Editorial

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Biographical notes: Sandeep Kumar has obtained his PhD in the field of Nature Inspired Computing. His area of interest is theoretical computer science, swarm intelligence and evolutionary computing. He has published more than 50 research papers in refereed journals and international conferences and edited two books and two conference proceedings.

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Janos Arpad Kosa received his PhD from Technical University of Budapest (TUB), Electrical Energy Department, Hungary. He developed the RL-I-SFCL and DC flux transfer and AC flux transfer between independent iron cores in power system first in the world. He likes dealing with solutions of applications of superconductors in the electrical energy system. He is currently working as a Professor at Neumann Janos University, GAMF Faculty of Engineering and Computer Science.

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1   Introduction

Computational intelligence provides a number of the well planned approaches to solve the real life problems. The nature has evolved for the period of thousands of year elevating with innovative models, techniques and tools and established into well-defined disciplines of scientific aspire. Humankind has been continuously annoying to apprehend the nature from the time when by evolving some innovative techniques and tools day by day. The area of computational intelligence is a combination of computing science with knowledge from different streams like mathematics, biology, chemistry physics and engineering. Size of data growing exponentially and it is highly desirable to develop some innovative methods by using intelligent algorithm. This special issue is having main objective to circulate the innovations and advancements of computational intelligence.

Computational intelligence includes fuzzy logic, neural networks and probabilistic algorithms. Fuzzy logic used for representation of knowledge, neural networks used for learning and adaption and probabilistic algorithms used for evolutionary computation. Fuzzy logic mainly deals with imprecision and approximation, learning and classification handled by neural networks. Finally probabilistic algorithms handle uncertainty.

The special issue facilitates researchers and scientists to publish original research work with regard to developments in field of intelligent computing by applying algorithms and methodologies to solve complex computing problems that include: medical imaging, classification and prediction, image and text recognition, application of nature inspired algorithms, decrease the cost of unmanaged growth of data with sustainable practices, diminish the risk of data theft or loss with global data visibility.

2   Summary of accepted papers

This issue collects several different contributions that extend selected works presented at the international conference on sustainable computing in science, technology and management (SUSCOM-2019).

Tiwari and Jain proposed a new automated variant of grasshopper optimisation algorithm (GOA) and named it exponential GOA. That is used to find the optimal fuzzy clusters for segmenting the cells in histopathological images. The fuzzy clusters with the minimum compactness are considered as the cells region. For the validation of the proposed method, two histopathological image datasets have been considered, namely triple negative breast cancer patient images dataset and UCSB bio-segmentation image dataset. The performance of proposed method is evaluated in terms of AJI value and F1 score against other state-of-the-art methods. The simulation results validated the effectiveness of the proposed method has compared to other methods.

Khamparia et al. performed analysis of users review with the help of using existing classification techniques. Pal and Saraswat developed a new approach for classification of histopathological images using improved bag-of-features framework. The approach based on weighted two-dimensional vector quantisation-based feature encoding method. The proposed method encodes the images in the feature encoding phase of the bag-of-features using a weighted two-dimensional representation of two codebooks based on two types of feature descriptors. The work is tested on two histopathological image datasets for the classification task. The results analysis considered three types of features, namely SIFT, SURF, and ORB. The combination of SIFT and ORB feature along with the W2DVQ method return higher classification accuracy as 80.13% and 77.13% for ADL and Blue Histology image datasets respectively followed by SIFT and SURF feature for ADL dataset and ORB and SURF features for Blue Histology dataset.

Kumar et al. proposed an automated system to recognise facial expressions using the deep convolutional neural network (DCNN). The newly developed system is trained using DCNN for the detection of human facial expressions. The research experimentation is conducted on the databases of KDEF and JAFFE. Both the database consists of seven emotion classes of neutral, anger, sad, disgust, happy, fear, and surprise. By observing the notable results for the deep neural network in existing concepts, the DCNN approach employed for facial expression recognition.

Madan and Goswami deployed cat swarm optimisation and grey wolf optimiser along with adaptation of k-anonymisation criteria in the map-reduce framework for achieving privacy preservation goal. Mohammed et al. (2020) developed improved whale optimisation algorithm and deployed it for sentiment analysis. The new EWOA has been tested on 12 standard benchmark functions. Further, a clustering method based on EWOA has been introduced for clustering of sentimental data. The proposed EWOA clustering approach employs binomial crossover and tournament selection-based clustering method to find the optimal cluster centroid in sentimental data. To assess the performance, proposed and all the considered methods are evaluated on five benchmark sentimental datasets and compared with cuckoo search, whale optimisation algorithm, grey wolf optimisation, bat algorithm, GOA, and hybrid cuckoo search (CSK). Anwar et al. developed a book recommender system.

