Editorial
Advanced Algorithms and Techniques for Miscellaneous Engineering Applications Such As Discrete Networks, Machinery And Computing Platforms

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Recently, advanced algorithms and newly emerged techniques for engineering applications have become more crucial attributable to faster and automatic processing demand. In today's research, novel developed techniques and advanced algorithms are required by modification of existing algorithms or merging of algorithms which are in full swing. Generally, there is no algorithm that accomplishes the best in all engineering applications. In order to compare various methods and obtain a better solution, research efforts are required. Researchers aim at searching the optimum solution in order to reach the best in some situations. It should be mentioned that the good processing power is needed for the engineering system.

This special issue is on "*Advanced Algorithms and Techniques for Miscellaneous Engineering Applications Such As Discrete Networks, Machinery And Computing Platforms*" for *Journal of Internet Technology*. It contains the selected six papers from the 7th International Conference on Electronics, Communications and Networks (CECNet2017), held on Nov. 24th-27th, 2017 in Hualien, Taiwan. It covers broad topics, image steganography, social networks, web service composition, mobile ad hoc network, perception layer in Internet-of-Things, and wireless communication systems. One-third of the papers are related to optimization problems. In the following, summary has been given for each of the selected papers. Readers are suggested to download the full manuscript for detail understanding.

The **first paper** "A Coverage and Repair Optimization Algorithm for Hybrid Sensor Networks" is written by Fei Ding, Dengyin Zhang, Aiguo Song, Jianqing Li and deals with original proposals for an optimal coverage, exploration and deployment (OCED) algorithm. A basic behavior set for coverage detection of mobile nodes was designed, the node deployment in non-obstacle areas can completed via a combination of these basic behaviors. The mobile node deploys near-minimal number of sensor nodes and achieves full sensing coverage even services to some unpredicted relatively regular obstacles scene. An improved Dijkstra-based deployment strategy is presented to realize network repair. The controllability of the mobile nodes is effectively improved. The proposed OCED algorithm offers deployment efficiency gain with high coverage percentage. This paper is qualified because of its contributions of proposing an innovative optimal coverage, exploration and deployment (OCED) algorithm, illustrative simulation results and analysis. It is also qualified as being part of National Major Project of China.

In **paper number two** "Hybrid Recommendation Algorithm based on Latent Factor Model and PersonalRank" the authors Jingjing Hu, Linzhu Liu, Changyou Zhang, Jialing He, Changzhen Hu prepared a new hybrid recommendation algorithm that combines LFM and the PersonalRank algorithm based on a bipartite graph. The algorithm can improve the accuracy of recommendations by first filling the sparse matrix before using the PersonalRank algorithm. This approach helps discovering the unexplained features, which refines the granularity and broadens the dimensions of features. Experimental results show that filling the sparse matrix using LFM can effectively reduce the impact of data sparsity so as to predict the score more accurately in top-N recommendation. This paper is qualified. Because this paper proposes a hybrid personalized recommendation method based on LFM and PersonalRank algorithm. Latent factor model (LFM) is an effective method for automatic classification of users and items, and it helps to anticipate scoring. The efficiency of the hybrid algorithm was verified on the MovieLens dataset. It can improve the accuracy rate and recall rate of recommendation.

The **third paper** is entitled "Wireless Network Localization Algorithm Based on Tikhonov Regularization for Anisotropic Networks" co-authored by Jiandong Yao, Xiaoyong Yan, Chengshan Qian, Huijun Li. A multi-hop range-free localization method based on Tikhonov regularization for anisotropy network is presented. Compared to similar algorithms, this approach can simultaneously handle two typical anisotropic networks, i.e., irregular distribution and radio irregularity. Simulation results demonstrate that the proposed approach has the characteristics of

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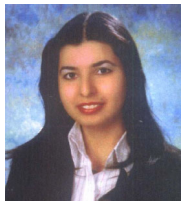
easiness of parameter setting and can effectively reduce distance estimation error in anisotropic network. This paper is qualified because a novel multi-hop range-free localization algorithm for anisotropy network is presented. The high efficiency of the proposed method is demonstrated comparing the method with state-of-art methods. Experiments results show that proposed algorithm improves localization accuracy by more than 90%.

