PROJECT TITLE: COVID-19 PREDICTOR

BY

1. K Amarender Reddy (20BCE7314)
2. Keerthi Krishna Kishore (20BCE7177)
3. Sainadh Reddy (21BCE8063)
4. Mohamed Sharfath N (20BCD7173)

INTRODUCTION

- COVID-19 is a serious global infectious disease outbreak with nearly 550,000 cases and around 25,000 deaths worldwide. It is part of a family of viruses called coronaviruses that infect both animals and people. This particular one originated in China at the end of 2019, in the city of Wuhan, which has 11 million residents. In the past two decades coronavirus outbreaks have caused global concern, including one in 2003 with the Severe Acute Respiratory Syndrome (SARS) and more recently in 2012 with the Middle East Respiratory Syndrome (MERS).
- The concept of Machine Learning is all about to make the AI model more accurate at prediction levels. We all know that the prediction in Machine Learning is done referring to the output after the specific algorithm is trained on a past dataset. These predictions help organizations, businesses, health departments, etc. to make highly accurate guesses and plan accordingly.
- Our project is completely based on the Machine Learning using its supervised learning techniques to make our model more accurate at its best.

OBJECTIVE

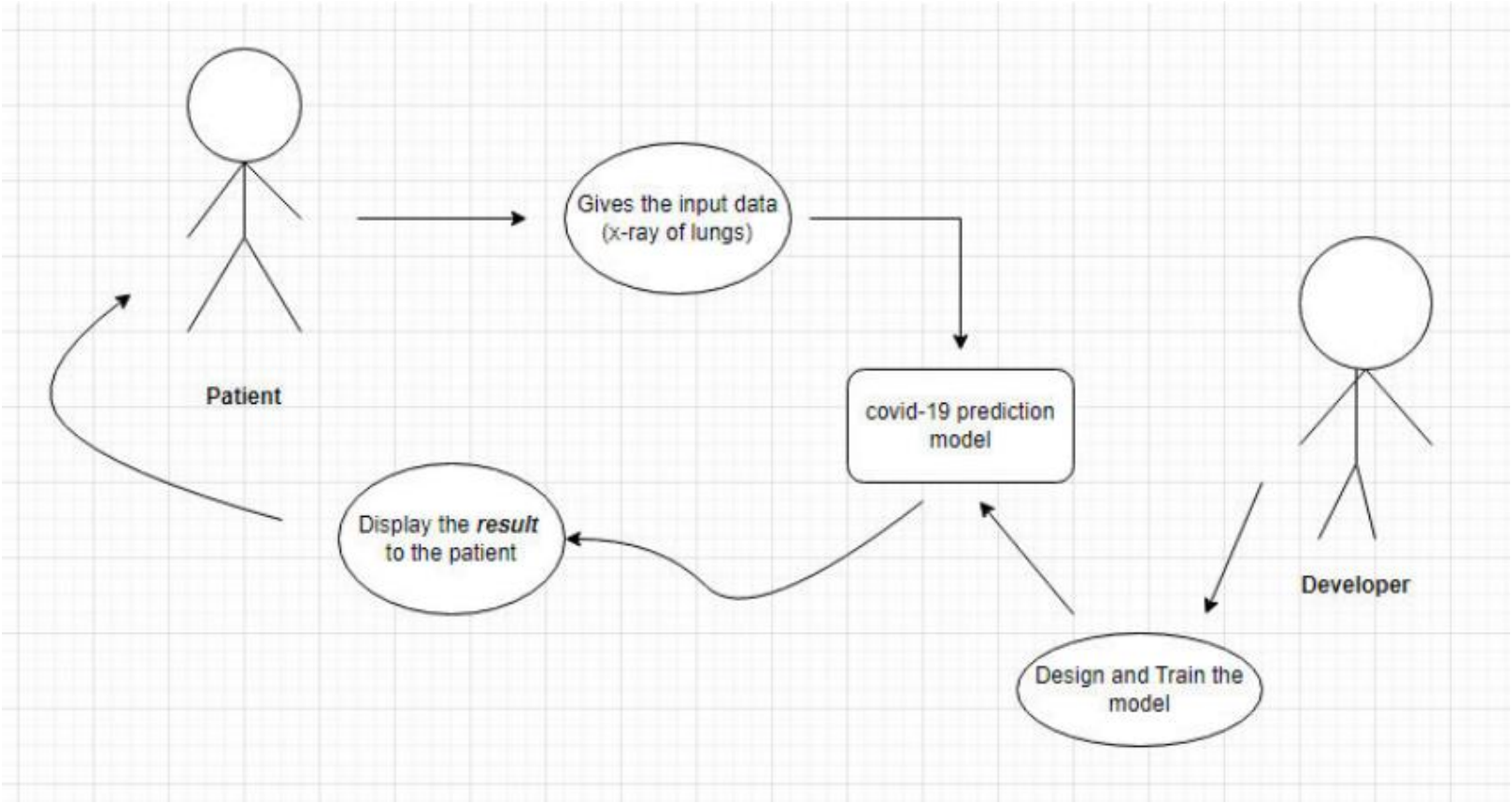
- Using this model, one can predict his/her covid-19 test status. Moreover, this could help the health officials in reducing the work load. This working model can help recognize and predict disease trends. We are working harder to make this available to various people regardless of age, gender, etc. by making use of vast collection of data.

