

Final Project Report

A. Project Title: COVID Prediction using chest X-Ray Images and Masked chest X-ray Images.

B. Team Members: Digesh Chitrakar, Enock Niyonkuru

C. Project Description:

In this project, we want to identify the best way of predicting COVID from a Patient's chest X-ray Image. We are testing a Mixture of both RGB X-ray Images and Masked chest x-ray images and using RGB Images only, and also test using Masked Images only to predict the best accuracy to predict COVID.

D. Data Used: [COVID-19 Radiography Dataset](#)

E. Data Analysis Results:

The data set created a database of chest X-ray images for COVID-19 positive cases, normal, Lung Opacity, and Viral Pneumonia Images

- Source: Qatar University
- Dataset is made of 21, 165 chest X-ray (CXR) images including:
 - COVID: 3,616
 - Viral Pneumonia: 1,345
 - Lung Opacity: 6,012
 - Normal: 10, 192
- Note: every image has its mask. This means we have 21,165 Images and 21,165 Masks.
- In this project we will use the dataset of 3.616 COVID-19 Positive Images and 10,192 Normal X-ray images, and their respective equal masks.

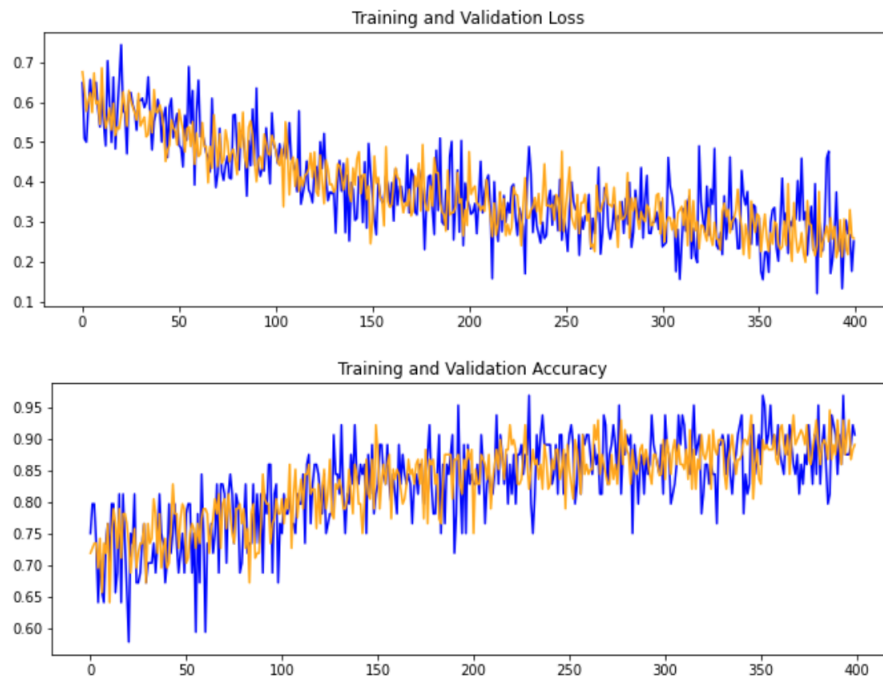
F. Methodology:

1. Download datasets
2. Add noise and pre-process images to make them consistent (same size)
3. Perform feature analysis
4. Perform regularization to reduce overfitting and find important features

