
Foreword

Special Issue on Green Sustainable Technologies for Creating a Better World

This special issue on Green Sustainable Technologies for Creating a Better World addresses the timely issue of developments and applications related to the challenges of securing green and clean energy sources for the 21st century to protect the environment. The special issue includes the extended version of selected papers accepted to the 2nd International Conference on Green Energy, Computing and Sustainable Technology (GECOST 2022), which was held virtually on October 26-28, 2022. GECOST 2022 was hosted by the Department of Electrical and Computer Engineering, Curtin University Malaysia in collaboration with the IEEE Malaysia ComSoc and VTS Joint Chapter, SDEC, University of Southampton Malaysia, G.H. Raisoni College of Engineering India, Universitas Tarumanagara Indonesia, Indore Institute of Science and Technology India, Universiti Teknologi Brunei, and University of Santo Tomas Philippines. All seven accepted papers in this special issue have gone through additional reviews from at least three reviewers. A brief introduction of each paper is included here.

The paper "Evaluating Network Structures in Byzantine-based Consensus Algorithms for Sarawak's Digitalized Pepper Value Chain" focuses on the Byzantine-based consensus algorithm that is used together with blockchain technology to minimize the constraints faced by smallholder pepper farmers. The methodology evaluates the network structures in Practical Byzantine Fault Tolerance (PBFT) consensus algorithm, namely the basic, group and layer network structures based on the performance, reliability, and scalability metrics. Experimental results show that the group network structure dominated the entirety of the experiment and presented as the proposed network structure, with the addition of specific nodes such as relay, storage, administer and brackets: bench and penalty to facilitate and maintain the longevity of the blockchain network. Therefore, the group network structure is appraised and considered as a robust technique in maintaining the long-term blockchain system for Sarawak's pepper industry.

The paper "Energy and Scientific Workflows: Smart Scheduling and Execution" highlights the benefits of energy-aware scientific workflow execution. In this paper, a set of requirements for an energy-aware scheduler is outlined and

a conceptual architecture for the scheduler is presented. The evaluation of the conceptual architecture is then performed by developing a proof-of-concept scheduler which is able to achieve around 49.97% reduction in the energy consumption of the computation. Hence, the approach and experiments shown in this paper demonstrate that different scheduling policies can have a huge impact on the energy consumption and performance of workflow execution.

The paper "Super-Resolution Enhancement of Sea Surface Temperature in the South China Sea Using Generative Adversarial Network" applies the deployment of deep learning architecture using Generative Adversarial Network (GAN) to increase super-resolution reconstruction using low-resolution imaging captured from the sea surface temperature data of the South China Sea. In addition, the development of spectral normalization is added to the Enhanced Super Resolution Generative Adversarial Network (ESRGAN) architecture to improve the training mechanism of generator and discriminator. This improved ESRGAN is compared with its super resolution performance against peak signal-to-noise ratio and structural similarity index evaluation metrics. The experiment shows that the low resolution of South China Sea data can be inferred to obtain a higher resolution with a more realistic resolution as compared to the conventional up sampling approaches.

The paper "Computer Vision-Based Surveillance of Oil Palm Trees using YOLOv5 and Aerial Imagery Investigation on Stochastic Optimised Hyperparameters" implements the YOLOv5 model for tree counting using the palm aerial imagery dataset from Papua, Indonesia. UAV images are used to classify trees into five distinct classes, namely healthy, smallish, yellowish, mismanaged, and dead palms. The experimental results show an achievement of an average F1-score of 0.895 for five classes, which outperformed Faster R-CNN (0.706) and CNN ResNet-101 (0.493). The strength of the proposed YOLOv5 model is high precision for all five classes above 0.961. In the effort to further optimise YOLOv5, further improvements are achieved using the genetic algorithm to optimise the parameters. The final average F1-score of this model on the five palm classes achieves 0.915. This application provides fast, robust, and accurate oil palm tree counting that can be applied elsewhere in the world.

