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## Preface

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**Biographical notes:** Vishal Bhatnagar holds BE MTech and PhD in the Engineering field. He has more than 21 years of teaching experience in various technical institutions. He is currently working as Professor in Computer Science & Engineering Department at Netaji Subhash University of Technology East Campus (Formerly Ambedkar Institute of Advanced Communication Technologies & Research), Delhi, India. His research interests include Data-Mining, Social Network Analysis, Data Science and Big Data Analytics. He has to his credit more than 134 research papers in various international/national journals, conferences and Book Chapters. He is currently working as Associate Editor of few Journals of IGI global and Inderscience.

He has to his credit experience of handling special issues of Many Scopus, ESCI and SCIE Journals. He has also worked as editor of many edited books of Springer, IGI global, CRC press to name a few.

Ahmad Taher Azar has received the MSc degree in 2006 and PhD degree in 2009 from Faculty of Engineering, Cairo University, Egypt. He is a research associate Professor at Prince Sultan University, Riyadh, Kingdom of Saudi Arabia. He is also an associate professor at the Faculty of Computers and Artificial intelligence, Benha University, Egypt. He is the Editor-in-Chief of *International Journal of System Dynamics Applications (IJSDA)* and *International Journal of Service Science, Management, Engineering, and Technology (IJSSMET)* published by IGI Global, USA. Also, he is the Editor-in-Chief of *International Journal of Intelligent Engineering Informatics (IJIEI)*.

Kavita Taneja is an Assistant Professor at Panjab University, Chandigarh. She obtained her PhD degree in Computer Science and Applications from Kurukshetra University, Kurukshetra, India. She has published and presented over 60 papers in National/International Journals/ Conferences and has bagged best paper awards in many Conferences including IEEE, Springer, Elsevier, ACM and many more. She is reviewer of many reputed Journals and has been Technical Program Committee member of many conferences. She has also authored and edited computer books. She has more than 18 years of teaching experience in various Technical institutions and Universities. She is also member of Board of Management, Academic Council and Board of Studies of many Universities and Institutions. She has guided scholars of PhD/MPhils and PG students of various universities and currently four students are pursuing PhD under her guidance at Panjab University. Her teaching and research activities include mobile ad hoc networks, simulation and modelling, image processing, recommender system and wireless communication.

Raju Ranjan is a Professor in School of Computing Science and Engineering at Galgotias University, India. He received his PhD in the area of Data Mining from Uttarakhand Technical University, Dehradun, India. He also earned his MTech. in Computer Science from JRN University, Udaipur, India. He is Master in Physics from Magadh University, Bodh Gaya, India. Earlier, he worked in Greater Noida Institute of Technology, Graphic Era Institute of Technology (Now Graphic Era University, Dehradun), Ideal Institute of Technology, Ghaziabad and Priyadarshini College of Computer Sciences also. His research interests include database, data mining and cyber security. He has been in teaching for over 20 years. He has guided under-graduate and post-graduate students in various research projects of Databases, Computer Graphics, Networking and Cryptography.

COVID-19 – the greatest global crisis since World War II and the largest global pandemic since the 1918–1919 Spanish Flu is upon us today. With its outbreak, lockdown has been instigated in most of the part of the world. For mental well-being, amidst rising anxiety and isolation, special issue entitled ‘Intelligent computational technologies for COVID-19 prediction’ under *Inderscience* is proposed to provide a platform to showcase integration computational techniques for prediction of COVID-19, life post pandemic and related changes in society.

The focus of this special issue is to provide the latest advancements in the computational technologies to tackle problem domains due to COVID-19. Researchers, academicians and engineers have submitted their research work which will enlighten

other researchers and provide the world with new and improved methodologies to bring world back to normalcy. Original research works from the area of Artificial Intelligence, Natural Language Processing, Convolutional Neural Network, Genetic Algorithms and Machine Learning predominately reflect the widespread need and urgency of integrating these computational technologies for tackling the global crisis. The aim of the special issue is to provide quality publications with innovative ideas and implementation of methodologies to fight COVID-19 at multi levels.

Everybody is looking at the daily rise of the death toll and the rapid, exponential spread of this novel strain of the virus. Besides the race to restrict the COVID-19 spread, scientists are working as quickly as possible to uncover effective treatments. The Coronavirus pandemic has spurred interest in evolving computational technologies as intelligent constituent equipped with Artificial Intelligence, Natural Language Processing, Convolutional Neural Network, Genetic Algorithms or Machine Learning to track the spread of the fast-moving pathogen and to plan disease prevention efforts and other emerging domains. Companies and governments worldwide are tapping the location data of millions of internet and mobile phone users for clues about how the virus spreads and whether social distancing measures are working. Unlike surveillance measures that track the movements of particular individuals, these efforts analyse large data sets to uncover patterns in people's movements and behaviour over the course of the pandemic. The main focus of this special issue is to provide the latest advancements in the related problem domains of COVID-19 and usage of intelligent computational techniques for solutions.

This special issue is a collection of six papers which are written by eminent professors, researchers and Industry people from diverse research areas. The papers were peer reviewed by the spectrum of reviewers, editorial board members and industry people with assorted expertise.

