Journal of Intelligent & Fuzzy Systems 37 (2019) 4407–4411
DOI:10.3233/JIFS-179272
IOS Press

Guest editorial

Special issue on fuzzy theoretical model analysis for signal processing

Valentina E. Balas[a], Jer Lang Hong[b*], Jason Gu[c] and Tsung-Chih Lin[d]
[a]*Aurel Vlaicu University of Arad, Romania*
[b]*Evault Technologies, SNS Network, Malaysia*
[c]*Dalhousie University, Halifax, Canada*
[d]*Feng Chia University, Taichung, Taiwan*

Keywords: Unsupervised learning, signal processing, reinforcement learning, incremental learning for image processing

The increasing availability of huge image collections in different application fields, such as medical diagnosis, remote sensing, transmission and encoding, machine/robot vision, and video processing, microscopic imaging has pressed the need, in the last few last years, for the development of efficient techniques capable of managing and processing large collection of image data. Classical signal processing methods often face great difficulties while dealing with images containing noise and distortions. Under such conditions, fuzzy logic methods are effective techniques for the design of a suitable mathematical criterion for matching signal descriptors to detect the correspondences between the signal remains as one of the basic problems of signal matching and computer vision. fuzzy logic techniques turn out to be effective to address challenging real-world signal processing problems that are often characterized by vagueness and uncertainty.

This special issue focuses on the innovative fuzzy principles and methods for signal processing. We invite technical articles that have a broad scope and general interest to a signal processing audience. We through call for paper through some conference and research community, we collected more than 326 papers. Based on the peer-review comments, we carefully selected 50 papers for this special issue. Now we will introduce the accepted 50 papers briefly.

Intelligent data analysis and data mining technologies are widely used in many domains and applications. In this special issue, we accept 21 papers which focused on the intelligent data analysis and data mining technologies. Article [5] proposed a new ensemble Fuzzy predictor model for estimating the degradation of a bearing using tribological responses among the rollers and the bearing races. This new method employs the genetic algorithm (GA) to assign an optimal weight vector to a set of adaptive network-based Fuzzy inference system (ANFIS) models. The ensemble of the predicted values of the ANFIS models is used as the prediction of the bearing degradation. In order to address the transfer learning and power efficient problem in big data fields, article [9] proposed a self-labeling online sequential extreme learning machine method, which is abbreviated SLOSELM. The shockwave signal is affected by the weapon launch and the external environment, and it is often mixed with many kinds of noise, some even submerged. To detect and extract the shockwave signal under low signal-to-noise ratio, the authors proposed three novel model to handle this situation in article [11], the proposed models are name the transient signal SNR, the power-law detector of the higher-order cumulate spectrum (HOCS) and the Dual-tree complex wavelet transform (DTCWT) extraction model. Article [12] proposed a new systematic metro operation

*Corresponding author. Jer Lang Hong, Chief Research Officer-Evault Technologies, SNS Network, Malaysia. E-mail: drjerlanghong@gmail.com.

