



## Guest Editorial: Special Section on Recent Advances in Data Driven Modeling & Soft Computing

This Special Section presents 11 papers accepted in SI: Recent Advances in Data Driven Modeling & Soft Computing. The articles in this Special Section focus on the newest findings of the data driven modeling and soft computing techniques for all possible applications, especially in the intelligent algorithm, image processing, and speech recognition fields. All of the articles underwent a rigorous peer-review. Acceptance into this Special Section was based on the reviewers' recommendation, mandatory revisions, and final examination by the Guest Editor. Creative thoughts and interesting inspirations are presented, discussed, and disseminated in this Section the SI is expected to be an impact section which could inspire researchers for exploring the related technologies of the intelligent computing.

First, there are 2 papers on the improved PSO algorithm and the applications. Ching-Yi Chen, et al. proposed a systematic data-driven adaptive neuro-fuzzy inference system (ANFIS) modelling methodology, which allows to construct ANFIS models automatically while considering both precision and linguistic interpretability of TSK-type fuzzy systems. Wei Lung Mao, et al. proposed a MPSO algorithms which mainly modify the calculation formulas of inertia weights. Two MPSOs, namely linear decreasing particle swarm optimization (LDPSO) and adaptive particle swarm optimization (APSO) are developed to enhance the convergence behavior in learning process. The RFNN uses MPSO based method to tune the parameters of the membership functions, and it uses gradient descent (GD) based scheme to optimize the parameters of the conclusion part of the fuzzy system.

One paper focus on applications using modified Neural Network. Hye-Jeong Song, et al. predicted the concentration of PM10 using meteorological factors, sand, fog, PM10, and DNN. When conducting the experiment, they considered two cases. The first is an experiment to predict the concentration of PM10 on the next day using the weather forecast data of that day. The second experiment was to predict the concentration of PM10 on the next day using the previous day's data. At this time, they tried to find optimal parameters by comparing various parameters of DNN.

Feature recognition are the important source of soft computing, 5 papers addressing feature recognition based on data driven modeling and soft computing were selected for this special section. Jihyuck Jo, et al. presented a modified Viterbi scoring procedure in this paper based on Dijkstra's shortest-path algorithm, the Viterbi scoring is translated into the searching of a minimum path, and the shortest-path algorithm is exploited to decrease the computational complexity while preventing the recognition accuracy from deteriorating. In addition, a two-phase comparison structure is proposed to manage state probabilities efficiently. Simulation results show that the proposed method saves computational complexity and recognition time by more than 21% and 10% compared to the conventional Viterbi scoring and the previous early termination, respectively. Nan Pan, et al. proposed an effective comparison algorithm based on wavelet domain DTW aiming at the line traces laser detection signal is put forward for the purpose of making effective trace analysis and infer the criminal tools. The proposed algorithm applies wavelet decomposition to the 1-D signals which picked up by single point laser displacement sensor to partially reduce background noises. After that, the sequence comparison strategy based on wavelet domain DTW is employed to do trace feature similarity matching. Finally, using linear regression machine learning algorithm based on gradient descent method to do constant iteration. They also proposed a crime tool identification algorithm based on GVF-Harris-SIFT and KNN is put forward. The proposed algorithm uses a gradient vector to smooth the gradient field of the image, and then uses the Harris angle detection algorithm to detect the tool angle. After that, the descriptors of the eigenvectors in corresponding feature points were using SIFT to obtain. Finally, the KNN machine learning algorithms is employed to for classification and recognition. For the purpose of overcoming the disadvantages that images and 3D scanning method difficult to track shearing tools efficiently and rapidly through trace, a set of laser detection system for shearing tools is developed by Nan Pan, et al. This system consists of motion control subsystem, laser detection subsystem, microscopic imaging subsystem and signal feature matching algorithm. By holding breakage of the cable, firstly,

using single-point laser displacement sensors to pick up surface features signal of line trace, then wavelet decomposition is used to reduce the noise, and the signal after noise reduction is obtained. After that, the threshold based sequence comparison method is used to achieve matches of similar coincidence for trace features, and then using a gradient descent method to have machine learning of parameters to construct the corresponding cost function. Getting the minimum cost of cost function value through continuous iterative, and finally realizing the fast traceability of corresponding shearing tool.

As to the soft computing applications in the field of industry, 3 papers were selected and included to this special section. Ching-Han Chen, et al. proposed a dynamic gesture recognition system applicable in IPTV remote control. It is able to detect the position of hand block in each frame of the input video at high speed. After acquiring the information of hand block, the robust dynamic gesture feature could be captured with the moving trail of hand block in the continuous images, and input to fuzzy neural network classifier (FNN classifier) for starting recognition process. Through this research, users are not only able to fulfill six different types of dynamic gestures recognition, but also able to extend internal gesture commands for flexibility in customization. Aiming at the drawback of artificial bee colony algorithm (ABC) with slow convergence speed and weak exploitation capacity, an enhanced exploitation artificial bee colony algorithm is proposed by Xiaofang Liu, et al. EeABC for short. First of all, a generalized opposition-based learning strategy (GOBL) is employed when initial population is produced for the sake of obtaining an evenly distributed population and avoiding the blindness of random initialization; Subsequently, inspired by the differential evolution (DE) algorithm, two new search equations is proposed, where the one is guided by the best individuals in the next generation to strengthen exploitation and the other is to avoid premature convergence in the later evolution stage. Jia-Shing Sheu, et al. proposed a household energy state monitoring system (HESMS) and a household energy load monitoring system (HELMS) for monitoring smart appliances. The proposed systems are based on the wireless communication network and can monitor household appliances' energy usage, control intelligent appliances, and decrease fire occurrence rates due to electrical appliance overloading.

Finally, in this special section, the last paper is about computational fluid dynamics. A two-dimensional model of staggered tube banks of the bristle pack with different pitch ratios was solved by computational fluid dynamics (CFD). The pressure distribution along the gap centerlines and bristle surfaces were studied for different upstream pressure from 0.2 to 0.6MPa. The results show that the calculated leakage agrees quite well with previous experimental results, which can verify the model. The

pressure is exponentially rather than strictly linearly decreasing distributed in the bristle pack. The 1st bristle is subjected to the highest pressure differential in a brush pack. The pressure differential on 1st bristle can be reduced significantly by increasing a brush density. The pressure distribution along the bristle surface is symmetry about the circle's horizontal line. The most obvious pressure drop occurred from about from 60° to 90°, which may be associated with the geometry arrangement. The local pressure coefficient Cpl can reflect the relationship between the static pressure and the kinetic energy of a brush pack. There is no stationary state reached between the kinetic energy and the static pressure when the upstream is larger than 0.3MPa. A multi-staged brush seal should be adopted.

We would like to express my deepest thanks to the reviewers for taking the time to comment on the papers. Moreover, we thank all the authors who have contributed their original work to this section. Lastly, Special thanks must be delivered to the Special Issues Editor: Prof. Mo Jamshidi and Ms. Kathy Johnson, Editorial Department of Autosoft Journal, for their kind and proficient supports to the publication of this Special Section.



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