The paper "Enhancing Automated Lung Disease Detection: An Approached Using Multi Network Features and ECOC-SVM Ensemble" proposes a hybrid transfer learning method with Error-Correction Output Codes (ECOC) and Support Vector Machine (SVM) ensembles configuration to enhance the automated diagnosis of lung infection. The diagnostic result attempts to categorize the input data into one of three categories: COVID-19, healthy, or non-COVID-

19 pneumonia. The mean accuracy of the proposed method is 96.21% compared to the existing fine-tuning pre-trained model, which yielded 89.1% for GoogLeNet, 88.95% for ResNet-18, and 89.31% for ShuffleNet. This strongly suggests that an improvement is achieved owing to the inclusion of features from various networks and a more complex final classification layer, which is the ensemble configuration.

The paper "Online Biomechanical Evaluation System for Archery" focuses on the online biomechanical evaluation system for precision sports such as archery. In this work, a web application is developed using the Flask web framework and Python for markerless human joint estimation with multiple analyser tools allowing users to easily perform biomechanical evaluation for archery. The web application utilises a depth camera and machine learning algorithms to capture and analyse the user's posture and action. The user can then receive immediate feedback on their technique and make adjustments to improve their performance. The web application would allow users to upload video footage of their archery shots, and then generate reports based on a comprehensive analysis of their posture and action. These reports allow coaches to communicate with athletes in making posture correction and shooting technique, ultimately leading to improved performance on the range.

The paper "Hybrid Model of Multi-Resolution Signal Transformation and Deep Neural Network in Power Quality Disturbances Classification" proposes a hybrid deep learning model consisting of multi-resolution transformation and deep neural network for power quality disturbances detection. The proposed hybrid model first transforms input signal into multiple frequency components using multi-level signal decomposition signal via wavelet transform. A layer of convolutional kernel is used to obtain the spatial and temporal features from the wavelet components. The process is followed by higher order latent feature extraction using transformer network which includes a layer of transformer encoder and a pooling mechanism. The proposed model is able to outperform other deep neural network models with better accuracy despite the noisy condition.

• Introduction to Guest Editors •



Garenth King Hann Lim has received MEng. (Hons) and Ph.D. in Electrical and Electronic Engineering from the University of Nottingham in 2007 and 2012 respectively. He is a teaching and research staff in Curtin University Malaysia since 2011. He has 14 years full-time experience and 4 years part-time experience in teaching and learning. His current research expertise comprises of numerical methods in 3D modelling, optimization, artificial intelligence, computer vision, signal processing and image/video processing for robotics, autonomous vehicles, and sport science applications. He has received internal and external research funding with total amount of RM1.7 million. He supervises 15 postgraduates for MPhil and Ph.D level. He has published 100+ journals and conference papers since 2008. He is very active in professional developments such as IEEE, IET, AAET, and IEM. He is now IEEE senior member and IET chartered engineer. He has received multiple awards in teaching and student activities. He is actively engaging with industrial research and consultancy in the field of electrical and electronics sector. He is actively engaging with community through outreach programs such as STEM playground, IEEE Innovation Nation and other STEM-related activities. He leads multiple conferences organization in Sarawak such as ICSCC 2019, GECOST 2021, GECOST 2022 and GECOST 2024. He currently pioneers a start-up in Ai3D PLT in 2022 to develop AI and 3D algorithms for sport science industry. He is also the co-founder of AgriSmartEye PLT serving the food industry using AI and computer vision.



Ling Huo Chong received his B.Eng. (Hons), M.Eng.Sc. and Ph.D. degrees from Multimedia University, Malaysia. He is currently a Senior Lecturer in the School of Science, Engineering and Technology, RMIT University Vietnam. Before joining RMIT University Vietnam, he was an Associate Professor in Curtin University Malaysia. From 2001 until 2015, Dr. Ling was affiliated with Faculty of Engineering, Multimedia University, Cyberjaya, Malaysia. His research interests include steganography, watermarking, cryptography and access control system.



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