Manuscript entitled "Multiple-Instance Support Vector Machine Based On A New Local Feature Of Hierarchical Weighted Spatio-Temporal Interest Points" is included as **paper number four** co-authored by Chun Shan, Liyuan Liu, Jingfeng Xue, Zhaoliang Sun, Tingping Ma. The contributions of this paper are local feature of hierarchically weighted spatio-temporal interest points. A new feature extraction algorithm, layered weighting the spatio-temporal interest points and fusing various features is presented. And the experimental results demonstrated its availability and efficiency. The traditional SVM classification algorithm is improved by introducing MIL into it. The need to guard the old and disabled all the time would be eliminated and save a lot of manpower costs. This paper is qualified because human action recognition is a hot research topic. A new kind of feature, the local feature of hierarchical weighted spatio-temporal interest points, which fused different features in a specific way is proposed. A new Multiple Instance Learning algorithm, forming the Multiple-Instance Support Vector Machine is introduced in order to classify the presented features more accurately, based on Support Vector Machine. And a higher accuracy for human action recognition in home environment is obtained.

The **fifth paper** "Prompt Image Search with Deep Convolutional Neural Network via Efficient Hashing Code and Addictive Latent Semantic Layer", written by Jun-yi Li, Jian-hua Li, studies a vision learning framework to generate compact binary hash codes for quick vision search after knowing the recent benefits of convolution neural networks. Its concept is that binary codes can be obtained using a hidden layer to present some latent concepts dominating the class labels with usable data labels. Its method is effective in obtaining hash codes and image representations and pretrained model from googlenet was used for incremental learning so it is suitable for good-sized dataset. It is demonstrated in its experiment that this method is better than some most advanced hashing algorithms in MINIST, NUS-WIDE and CIFAR-10 dataset. This paper is qualified because it presents an effective deep studying framework, and creates hash-based binary learning codes for quick image classification and search. Besides, it adds a latent feature layer in this deep network for studying image representations and a set of hash-like functions. Additionally, it is shown from experimental results that this method improves the original search results with 0.75% and 12% search precision in the datasets of CIFAR-10 and MNIST. This paper is also qualified as being supported financially by the 973 National Fund Project and the National Natural Science Fund.

The **sixth paper** "MeteCloud: Meteorological Cloud Computing Platform for Mobile Weather Forecasts based on Energy-aware Scheduling", written by Wei Fang, Victor S. Sheng, XueZhi Wen, proposes a new meteorological cloud computing platform (MeteCloud) for Mobile Weather Forecasts based on energy-aware scheduling for improving the energy efficiency and, a novel MeteCloud architecture and a hybrid scheduling algorithm to testify the availability of meteorological cloud computing platform. Additionally, its experimental results demonstrating that MeteCloud has better performance and efficiency are the other contributions of this paper. This paper is qualified with its illustrative simulations and algorithms. Because it is a detailed study about MeteCloud with 20 pages and this paper proposes an elastic cloud platform (MeteCloud) based on Energy-aware Scheduling for querying and processing meteorological information. Additionally, the results shows the MeteCloud is capable of obtaining significant energy savings and good performances. Many other real application systems can be developed under the same framework of MeteCloud. It is shown that commercial and research cloud services are feasible for the execution of our MeteCloud application. Furthermore, this work was supported in part by the open program of State Key Laboratory of Novel Software Technology (Nanjing University), the Priority Academic Program Development of Jiangsu Higher Education Institutions, and the US National Science Foundation.

Guest Editors



Ms. Özlem Boydak was born in Turkey. She was graduated from both Mechanical Engineering and Electrical Engineering from Yildiz Technical University in Istanbul in 2004. She gained her master's degree from Mechanical Engineering department of Bogazici University, which is one of the best universities of Turkey. Now, she is a Ph.D. candidate of Mechanical Engineering at Marmara University in Istanbul and she is also the academic staff of Istanbul Medeniyet University as an academician. She also worked as R&D engineer at international companies previously. She has many international publications. She serves as a reviewer for many international journal and conferences. Her research interests include energy, energy production cycles, rankine cycle, renewable energy, production of electricity, product development and manufacturing methods.

Dr. Noureddine Bouhmala received his Ph.D. thesis from The University of Neuchâtel, department of computer science, Switzerland in 1998. In 2001, He joined the department of computer science at the University College of Southeast Norway (USN), Norway. Today he is working at the department of maritime technology and innovation (USN). Since 2007, he has been affiliated with University of Agder in a 20% position at the department of Information and Communication. His research interests include combinatorial optimization, data mining, algorithms, maritime logistics. Much of his work has been on improving the understanding, design, and performance of large scale optimization algorithms. He is the author of more than 60 refereed journal and conference publications.