

Guest Editorial

Artificial intelligent techniques and its applications

Mahalingam Sundhararajan^{a,*}, Xiao-Zhi Gao^b and Hamed Vahdat Nejad^c

^a*Department of Electronics and Communication Engineering, Bharath Institute of Higher Education and Research, Bharath University, Chennai, India*

^b*Department of Machine Vision and Pattern Recognition Laboratory, Lappeenranta University of Technology, Finland*

^c*Department of Computer Science and Engineering, University of Birjand, Birjand, Iran*

Keywords: Artificial intelligent, computing techniques and applications

This special issue is a selected collection of papers submitted to the IEEE International Conference on Algorithms, methodology, models and applications in emerging technologies and International Conference on Telecommunication, Power analysis and Computing Techniques and on 16–18th, February, 2017 & 6–8th April 2017, Chennai, India. These papers have been reviewed and accepted for presentation at the conference and for publication in the Journal of Intelligent & Fuzzy Systems (JIFS). In this special issue there are 50 papers covering a wide range of tools, techniques and applications of artificial intelligent techniques and applications.

The International conference on Intelligent Systems Technologies and Applications aims to bring together researchers in related fields to explore and discuss various aspects of intelligent systems technologies and their applications. It provides excellent opportunities for the presentation of interesting new research results and discussion about them,

leading to knowledge transfer and generation of new ideas.

There are twelve papers addressing research problems in optimization of big data analysis. Article [1] focused on optimize the use of construction site space in the case of meeting multiple conflicting or uniform arrangement objectives. The author proposed a safety model for site layout construction and the corresponding research. Experimental results show the proposed method can achieve good performance than traditional method. In article [2], A north-seeking data quality optimization method for a magnetically suspended gyroscope is proposed based on two-position characteristics combined with the north-seeking characteristic principle of the magnetically suspended gyroscope total station theodolite. In the proposed method, the authors established a simple linear regression model based on the linear relationship satisfied by the rotor current of two precise seeking positions and the north-seeking azimuth firstly. Then, calculated the confidence interval of the corresponding rotor current from the a priori value of the north-seeking azimuth. Lastly, recalculated the gyroscope azimuth. The authors test the effectiveness of the method by using the engineering test data, the experimental results show that the method

*Corresponding author. Mahalingam Sundhararajan, Department of Electronics and Communication Engineering, Bharath Institute of Higher Education and Research, Bharath University, Chennai, India. Tel.: +91 44 2229 0742/Ext. 0125; Fax: +91 44 2229 3886; E-mails: msrajan69@yahoo.com; deanresearch@bharathuniv.ac.in.

is effective at testing the north-seeking data quality of the gyroscope and correcting directional results. To automatically detect and characterize paper impurities with computer vision, article [3] proposed a novel two parts evaluation procedure with feature representations using Alternating Direction Method of Multipliers (ADMM) sparse codes. The method is based on an offline training step to obtain sparse coefficients and codebooks via learning extracted features with ADMM optimization, followed by an online detection step to use linear SVM classifier to assess defective paper samples from non-defective ones. The proposed approach bridges the gap between paper impurities evaluation and sparse feature representations, taking advantages of existing ADMM algorithms to handle sparse codes problem. In article [4], the authors introduce the value flow analysis of circular economy into the cost accounting, analysis and optimization of enterprise reverse logistics. The authors also take into account the external costs (secondary pollution and environmental benefits of recycling) in the reverse logistics cost accounting. Ultimately, the paper aims to formulate a cost accounting and an optimization model of reverse logistics. Based on the case of an automobile recycling company in Hunan Province, China, it makes a proposal on how an enterprise may optimize its costs and achieve a coordinated development of society, economy and environment. Article [5] focused on the problem of moving nodes data collection in WSNs. A moving node can be moving tramcars, moving cars on bridge or autonomous under-water vehicles, etc. However, in reality, the moving nodes have certain constraints on both space and capacity. In this paper, the network problems such as the node energy, the sink movement distance upper limit and the communication loss, are formally modeled as linear programming models. Thus, the optimal sink moving path can be determined by solving these models. Experiments show that the models can be applied to small and medium size WSNs with acceptable running time. However, the running time becomes extremely long when the network size is scaled up. Article [6] improved the nonlinear genetic algorithm and solved the optimization problem of the rod length. Article [7] combined the genetic algorithm with particle swarm algorithm to make up for deficiencies such as the low calculation speed of genetic algorithm and search scope limitations of optimum solution in the particle swarm optimization, and the hybrid particle swarm optimization algorithm was formed with fast computation speed and the reliable opti-

