahfoud Al-Hakimi, I. Nyoman Gede Arya Astawa, I. Wayan Budi Sentana and I. Made Ari Dwi Suta Atmaja	44
Enhancing Smart Grid Stability Using AI Techniques: A Systematic Literature Review Muhamme Ibrahim, Moamin A Mahmoud, Noor Islam Jasim and Saraswathy Shamini Gunasekara	50

Image Analysis of the Nasal Region for Respiratory Rate Detection Del Mundo Angelo Ray D., Lauraya Mark Jacob V. and Dela Cruz Jennifer C.	56
Manipulations of Organisms and Ecosystems in Artificial Life Mohamed ElZayyat and Denis Mušić	62
Quadrotor Precision Landing on Inclined Surfaces Using Adaptive Leg Design with Robust PID and Fractional PID Control Abdullah Nader Alkhater, Ghulam E. Mustafa Abro and Ayman M. Abdallah	67
Input Delay Compensation via Barrier Lyapunov and Fuzzy Padé Approximation for Precise Trajectory Tracking for Quadrotor UAVs Muhammad Salem Alsharief, Ghulam E. Mustafa Abro and Ayman M. Abdallah	72
A Color-Based Real-Time Target Detection using OpenCV for DJI Tello Drone A'dilah Baharuddin and Mohd Ariffanan Mohd Basri	77
Smooth Transition MMPC for High-Frequency Attitude Control in Quadrotor UAVs Rayan Ibrahim Almosawi, Ghulam E. Mustafa Abro and Ayman M. Abdallah	83
Review Paper on Centroiding Algorithm for Lunar Navigation Anis Hannani Razaman, Yasser Asrul Ahmad, Othman Omran Khalifa, Norazlina Saidin and Amelia Wong Azman	89
The Role of Artificial Intelligence (AI) in Interior Architecture Design: Thematic Review Noor Hafizah, Aysha Mnea and Mohd Zairul	94
Optimizing TAN Concentration Prediction in Various Anaerobic Digestion Systems: A Machine Learning Approach Benyahya Youssef, Chiguer Amine, Sadik Mohamed and Fail Abderrahim	100
Evaluating Indoor Positioning Accuracy with 4- and 8-Light Emitting Diode Configurations Using Machine Learning Yuen Chark See, Jin En The, Zhi Yin Goo, Jun Kit Foong and Zhen Hui Thean	106
AI Based Control System for Electric Vehicles with Predictive Maintenance and Adaptive Energy Management Ren Xiang Goh, Hsiao Wei Su, Choon Min Cheong, Tian Fat Lai, Muhamad Hazwan Abdul Halim and Ronald Anak Jackson	112
Exhaustive Feature Selection using Wrapper method for Artery-Vein Classification in Retinal Fundus Image Assyareefah Hudaibah Saad, Nur Asyiqin Amir Hamzah and Wan Mimi Diyana Wan Zaki	118
Reinforcement Learning for Automated Anterior Commissure Localization in Brain CT Scans for Tumor Detection Siti Nurhajar Rafiqin Roslan, Aqilah Baseri Huddin, Muhammad Rizqun Kareem Bahari, Wan Mimi Diyana Wan Zaki and Siti Salasiah Mokri	123
Exploring Virtual Reality as a Medium for Cognitive Behavioral Treatment Wai Yie Leong	129
Performance Analysis of Quantitative Muscle Spasticity Model in Flexion and Extension Passive Movements Muhamad Aliff Imran Daud, Asmarani Ahmad Puzi, Shahrul Na'im Sidek, Ismail Mohd Khairuddin and Mohd Azri Abdul Mutalib	134
AI-Generated Brain Scans for Synthetic Healthcare Data Wai Yie Leong	140

Soybean Seed Quality Assessment Classification using EfficientNet B0 Algorithm	144
Isaac Angelo M. Dioses, Jesusimo L. Dioses Jr., Russell N. Aquino, Catleen Glo M. Feliciano, James Bryan Tababa and Loida F. Hermosura	
Vertical Beam Segmentation in Mobile Slit Lamp Images for Peripheral Anterior Chamber Angle Measurement	150
Aziean Mohd Azize, Nurul Syahira Mohamad Zamani, Wan Mimi Diyana Wan Zaki and Haliza Abdul Mutalib	
Three-phase Multilevel Inverter with Minimized Low-order Harmonics using Mantis Search Algorithm	155
Quan Ming Wong, Wei Tik Chew, Siok Lan Ong, Yee Wei Sea, Ahmad Firdaus Ahmad Zaidi, Noor Syafawati Ahmad, Mohd Azrik Roslan and Jenn Hwai Leong	
