A DEEP LEARNING APPROACH TO PREDICT SEVERITY OF LUNG FUNCTION BASED ON A CT SCAN OF THE LUNG

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Abstract

At present, technology has improved very much in every section. Deep leaning is a one of emerging technologies today which is also sub part of machine learning. Deep learning is applied for large variety of problems in every sector such as education sector, health sector and economical sector.

In health sector lot of research and applications have been done to improve the efficiency of diagnosis of various diseases. Lot of research have been done applying machine learning to solve problems in healthcare sector. Using deep leaning, manual diagnosis and testing approaches can be replaced with the automated systems developed using machine learning.

IPF can be consider as life threatening disease as there are no treatments for fully recovery. It is critically essential to diagnose interstitial pulmonary fibrosis at early stage as soon as possible. This directly affects the surviving time of the patient. But at present, only manual approaches such as CT scan, X-ray scan, breathing tests and lung biopsy. Using these approaches, it is very difficult to diagnose and a very time-consuming procedure. Sometimes several tests must be proceeded to get the final diagnosis.

The purpose of this project is to automate the diagnosis system for interstitial pulmonary fibrosis so that it can be diagnosed at the early stage with high efficiency.

The lung function prediction system has been implemented to automate diagnosis of interstitial pulmonary fibrosis. It can predict forced vital capacity of a patient for a upcoming week when previous 10 CT images and clinical data are entered. The lung function prediction system has been powered with a ensemble model of two models which are convolutional neural network long-short term memory model and an artificial neural network. The prediction of FVC value for a patient is generated with 8.4% mean absolute percentage error.

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