risk identification method (MORIM) and risk grade classification method (RGLM) based on the daily dispatching fault log. In article [13], the authors developed a kind of location-based marine fishery information service method which can obtain the location information and made some decision smartly by using the support of BeiDou navigation satellite system. Article [15] studies the coping strategies of three-level supply chain systems composed of manufacturers, distribution centers and retailers under uncertain risks. In order to solve the load imbalance and task priority disorders problem, article [27] proposes a task scheduling algorithm named p-min-min-max, which combines with priority and greedy strategy. Article [28] estimated the parameters for outlier detection and then proposed a special statistic based outliers detection method. In order to further improve the effectiveness of data mining and reduce the difficulty of data acquisition, article [31] studies the design and simulation of integrated education information teaching system based on fuzzy logic. Focused on the path planning problem of agricultural product logistics distribution, article [32] proposed a new particle swarm optimization (PSO) algorithm. In order to pre-warning the product quality risk of the e-commerce platform, article [33] studies the machine learning algorithm for the products quality risk assessment, which propose the Fuzzy C-Means clustering algorithm for the feature extraction and the Cost Sensitive Leaning (CSL)-Naive Bayesian algorithm to construct the assessment model for E-commerce product quality risk form the massive and unbalanced data. In order to improve the thermal energy conversion rate of straw recycling system further and reduce the work energy consumption of the Internet of Things control platform of straw recycling system, article [34] designs the Internet of Things control platform of straw recycling system based on genetic algorithm, which is composed of the basic framework of the Internet of Things and the control terminal of the Internet of Things. Focused on the cold start problem of education resource recommendation, articles [35] proposed a personalized recommendation system, which combined the user preference behavior data analysis with the online education recommendation model. Article [36] studies the GIS-based risk assessment and regionalization of Taihang Mountain drought and flood disasters. In order to improve the comprehensiveness and accuracy of geological hazard risk assessment, a cloud fuzzy clustering algorithm is constructed in article [39], which can effectively estimate and evaluate uncertain variables. Article [40] constructs a model of competition between two manufacturers (large farmers) and two retailers (pork wholesalers) in the pig breeding industry under fuzzy environment. Article [41] analyzed the homological dimension of Rees matrix semigroups in intelligent fuzzy systems. Article [43] proposed an improved TextRank algorithm with weight calculation based on sentence graph to solve the information retrieving problem. Based on the movement of the vehicle Mechanical balance method, article [45] combined the equilibrium equation with balance equation, and then established a road-vehicle load coupled system. Article [46] uses the combination of Fluent numerical simulation technology and smoke visualization experiment to explore the best ratio of the air supply and exhaust velocity in the push-pull ventilation flow field. In article [49], in the so-called centralized charging and unified distribution mode, a two-stage optimization model is proposed for capacity planning and ordered discharging strategies of centralized charging stations considering the peak-shaving effects.

Deep learning is an important role in artificial intelligent techniques, there are 10 papers are focused on deep learning technologies and applications. Article [1] analyzed the current situation of traffic in multiple cities, and starts with the traffic under big data and cloud computing, and studies the application of big data and cloud computing in intelligent transportation system, and then provide some reference for the development of smart Wuhan. Article [4] proposed a ship target recognition method based on single shot multi-box detector (SSD) deep learning. Article [6] proposed an improved BP neural network algorithm for data mining, and demonstrates the effectiveness of the algorithm in data mining. Article [7] introduced the RBNN-based classification algorithm by considering the high dimensionality, non-linearity and complex correlation between feature items, and the theoretical and feasibility analysis were carried out so as to apply it to text feature dimension reduction. In article [8] an improved recurrent neural network is used to establish a predictive model, which is applied to the trend trading of soybean futures in China's commodity market. Aiming at the problem of low prediction accuracy and slow training time for Neural network with single hidden layer forecast, article [10] proposed a combination of Multitask and DBN Neural network used to predict the short-term free parking berths. Article [21] demonstrated the algorithm and key theory of PCA and its use in image-processing. Article [23] proposed a new approach named PCD

for computing adversarial examples for Deep Neural Network (DNN) and increase the robustness of Big Data. In order to improve the thermal energy conversion rate of straw recycling system further and reduce the work energy consumption of the Internet of Things control platform of straw recycling system, article [38] designs the Internet of Things control platform of straw recycling system based on genetic algorithm, which is composed of the basic framework of the Internet of Things and the control terminal of the Internet of Things. Article [44] studied the coordination issues in the multi-chain supply chain system where several retailers are included and they can carry out horizontal inventory coordination between themselves in the supply chain system.

