Guest Editorial Preface
Special issue on eHealth Technologies to Deal With the COVID-19 Pandemic

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This special issue of the *International Journal of E-Health and Medical Communications* (IJEHMC) is on "eHealth Technologies to Deal With the COVID-19 Pandemic." The special issue is a set of seven papers selected after peer-review from the multiple papers received as the response to an open call for papers attracting submissions from eminent researchers, academicians, and practitioners worldwide. We take this opportunity to profoundly appreciate all the reviewers for their work reviewing the papers for this issue.

The final themed issue combines seven papers selected after the rigorous peer-review of each of the papers received. These papers present innovative approaches utilizing various eHealth technologies to diagnose COVID-19 in a patient or model the COVID-19 infection spread in the population. These papers survey the state-of-the-art developments in the literature and propose novel intelligent methods approaches to deal with the COVID-19 pandemic. This special issue primarily covers COVID-19 research, which needs to be available to researchers and academicians as soon as possible. The special issue contributes to satisfying the need for immediate solutions to contain the spread of COVID-19 through information exchange and analysis. These solutions can also be adopted for tackling future epidemics.

The first paper title is "HuDA_COVID: Human Disposition Analysis During COVID-19 Using Machine Learning". The authors are Charu Gupta (Bhagwan Parshuram Institute of Technology, Delhi, India), Dev Gaur (Bhagwan Parshuram Institute of Technology, Delhi, India), Prateek Agrawal (Lovely Professional University, Punjab, India), Deepali Virmani (Bhagwan Parshuram Institute of Technology, Delhi, India). They proposed a Human Disposition Analysis method during COVID-19 using machine learning (HuDA_COVID), where factors such as age, employment, addiction, stress level are studied for human disposition analysis. A mass survey is conducted on individuals of various age groups, regions & professions, and the methodology achieved varied accuracy ranges of 87.5% to 98%. HuDA_COVID indicates a need for a methodical approach towards the human psychological needs to help the social organizations formulating holistic interventions for affected individuals.

The second paper title is "Utilisation of Transfer Learning Model in Detecting COVID-19 Cases From Chest X-Ray Images". The authors are Malathy Jawahar (Leather Process Technology Division, CSIR-Central Leather Research Institute, India), L. Jani Anbarasiad Prassanna Jayachandran (School of Computer Science and Engineering, Vellore Institute of Technology, Chennai, India), Manikandan Ramachandran(School of Computing, SASTRA University, India) and Fadi Al-Turjman (Artificial Intelligence Department, Near East University, Turkey. The authors propose a hybrid algorithm integrating the robustness of MobileNet (using transfer learning approach) and Support Vector Machine (SVM) to analyse patients' chest X-Ray images to diagnose COVID-19. They evaluated their approach using a dataset of 535 chest X-Ray images of healthy and infected patients and achieved a 95% classification accuracy.

The third paper is titled "Time-Series Forecasting and Analysis of COVID-19 Outbreak in Highly Populated Countries: A Data-Driven Approach" and authored by Arunkumar P.M. (Karpagam College of Engineering, India), Lakshmana Kumar Ramasamy (Hindusthan College of Engineering and Technology, India), and Amala Jayanthi M. (Kumaraguru College of Technology, India). The paper compared the COVID-19 spread in six countries Brazil, China (Hubei), India, Indonesia, Pakistan, and the USA, proposed a novel COVID-19 outbreaktime-series forecasting approach using Auto-regressive integrated moving average (ARIMA) model, and analysed the various hyperparameters. The findings are significant for analysing the impact of government measures to manage COVID-19 spread.

The fourth paper's title is "Binary Classification of COVID-19 CT-Images Using CNN: COVID Diagnosis Using CT". The authors are Shankar Shambhu (Chitkara University, Himachal Pradesh, India), Deepika Koundal (Department of Virtualization, School of Computer Science, University of Petroleum & Energy Studies, Dehradun, India), Prasenjit Das (Chitkara University, Himachal Pradesh, India) and Chetan Sharma (Chitkara University, Himachal Pradesh, India). They proposed a novel approach to analyse computed tomography (CT) images of the respiratory system to diagnose COVID-19 using convolutional neural network (CNN) deep learning binary classification algorithms. They achieved an accuracy of 86.9% while evaluating their proposed approach with a dataset of 746 CT images of patients having COVID-19 related symptoms.

The fifth paper, titled "Artificial Intelligence for Novel Corona Virus (COVID-19) Pandemic," by Ayesha Ahmed and Prabadevi Boopathy from Vellore Institute of Technology, Vellore, India, and Sudhagara Rajan S. from Jain University, Bangalore, India, is a state-of-the-art survey of applications of artificial intelligence (including machine learning and deep learning) in COVID-19 management. It also analyses the impact of the COVID-19 pandemic on lifestyle and economy through a case study. The paper also proposes a blockchain with an edge computing-based secured framework to manage the data related to COVID-19 patients. The authors also identify challenges faced while developing and applying artificial intelligence approaches in managing the COVID-19 outbreak, including AI algorithms' performance, data collection, availability, storage, privacy, security, and reliability concerns. Furthermore, the authors discuss how the COVID-19 pandemic might become an opportunity to accelerate the AI health care revolution and Industry 5.0.

The sixth paper titled "Comparison of Active COVID-19 Cases per Population Using Time-Series Models" is authored by Sakinat Oluwabukonla Folorunso (Olabisi Onabanjo University, Ago Iwoye, Ogun State, Nigeria), Joseph Bamidele Awotunde (University of Ilorin, Ilorin, Nigeria), Oluwatobi Oluwaseyi Banjo (Olabisi Onabanjo University, Ago Iwoye, Ogun State, Nigeria), Ezekiel Adebayo Ogundepo (Data Science Nigeria) and Nureni Olawale Adeboye (Federal Polytechnic, Ilaro, Ogun State, Nigeria). It offers a novel analysis of various deep learning, and statistical time-series approaches for forecasting daily COVID-19 active cases in Nigeria's all the thirty-six different states and the Federal Capital Territory. The authors used two publicly available datasets for studying the prediction performance of each of the models. They found the Auto-Regressive Integrated Moving Average (ARIMA) outperformed other models.

The seventh paper is titled "Semantic Pattern Detection in COVID-19 Using Contextual Clustering and Intelligent Topic Modeling" and authored by Pooja Kherwa and Poonam Bansal (Maharaja Surajmal Institute of Technology, India). It proposes a novel approach to present semantic patterns in the available literature of Covid-19 based on contextual clustering and intelligent topic modelling using pointwise mutual information and log-frequency biased mutual dependency. The study analyzed a collection of 21323 articles published on Covid-19 till on 21st May 2020from WHO-Covid-19 Database using latent semantic analysis with three-level weights at term, document, and corpus level and intelligent latent Dirichlet allocation topic modelling techniques to find the topics in the dataset.

These papers review the state-of-the-art eHealth technologies to address global health concerning the COVID-19 outbreak. These papers also highlight opportunities to excel in medical technology (MedTech) development and challenges the researchers and developers face in developing artificial health intelligence solutions. These papers also offer novel solutions utilizing mainly artificial technology such as deep learning, clustering, image analysis, time-series analysis machine learning techniques to diagnose COVID-19 and examine and forecast the outbreak. All these innovative

techniques are evaluated using empirical data and supported by the theoretical and mathematical framework. The research presented in the special issue will also enhance our understanding of COVID-19 and its spread, trends, and equip us with novel tools to better diagnose the disease and manage the pandemic.

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