mal solution. The hybrid algorithm was applied to the model of production scheduling, and the calculation steps and structure of the hybrid algorithm were defined. Article [8] proposed a rock engineering system (ORES) method and then analyzed the permeability and failure process of rock. Article [9] proposed a new optimization management method which can improve the effective. Article [10] proposed a new optimized big data analysis method and use it in financial capital management. Article [11] focus on collaborative management mechanism based on BIM in the context of Zhengzhou airport expansion project. By using network social relations project organization, the author constructs the game simulation model and analyzes cooperation network generation mechanism of Zhengzhou airport expansion project, set up the snowdrift game strategy update rules, establish the evolutionary game model of scale-free network model. In order to make the RBF hidden layer centers being established more adaptively and avoid the blindness, article [12] proposes a fusion algorithm to optimize the parameters of the RBF neural network in recognizing the state of coal flotation.

Multimedia big data analysis is an important role in artificial intelligent techniques and applications, there are five papers are focused on multimedia big data analysis. Article [13] analyzed the Ad Hoc network based video transmission technology, in this paper the author proposed a multi-path routing protocol to addressing the problem of choosing the interference path with different height. Article [14] developed a multimedia digital platform and applied the platform in teaching of college physical education course. Article [15] based on the survey result that the interaction experience about the game interface on smartphones is always reluctant for users, this paper focused on how to provide better experience for users and make up for the rapid prototype method in designing user interface to provide some references for smartphone-game interface designers. By analyzing the development process and the main features of smartphone-games, the current status of smartphone-games design are presented, and three kinds of prototype methods are used to combine the interactive design process and the management process which are devoted to improve the interface design. Finally, based on a case analysis, the user interface design is demonstrated to be a user-centered iterative design process where the in-depth user research should be carried out in the early phase, and the repetitious user tests should be implemented

in the last phase. This paper provides technical support for the analysis of smartphone-game interface design. In order to meet the requirements of cross-platform application, its development is growing louder and louder, article [16] studied the HTML5 technologies and applied them in the mobile internet. In order to realize the online thickness measurement of thin films, an automatic film thickness measuring system was established in article [17]. Experimental result show the proposed system can achieve good performance than any other system.

Big data mining and prediction is another important aspect of artificial intelligent technology and big data analysis. There are five papers focused on big data mining, two papers focused on big data prediction, three papers focused on big data analysis reliability, and one paper focused on big data system scheduling and one paper focused on block chain. Because of all these twelve papers are relevant with big data analysis, so we introduce all these papers together. Article [18] proposed a new algorithm to improve the efficiency of the resultant adiabatic evolution and then the authors show five kinds of possible forms of the driving Hamiltonian, and analyses the performance of the algorithms. In order to look closer at the formation conditions of fold-and-thrust wedges and to explore the origin of landward-vergent thrust wedges, article [19] conducted a series of analogue and numerical models under different conditions of substrate. Results of the proposed models revealed that in the frictional basal substrate, and under conditions of a large coefficient of frictional basal, it will deform the fold-and-thrust wedges. Article [20] studied the encrypted network behavior recognition and mining in a large amount of network data environment, and proposed a fast online recognition method for the encryption network behavior based on the combination of correlation coefficient and k-nearest neighbor (KNN). Taking the encrypted Twitter traffic as the research object, a lot of encrypted Twitter network behaviors including message sending, pictures sending and other behaviors were analyzed, and then the statistical characteristics to express the encryption network behavior were extracted, and the samples library of encryption network behaviors based on correlation coefficient were established. Then, through the real-time collection of interactive network data, the correlation coefficient between the interactive data and the sample library were calculated, in order to overcome the noise interference of the similar data traffic. Meanwhile, the data packets after the similarity filtering were classified as

