

Guest Editorial Preface

Special Issue on Challenging Research Issues in Big Data Analytics and Applications

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Big data analytics, an indispensable technology that has gained pivotal attention due to the large-scale digital transformations which has taken over the society over the past few years. A kind of data revolution is being witnessed which has led to data emerging, surging, and serving as an important asset for any economy. Data is originating, evolving, and being emulated every minute from diversified sources like applications, websites, social media, smart sensors, etc., encompassing domains like industry, banking, healthcare, finance, education, environmental management, and many others, touching almost every aspect of life leading to the collection of data to an elusive and enormous scale. This data, if harnessed efficiently can provide revolutionary breakthroughs regarding the future course of actions creating high impetus in almost every walk of human life. The traditional data analytical techniques do not qualify to handle this large-scale data efficiently and effectively. Therefore, advanced analytical techniques, algorithms, and frameworks are obligatory to review and analyze the massive datasets with morass of hidden inherent, important information. Thus, the opulence and immensity of data has opened unprecedented research avenues for researchers and scientists to convert this raw data into meaningful insights (gold nuggets). The goal of this special issue is to present novel solutions to challenging technical problems arising in a few significant applications in the arena of Big data in an introspective and prospective manner.

This special issue implicates 5 papers that present in-depth and coherent research results and detailed discussions on challenging issues in various use cases of Big Data. Each of these papers have been critically reviewed through full double-blind peer review process, before their final inclusion into this special issue. This special issue profoundly fulfils the need for stimulating research in this field taking an initial progressive step towards advancing the research in establishing more advanced algorithms and techniques to overcome research challenges in extracting knowledge out of Big Data in a multitude of applications.

The first contribution is “Cognitive Analytics for Rapid Stress Relief in Humans Using EEG Based Analysis of Tratak Sadhana (Meditation)- A Big data Approach” in which Kamthekar et al. report the effect of Tratak Sadhana (meditation) on humans using electroencephalogram (EEG) signals by analyzing various non-linear parameters like Approximate entropy, Wavelet entropy and Higuchi’ fractal dimensions to assess the variations in EEG in both the states of rest (i.e. with eyes closed) as well as during Tratak Sadhana meditation. The experimental study has been carried out on 6 human

subjects with respect to the 4 brain lobes. The results show a significant noteworthy difference in the values of these non-linear parameters establishing the fact that concentrative meditation called Tratak Sadhana has a profound and prominent effect on achieving rapid stress relief in humans. This paper paves the way for further classic and contemporary research in developing new models to support meditation therapy data collection, integration, and analysis on large number of subjects to enhance the efficacy of such models.

The second contribution viz. “Enhancing Security in a Banking Environment Using Business Intelligence” by Mathur et. al. re-addresses a very important issue of Big Data, i.e. security of data in data warehouses which are the most valuable assets of any organization for critical business and decision-making purposes. This article, through implementation and enthralling results proposes to use a “blowfish encryption algorithm” to enhance the security of data in data warehouse. In the future, the authors propose to incorporate even more promising security parameters in this research for enhancing the security of the data warehouses.

In another contribution, scilicet “Colorizing and Captioning Image using Deep Learning Models via IOT Deployment Tools” by Krishnamurthi et al. works on using and creating an efficient neural network model for colorizing images and transporting them to remote systems through IoT deployment tools. This article also proposes a deep leaning model for captioning of an image using bi-directional LSTMs and Inception V3 with accuracy close to fifty percent. The article deploys the models for colorization and captioning the images to remote systems by employing Docker and AWS Greengrass and further deciphers comparative analysis of both. Thus, this article presents a bridge between the fields of neural networks and Internet of Things (IOT), paving the way for other researchers to carry on the prolific work.

The next contribution is named: “Efficient Pixel-Value Differencing-based Hybrid Steganographic Method using a Modulus Function” by Malik and Gandhi have projected a new hybrid steganography scheme which works in two phases to increase the embedding capacity along with stego-image quality. This research work is based on existing Pixel-Value Differencing (PVD) method which is an established method in the field of steganography. The experimental results have also manifested that the proposed hybrid steganography scheme has significantly improved both embedding capacity and stego-image quality when compared to other relevant PVD-based steganographic methods.

In the last contribution, Gandhi and Ghose have proposed a stable differential evolution parent selection fitness function (DE/EI) based on entropy, stability, and accuracy in their article: “DE/EI A New Differential Evolution Selection Operator Based on Entropy and Index for Feature Ranking” for the purpose of feature ranking. The results have been evaluated using two different classifiers viz. Support Vector Machine (SVM) and Naïve Bayes (NB) and three different stability measures viz. Jaccard Index (JI), Adamic Adar (AA) and Modified Cosine Index (MCI) corroborate its performance. For future work, the authors would like to develop a parent selection function for benchmark optimization functions.

In summary, the goal of this special issue is to render a groovy glimpse of how Big Data algorithms and techniques are being used to provide promising solutions to ranging applications in every sphere of life spanning from personal to commercial benefits. The papers give us a clear proof that Big Data tools and technologies would continue to be one of the coveted and sought-after topics for research incorporating supporting applications. The prospective further research is believed to be inculcating innovative practices and directions in this rapidly emerging discipline in a promising and prolific manner.

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Guest Editors

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