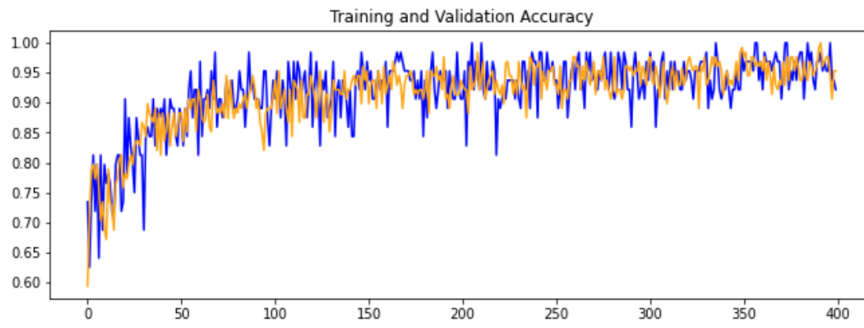
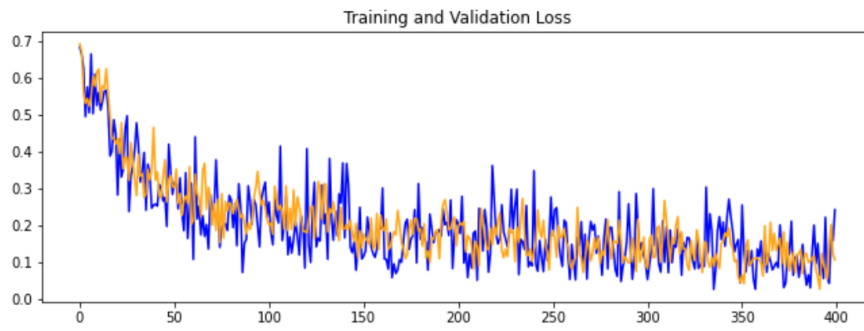
5. Visualize feature correlation
6. Design a Convolutional Neural Network learning model
7. Train the model on all three data types and evaluate performances
8. Compare with existing work

G. Results (Include tables/charts – each result must be supported by figures/charts/tables)

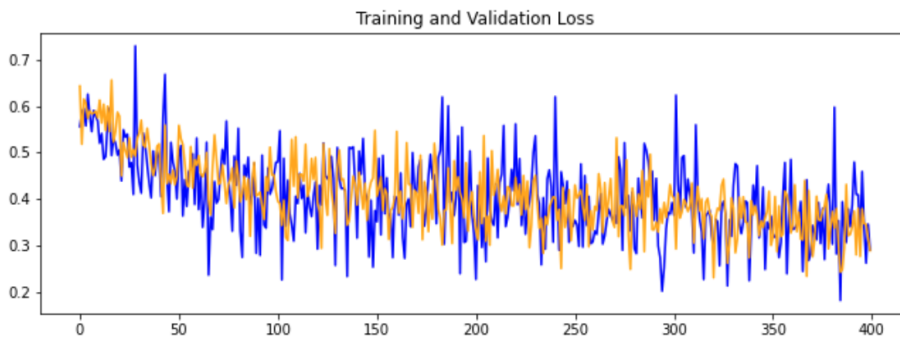
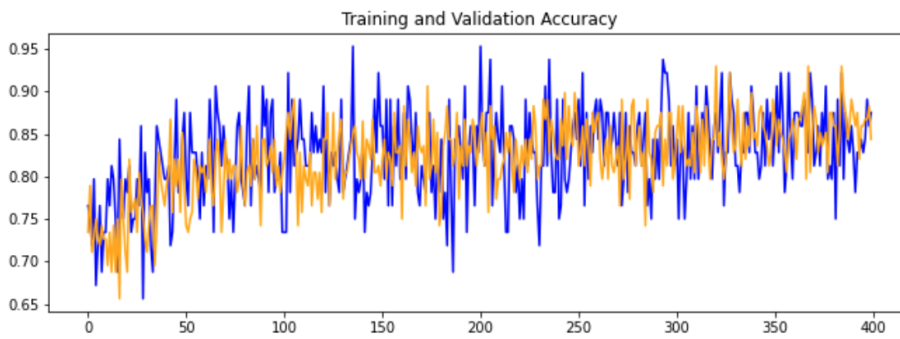
Train and Test on Image and Masks



Train and Test on Image only



Train and Test on Mask only



According to the training and prediction we found out that the Image only was mostly high accuracy in prediction for 95.36% and the combination of Image and Masks was the second in accuracy with 88.8% and Mask only was the least in prediction with 84.10%.

H. Challenges (Main challenges that you overcome while working on the project)

Challenges we faced while working on this project was to decide the best model. To do so, we performed hyperparameter tuning and tested until we got 90%+ accuracy in at least one of the testing modes.

The other challenge we faced was the initial training period. Before, the model was too complex and required too much resources. We ended up simplifying the model.