the true behavior or the false behavior by using the KNN algorithm, and then the encryption network behavior was identified automatically by the default threshold of the correlation coefficient in big data environment, and compared with the traditional correlation coefficient method, the recognition efficiency of this method was greatly improved, which reaches to about 94%. Based on above, combined with the network vulnerability analysis, web crawler and virtual identity mining, the comprehensive encryption network behavior mining was successfully realized in the environment of big data. Article [21] proposed a new method for dynamic vibration an achieved good performance than some other method. Article [22] studied the complex data study on mechanical fault diagnosing. Article [23] designed a new prediction technique based on nonlinear combined AWNG-BP. Article [24] proposed a text prediction method based on multi-label attributes and improved maximum entropy model. Article [25] analyzed the reliability of network security risk factors based on D-S evidence theory. In order to improve the network transmission efficiency, article [26] improve the ON/OFF model. The experimental results show that the model has good advantages in the physical meaning and complexity under longer correlation, and the C-ON/OFF network traffic model can be applied to the design of the network traffic monitoring system. Article [27] researches the reasonable position of speed bump based on triaxle truck vibration characteristics. Article [28] studied the meta-job scheduling heuristics in heterogeneous environments and then proposed three scheduling algorithms. Article [29] applied the block chain technology in spot exchange, which improved the ability of market regulators to supervise the market order.

Sustainable computing is another interest topic of artificial intelligent techniques and applications, there are twelve papers are focused on sustainable computing of the artificial intelligent. Article [30] analyzed the collaborative design and construction collaborative mechanism of cloud bim platform construction project based on green computing technology. Article [31] improved the SVM algorithm and applied the improved algorithm in evaluation of sustainable development of urban transportation and ecological environment. Article [32] studied the optimized excavation approach and applied it in long-span underground cavern. Article [33] studied the TDOA location error elimination of hazardous chemicals storage based on improved wavelet. Article [34] studied the structure optimization design of modified

wood furniture tenon structure based on the finite element analysis of ANSYS. Article [35] applied the green computing for active vibration control in the strapdown inertial navigation system, which improved the effectiveness and efficiency of the control algorithm. Article [36] discussed two mechanisms product market competition and enterprise asset strategy, and their influence on enterprise operating liabilities. Article [37] focuses on improving the accurate prediction of tourist capacity, which is the key to solve the contradiction of tourism economy development and ecological environment protection. EMD-BP integrated predictive model is proposed and uses Empirical Model Decompose method to decompose time-series data of visitors into several TMF, then forecasting each component by BP neural network. Article [38] improved the AHP-entropy method and applied the proposed method in tariff source risk which achieved good performance. Article [39] proposed a SWAT model and applied the model in simulation analysis of river basins in western china. Article [40] improved the CMADS method and experimental results show the proposed method can achieve good performance in soil and water simulation. Article [41] studied the water consumption process and influence mechanism of Balkhash lake in central Asia.

Finally, article [42] proposed a new method which use the orthogonal vibration signals at the top and side of the cylinder head to improve the identification rate of fuel supply fault in diesel engine. Based on the 3D virtual laminated element and considering the beam-slab-column collaboration, article [43] conducts the nonlinear infinite laminated element analysis of three reinforced concrete (R.C.) space frame structural models with different seismic pre-cautionary, respectively. Article [44] proposed a distribution trend model of runoff by using Gini coefficient, which was used to identify the variation points of runoff at Ga Datan station in the Da Tong River basin. Article [45] analyzed the response of steel frame with a sudden removal first floor column dynamically. Article [46] proposed an innovative human active muscle control model based on a back-propagation neural network (BPNN) controller. Article [47] analyzed the optimal investment of enterprises and the optimal emission reduction subsidy of the government under the Nash and Stackelberg game conditions. Article [48] proposed a new range-free algorithm based on hop correction of RSSI. Article [49] improved design and performance analysis of counter-flow thrust vectoring technology

under high subsonic. Article [50] studied the dynamic response of explosion containment vessels.