METHODOLOGY

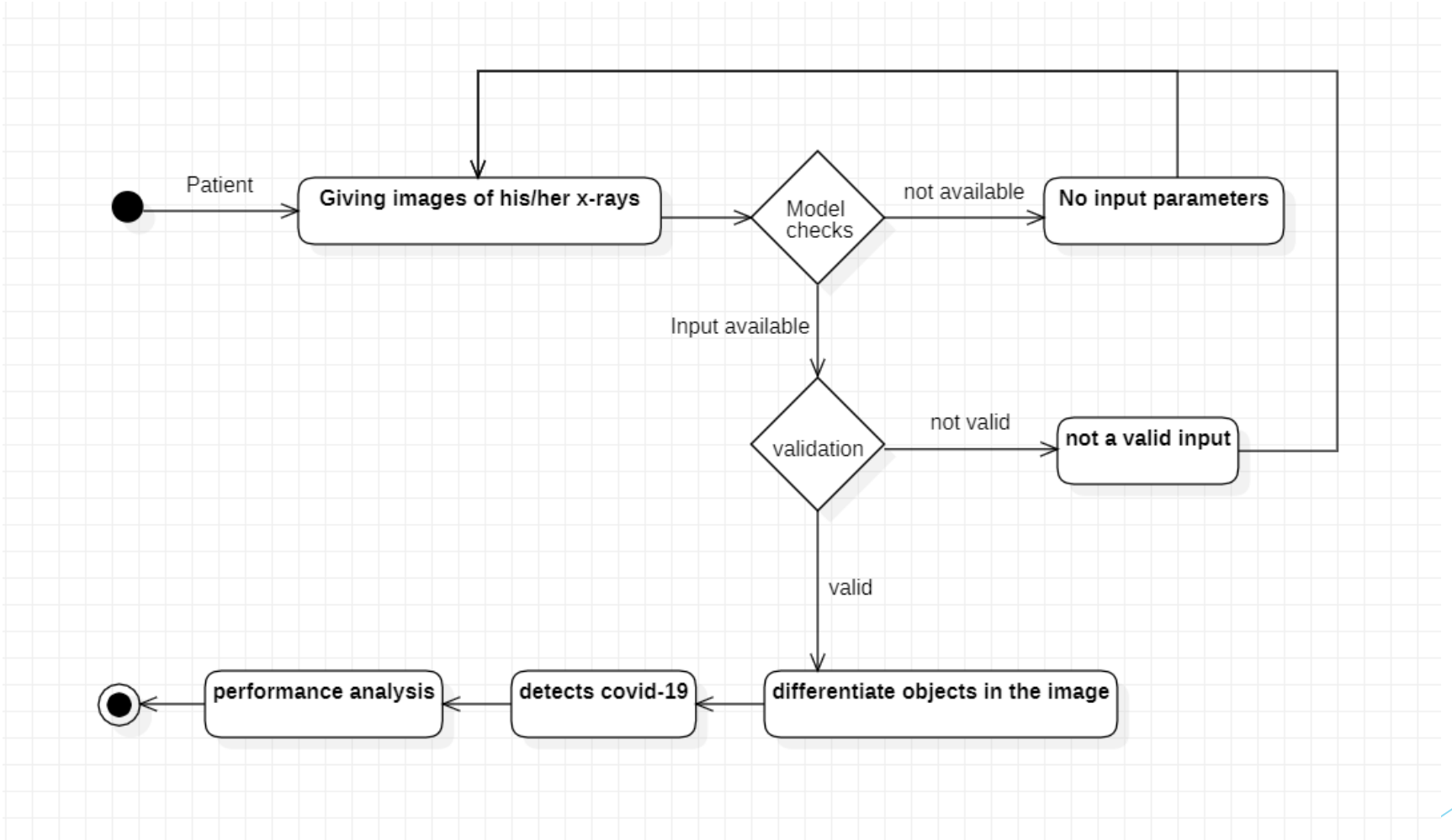
- We are focusing on the deep learning techniques such as Artificial Neural networks (ANN). Unlike Machine Learning, deep learning techniques make use of artificial neural networks and makes our model even more accurate at predicting complex objects. Artificial neural networks is a collection of connected units or nodes or neurons that form a layer and transfers the processed data to the output layer using various activation functions. Our project is based on CNN, an ANN classifier that takes input as an image and add learnable parameters such as weights and bias and then differentiate objects from one to another in the given input. The entire project makes use of python technology and its packages such as tensor flow, pandas, numpy, etc. Our ultimate aim is to predict the covid-19 from the given CT scans of lung as an input. After the collection of dataset consisting of COVID-19 lung CT frames and non COVID-19 lung CT frames, we have to focus on pre-processing techniques that affects the input image.

