

## Guest Editorial: Special Issue for TANET 2022

*Sheng-Lung Peng\*, Lun-Ping Hung*

The Taiwan Academic Network Conference (TANET 2022) was held at National Taipei University of Business, Taoyuan, Taiwan during December 15-17, 2022. TANET is one of the largest joint IT symposia held in Taiwan. It invites information-related practitioners to publish high-quality papers at the seminar, providing a platform for senior industry, government, academic and research experts to communicate and share their experiences. It shares research experiences and discusses potential new trends in the IT industry. This special issue has invited extended versions of selected outstanding papers, and we also welcome additional submissions. Each paper submitted in this issue has been rigorously evaluated by at least two reviewers who specialize in their respective research areas. Ultimately, five papers were selected for inclusion in this special issue, which are briefly summarized below.

In the paper entitled “*Time-Varying Cypher Assignment Based on Secrecy Capacity*” by Cheng-Ying Yang, Jong-Shin Chen, Kuo-Chun Hsu, Jenq-Foung JF Yao, and Min-Shiang Hwang, they proposed a cypher generator with physical-layer coding scheme. The cypher format consists two parts. One is the prefix code and the other is the error control code. The main purpose of prefix code is the key to find the position index of the code within the cypher. In this cypher generator, the interleaver plays the role of scrambling the original data. It increases the difficulty of cracking the cypher. Combined with cryptanalysis, a practical example of LDPC is given. With the help of artificial intelligence technology, advanced cypher encoding and decoding algorithms can be developed.

In the paper entitled “*A Vehicle Abnormal Behavior Detection Model in Single Intelligent Vehicle Scenarios*” by WenHui Wang, Qiang Zhu, Chia-Wei Lee and ZhenJiang Zhang, the authors proposed a vehicle anomaly data detection method based on deep learning for identifying unknown types of anomalies and deploying on computationally limited vehicle terminals under single intelligent vehicle scenarios. They first modified the discriminator based on the GAN network, so that the network can assign different weights to different sensors, thereby improving the generalization performance of the model. They then assign weights to each parameter of the model during the training process and pruned the model based on the weights to improve its computational speed. They verified the reliability of the method on the Safe Pilot Model Deployment data set. The results show that the model has good detection performance for various abnormal data, especially when facing data not encountered during the training process, the model effectively reduces the calculation time of the detection process.

In the paper entitled “*Exploring Techniques for Abnormal Event Detection in Video Surveillance*” by Varsha A. Kshirsagar, Shou-Chih Lo, and Guanling Lee, the authors studied the effectiveness of various abnormal event detection techniques in video surveillance, addressing challenges such as intrusions, accidents, and suspicious activities. The study reveals the popularity of traditional methods such as background subtraction and motion detection, despite their limitations in complex scenes. It highlights the increasing use of deep learning techniques, especially CNNs and RNNs, which show promise but require large amounts of labeled data. The findings highlight the importance of selecting appropriate detection techniques based on specific surveillance scenarios and highlight the need for extensive labeled datasets for deep learning methods. The originality of this research lies in the comprehensive review and comparison of various abnormal event detection technologies, which provides valuable insights and practical significance for advancing video surveillance systems.

In the paper entitled “*Evaluating the Robustness of Transfer Learning with Recipes on Small Data– Using Data of Birds as an Example*” by Chuan-Ming Liu, Jung-Chih Wu, Chih-Le Chang, and Hsiu-Hsia Lin, they employed various techniques to fine-tune the model for optimization. Experiments were conducted on six different datasets to improve the accuracy of the model and prevent overfitting, and the results demonstrate and validate the proposed approaches. When evaluated using 10-fold cross-validation, the bird dataset achieved an accuracy of 82.9%. This level of accuracy is reasonable, especially given the complexity of the dataset, which contains 200 categories.

The paper entitled “*LUT-SLS: A Lightweight Transformer Network based on U-Net for Skin Lesion Segmentation*” by Ming Zhao, Bingxue Zhou, and Ling-Ju Hung, they proposed a new lightweight structured network LUT-SLS based on U-Net and Transformer. First, U-Net and Transformer are used in the overall structure, which can capture the long-range dependencies in image relationships and contextual information, thereby improving the accuracy of segmentation. Second, a novel PLTS module is designed, which replaces the traditional self-attention mechanism by introducing an average pooling operation to achieve the extraction of global features and local details. At the same time, a novel MMLP structure is designed, which introduces the residual depth-separable operation on the traditional fully-connected structure, and further improves the feature expression capability by enhancing the processing of pooled features, thus further improving the feature expression ability. Finally,

---

\*Corresponding Author: Sheng-Lung Peng; E-mail: slpeng@ntub.edu.tw

the encoder and decoder parts are connected through the MSBN module to further extract deep features while fusing encoder features. Experimental results show that the model proposed in this paper achieves competitive advantages in balancing the number of parameters, computational complexity and performance compared with the current leading models on multiple public datasets. Provide solutions for model deployment on IoT terminals to help doctors make more accurate clinical decisions.

As guest editors of this special issue, we would like to thank all reviewers and authors for their helpful comments and significant contributions to this special. Finally, we thank Dr. Han-Chieh Chao, the Editor-in-Chief of JIT journal, for his encouragement and support to publish this special issue and to Ms. Sharon Chang, the Assistant Editor, for her professional help during the preparation of this special issue.

## Guest Editors



**Sheng-Lung Peng** is a Professor at the Department of Creative Technologies and Product Design, and the Dean of the College of Innovative Design and Management, National Taipei University of Business in Taiwan. He is an adjunct Professor at National Dong Hwa University in Taiwan and Kazi Nazrul University in

India. He is an Honorary Adjunct Professor at Sir Padampat Singhanian University and Baroda University, India. He serves as the president of the Association of Taiwan Computer Programming Contest and the Association of Algorithms and Computation Theory. He is a co-director of the ICPC Asia Pacific, and a director of the Institute of Information and Computing Machinery and the Taiwan Association of Cloud Computing. He is also a supervisor for the Chinese Information Literacy Association. His research interests are algorithm design in the fields of artificial intelligence, bioinformatics, combinatorics, data mining, and networking.



**Lun-Ping Hung** is currently a Professor of Department of Information Management, and the Dean of the College of Health Technology, National Taipei University of Nursing and Health Sciences in Taiwan.

His research interests include Internet of Things, mobile computing, medical informatics, management of day care institution for elders, assistant medication system, and cloud computing for diabetes care, rehabilitation, and homecare.