

## **Guest Editorial**

# **Advanced Algorithms and Techniques for Engineering Applications Such As Sensor Networks, Signal Processing and Network Computing**

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Nowadays, engineering applications with newly emerged techniques are more significantly disposable to faster and automatic processing demand. One of the engineering field is sensor and signal processing industry is going through a transformational phase of development. Thus, in order to provide a better solution and compare miscellaneous methods, research efforts are required. Researchers aim at searching the optimum solution in order to gain the best in good processing signal required for the specialization in engineering area.

This special issue is on “Advanced Algorithms and Techniques for Engineering applications Such As Sensor Networks, Signal Processing and Network Computing” for *Journal of Internet Technology*. It contains the 5 selected papers from the 2<sup>nd</sup> International Conference on Sensor Networks and Signal Processing (SNSP 2019) in Taiwan during November 19<sup>th</sup>-22<sup>nd</sup>, 2019 which is co-organized by National Dong Hwa University. SNSP 2019 is one of the leading international conferences for providing a comprehensive global forum for experts and participants from academia to exchange ideas and present results of ongoing research in the most state-of-the-art areas of sensor networks and signal processing. In the following, summary has been given for each of the selected papers. Readers are suggested to download the full manuscript for detailed understanding.

The first paper ‘Extreme Learning Machine Based Defect Detection for Solder Joints’ is written by Liyong Ma, Wei Xie, Yong Zhang, Xijia Feng that deal with solder joints. In this paper, a vision inspection is developed to detect defects of solder joints in automatic line. Extreme learning machine is applied to identify defective solder joints from qualified ones. Five low level features and three advanced features are employed as input features. The low-level features include roundness, roughness, entropy, contrast and histogram of oriented gradient. The advanced features include grey-level co-occurrence matrix, local binary pattern, and segmentation-based fractal texture analysis. In order to solve the unbalanced samples problem, Gaussian mixture model based dense estimation scheme is

proposed to adjust the classification super plane for extreme learning machine. This paper is qualified because it demonstrates that the proposed defect detection method is more efficient than neural network, support vector machines, common extreme learning machine and convolution neural network-based methods, and it has real-time performance to meet the requirement of the actual production line.

The second paper ‘Weighted-Group-Density Based Community Discovery Algorithm for Dynamic Weighted Networks’ is written by Dongming Chen, Xinyu Huang, Yunkai Wang, Dongqi Wang, that aiming at solving the problem of community detection in weighted dynamic networks. This paper defines a Weighted -Group -Density metric to evaluate the community closeness. By analyzing the dynamic changes of weighted networks, it propose a novel community detection algorithm based on weighted group density for dynamic weighted network. In order to validate the performance of the proposed algorithm, several experiments are conducted, where the datasets are extracted from the novel ‘A Song of Ice and Fire’. This paper is qualified because it developed the proposed algorithm outperforms the competitive algorithms, which is of great significance to the dynamic research of complex networks.

The third paper ‘Characteristics of Dynamic Connection and Path Spatial-temporal Evolution in Cluster Flight Spacecraft Network’ written by Yanfeng Shi, Shengbo Hu, Jinrong Mo, Xiaowei Song, Tingting Yan that studies the characteristics of dynamic connection and path spatial-temporal evolution by the probabilistic connectivity matrix in cluster flight spacecraft network (CFSN). This paper based on twin satellites mode, it establish the mobility model of nodes. And then by adopting empirical statistical method and curve fitting method, the solution of the nodal distance density function in the CFSN is obtained and the threshold range of nodal connection distance are derived under the constraints of CFSN. Finally, using the orbital data generated by STK (Satellite Tool Kit), through the definition of sequential path and a new matrix multiplication, the probabilistic connectivity matrix of sequential path of multiple hops

between nodes is obtained. The characteristics of dynamic connection and path spatial-temporal evolution in an orbital hyperperiod are studied. This paper is qualified because the proposed method can provide theoretical reference for the design and optimization of CFSN.

The fourth paper ‘Location of Static Targets on the Seabed - A Study’ written by Biyuan Yao, Xinghui Cao, Binjian Shen, Guiqing Li, Jianhua Yin deal with the location of underwater targets issue in military applications. This paper specifically target a stationary object, a comparative experiment is designed by using the weighted centroid localization algorithm in the non-ranging location and the least square localization algorithm in the location of ranging to determine the target range. This paper is qualified because the weighted centroid location algorithm adopted in this study has a low computational complexity, and therefore, resolves the three issues. These issues are (i) the estimated position of the measured object, (ii) the positioning error of the estimated position and the actual position of the object measured, and (iii) the closest beacon to the measured object.

The fifth paper ‘Research on Face Recognition Technology Based on ESN Multi Feature Fusion’ written by Shuang Liu, Deyun Chen, Zhifeng Chen, Changhai Ru, Ming Pang that deal with multi feature Echo State Network (ESN) fusion face recognition. This paper designed three invariant features are selected as the basis for face recognition, including Histogram of Oriented Gradients (HOG) features, Local Binary Patterns (LBP) features and Visual Pattern Recognition by Moment Invariants (Hu). These three kinds of features cover the illumination, texture, shape and other properties of face images. In the fusion stage of the three features, the HOG feature dictionary, the LBP feature dictionary and the Hu feature dictionary are first formed, and then they are replaced by the ESN to train and determine the fusion weight of the three features. This paper is qualified because the similarity measure of the three features fusion is formed as the basis for judging the face recognition. The weight setting of different features in the process of similarity comparison is completed by ESN iteration, which improves the accuracy of each feature as the judgment basis. It also shown that show that recognition accuracy of the method is higher than the method using single feature, and it is obviously better than the multi feature method using adaptive weight and the multi feature method using the genetic algorithm.

## Guest Editors



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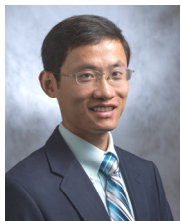
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