Chapter 14
State-of-the-Art Review on the Models, Techniques, and Datasets to Diagnose COVID-19 Disease

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ABSTRACT

The present corona virus disease outbreak of 2019 is a rapidly spreading illness caused by the novel serious acute respiratory syndrome coronavirus2 (SARS-Cov2). France has the highest rates of infection, morbidity, and mortality, and is among the nations most impacted by the disease, along with the United States, India, Brazil, and Russia. Since early January 2022, thousands of articles have been published on COVID-19. The majority of these articles agreed with descriptions of the mode of transmission, spread, duration, and severity of the illness; models or techniques used to diagnose the COVID-19 disease; and vaccine status in various locations. Thus, this review completely discusses the highest analytical aspects of COVID-19, including various classification, segmentation, prediction, and feature selection techniques to diagnose, detect, and predict the Covid-19 disease. This review chapter will surely help researchers to choose the techniques and datasets for effective diagnosis and evaluation.

INTRODUCTION

The COVID-19 pandemic, which began in the year 2019 in Wuhan, Hubei Province, China and has since spread to most parts of the world, is caused by the SARS (Cov2.1) virus. Through droplets or direct contact, the infection is competently spread from animal to human and human to human (Margusino-framiñán et al., 2021). The COVID19 pandemic has powerful effects on individuals' movement and interactions. COVID19 has been found to have a significant influence on people's travel tendencies for fundamental and non-fundamental trips. According to the McKinsey Center for Future Mobility, a particular mode of transportation is currently pandemic (Rahman et al., 2021). Prior to COVID-19 and similar disruptive conditions, people's travel mode options for commuting, business, and individual trips were heavily influenced by travel time, cost, and convenience. During this pandemic, decreasing the exposure of infection has turn into the fundamental deliberation for people when resolving on their form of transportation. As a result, the use of individual automobiles, walking, cycling, and contributing micro mobility has outpaced the benefit of distinct modes of common transportation (Fagbola et al., 2022).

COVID-19 is known to be carried from one individual to another, which is the pandemic's present method of dissemination. Covid19 patients infected those in close proximity. However, because multiple Patients with COVID-19 can act as carriers even when they have no symptoms and may have accidentally disseminated the virus to others (Rahman, Abdulateef, & Aziz, 2021). The research articles that have previously been published will be covered by this review. We desire to provide all data pertaining to different classifications, segmentation, prediction, and feature selection techniques such as CNN, VGG-19, CheXNet, various deep learning models, Resnet50 hybrid models, transfer learning, Classic U-Net, VB-Net, and the Decision Tree algorithm in a specific location, while demonstrating the COVID19 computerized diagnostic in x-ray and CT pictures, ultrasound and radiographic images of the lungs, and detecting the COVID-19 disease. The core objective of this review paper is to comprehensively outline the streamlines of the prior research, compile every set of data that is accessible for lung CT, x-ray, ultrasound, and radiographic pictures, and list the most popular techniques for autonomously diagnosing COVID19 from medical pictures. Researchers can choose the techniques and datasets for effective diagnosis and evaluation of COVID 19 in their research work. We organized our paper as follows:

- Section 1 describes the introduction to COVID19 and the aim of this paper.
- The literature review and gaps found are described in Section 2.
- Section 3 includes the techniques and methods used in the existing papers.
- Section 4 will categorize and analyze the various methods, techniques, datasets, image types, and applications of the existing methods.
- Section 5 includes conclusions, recommendations, and future work to help the new researcher find potential COVID-19 detection work in the future.

BACKGROUND

Zhang et al. (2020) proposed a Covid19 Classification model. It has been proposed to use Deep learning in chest x-ray pictures. The benefit of artificial intelligence enables the rapid perception of chest X-ray pictures and the identification of ill people. The experiment results are promising for the use of computer-supported pathology (Doshi et al., 2023). It can also be used when other options, such as RT-PCR assays,

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