DESIGN OF PROPOSED WORK

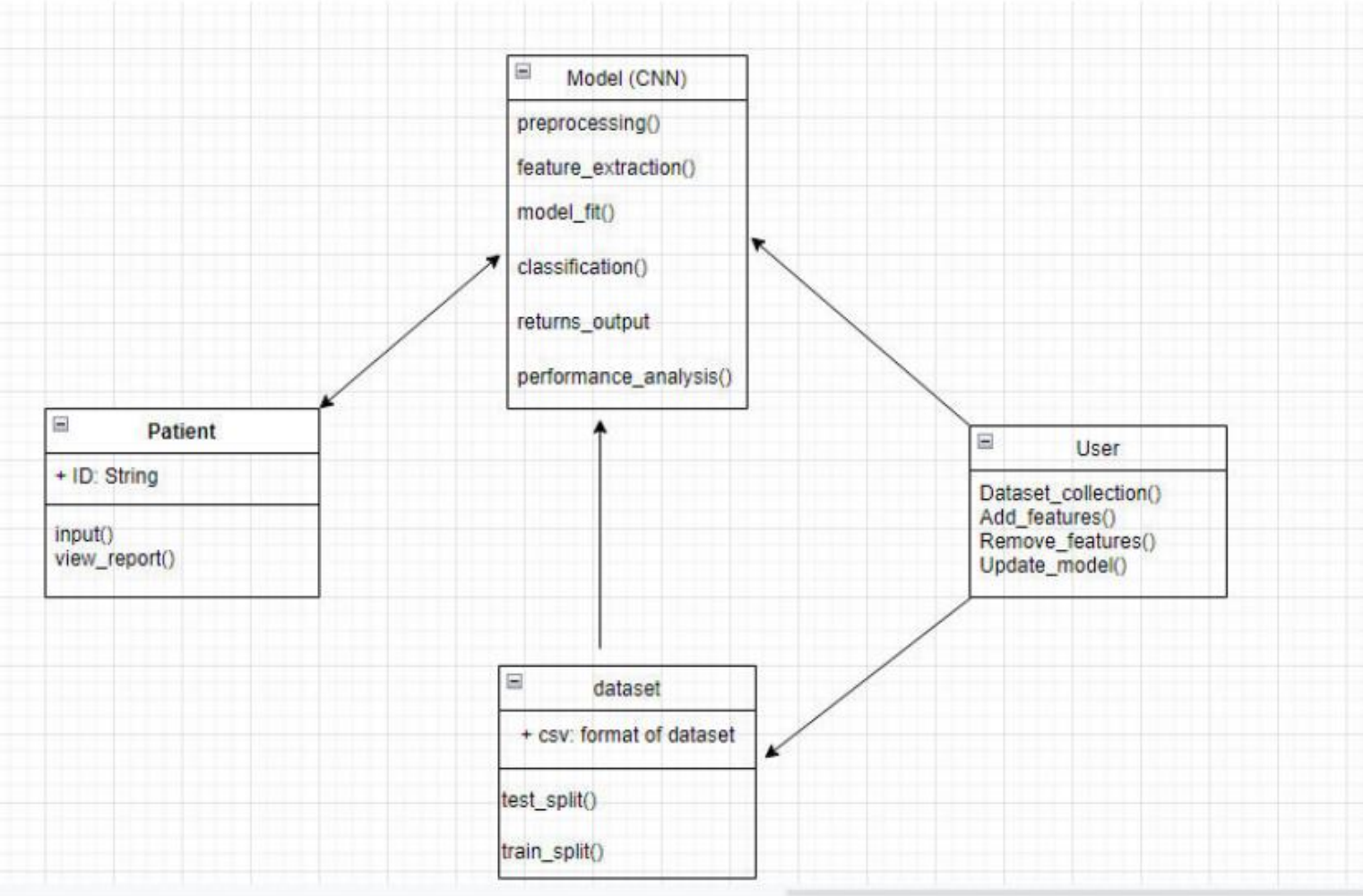
- USE CASE DIAGRAM



