

EDITORIAL

System Analysis and Optimization with Applications (Part 1)

Neurodynamic systems have been the focal point of many types of research during the past years. This can be attributed to the fact that neurodynamic systems can be used for real-time optimizations in a varied range of science and engineering areas including robot control, signal processing, machine learning, and planning and decision making. In the current era, the application of artificial intelligence in big data, machine learning and related areas has led to an exponential increase in the size and complexity of the datasets. This urges the requirement of optimization techniques of large-scale distributed/decentralized computations. Efforts are also being made for using multiagent systems for distributed optimization in the areas of power control, sensor networks, smart grid, regression of distributed data, *etc.* [1-4]. This special issue of the Journal titled “Recent Patents on Computer Science” presents a collection of quality research work carried out on neurodynamic systems and their applications in optimization and engineering problems.



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From a wide range of interesting research papers on various aspects of system optimization, the guest editors, after undergoing exhaustive peer-reviews from experienced and well-known reviewers, have carefully selected 5 research papers. The final decision for the inclusion of 5 research papers is strictly based on the outcome of rigorous peer-review and successful revisions of the research papers by the researchers as per the reviewers’ suggestions and guidelines.

A summary of the research papers included in this special issue is enlisted as follows:

In the first article, Dureja and Pahwa [1] present an in-depth analysis of the impact of using various non-linear activation functions such as ReLU, Tanh, Selu, PRelu and Elu in Convolutional Neural Networks (CNNs) for classification tasks. The analysis is performed on a dataset containing 10000 images of cats and dogs. The study confirms that using ReLU in CNN optimizes the overall performance of the classification task in terms of accuracy and speed. The research presented by the authors can be utilized to optimize the predictions using convolutional neural networks.

The second article by Rao and Reddy [2] proposes a method for content-based image classification and retrieval technique. The proposed technique is comprised of two phases *viz.* Feature Extraction and Retrieval Process. Features can be textual or visual. Visual features are extracted using Scaling Invariant Feature Transform (SIFT) and K-Means clustering algorithm that fed to the retrieval phase. The retrieval phase utilizes K-nearest neighbor algorithms for classifying and retrieving the images. The comparative analysis of the proposed approach with the existing works depicts its efficiency in terms of precision and recall rate.

The third article presents a study by Gupta and Saxena [3] that explores the concept of bullwhip effect in supply chain management using operational and financial variables. Studies revealed that the majority of the existing literature that investigate the bullwhip impact is based on mathematical and simulation models. However, this work proposes a machine learning approach for classifying operational and financial variables affecting the bullwhip effect in the Indian sectors. The authors employ a Rapid Miner tool for data mining and analysis which employs Weka Alternating Decision Tree (w-ADT) for classification of data. A comprehensive analysis of the obtained results is presented in this work. The obtained results identify seven potential variables that has been the highest levels of accuracy and minimum deviation. The work presented in this article can be extended using a different combination of classification techniques to improve the accuracy levels.

The next article presented by Mahapatra *et al.* [4] in the fifth article of this issue aims to address the scalability issues of MANETs. The study analyzes the effect of different number of agents operating in the different topologies of MANET. The proposed work utilizes F-Min constrained optimization technique to optimize the number of deployed agents in a multiple agent deployments scenario in MANETs so as to balance the computational overheads and performance gains of the network. The optimal solutions are demonstrated using Pareto-optimal points.

The last article of the issue presents the work of Sharma *et al.* [5] where the authors propose a two-tier security solution for storing data across public cloud. The proposed algorithm uses AES file encryption method to store the data in an encrypted format, thereby ensuring that the original data is accessible across the cloud only to the authentic owner of the data. The proposed work is implemented on the Google Drive platform in order to demonstrate the monitoring and security maintenance of the private data by the customer.

We would like to thank all the authors for their novel contributions in this issue as well as the reviewers for their valuable inputs and timely support in order to ensure the quality of the accepted articles. We expect that this special issue of Recent Patents on Computer Science will provide comprehensive coverage of the state-of-art and novel research directions to the researchers and academicians working in the area of system optimization.

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