Guest Editorial
Special Issue for NCS 2019

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The National Computer Symposium 2019 (NCS 2019) held on November 14-15, 2019 in National Quemoy University, Taiwan. This symposium is held every two years. It brought together experts, researchers, scientists, and engineers from around the world to share their experiences and exchange opinions, and promote exchanges between industry, government and academia. This symposium enhanced the software research and development capabilities of information talents, promoted the development of industry-university cooperation, and took innovation and creativity as the basic spirit of the symposium. It is hoped that computer development will be promoted and the high-tech industries will also be promoted.

With pleasure, we present this special issue of Journal of Internet Technology (JIT), devoted to NCS 2019. We invite some outstanding accepted papers in their extended versions and widely open for other submissions to this special issue. Each paper submitted to this special issue was rigorously reviewed by at least two reviewers in the corresponding research areas. Finally, about five papers are selected for this special issue. A summary of these papers is outlined below.

The first paper entitled "Enhancing Multimedia Streaming with Weighted Multiple Transmission Paths in Software Defined Networks" is contributed by Yeong-Sheng Chen, Lu-Chung Ting, Nien-Tzu Hsieh, and Chih-Heng Ke. In this paper, the authors use the data flow control ability of Software Defined Networks (SDN) to propose a multipath transmission mechanism based on SDN environment for increasing the efficiency of multimedia streaming transmission. The proposed method looks for the optimal transmission path meeting the QoS constraints, and then uses the stochastic switching mechanism of OpenFlow protocol to transmit the data packets of single data flow through multiple paths, and uses Analytic Hierarchy Process to set the transmission weights of different paths, so as to obtain better transmission effect. The experimental results show that in comparison to the traditional single data flow through single path transmission method, the multipath transmission mechanism proposed in this study not only avoids the single path interruption, but also reduces the wasting of resources resulted from path idling, and it attains higher network transmission bandwidth, lower packet loss rate and delay time.

The second paper entitled "Strong Spanning Laceability of Mesh" is contributed by Sheng-Lung Peng, Lili Zhang, Jianxi Fan, Cheng-Kuan Lin, and Hong Chen. This paper studies the strong spanning laceability on meshes. A k-container of a graph G is a set of k disjoint paths between two nodes x and y. It is called a k^*-container if it contains all nodes of G. A bipartite graph G is strong k^*-laceability if there is an r^*-container between any two distinct nodes x and y form different partite sets of G with $r \leq \min\{\deg(x),$ $\deg(y), k\}$. The strong spanning laceability of G, denoted as $sk_L(G)$, is the maximal value for G such that G is strong $sk(G)^*$-connected and $sk(G) \leq \Delta(G)$ where $sk(G)$ is the strong connectivity of G and $\Delta(G)$ is the maximal degree of G. Let $M_{m,n}$ be the mesh with m rows and n columns. This paper shows that $sk_L(M_{m,2n}) = 3$ if and only if $m \geq 4$ and $n \geq 2$ or $\{m, n\} = \{3, 2\}$.

The third paper entitled "Thirty-day Re-Hospitalization Rate Prediction of Diabetic Patients" is contributed by Dong-Her Shih, Feng-Chuan Huang, Cai-Ling Weng, Po-Yuan Shih, and David C. Yen. This paper aims to use data mining technology to accurately predict the 30-day re-hospitalization of diabetic patients. It uses the data set from UCI machine learning repository and uses feature reduction method to find out the classification results of re-hospitalization, and then uses frequent set and Apriori algorithm to find the association rules between diabetes mellitus patients and re-hospitalization related variables. The experimental results show that the recursive feature reduction method is effective in combined with SVM can get a better prediction accuracy.

The fourth paper entitled "Secure Federated Learning with Efficient Communication in Vehicle Network" is contributed by Yinglong Li, Zhenjiang Zhang, Zhiyuan Zhang, and Yi-Chih Kao. In this paper, the authors propose a secure federated learning (FL for short) with efficient communication scheme in vehicle network. To protect the privacy of local update, they upload the updated parameters of the model with local differential privacy. In particular, they further propose a client selection approach that identifies relevant updates trained by vehicles and prevents irrelevant updates from being uploaded for reduced network footprint to achieve efficient communication. Then it is proved that the loss function of the trained FL in the proposed

scheme exits a theoretical convergence. Finally, by evaluating the proposed scheme on two datasets and compare with basic FL. The proposed scheme improves the communication efficiency, while preserves the data privacy.

The last paper entitled "Design of an IoT-Based Mountaineering Team Management Device Using Kalman Filter Algorithm" is contributed by Yu-Xiang Zhao, Yi-Zeng Hsieh, Shih-Syun Lin, Chin-Ju Pan, and Chi-Wen Nan. This paper proposes an IoT-based mountaineering team management device to effectively assist mountaineering guides in leading mountaineering teams. The device can monitor the real-time physiological status and coordinate of each team member, and uploads the information to the cloud service platform via a mobile Internet. The authors used an unscented Kalman filter to reduce the data influence of motion since the user's heartbeat and temperature are unstable during the motion of mountaineering. When an abnormal event occurs, the device allows the guide to immediately acquire the real-time information of each member. If accidents occur or team members become lost, the device enables quickly locating the lost members. Additionally, the device can be used to make announcements to all team members. The proposed device can immediately and effectively assist mountaineering guides managing mountaineering teams, thereby improving mountaineering safety.

Acknowledgements

Guest Editors

Yao-Chung Chang served as the Professor and Chair, Department of Computer Science and Information Engineering (CSIE), National Taitung University (NTTU) since 2018. He also served as the Director of Computer Center and Taitung Regional Network Center, National Taitung University, from Aug. 2009 to Jul. 2011. Besides, Dr. Chang is a recipient of the universities' subsidization program for encouraging exceptional talent, Ministry of Science and Technology, Taiwan (2010-2021). Dr. Chang has been the session chair of 31 international conferences, the program committee of 97 international conferences and 68 international conferences. He has published more than 45 papers in international journals and conferences. Also, he received the Outstanding Teaching Award from Nation Taitung University. His primary research interests include Intelligent Communication System, IoT, and Cloud Computing. E-mail: ycc@nttu.edu.tw

Ruay-Shiung Chang received his B.S.E.E. degree from National Taiwan University in 1980 and his Ph.D. degree in Institute of Decision and Computer Science from National Tsing Hua University in 1988. After graduation, he had worked for Chung Shan Institute of Science and Technology, National Taiwan University of Science and Technology and National Dong Hwa University. Right now, he is the President of National Taipei University of Business. His research interests include Internet, wireless networks, and cloud computing. NTUB is a traditional and the oldest business university in Taiwan. Dr. Chang hopes to bring modern Information and Communication Technology into the teaching and research of NTUB. Dr. Chang received the Outstanding Information Technology Elite Award from the Taiwan's Information Month Committee in 2009. In 2017, Dr. Chang received the Exemplary Teacher's Award from the Venerable Master Hsing Yun Public Education Trust Fund for his longtime dedication to higher education. E-mail: rschang@ntub.edu.tw