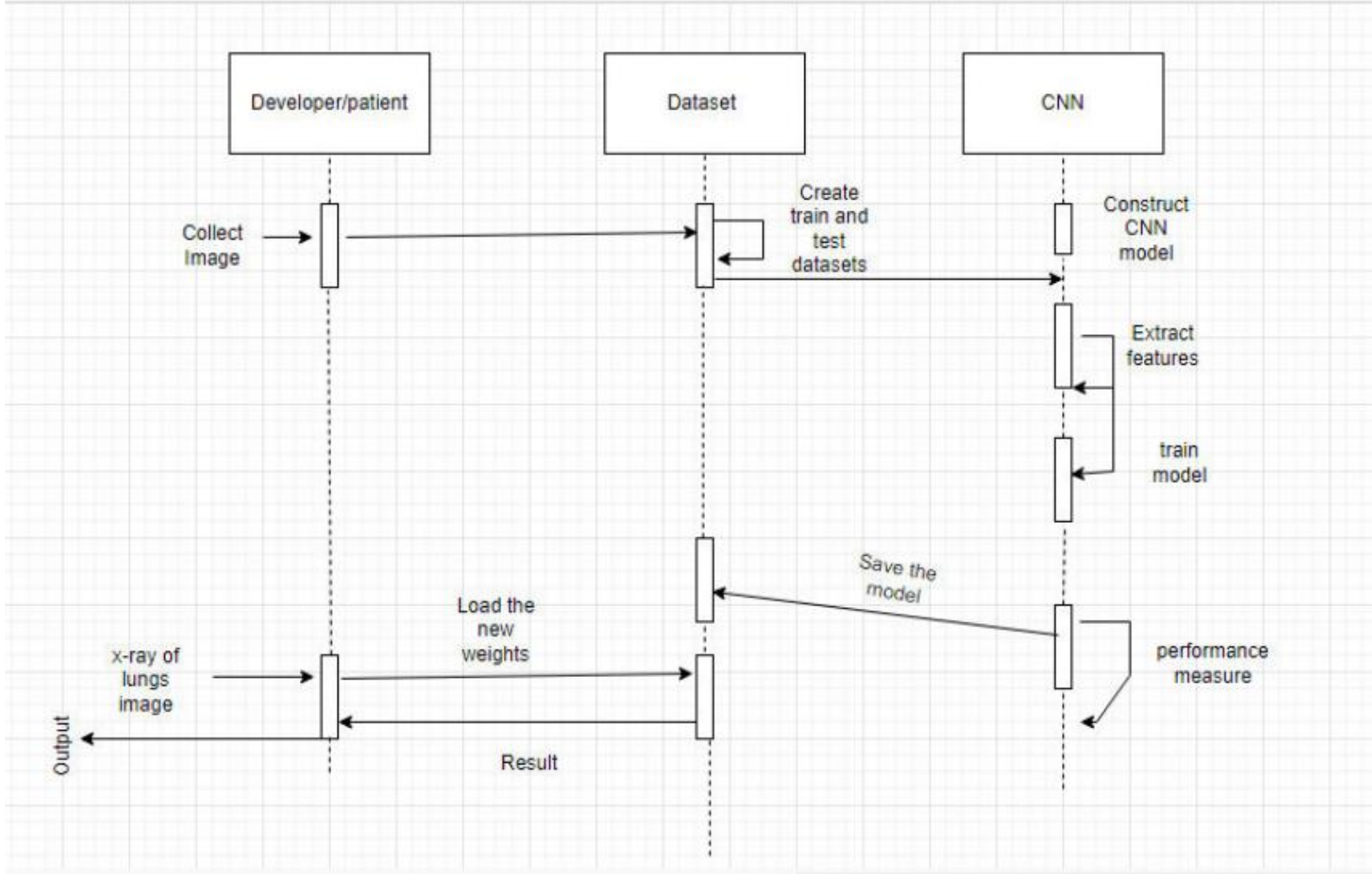
ACTIVITY DIAGRAM



- CLASS DIAGRAM

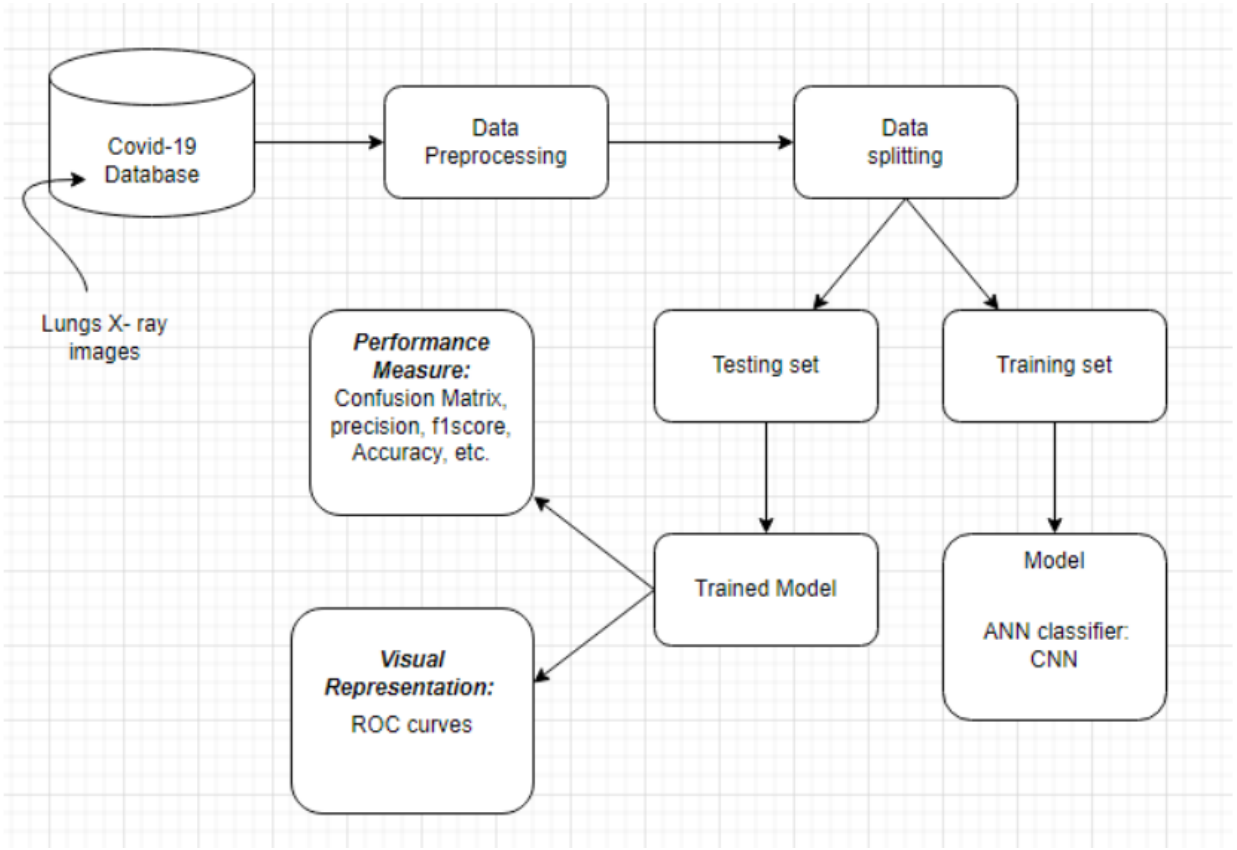


