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COVID-19: Healthcare Sector Focused Multi-Disciplinary Opinions on Global Pandemic

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Abstract

COVID-19 pandemics have affected the life of every human being in this world dramatically. The daily routine of the human has been changed to an uncertain extent. Some of the people are affected by COVID-19, and some of the people are in fear of this epidemic. This has completely changed the thorough process of the people, and now, they are looking for solutions of this pandemic at different levels of the human addressable areas. These areas include medicine, vaccination, precautions, psychology, technology-assisted solutions like information technology, etc. There is a need to think in the direction of technology-compliant solutions in the era of COVID-19 pandemic. In this paper, the opinions, directions, measures, and innovative aspects have been discussed for the COVID-19 epidemic.

Keywords: COVID-19; SARS; MERS; CoV; IoT

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Introduction

The information about the spread of COVID-19 pandemic was circulated to the world in the last three to four months earlier of 2020. There are different opinions of the people across the world on the COVID-19 pandemic. These opinions focus on the origin, spread, and solution of the COVID-19. Healthcare is the prime area of concern affecting the daily life of everyone in this world. Despite the broader domain of the internet, still, there is a great need to invent the applications that benefit human health. The development of wearable devices, smartphones, and sensors adds another feather in the healthcare domain. Nowadays, the field like the Internet of Things (IoT) being given due consideration as it provides solutions to our daily life concerns. IoT can serve as a benchmark for the revolutionary change in the healthcare sector too. The successful implementation of IoT technology in the healthcare sector will result in faster and safe preventive measures, lower medical cost, and improvised patient-centric practice and sustainability. Till date, enabling healthcare and medical technologies with IoT is still a significant challenge due to a lack of cost-effective and accurate sensors, IoT security, and standardized architectures. Taking in consideration the user's perspective, the successful IoT implementation rigorously requires factors like an interoperable IoT environment for care delivery and research, tightly coupled health data mining applications, adequate data, and knowledge standards of self-empowerment along with the sound clinical decision-making foundation. In the near future, IoT enabled healthcare systems

will surely ease the doctors to have rich patient's information repository with advanced sensing and monitoring solutions like E-clinical Information Systems. The primary motto of the exclusive discussions on COVID-19 is to show state-of-art research and applications in the field of the healthcare system through technology-compliant solutions like IoT, etc. There is an utmost need to investigate the novel IoT solutions to meet the broader demand of the global healthcare segment.

Related Work

The outbreak of the COVID-19 pandemic has been realized by the people in the world last three to four months back. The spread of this COVID-19 reaches a very high infection in different parts of the world. The major efforts reported by the researchers and scientists across the globe are as follows. The adaptability of anti-inflammatory drugs for the treatment of coronavirus patients in China was reported by Zhang et al. [1]. This includes the opinions and efforts of immunologists from China and their participation in multi-rounds with teams of interdisciplinary areas. These disciplines include people from the medical science and engineering fields. The idea of immune system has been extracted from the data of discharged patients from the Chinese leading PUMC Hospital. Rothana et al. [2] reported coronavirus (CoV) disease (COVID-19) as the successor of severe acute respiratory syndrome (SARS)-CoV and Middle East Respiratory Syndrome (MERS)-CoV. The SARS and MERS were a severe threat

