DEEP TRANSFER LEARNING MODEL FOR COVID-19 PNEUMONIA CLASSIFICATION USING MEDICAL IMAGE DATA ON LOW COMPUTATIONAL POWER DEVICES

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Abstract

Coronavirus Disease, also known as COVID-19, is an infectious disease that was first found in December 2019 in Wuhan, China. Following that, the virus swiftly spread over the world, eventually affecting 221 nations and territories, and being named a global pandemic by the World Health Organization. This virus has had a devastating effect on the world, not just in terms of health, but also in terms of economy, the environment, and social issues, and has become this century's most significant health disaster.

In this pandemic condition, most researchers are concentrating their efforts on using Machine Learning and Deep Learning to diagnose COVID-19. Despite the fact that the RT-PCR test is the most common approach for diagnosing COVID-19, it has been discovered that in many cases, this test fails to predict infected people due to its low sensitivity. As a result, researchers are increasingly turning to medical image data such as CT scans, X-rays, and ultrasounds in their studies as an alternative to the RT-PCR test for diagnosing COVID-19-infected patients with the help of Machine Learning and Deep Learning algorithms In this paper, a Deep Transfer Learning approach , use pre-trained CNN model MobileNetV2 is proposed to distinguish COVID-19 Pneumonia patients from Regular Pneumonia Patients and Healthy people, taking into account high accuracy and sensitivity, as well as the ability to run the final outcome on Mobile Devices or any device with low computational power. In this study, CT scan and ultrasound medical image datasets were gathered from publicly available sources were used. With near-zero false negative rates, this model obtained roughly 98 percent accuracy for the CT Scan dataset and 97 percent accuracy for the Ultrasound Image dataset. In terms of performance, this model was deployed as a mobile application in Android Studio using a virtual Android phone with 2GB RAM and as a web application in Amazon EC2 with smaller configurations such as 2GB RAM and 1CPU. Both applications performed admirably, with predictions arriving in less than 2 seconds.