- SEQUENCE DIAGRAM



WORKING MODEL

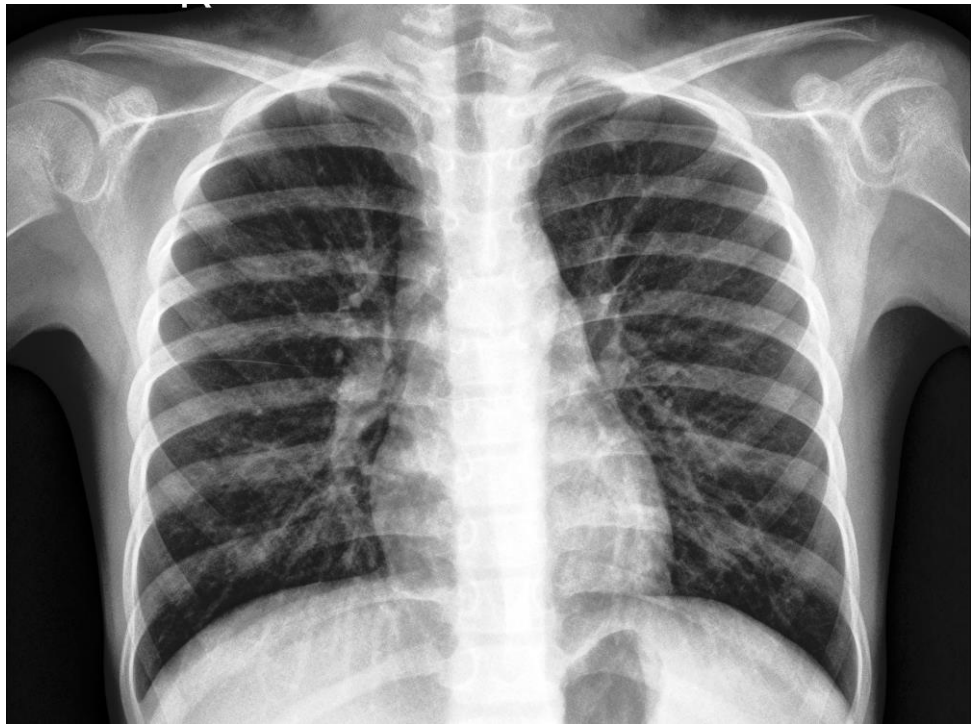
- System Architecture Diagram for COVID-19 analysis and prediction using CNN (ANN-classifier) model.