Fuzzy theoretical have been widely used in image processing, we select 6 papers which focused on fuzzy theoretical based image processing. Article [2] proposed a Curvelet transform based band noise elimination method, which optimizes the effect of image de-noising from two aspects. Experimental result shows super wavelet change can implement spectrum evolvement of images in more scales and directions and indicate various information features including curve strange information. Focused on the low accuracy problem of normalized cross-correlation (NCC), article [3] proposed a fast, highly accurate NCC image matching algorithm. Article [16] proposed two kind of new cubic chaotic maps based on Li-Yorke's chaos criterion theorem, and gives the corresponding chaos discriminant conditions. A centerline-based text region detection algorithm is proposed in article [20], which is used to process the output of network during text instance segmentation. The proposed algorithm calculates each text region according to the geometric information of the text instance; thus, it is able to process multi-oriented text instances precisely. Article [22] proposed a new photograph construction method, which the measurement matrix of compressed sampling is constructed based on the sparsity of LDPC matrix and the method of photograph construction. Article [42] reprocesses the information of the boundary intelligent contour so as to effectively extract the codes of image contour features. The algorithm based on the coordinates of contour extracted through the level set evolution algorithm is used to obtain several 2D contour matrixes with the same size after repeated conversions.

The wireless sensor network (WSN) promises to reshape entire industries. There are 13 papers focused on WSN and its application technologies. Article [14] proposed a new type of verifiable secret sharing (VSS) scheme based on bivariate polynomial to achieving the RSU authentication in a secret sharing way. Article [17] focused on accelerating quantum-safe cryptography for communication systems by improving inversions in finite fields, and then the authors proposed a new method to accelerating quantum-safe cryptography for communication systems. In order to improve the influence of particles degeneracy on the estimation of vehicle sideslip angle, and ensure the nonnegative qualitative of the covariance matrix and iterative stability of the unscented Kalman filter algorithm, article [18] proposed a vehicle sideslip angle estimation method, which can be used to optimize the density distribution function. Article [19] propose a variant of Mastrovito multiplications based on general irreducible polynomials methods. Focused on the identification process and evaluation method of distributed node trust behavior, article [24] call links and resource consumption of software behavior during the development phase to verify the trusted behavior identification model. Based on the privacy protection algorithm of CRAE, a high accuracy fusion algorithm for privacy preserving was proposed in article [25], so as to effectively reduce the overall energy consumption of the sensor network. In article [26], a data detection method based on time series is proposed to solve the problem that the sampling values of sensors vary greatly in harsh environments and the detection results of events are inaccurate with the increase of fault nodes in wireless sensor networks. In artile [29], the authors utilized the widely-applied iBeacon technology to develop a positioning and guidance system in order to assist the visually impaired to move indoors and interact with the environment. In article [30] a newly-designed manipulator is proposed with the improvement in tactile information processing and the mechanical structure. Article [37] proposed a novel industry configuration model of network emotion mining and fundamental research. Article [47] illustrates an alternate means –ANFIS – of calculating transmission line failure risk. ANFIS has a multi-dimensional nonlinear mapping capability, and the relationship between closing performance of circuit breakers and line failure risk is such a relationship. Article [48] present nine typical IFA resolution schemes, and then simulate its performance and evaluate its value as a defense against an IFA attack. Article [50] designed an intelligent transplanting system for vegetable pot seedling, which included the function of the seeding storage mechanism.

In conclusion, this special issue would not have been possible without the help of many people. As guest editors, we would like to take this opportunity to thank the authors for their contributions and the reviewers for their invaluable comments and timely responses. We also would like to thank the JIFS Editor-in-Chief and staff for their support during the preparation and production of this special issue.