5G Slicing with Machine Learning: Dataset Design, Model Adjustment and Performance Metrics	161
Faris Syahmi Samidi, Nurul Asyikin Mohamed Radzi, Norazizah Mohd Aripin, Yanti Erana Jalil and Kaiyisah Hanis Mohd Azmi	
Small-Scale Dataset for Machine Learning Based Network Intrusion Detection	167
Mohammad Azmi Ridwan, Nurul Asyikin Mohamed Radzi, Faris Syahmi Samidi, Suhaila Sulaiman, Kaiyisah Hanis Mohd Azmi and Wan Siti Halimatul Munirah Wan Ahmad	
Smart Poultry Farming 4.0: Leveraging IoT for Climate Control and Productivity	172
Wai Yie Leong	
Design of an Electromagnetic Flywheel-Based Energy Harvester with a Battery Management System (BMS) for the Blind and Visually Impaired IoT-Enabled Assistive Devices	176
Glenn Harry Abraam M. Arollado, Rence Josiah F. Lopez and Ronald Vincent M. Santiago	
A Joint Gauss-Seidel and Neumann Series Precoding Scheme for a Downlink Massive MIMO System	182
Nurulhuda Ismail, Khairun Nidzam Ramli, Ariffuddin Joret, Mohamad Hairol Jabbar, Norshidah Katiran and Eddy Irwan Shah Saadon	
Comparative Analysis of the Multiscale Convolutional Neural Network and Advanced Deep Learning Models for Land Cover Classification Using Hyperspectral Imagery	188
Yuhao Ang, Helmi Zulhaidi Mohd Shafri and Mohamed Barakat A. Gibril	
Adaptive Palmprint ROI Extraction using Contour-Based Approach with PCA Alignment	194
Tan Shie Chow, Muhammad Imran Ahmad, Zahari Awang Ahmad, Adhi Kusnadi, David Agustriawan and Marlinda Vasty Overbeek	
Burned Forest Areas Mapping using Semantic Segmentation Networks with Group and Shuffle Embeddings	200
Mohd Asyraf Zulkifley, Nurul Aina Abdul Aziz and Marzuraikah Mohd Stofa	
Autonomous Truck Platooning with Vehicle-to-Vehicle Communication	205
TeckChai Tiong, Ismail Saad, Kenneth Tze Kin Teo and Herwansyah Lago	
Advancing Sustainable Paddy Farming: Utilizing Multispectral Unmanned Aerial Vehicle (UAV) Technology for Efficient Water Stress Detection and Management	210
Nurain Wadhihah Mohd Nazri, Khairil Afendy Hashim, Nurul Ain Mohd Zaki, Abd Manan Samad, Zulkiflee Abd Latif, Zaki Ahmad Dahlan, Norhashila Hashim and Wani Sofia Udin	
Utilizing Thermal Unmanned Aerial Vehicle (UAV) Technology for Precision Agriculture Monitoring of Temperature Stress in Paddy Fields	216
Nurain Wadhihah Mohd Nazri, Khairil Afendy Hashim, Zaki Ahmad Dahlan, Abd Manan Samad, Zulkiflee Abd Latif, Nurul Ain Mohd Zaki, Norhashila Hashim and Wani Sofia Udin	

Alternative Customized Ordering System using Aveva Edge	221
Jia Jan Ong, Kang Long Chua, Yoon Ket Lee, Tsung Heng Chiew, Kai Ming Chang and Yeh Huann Goh	
Control-Enhanced Thrust-Vectoring Rockets: Comparative Insights from PID and FOPID Control	227
Eman Mahmoud, Ghulam E. Mustafa Abro and Ayman M. Abdallah	
Implementation Research of Tiny ML on RISC-V Platform using Efinix Platform for Real Time Person Detection	233
Yeap Wei Hao, Cheong Choon Min, Roslee Mohd Sabri, Richard Lai Tian Fat, Su Hsiao Wei, Hazwan Halim and Solahuddin Yusuf Fadhlullah	
Pothole Detection Using UAV with Deep Learning Algorithm for Road Inspection	239
Nor Hafiza Aziz, Khairil Afendy Hashim, Abdul Manan Samad, Zaki Ahmad Dahlan, Mohd Adly Rosly, Ismail Ma'arof, Khairul Afinawati Hashim, Basharudin Abdul Hadi and Mohamad Najib Mohamad Fadzil	
4D Printing of a Modular Tweezer-Like Gripper	245
Jia Long Chong, Kai Feng Bong, Mohamed Sultan Mohamed Ali and Marwan Nafea	
Estimation of the Volume and the Surface Area of a Charcoal Kiln based on the Paraboloid and the Terrestrial Laser Scanning	251
