PNEUMONIA DETECTION FROM THE CHEST X-RAY IMAGE

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Domain Background

Coronavirus disease is widely spread around the world in 2020. Coronavirus detection kit is limited as more people are getting infected than producing Covid-19 diagnose kit. The kit cost is much higher that developing country like India, Nepal, Pakistan and many African countries cannot afford it. These countries are still fighting with the diseases that spread by bugs and mosquitos like Malaria, Dengue and many more. Covid-19 symptoms are variable, but majorly it includes fever and cough. Fever is most common among the many diseases like Malaria, Covid-19, Dengue and others. To predict Covid-19 without using Coronavirus detection kit is to check the amount of the cough present in the lungs. If certain amount of cough increase in the lungs, it calls Pneumonia. So, Pneumonia detection might be helpful for the pre-stage of identifying Covid-19 patients. Pneumonia can be detecting through the X-ray image of the chest or lungs.

Problem Statement

As per CDC, Coronavirus infected rate is near to 5. That means one infected person can transfer Covid-19 virus to other 5 persons. As an early detection, physicians are recommending doing Pneumonia test through chest X-ray. As a result of that, radiologist suppose to look more X-ray images and take a decision whether patient is has Pneumonia or not. Radiologist is also human, and human makes a mistake. Sometime this mistake has to pay off another human precious life. We can reduce mistake through providing assistant on Pneumonia detection to radiologist. Artificial Intelligence (AI) has the potential to diagnose disease through image classification. As a part of this project, we are going to train Machine Learning model which will detect the Pneumonia through chest X-ray image and providing web application to radiologist, who can upload the chest X-ray image and our Machine Learning algorithm diagnose Pneumonia disease.

Datasets and Inputs

We are going to use chest X-ray dataset from the Kaggle. This dataset has total 5856 chest X-ray images. Among them 4,273 images are marked as lungs are infected by Pneumonia and 1,583 images marked as healthy or normal lungs. We are using pixels of the image as an input feature of our machine learning model and we are going to use binary image classification to distinguish between Pneumonia infected lungs vs. normal healthy lungs.

Solution Statement

As a part of the project, we are going to build the model which will classify or predict that given chest X-ray image has Pneumonia or not.

Benchmark Model

As a part of this, we are planning to use different kind of machine learning algorithms and select good machine learning model with the perfect hyperparameter which will gives best accuracy on test dataset.

Evaluation Metrics

We are planning to achieve greater than 75% accuracy on the test data with tuned hyperparameter.

Project Design