

Chapter 18

Exploration of Computational Intelligence Insights and Data Analytics to Combat COVID-19

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ABSTRACT

COVID-19 is having a huge impact on the society around the world, causing a huge number of deaths, which is increasing day by day. All the countries are fighting against this global pandemic by working on vaccines, implementing complete and partial lockdowns to avoid the spread of virus. On the basis of the various literature surveys done by the authors, it is found that computational intelligence and data analytics can play a vital role in this pandemic and can be really helpful. This chapter explains how data analytics and computational intelligence can serve the world to combat COVID-19.

INTRODUCTION

There are around 7.8 billion people around the world. However, there is one major threat to the lives of all this population which is the disease that can be easily transmitted from one person to the other. Such diseases lead to pandemic. In the current year 2020, the world is experiencing a pandemic.

Corona virus Disease 2019 (COVID-19) is the disease currently causing the pandemic. This virus is caused by SARS-CoV-2, which affects the respiratory system of the human body and can also lead to death (Chan et al., 2020). This virus can easily spread from one person to the other making rapid increase in the infected rate. It is reported that COVID-19 has affected over 200 countries and millions of people got affected by it. Many people recovered from this disease but however there are many people who lost their lives due to COVID-19. The World Health Organization (WHO) has declared this COVID-19 outbreak as Public Health Emergency of International Concern (PHEIC).

DOI: 10.4018/978-1-7998-3053-5.ch018

Data analytics and Computational intelligence can be used in the pandemic situation for determining the patients with high risk, tracking the virus spread in the early stages and predicting the risk of mortality using the historical data of the patients. Artificial intelligence can be used for applications like medical help, awareness notification, screening, etc., Also it is found that these computational intelligence techniques has been applied in many countries and improvements are made as they are implemented (Vaishya, 2020).

The role of big data analytics comes into play when there is a need for huge data processing like prediction (Sivanandhini, 2020) (Rajesh, 2017) (Sandhya et al., 2020). In this pandemic like COVID-19 data analytics can be applied in the Analysis of Health records, tracking of travelling information about an individual, Government notices, report of affected cases all over the globe and predicting the cause and source of illness.

The main objective of this book chapter is to provide an overview of how computational intelligence applications are used in in different stages of COVID-19 treatment. This chapter also provide how the data analytics used in combating COVID-19.

BACKGROUND

Various pandemic like Plague of Galen, Black Death, Spanish flu, etc., have occurred before. All these pandemics were very severe. Plague of Galen which is also referred as Antonine plague erupted in 165 A.D. was very severe and caused millions of deaths. Black Death pandemic outbreak in 1346 also caused millions of deaths, so did Spanish flu pandemic outbreak in 1918 took the lives of millions of people (Srivastava et al., 2020). Currently Coronavirus Disease also known as COVID-19 which occurred in 2019 is declared a global pandemic. This pandemic is hugely impacting almost all the countries. Many people till now across various countries have lost their lives due to this COVID-19 pandemic.

Computational intelligence has been emerged as a significant technology in the field of healthcare and is applied in many medical applications in clinical diagnosis and clinical assessment. In this COVID-19 pandemic the technology of computational intelligence has many contributions in terms of products in combating the corona virus (Shi et al., 2020). The accessibility of data analytic tools in the healthcare has a significant transformation in personal medicine, epidemiology and medical operations (Allam et al., 2019).

WHAT IS COMPUTATIONAL INTELLIGENCE?

Computational intelligence is a part of artificial intelligence, which is used to understand the versatile approaches of human being like learning, understanding, thinking, recognition, etc., and empower them in real world. Computational Intelligence includes many computational paradigms that are differing from various intelligent systems. These computational intelligence methods play a vital in part in increasing learning ability and agility. Some of the major applications of computational intelligence include fuzzy systems, neural networks, evolutionary algorithms, etc.

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