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Research Project – Pneumonia Detection using Deep Learning.

1. An introduction about the background knowledge and why this project is important;

It appears like we are traveling back in time to the 1900s during the Spanish influenza with the recent outbreak of COVID-19, also known as the coronavirus. A lethal virus called the coronavirus has killed hundreds of thousands of people in various parts of the world. The chance of getting more severe complications from the virus appears to be higher in older adults, persons with major underlying medical disorders, and people who have experienced pneumonia in the past.

Medical specialists from all over the world are working around the clock to cure patients and stop the virus from spreading due to increased death rates and a shortage of medical resources. The virus can cause pneumonia in severe forms, increasing the risk of death. In order for patients to obtain treatment in a timely way, especially in underdeveloped areas, it is essential to have rapid and accurate pneumonia detection.

With the ongoing development of technology, it is now possible to employ tools built on deep learning frameworks to identify pneumonia from chest x-ray pictures. Here, the challenge would be to support the diagnosing procedure so that therapy can proceed more quickly and with better clinical results.

2. What is the project to be conducted? What are the data to be used? What are the goals?

The Project is being deployed on a Django Framework, a python framework and the model is trained on ODU GPU servers using TensorFlow.

Dataset: https://www.kaggle.com/paultimothymooney/chest-xray-pneumonia

The Dataset has 6000 Chest X-Ray HD Images. This pneumonia classification dataset has Symptoms include some combination of productive or dry cough, chest pain, fever and difficulty breathing.

Goal: The goal of the project is to identify the Pneumonia disease using chest X-ray image.

3. What methods are you are going to use for the project? What are the main steps to be worked out?

Methods: ResNet-50 Architecture is being used for model development.

Main Steps involved:

1. Data gathering
2. Data Cleaning
3. Data Pre-Processing
4. Splitting Data into Train/Test/Val
5. Training the model
6. Testing the model
7. Deployment
8. Testing the model on Webpage using Django Framework

4. What are potential results, in what format?

The result will be binary. The model will predict whether the input chest X-ray image has Pneumonia disease or not. It will be in JSON format.

5. What kind of the packages are needed to be used in your project development?

Python==3.8+

Django==3.1+

TensorFlow==2.8

Numpy

Pandas

Matplotlib

Seaborn

Open CV

Scikit learn