Machine Learning Approach for Designing and Development of Risk Level Indicator for Patients with Lung Diseases

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Declaration

I hereby declare that to the best of my knowledge, this submission is my own work and it neither contains direct material previously published nor written by another person or material, which to substantial extent, has been accepted for the award of any other academic qualification of a university or other institute of higher learning except where acknowledgement is made in the text.

Certified by

Signature :

Date   :   10th December 2021

Name of Supervisor I   : Ms.Anjalie Gamage

Signature   :…………………………………….

Date   :…………………………………….

Abstract

"Lung disease" as a medical term, discusses as several disorders that affects both lungs. There are different types of lung disease like asthma, lungs infections like Influenza, Pneumonia, Tuberculosis, and numerous other types of breathing problems including Lung cancers. These lung diseases can be the main reason for failure in breathing. Due to COVID19 pandemic, Pneumonia and COVID19 were highlighted mostly as fatal diseases. Many clinical studies highlighted most of the patients suffering from Coronavirus Disease 2019 (COVID-19) are extra capable to trigger lung infections. Pneumonia and COVID-19 are fatal diseases if it not detected on time. COVID-19 is triggered by new Corona virus, was called as Severe Acute Respiratory Syndrome COronaVirus2 (SARS-CoV-2). Newly identified this disease has caused many deaths and confirmed detections reported worldwide, followed with a greatest risk to community wellbeing, especially for patients with lung diseases. Process of developing a clinically accepted vaccine or specific therapeutic drug for this disease are not finalized, which will contribute to the expansion of actual prevention action plans. If it diagnoses at the right moment lots of lives will be saved. Thus, methods to identify lung illness accurately and efficiently is important for timely treatment of lung disease patients, distribution of medical resources and administration of hospital in the event of an outbreak.

Existing techniques of identifying COVID-19/Pneumonia, such as PCR tests are not notional, cost-effective, perfect, affordable and speed because the current rate of the eruption of arising coronavirus is improving highly. Therefore, a speedy and definite techniques for the identification of viral inflammations in bio fluids has become a forefront technique to apparatus the spread of this fatal virus. Tests like Real-time polymerase chain reaction (RT-PCR) and PCR test are also very sensitive methodologies, [9] but, still has doubt about the accuracy level of these tests. Therefore, the precise method for PCR is critical. And some people don't like to face PCR tests because of the physical pain happens when testing.

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Normally chest radiography (chest x-ray) is a cheap technique of detecting these diseases when compared to PCR tests. In developing countries there's lack of facilities. Because of that time which takes to do a PCR test takes too long. Then the patients who faced those tests must wait several days for their medical report without knowing the actual result. In that case patients must patiently wait for days and it's stressful. These facts create a background for new innovations in detecting lung diseases to identify those diseases using chest x-ray imageries.

Proposed solution will easily and precisely detect the risk level of patients with these two lung diseases Pneumonia and COVID19 using an app with chest radiography, which is considered as a cheap, easy to access and speedy manner. Proposed solution will identify, classify several stages of Pneumonia, and evaluate the risk level of the patient suffering with the use of Image Processing, Deep Learning and Convolutional Neural Networks. So, anybody who use the proposed solution may have the ability to have a precious decision about own medical condition accurately, quickly with low cost.

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List of Abbreviations

Term	Definition
WHO	World Health Organization
PCR	Polymerase chain reaction
CNN	Convolutional Neural Network
CXR	Chest X-ray
CT	Computed Tomography
API	Application Programming Interface
LUNGSRI	Lungs Risk Indicator Mobile Application
User	Someone who interacts with the mobile app

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