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A review of Deep learning methods in the study, prediction and management of COVID-19

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Abstract— **Artificial intelligence has been considered one of the branches of computer science in the world, especially in Iran, for many years and has led to significant changes in medicine. Today, the scope of artificial intelligence has expanded to the point that it can be used in all areas of medicine, such as diagnosis, treatment, and prediction. In this article, after a brief overview of the application of artificial intelligence and deep learning models, the application of these systems in the field of COVID - 19 prediction is discussed. First, the method used by artificial intelligence algorithms for prediction is explained. In the prediction phase, the algorithms extract patterns from the data after learning the COVID 19. They are then able to identify the COVID - 19 from new samples. We hope that this article will be attractive and helpful for researchers, professors, and students of medicine and artificial intelligence to get familiar with this science and solve complex problems effectively.**

Keywords: Covid-19, Deep Learning, CT, artificial intelligence

I. INTRODUCTION *(HEADING 1)*

Since the beginning of 2020, coronavirus disease 2019 (COVID -19) has spread rapidly worldwide. Chest CT is proving to be a proper diagnostic technique in the management of COVID -19. Artificial Intelligence (AI) can assist in the rapid screening of CT scans for COVID -19 findings to differentiate from other clinical entities. It would be ideal if COVID -19 could be automatically and accurately detected using chest CT [1.2]. Early diagnosis of COVID -19 using a chest CT allows patients to receive timely therapy and helps prevent the spread of the disease [3].

For scientists, medical professionals, and policy makers, determining the accuracy of COVID -19 cases is a problem. As of April 23, 2020, there have been 2.7 million verified cases, about 190,000 people have died, and over 750,000 have been reported as recovered. However, there is no publicly available information on diagnoses that could miss infections. False-negative tests could contribute to confusion and increase concern [4]. Several artificial intelligence-based systems have been developed for the automatic identification of COVID -19 from chest x-ray. In this paper, we review the different methods for detecting COVID -19 and the problems we face. Several deep learning architectures such as ResNet, Inception, Googlenet, and others detect COVID -19.

These methods detect pneumonia in humans, because it is difficult to tell whether the pneumonia is caused by COVID - 19 or by another bacterial or fungal infection.

II. METHOD

A literature search was performed in Medline, PubMed, Science Direct, and Google Scholar, evaluating detecting covid-19. In many resource-limited healthcare settings, chest radiography provides a rapid and generally inexpensive imaging modality. Unfortunately, there is a lack of radiological expertise in these areas, making interpretation of these images impossible. An artificial intelligence (AI) system could be a helpful tool for radiologists or the medical team when radiological knowledge is not available [6]. Deep learning has been used to detect bacterial and viral pneumonia on chest x-ray of children [7].

It helps in early detection and treatment using digital techniques and decision science and provides the best education to students and professionals on this new disease [8].

Currently, efforts are being made to develop new diagnostic techniques based on machine learning algorithms. For example, using a CRISPR-based virus detection system, machine learning-based screening of SARS-CoV-2 assay