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] Y. Li, The management model of construction plane layout based on pareto ant colony genetic algorithm, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [2] Z. Shi, Z.Q. Yang and K.Y. He, Azimuth information processing optimization method for a magnetically suspended gyroscope, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [3] Z. Qi, H. Peng, W.W. Huang and H.Y. Shi, Automated paper impurities evaluation using feature representations based on ADMM sparse codes, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [4] Z.F. Zhou, Y.F. Cai, Y.X. Xiao, X.H. Chen and H.X. Zeng, The optimization of reverse logistics cost based on value flow analysis – a case study on automobile recycling company in China, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [5] H.L. Wang, J. Shen and X.L. Wang, Modeling and simulation of the optimal sink moving path based on mixed integer linear programming, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [6] B.R. Ding, X.H. Qu and Y.L. Chen, Application and research of mechanical design optimization based on genetic algorithm kinematics simulation technology, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [7] J.R. Shang, Y.N. Tian, Y. Liu and R.L. Liu, Production scheduling optimization method based on hybrid particle swarm optimization algorithm, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [8] Z. Jia, H. Tian, Z.N. Yang, T. Liu and S. Bandara, Mechanism of water inrush from coal seam floor based on coupling mechanism of seepage and stress, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [9] D.N. Liu, X. Zhang, C.C. Gao, M. Yang and M. Li, Cost management system of electric power engineering project based on project management theory, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [10] Y.C. Chao, S.J. Guo and X.Q. Liu, Research on the influence of financial capital operation of non-financial listed companies on profitability, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [11] R.R. Dong and W. Richards, Network evolution simulation of cooperation relationship in two phase project of zhengzhou airport based on BIM, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [12] M.L. Tian, M.Q. Tian, J.M. Yang and J.L. Li, Optimization of RBFneural network used in state recognition of coal flotation, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