References

[1] X.D. Liu and C.L. Li, An Intelligent Urban Traffic Data Fusion Analysis Method Based on Improved Artificial Neural Network, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[2] C. Wu, X.Y. Ma and W.B. Wang, Hyperspectral Image Denoise Based on Curvelet Transform Combined with Weight Coefficient Method, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[3] P. Wu, W. Li and W.L. Song, Fast, Accurate Normalized Cross-Correlation Image Matching, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[4] W. He, S. Xie, X.L. Liu, T. Lu, T.J. Luo, M.A. Sotelo and Z.X. Li, A novel image recognition algorithm of target identification for unmanned surface vehicles based on deep learning, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[5] J.G. Yu, H. Zhu, C. Ding and O. Pfeiffer, A Novel Ensemble Fuzzy Model for Degradation Prognostics of Rolling Element Bearings, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[6] Y.T. Liu, Incomplete Big Data Imputation Mining Algorithm Based on BP Neural Network, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[7] Q. Zhang and F. Wilson, RBNN Application and Simulation in Big Data Set Classification, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[8] Q. GU, N. LU and L. Liu, A novel recurrent neural network algorithm with long short-term memory model for futures trading, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[9] Z.T. Zhao, X.Z. Zhao and L.L. Li, Self-Labeling Online Sequential Extreme Learning Machine and its Application, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[10] H.W. Zhao, Y.Q. Liu, Y.P. Huang, X.W. Lu and X.H. Tu, Short-term free parking berths prediction based on Multi-task – DBN Neural network, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[11] Y.L. Zhang, T.L. Han, B.H. Lang, Y. Li and F.W. Lai, Detection and extraction of shockwave signal in noisy environments, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[12] X.B. Ding and Z.G. Liu, Urban Rail Transit Operation Risks Intelligent Identification Algorithm Based on Dispatching Fault Log Data Mining, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[13] W.F. Zhou, J. Hou, W. Fan and Y. Dai, A Location-based marine fishery information service based on BeiDou navigation satellite system, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[14] W.J. Ji, L. Zhu, Y.C. Wang, Z. Liu and X.H. Hei, RSU Authentication in Vehicular Ad Hoc Networks Base on Verifiable Secret Sharing, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[15] Y. Cao, W.Y. Wei, L. Huang, H. Qiao and J. Du, Research on Supply Chain Risk Coping Strategy Based on Fuzzy Logic, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[16] X.Y. Wei and H.Y. Zang, De Construction and complexity analysis of new cubic chaotic maps based on spectral entropy algorithm, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[17] H.B. Yi, Computing Inversions in Finite Fields Based on Cellular Automata, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[18] S. Wang, Q. Yu, X. Zhao, S. Zhang and Y.M. Ye, Vehicle sideslip angle estimation based on SVD-UPF algorithm, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[19] H.B. Yi, R.N. Chi and Z. Nie, Efficient Multiplications in Finite Fields for Multivariate Signatures, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[20] Q.B. Xie, K. Zhou, X. Fu and X.H. Fan, Feature Attention based Detection Model for Medical Text, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[21] Z.Q. Hu and X.P. Yuan, A machine vision detection algorithm for laser-cutting spark jet angle, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[22] X.Q. Yin, J.S. Qian, X.G. Guo, C.F. Fu and G.H. Lin, Compressed sensing of remote image based on photograph LDPC codes matrix, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[23] Y.L. Zhang, G.H. Pu, M. Zhang and Y. William, Generating Adversarial Examples for DNN Using Pooling Layers, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[24] Y. Lin, X.J. Yu and W. Glaubitt, Trusted Behavior Identification Model for Distributed Node, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[25] Y. Li, High accuracy data fusion algorithm for privacy serving in wireless sensor networks, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[26] Y. Li, Anomaly detection in wireless sensor networks based on time factor, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[27] Z. ZHOU, H.L. Xie and F.M. Li, A Novel Task Scheduling Algorithm Integrated with Priority and Greedy Strategy in Cloud Computing, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[28] L. Cui, L.B. Cheng, X.M. Jiang and Z.F. Chen, Albarka. Robust Estimation and Outlier Detection Based on Linear Regression Model, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[29] H.K. Lu, P.C. Lin, K.C. Chu, A.N. Chen and A. Yuan, Development and Evaluation of a Beacon-Based Indoor Positioning and Navigating System for the Visually Impaired, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[30] Y. Li, K. Yuan, Q. Cai, F.Y. Yu, C.F. Cai, X.Y. Li, P.F. Liu, M.Y. Qian, J. Yu, X.M. Peng, H.G. Chen, R.T. Qin, Z.W. Wang, N.X. Huang, K.L. Liu and Z. Cheng, Evolutionary bionic manipulator method based on capsule network, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[31] F.G. Yao, Design and Simulation of Integrated Education Information Teaching System Based on Fuzzy Logic, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[32] L.M. Chen, M.L. Ma and L.X. Sun, Heuristic Swarm Intelligent Optimization Algorithm for Path Planning of Agricultural Product Logistics Distribution, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[33] Y. Liu, K.D. Tong, J.H. Lu and F. Mao, The Product Quality Risk Assessment of E-commerce by Machine Learning