Taufiq Khairi Ahmad Khairuddin, Zulkepli Majid, Mohd Ali Khameini Ahmad, Ahmad Fadillah Embong, Mohammad Izat Emir Zulkifly, Abd Manan Samad, Ismail Ma'arof and Mohd Ridza Mohd Haniffah	
ECG Classification based on Multimodal Feature Extraction and Deep Learning Model	256
Rajeev Sekar and Ranjeet Kumar	
Photoplethysmogram (PPG) signal analysis for the Heart Rate estimation using Shannon Entropy	262
Suman, Suguna M., Ranjeet Kumar and Shivani Gupta	
A Novel Power-Gating 8T SRAM Cell with Improved Standby and Operational Efficiency	266
Chandramauleshwar Roy, Sreenithi KM, Varsha Bijapur and Siya Joshi	
Improve Black Ice Image Detection for Road Safety	272
Falah Amer Abdulazeez, Ismail Taha Ahmed and Baraa Tareq Hammad	
Mobile Health Diagnostics for Accommodative Dysfunction: Leveraging Handheld Device Technology for Near Point of Convergence Testing	277
Ahgalya Subbiah, Kevin Loo Teow Aik and Balram Krishna Kumar	
A Survey on Swarm Intelligence Algorithms for Optimizing Path Planning	283
Choo Yan Jie, Muhammed Basheer Jasser, Samuel-Soma M. Ajibade, Hui Na Chua, Richard T. K. Wong, Ahmad Sahban Rafsanjani and Anwar P. P. Abdul Majeed	
Cost-Benefit Analysis with Dashboard of Solar Panels for Residential Malaysia	289
Teoh Chee Quan, Muhammed Basheer Jasser, Samuel-Soma M. Ajibade, Hui Na Chua, Richard T. K. Wong, Charis Shwu Chen Kwan and Bayan Issa	
Comparison of Depression Detection between LLMs and Zero-Shot Learning using DAD Dataset	295
Justin J. D. Leow, Hui Na Chua, Muhammed Basheer Jasser, Bayan Issa and Richard T. K. Wong	
Multi-Class Classification of Lung Cancer using Streamlined Convolutional Neural Networks	301
Yu Tim Goh, Hui Na Chua, Muhammed Basheer Jasser, Richard T. K. Wong and Bayan Issa	

Transformer-Based Ensemble Approach for Robust Deepfake Detection in Low-Resolution Short Videos	307
Chun Yun Chiang, Hui Na Chua, Muhammed Basheer Jasser, Richard T. K. Wong and Bayan Issa	
Joule Heating of a 4D-Printed Multi-Material Origami Gripper	313
Muhammad Syamir Abu Bakar, Nur Akma Mahat and Marwan Nafea	
Joule Heating of a 4D-Printed Beak-Like Origami Gripper	319
Muhammad Syamir Abu Bakar, Nur Akma Mahat and Marwan Nafea	
Unifying Prediction and Explanation in Time-Series Transformers via Shapley-based Pretraining	325
Qisen Cheng, Jinming Xing, Chang Xue and Xiaoran Yang	
The Conductivity and the Depolarization Factor of a Spheroid based on its Polarization Tensor and Volume	331
Nurhazirah Mohamad Yunos, Taufiq Khairi Ahmad Khairuddin and Siti Nur Auni Rusli	
SW-LSTM: Strong-Weak Long Short-Term Memory Fusion Network for Forecasting Pandemic Spread	337
Abhishek Sharma, Saumya, Meghanshu Verma, Himanshu Singh, Badri Narayan Subudhi, Vinit Jakhetiya and Udit Satija	
Artificial Intelligence Adoption in Housing: A Bibliometric Analysis	343
Anthonia Oluwatosin Adediran, Samuel-Soma M. Ajibade, Muhammed Basheer Jasser, Faizah Mohammed Bashir, Yakubu Aminu Dodo, Yasni Nurul Huda Mohd Yassin and Bayan Issa	
Evaluation of Machine Learning Techniques for Prediction of Breast Cancer	349
Jared Tan Yi Hoong, Samuel-Soma M. Ajibade, Muhammed Basheer Jasser, Anwar P. P. Abdul Majeed, David Olayemi Alebiosu, Bayan Issa, Anthonia Oluwatosin Adediran and Charis Shwu Chen Kwan	
Machine Learning Ensemble Techniques for Prediction of Diabetes	355
Toh Kar Ming, Samuel-Soma M. Ajibade, Muhammed Basheer Jasser, Anwar P. P. Abdul Majeed, Kehinde Ehineni and Verena Atud Achick-Muyu	
Performance of ResNet50 in Classifying Artificial Intelligence Generated Arts	361
Isaac Angelo M. Dioses, Wendell Castillo, Patrick Neil Santiago, Marites P. Geronimo, Joel A. Macaso and Suzette DC. Domingo	
Author's Index	367