- [13] J.P. Liu, X.B. Yuan, H.W. Qian, Y.B. Chen and F.L. Liu, Research on video transmission ad hoc network routing technology oriented multimedia applications, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [14] D.W. Cao, C. Liu, S.N. Wang, X.L. Wang and W.F. Wu, Research and application of multimedia digital platform in the teaching of college physical education course, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [15] W.H. Huang and Z. Ji, Design and implementation of a game interface interaction on smartphone, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [16] W. Yu Y. Xu, Research on the application of HTML5 in the development of mobile internet, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [17] G.L. Ma, L.X. Liu, G.Y. Yang, C. Wang and B. Zhao, Measuring film thickness with Dual-laser imaging method, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [18] Z.G. Zhang, S.F. Lu and X. Zhou, Can adiabatic algorithms with extra items always be efficient in quantum computation? *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [19] Q. Xu, Y. Zhao, T. Hou, J.X. Wang, X. Zhao, J.G. Liu and D. Wang, The evolution of Folds-thrust wedges: Mathematical simulation based on finite difference method, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [20] H.J. Zhu, L.H. Zhu, M. Shen and K. Salabat, Online and automatic identification and mining of encryption network behavior in big data environment, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [21] X.T. Xia, Y.F. Li, S.J. Dong, W.H. Zhu and T.J. Chen, Based on ANSYS crown tapered rolling bearings dynamics simulation analysis, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [22] Y.J. Li and Q.C. Chang, Complex data study on mechanical fault diagnosing, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [23] Y. Bi, AWNG-BP Prediction Technique Study Based on Nonlinear Combination—A case study of prediction of food supply chain in rural areas of Hubei Province, China, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [24] Y. Yin, D. Feng, Y. Li and Z. Shi, Text prediction method based on multi-label attributes and improved maximum entropy model, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [25] J.J. Yu, M. Hu and P. Wang, Evaluation and reliability analysis of network security risk factors based on D-S evidence theory, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [26] Y. Liu, T. Song and L.J. Liao, Construction of C-ON/OFF network traffic model based on time series, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [27] X.N. Zhao, S. Wang, M.N. Yu, Q.G. Yu and C.Y. Zhou, The position of speed bump in front of truck scale based on vehicle vibration performance, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [28] X.B. Jin, J. Wang, D.L. Wang and C.S. Fang, The research on meta-job scheduling heuristics in heterogeneous environments, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [29] M.Z. Liu and Z.F. Zou, The application of block chain technology in spot exchange, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [30] Z. Jiang, Analysis of collaborative design and construction collaborative mechanism of cloud bim platform construction project based on green computing technology, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [31] S.R. Lu and Y. Liu, Evaluation system for the sustainable development of urban transportation and ecological environment based on SVM, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [32] Z.F. Sun, X.X. Wu and H.L. Qu, Research on optimized excavation approach applied in long-span underground cavern, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [33] Y. Li, Research on TDOA location error elimination of hazardous chemicals storage based on improved wavelet, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [34] Y.S. Chen and Z.H. Wu, Study on structure optimization design of modified wood furniture tenon structure based on the finite element analysis of ANSYS, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [35] J.L. Wen and B. Zheng, Target method approaching green computing for active vibration control in the strapdown inertial navigation system, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [36] C.H. Ma, Y.P. Ruan and K. Zheng, Product market competition, asset strategy and enterprise operating liabilities, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [37] S.J. Lin, J.Y. Chen and Z.X. Liao, A EMD-BP integrated model to forecast tourist number and applied to Jiuzhaigou, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [38] Z. An and L.R. Song, Research on the role of AHP- entropy method in the identification and evaluation of China tariff source risk, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [39] X.H. Lei, X.Y. Meng, T. Qin, T. Wang, S.Y. Cai, M.X. Yang, W.H. Liao, Y. Tian and K.S. Arun, Runoff simulation analysis of river basins in western China based on ensemble of CLM3.5+ RAPID model and SWAT model, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [40] L.N. Zhang, X.H. Lei, X.Y. Meng, H. Wang, T. Qin and K.S. Arun, Runoff simulation of hunhe river basin in China using soil and water assessment tool driven by CMADS, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [41] A.H. Long, X.Y. Xiaoya Deng, L. Xie, X.Y. Meng and K.S. Arun, Study on water consumption process and influence mechanism of Balkhash Lake in Central Asia, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [42] Z.Y. Li, H.D. Zhao and R.L. Zeng, Identification of fuel supply faultindiesel engine based on cylinder head orthogonal vibration signal, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [43] Y.G. Jia, H. Li, G.Y. Wu, Z.J. Yuan and Q. Zhang, Spatial nonlinear simulation analysis of progressive collapse resistance of R.C. frame structure under different seismic precautionary, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [44] S.Y. Cai, H.X. Lei, X.Y. Meng and Y. Ji, Ecological flow analysis method based on the comprehensive variation diagnosis of Gini coefficient, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [45] K. Ma, Y.N. Xu and W.B. Li, Dynamic response analysis of steel frame with a sudden removal first floor colum, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [46] J. Huang, Y. Xu, X.Y. Peng, L. Hu and J.K. Yang, Development of a human head and neck muscle activation control model based on BPNN, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [47] Y.D. Li, X.P. Xie and Q.S. Liu, Study on longitudinal emission reduction investment of supply chain and government's subsidy policy, *Journal of Intelligent & Fuzzy Systems (JIFS)*.

- [48] X. Feng, Z.F. Chen and Z. Liu, A New Range-free Algorithm based on hop correction of RSSI, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [49] J.N. Li, W. Lu, Y.C. Wang and Y.L. Zhang, Improved design and performance analysis of counterflow thrust vectoring technology under high subsonic, *Journal of Intelligent & Fuzzy Systems (JIFS)*.
- [50] L.N. Li, D.W. Zhong and X.R. Mao, Research on dynamic response of explosion containment vessels, *Journal of Intelligent & Fuzzy Systems (JIFS)*.