Algorithm on Spark in Big Data Environment, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[34] J. Mao, X.Q. Jiang and X.Z. Zhang, Research on smart surveillance system of Internet of things of straw recycling process based on optimizing genetic algorithm, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[35] P.C. Wei and L. Li, Online Education Recommendation Model Based on user Behavior Data Analysis, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[36] L.H. Wen, Z.H. Shi and H.Y. Liu, Research on Risk Assessment of Geological Disaster Based on Cloud Fuzzy Clustering Algorithm, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[37] S.H. Yan and L.F. Guo, Construction of Industry Configuration Model for Network Emotion Mining and Fundamental Research Based on Deep Learning, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[38] M. Yang, Research on smart surveillance system of Internet of things of straw recycling process based on optimizing genetic algorithm, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[39] Y.G. Yang, J.Q. Yu, Y.B. Fu and J.T. Hu, Research on Geological Hazard Risk Assessment Based on the Cloud Fuzzy Clustering Algorithm, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[40] X.Y. Guo, J. Zhou and X. Wang, Game Analysis on Competition of Enterprises in Pig Breeding Supply Chain under the Fuzzy Environment, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[41] R.R. Cui, Homological dimension of Rees matrix semigroups in intelligent fuzzy systems, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[42] Y.F. Wu, A Study on the Intelligent Application of the Code and the Contour of the Image Feature, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[43] C. Shen, H.F. Lin, H.H. Hao, Z.H. Yang, J. Wang and S.W. Zhang, Intelligent multi-document summarization for biomedical literature by word embed-dings and graph-based ranking, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[44] H. Pang, S.H. Dong and X.W. Zhang, Horizontal inventory coordination in intelligent supply chain based on multi-objective genetic algorithm, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[45] J.H. Luo, X.L. Liu, D.C. Mi, D.Q. Chen, Z.F. He and L.W. Xu, Intelligent Dynamic Response of Guangxi Marine Soft Foundation under Traffic Load, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[46] L.D. Liu, J.W. Dai, J.W. Yang, M. Jin, W. Jiang and X.Y. Lu, Intelligent simulation experimental study on influence of air velocity of air supply hood and exhaust hood with vertical push-pull ventilation, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[47] X.Y. Duan, F. Zhang, M.F. Liao, J.Y. Zou and Y. Lv, Forecasting Failure Risk of Transmission Line in Ultra-high-voltage networks using ANFIS, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[48] G.L. Xing, J. Chen, Y. Li, M. Han, L.T. He, T.Y. Mao and R. Hou, Countermeasures of Interest Flooding Attack in Named Data Networking, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[49] H.Q. Gan, C.Y. Zheng and H.T. Cui, A two-stage model for capacity planning of centralized charging station and ordered discharging, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

[50] J.T. Ji, L.H. Yang, X. Jin, H. Ma, J. Pang, R.B. Huang and M.M. Du, Design of intelligent transplanting system for vegetable pot seedling based on PLC control, *Journal of Intelligent & Fuzzy Systems (JIFS)*.