Jain et al. discussed major issues and challenges being faced to deal with the privacy protection methods in the internet of things. Kaleka et al. analysed the performance of eight well-known metaheuristic algorithms namely SHO, GWO, PSO, ACO, BA, GSA, MFO and WOA for solving numerical optimisation problems. The results reveal that the performance of SHO is better than the other algorithms. GWO and PSO algorithms are able to provide the good solution for many benchmark test functions, however the stability problem hinder their success rate against SHO. GWO and PSO provide better stochastic behaviour than MFO, BA and ACO. WOA and GSA have good decision mechanism to search the subspace of given problem.

Singh and Kumar developed a possibilistic c-means with constraints (PCM-S) algorithms in a supervised way for remotely sensed imagery. The proposed algorithm PCM-S has ability to overcome the disadvantages of FCM, PCM algorithms and it is achieved by incorporating local spatial and grey level information. The PCM-S introduces the factor of convolution including noise minimiser parameter which makes the PCM-S algorithm better than PCM-S in the presence of noise as well as to outliers.

Singh et al. developed a blind watermarking technique for colour images based on SVD of DWT coefficients. The technique is imperceptible and robust against major image processing operations. However, if the level of DWT is further increased to three-level, better PSNR and BCR are expected to be achieved. However, this is achieved at the cost of smaller watermarks. Since there is no requirement of the originals at the time of extraction, the technique is able to resist false positive watermark extraction. Additional security is provided by the keys used during embedding and extraction.

Rachapudi and Devi developed an efficient bag-of-features histopathological image classification method using a new variant of the salp swarm algorithm (SSA) named as random salp swarm algorithm (RSSA). The performance of RSSA has been validated on 20 benchmark functions in terms of mean and standard deviation of the fitness value. Additionally, the proposed RSSA-BOF method has been tested on Blue Histology image dataset. The proposed RSSA method has outperformed the other considered state-of-the-art methods on the majority of the benchmark functions. The proposed method has shown 05% increase in accuracy for the histopathological image classification on the considered dataset.

Dehraj and Sharma proposed an autonomic computing in terms of developing autonomic-based software systems. The proposed is very preliminary, however, it may provide the researchers with a direction to propose this revolutionary concept in terms of software development. Rekha et al. introduced earth mover's distance (EMD), to measure similarity, i.e., to find the samples similar in nature and eliminate them as redundant from the dataset. The proposed framework incorporates the elimination of 'redundant' and 'outliers' instances from the majority samples. The results obtained show a significant improvement over the state-of-the-art under sampling techniques. The proposed EMD-based under sampling technique eliminates the existence of redundant instances in the skewed data-set. The performance of the frameworks is validated with conventional and ensemble classifiers. The results obtained are quite satisfactory with ensemble classifiers.

Srinivas and Rao proposed a DeepCNN model. DeepCNN has the ability to denoise the images with known and unknown noise levels. The denoising results are performed in three frameworks. Rekha et al. proposed a new approach for handling class-imbalanced data. The proposed framework incorporates the elimination of 'redundant' and 'outliers' instances from the majority samples. The results obtained show a significant improvement over the state-of-the-art undersampling techniques. The proposed EMD-based undersampling technique eliminates the existence of redundant instances in the skewed data-set. The performance of the frameworks is validated with conventional and ensemble classifiers.

Chawda and Patel (2020) performed portfolio optimisation using winnowing algorithm. This paper also presented the enhanced exploration for the Winnowing algorithm (WAPWO-EE). The algorithm has been tested on the standard dataset of a five-asset problem given in the literature. Comparative analysis of the obtained experimental results proved WAPWO-EE to be much faster while preserving the robustness, accuracy and efficiency of the original Winnowing algorithm.

Lahiani and Neji developed a hand pose estimation system specifically for handheld devices. Authors show that the proposed system is effective using a combination of HOG and LBP features with an SVM classifier. Chebli et al. carried out detailed study of CAD systems with semi-supervised learning. Revathy et al. developed a model for prediction of dengue – human protein interaction for anti-viral drug discovery. The model

supports in extracting the unseen features and relationships in the data to take better decision. The conventional machine learning method can be improvised using optimisation algorithms to reduce the network error rate. In the present study, the hybrid model is proposed which combines FFBPN with firefly optimisation technique to predict the dengue human protein interaction. As a result of this study, the hybrid model classifies the various type of interaction between dengue protein and human protein. The interaction between dengue – human proteins are serotype specific and more exploration is needed to confirm the serotype specific interaction. The proposed hybrid model attains high accuracy which proves the value of predictions closer to the actual value.

Pragathi et al. developed a Lorentzian adaptive filter control algorithm for grid intertied photovoltaic system. The new system has given satisfactory results for reducing harmonics, load balancing, compensation of reactive power, unity power factor for ZVR under nonlinear/linear loads. The Lorentzian adaptive filter has compensated various power quality issues in comparison with several conventional methods. The advantage of Lorentzian adaptive filter control algorithm is that it eliminates mean square error by use of diagonal matrix.

3   Conclusions

Authors of this issue have provided many different contributions that extend the selected works presented at the SUSCOM 2019. These contributions in this special issue represent several different approaches related to image processing, drug designing, sentiment analysis, classification of images and prediction of diseases.