to public health in the past. The source of the spread of the coronavirus was exposed to the wet animal market in Wuhan city of China. The infection arises from the animal in the first instance, and it spread in humans from one to another. This leads to the transmission of the virus to the massive population in different parts of the world by the COVID-19 epidemic. The precautionary measures include special attention to the people of different age groups like children, young, and old. Special factors like symptoms, epidemiology, transmission, pathogenesis, phylogenetic analysis, and future directions have been addressed in reference [2]. The emergence of the CoV and its outbreak on the people of the world was reported from the challenges based aspect by Lia et al. [3]. Moreover, it was observed that most of the COVID-19 cases are being originated from China in reference [3]. The symptoms of the coronavirus lie in the disease like cough, fever, and pneumonia at the initial stage and further lead to difficulty in breathing and fatal effects on the human body. As of the 17 May 2020 report on the World Health Organization (WHO) website [4] has shown 4,494,873 confirmed cases of COVID-19, including 305,976 deaths globally. This shows the severe threat of the COVID-19 to the people of the world. An experimental-based investigation on a specific number of COVID-19 suspected people for the rapid diagnosis was reported in the reference [5]. This reveals the significance of the early detection of COVID-19 cases and reduces the further transmission of the coronavirus to the other peoples by means of isolation. This further allows the Government to adopt the policy on containment and non-containment zones. Another perspective to think of the COVID-19 using a data science perspective, as proposed in reference [6]. This is more than just analyzing the data but deals with the life of human beings. There is also a need to address the challenging issues like adaptability and affordability for healthcare services to the common people. Coronavirus, as a global concern, was presented by Kampf et al. [7] and affected the respiratory system of the people severely. As per reference [7], the transmission of coronavirus from humans to humans may take place in between two to ten days. The persistence of humans and virus on the inanimate surfaces like plastic, metal, and glass was reported. One viewpoint in the era of the COVID-19 pandemic dealt with the shortage of the supply and manufacturing of precautionary material like the mask and Personal Protective Equipment (PPE) across the world [8]. The recommendation for the manufacturing industries allied with the manufacturing of these materials is to fulfil the demands of different countries. This is a must for the industries to think in the direction of the manufacturing of such products for the local and global needs. In addition, the work can be carried out for the thermal disinfection of the mask without compromising the function of the filter unit [9,10]. This can help the reusability of the protected material like masks and PPE in daily life. In the direction of vaccination, an effort was reported in the reference [11], where an investigational analysis has been reported using Hydroxychloroquine and azithromycin as a treatment of COVID-19 on the specific number of patients of coronavirus. Perception of the COVID-19 for the scientific community was presented in the reference [12]. This revealed the concerns about the thinking of the researchers and scientists in the era of COVID-19 and the normal situation post this pandemic. The usefulness of the digital phenotyping and unstructured

data was demonstrated by Deboever et al. [13] to improve the disease related information for the community. The factors like population biobanks, genetic data, and high dimension phenotyping. The spread of the COVID-19 pandemic emerged the challenges for technological solutions, including IoT and Big data, to serve the community. The work on the challenges associated with Geographical Information Systems (GIS) and big data was proposed by Zhou et al. [14]. The concerns were raised for the GIS in terms of data acquisition and linkage of the associated data like homogeneous and heterogeneous to compute the resultant information [14].

Discussions, Challenges and Recommendations

The objective of this paper is to discuss the existing views and focus on the recommendations for the enhancement in the current situation from COVID-19. Based on the literature, perceptions, challenges, and viewpoints, the following opinions are suggested [15] to the research community for the prevention and elimination of global pandemic COVID-19. The research community irrespective of the discipline, focus on the following:

1. The comprehensive thought process for the designing of the internet of things (IoT) based solutions for healthcare applications used in the prevention from COVID-19.
2. Strategies for restricting the outbreak of COVID-19 with the emerging trends in E-healthcare applications. Which should be the optimal strategy to deal with a global pandemic?
3. Explorations on the data analysis as derived from the advanced data mining and warehousing associated with IoT. Besides, cloud-based technologies can be incorporated for the global spread of healthcare-related information to serve the community of different countries in the world.
4. The most adaptable method and technology can be deployed for the development of innovative solutions for COVID-19 related people like smart, patient-centric healthcare information systems.
5. The implementation of smart solutions like wearable technology for mask and PPE along with their disposal can be considered to deal with a global epidemic like COVID-19. This will lead to the manufacturing and incorporation of wearable technologies in the healthcare sector industries.
6. A Pervasive thought process can be standardized for dealing with global pandemics like COVID-19. In addition, research measures should be considered for the security and privacy challenges of IoT services carrying healthcare-related information.

These areas and directions are diverse but, in parallel, the need for healthy bonding and correlation between the people like researchers and scientists irrespective of their discipline. The discipline may vary from medical, engineering, computing, finance, and management, etc. In addition, standard protocols and interoperability measures can be worked out for the exchange of information in the global pandemic situations.

Conclusion and Future Remarks

In this paper, the opinions have been discussed in the multi-disciplinary areas of research like COVID-19 challenges, medicines and vaccines, precautionary measures, technology assistance, and the Internet of Things. These opinions and discussions serve as an integrated platform for researchers and scientists to think about future perspectives to deal with healthcare-related COVID-19 pandemic situations. This includes the original, significant, and visionary automation-based ideas, innovations, scientific designs, and applications focusing on Interdisciplinary technology compliant solutions like IoT, vaccination, manufacturing, preventive measures, etc. for the improvement of efficiency and reliability of existing healthcare systems. For the future, there is a dire need to strengthen the technology not only in one area but also for the interdisciplinary areas to recover from the pandemic situation rapidly and serve the community.

Disclosure of potential conflicts of interest

The Author declares that they have no conflicts of interest regarding publication of this manuscript.

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