Overview of the system architecture:

In the very first step, after the collection of dataset from the valid source, we pre-process it for the efficient one. The steps in the Data preprocessing includes data cleaning, data transformation and data reduction. Thereafter, we split the dataset into train and test for the required size in order to achieve the welltrained model. Once the dataset gets split, we fit the training set into the desired model and figure out the accuracy level and make an analysis from the various performance metrics such as ROC curves, confusion matrix, etc.

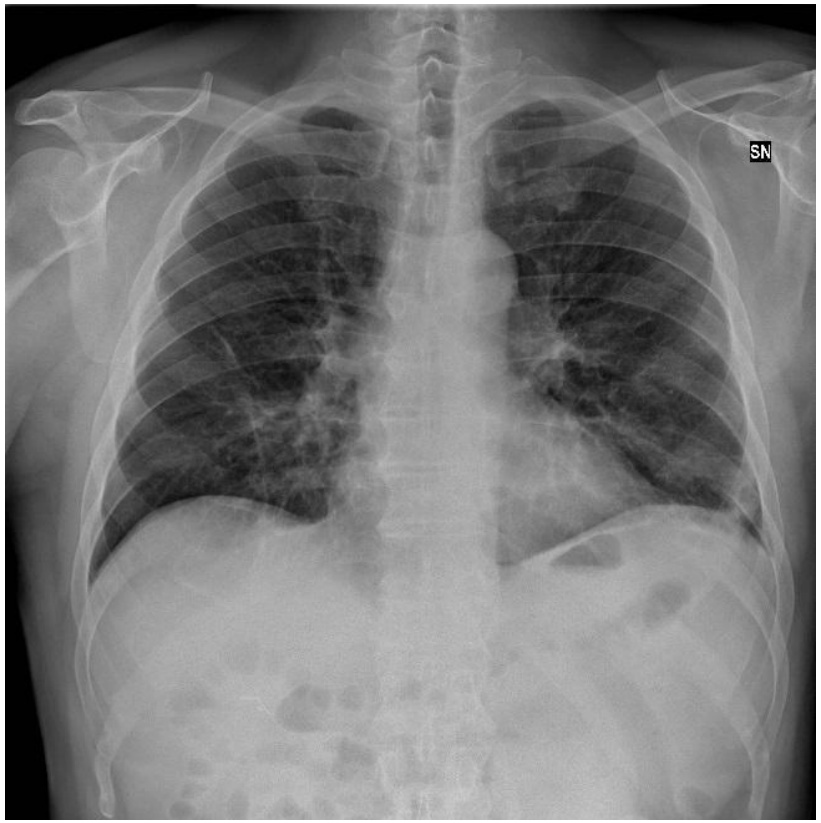
TESTS & RESULTS



```
print(prediction)
```

```
1/1 [==============================] - 0s 384ms/step
Normal
```

TEST CASE – 1
Output : Normal



TEST CASE – 2
Output : +ve

```
print(prediction)

1/1 [==============================] - 0s 50ms/step
COVID
```

- DISCUSSIONS

The above output says that the sample x-ray of a lung is detected as normal. From the above images (code) 5 and 6, we can observe that after certain number of epochs performed (here we considered 5), there is a gradual increase in an accuracy of our model at every step. In the epoch 5, our model reaches at accuracy 0.95 (~91%) after all the optimization techniques performed. Dataset obtained from the legitimate source i.e. Kaggle Here we took the 'ReLU' activation function in the hidden layer. Number of Epochs performed is 5. Number of Batches is 40 (for about 160-180 samples i.e. batch size- 4).

REFERENCES

https://www.kaggle.com/datasets

https://ieeexplore.ieee.org/document/9392723