The paper, 'Optimal path routing in WMNs: HGAB3C based approach', implemented a new approach for routing in Wireless Mesh Networks (WMNs). The approach is based upon Hybrid Genetic Algorithm Big Bang- Big Crunch (HGAB3C) adapted for finding optimal path. The proposed algorithm can also be used effectively in isolation wards of COVID-19 hospitals and quarantine centres where robots can be networked for communications between patients and doctors. GA is used for global optimisation and BBBC is used for fine tuning (local optimisation). We used this proactive routing approach to find the optimal paths in dynamically created Wireless Mesh Network of client nodes. The approach is implemented in MATLAB and its performance is evaluated with different architectural scenarios from 1000 nodes to 10000 nodes WMNs with a step increase of 1000 nodes. The proposed approach promises to find optimal path maximum times as compared to all other algorithms, indicating the superiority of HGAB3C amongst the 10 competing algorithms.

The paper, 'Modified COVID-19 Indian and international dataset for automatic prediction of risk in an individual using machine learning models using a mobile APP' adopts five machine learning models intended to predict the risk of having COVID-19. COVID-19 is a major problem not only impacting the health but also the economic development of countries around the globe. Therefore, automatic COVID-19 diagnosis and risk prediction in an individual is very significant in preventing pandemic and also for proper medication. The existing datasets- the Indian COVID-19 dataset and the International COVID-19 Dataset have been systematically modified to include negative COVID-19 patient data and also facilitate feature learning in this paper. The modified

datasets are experimented with models like Logistic regression, Naive Bayes, k-nearest neighbours, Random Forest, and Neural Network. Further, paper presents comparison of these models on the basis of score obtained in prediction on the two datasets. The model is also implemented as a Mobile Application to be used in real-time for facilitate common man to tackle COVID-19 at fingertip.

The paper, 'Neural network and NLP based chatbot for answering COVID-19 queries' emphasised that during the COVID-19 pandemic, people across the world are worried, a bit panicking but most importantly they are highly concerned. The study and research it was to help the society by providing a digital solution to this problem which was a chatbot through which people can self-evaluate their safety. In this paper, a chatbot for answering queries related to COVID-19 is proposed. Various Natural Language Processing algorithm has been used to process dataset. By Artificial Neural Network, the model is created and it is trained from the processed data, so that appropriate response can be generated by our chatbot. Assessment of the chatbot is done by testing it with a hugely different set of questions, where it performed well. Also, with additional data, accuracy is likely to increase as we have used Neural network. It has been noticed that making people aware of COVID-19 and making them aware of its symptoms has helped people all around the globe to stay active and alert the authorities if there is a matter of doubt if a person has COVID-19 or not.

The paper, 'COVID-19 drugs invention using deep neural network models: an artificial intelligence approach', proposed four different deep neural networks based models (Bi-Directional LSTM (Long Short Term Memory) with Attention, CGVAE (Constrained Graph Variational Autoencoders), EENN (Edge Memory Neural Network) and CMAP (Connectivity Map) based deep neural network (DNN)) for usage in drug invention of highly effective lead molecules for the disease COVID-19. The models have been evaluated on three differing metrics based on the generated lead molecule–Validity, Uniqueness and Originality.

The paper, 'Mental health issues and sleep quality of Indian employees and higher education students during COVID-19 lockdown', is presented to assess the mental health difficulties and influence of lockdown stressors among employees of the government sector and private sector and Indian higher education students during the COVID-19 lockdown. The basic demographic, sleep GAD (generalised anxiety disorder), PSS (perceived stress scale) and sleep quality, data from 676 participants using a web-based cross-sectional survey is included. Lockdown stressors have a significant correlation with GAD and PSS. It is highlighted that the increased usage of mobile phones has a significant association with sleep latency and sleeps quality and is a subject of concern. Good sleep quality contributes to the sound mental and physical health. The study presented suggests the importance of a sophisticated application based continuous centralised monitoring and alerting system to help healthcare providers address the challenges at an early stage.

The paper, 'Convolutional neural network based SARS-CoV-2 patients detection model using CT images', presented Convolutional Neural Network (CNN) based classification model for recognising a Computed Tomography (CT) image of patient and classifying it as COVID or non-COVID. The dataset consists of variable sizes CT images that are a challenge for building a CNN model. This paper also analyses the CNN models built using three different solvers such as Adaptive Moment Estimation (Adam) optimiser, Stochastic Gradient Descent with Momentum (SGDM) optimiser, and Root Mean Square Propagation (RMSProp) optimiser. Among the three CNN models, for CT

image-based classification for infected or non-infected patient, Adam optimiser performs better than RMSProp optimiser and SGDM optimiser.

Last but not the least, the guest editors of the special issue 'Intelligent Computational Technologies for COVID-19 Prediction' would like to thank all the authors and researchers who considered this special issue as a platform for presenting the novel ideas pertaining to usage of intelligent technologies in COVID-19 prediction which is need of hour during pandemic. This would help society to come up with innovative ideas and thoughts considering submissions in prestigious journal *IJIEI* their valuable research. Also, we would like to acknowledge the wholehearted contribution of the reviewers without which the timely completion of the special issue would have been dream and providing positive and valuable observations to the authors. Finally, the guest editors would like to personally thank the Editor-in-Chief of *International Journal of Intelligent Engineering Informatics (IJIEI)*, Professor Ahmad Taher Azar first for his accepting our proposal with the theme on COVID-19 prediction and always standing with us with valuable guidance and support which resulted in timely completion and quality publication of the special issue.

We wish all our readers and their family members good health and prosperity.