

Analyze Chest X-ray images to detect COVID-19 using CNN

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Abstract: In modern world we faced a pandemic which is Coronavirus Disease (COVID19) is a fast-spreading infectious disease that is currently causing a healthcare crisis around the world. For this modern problem our team came with modern solution "Analyze Chest X-ray images to detect COVID-19 using CNN". we came with this solution because while testing a person with rapid diagnostic test (RDT) or nucleic acid amplification tests (NAAT) we will get results in 3 to 5 days it may take long while also.

During this period spreading of disease will increase it led to more deaths of many people. So to avoid this situation we can detect covid 19 with chest X-Ray with using deep learning algorithm Convolutional neural network(CNN). In deep learning, a convolutional neural network (CNN, or ConvNet) is a class of deep neural networks, most commonly applied to analyzing visual imagery. Convolutional networks were inspired by biological processes in that the connectivity pattern between neurons resembles the organization of the animal visual cortex. It will predict whether covid 19 positive or covid 19.

Keywords: Covid-19, CNN, X-Ray

1. INTRODUCTION

According to the World Health Organization (WHO)'s official Situation Report – 205, coronavirus disease 2019 (COVID-19) has globally infected over 20 million people causing over 0.7 million deaths. Individuals with COVID-19 have had a wide scope of symptoms reported going from mellow manifestations to serious illness.

Respiratory problems like shortness of breath or difficulty in breathing is one of them. old people having a lung disease can have serious complications from COVID-19 as they appear to be at higher risk[1]. Some common human coronaviruses that infect the public around the world are 229E, HKU1, OC43, and NL63. Before debilitating individuals, viruses like 2019-nCoV, SARS-CoV, and MERS-CoV infect animals and

evolve to human coronaviruses. To curb certain respiratory viral ailments, including COVID-19.

2. EXISTING SYSTEM

Detection of COVID-19 involves RT-PCR test which is a real-time reverse transcription polymerase chain reaction (rRT-PCR) test for the qualitative detection of nucleic acid from SARS-COV-2 in upper [2] and lower respiratory specimens, from nasal or throat Swab collected from individuals suspected of COVID-19. Typically it delivers the result within 24 - 48 hrs.

Antigen Test is a COVID-19 detection test that detects certain proteins that are part of the virus using a nasal or throat swab to get fluid sample, this test can produce results in minutes. ResNet - Residual Networks is used as a backbone for many computer vision tasks. It can have up to 50 layers

2.1 Drawbacks with Existing System

- Difficult to identify the disease. It requires Experienced Radiologists.
- Expensive (An RT-PCR test costs over Rs 3000).
- Every time a patient needs to visit the doctor.
- ResNet requires weeks for training, making it practically infeasible.

3. PROPOSED SYSTEM

Developing a Computer Aided Detection (CAD) tool for iterative Covid-19 detection, along with the adequate description of its forming techniques which includes feature selection, extraction and classification of neuro

images to support [3] the clinicians for early and more accurate diagnosis.

- a). It takes a chest X-Ray Image as input and outputs a prediction among three classes: Normal, Pneumonia and COVID-19. using the novel Deep Neural Network based model.
- b). It is hard to train a deep neural network from scratch, Hence using a pre-trained model as a backbone will be of much ease. Our approach is to use Xception.

3.1. Algorithm Description

Input: User will give input X-Ray Image

Steps:

- Step-1: Connect to Google Drive to access Dataset
- Step-2: Import all dependencies
- Step-3: Define Few Parameters
- Step-4: Fetch Images and Class Labels from Files
- Step-5: Visualize the First 40 Images from the Data set
- Step-6: Normalization
- Step-7: Train Test Split
- Step-8: Visualize a few images from Training and Test sets
- Step-9: Building and Visualizing model
- Step-10: Training the model
- Step-11: Save the Model
- Step-12: Making Predictions
- Step-13: Connect with Flask App

Output: Uploaded image will get respective Results

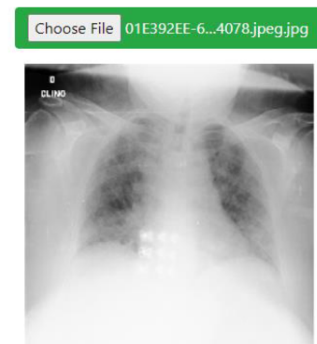
4. RESULTS

Covid-19 Disease Diagnosis

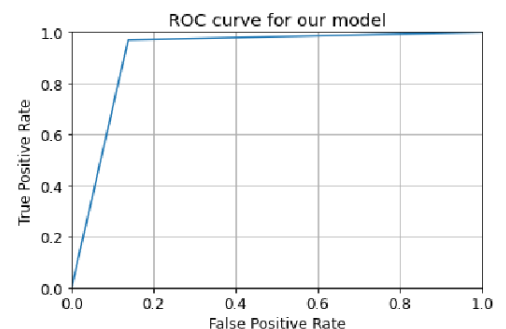
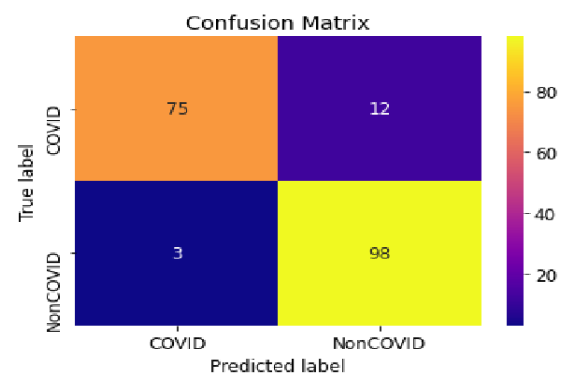


Result: Covid -Ve

Covid-19 Disease Diagnosis



Result: Covid +Ve



Front-end : **HTML, CSS, JS**

Framework : **FLASK**

Languages : **PYTHON**

Libraries: **PYTORCH/KERAS/TENSORFLOW**

5. CONCLUSION

As the world grapples with COVID-19, every ounce of echnological innovation and ingenuity harnessed to fight this pandemic brings us one step closer to overcoming it. Artificial intelligence (AI) and machine learning are playing a key role in better understanding and addressing the COVID-19 crisis. Machine learning technology enables computers to mimic

human intelligence and ingest large volumes of data to quickly identify patterns and insights. In the fight against COVID-19, organizations have been quick to apply their machine learning expertise in several areas: scaling customer communications, understanding how COVID-19 spreads, and speeding up research and treatment.

- a). Enabling organizations to scale and adjust
- b). Understanding how COVID-19 spreads
- c). Speeding up research and treatment
- d). Detecting COVID-19 Infection in Medical Imagery.

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