Forgery Detection using deep learning

Dataset:

COVID-19 Digital X-rays Forgery Dataset

CM - Copy Move Forgery Technique
S - Splicing Forgery Technique

This dataset consist of 4 classes and they are
{
COVID-19 2000 images
CM COVID-19 2000 images
S COVID-19 2000 images
Viral Pneumonia 1340 images
CM Viral Pneumonia 1340 images
S Viral Pneumonia 850 images
Normal 2000 images
CM Normal 2000 images
S Normal 2000 images
}

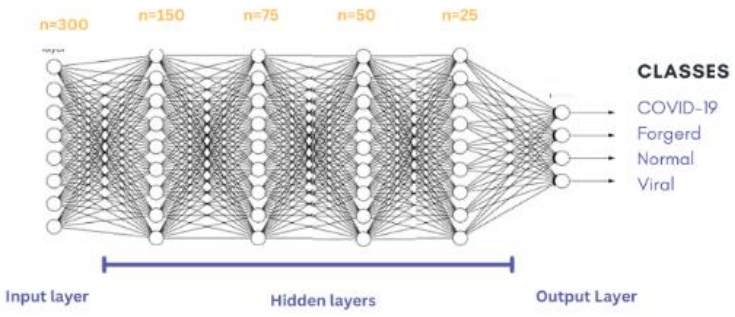
Link: https://www.kaggle.com/datasets/nourmahmoud/covid19-digital-xrays-forgery-dataset/data

Model Architecture :

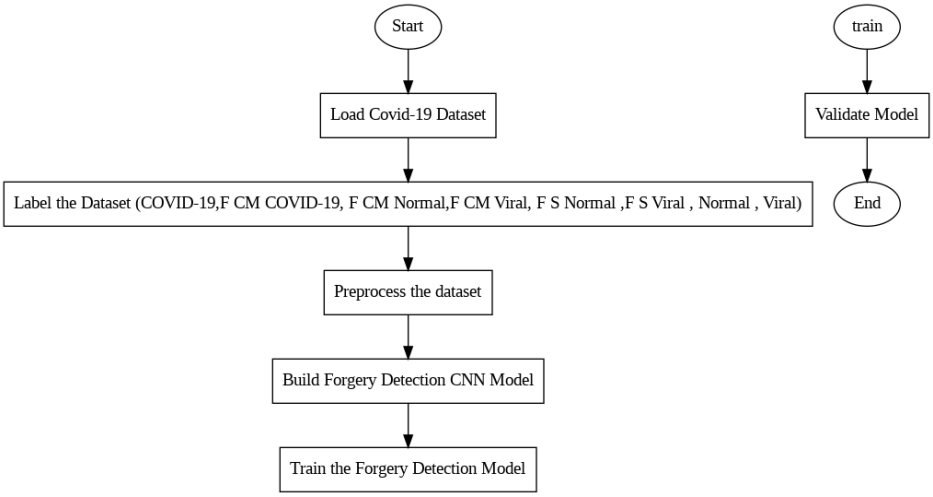
The CNN model consisted of the following fully-connected dense layers:

1. The input layer having 300 neurons
2. Hidden 1 layer having 150 neurons
3. Hidden 2 layer having 75 neurons
4. Hidden 3 layer having 50 neurons
5. Hidden 4 layer having 25 neurons
6. Output layer with 4 neurons

The first five layers used “ReLU” activation function, and the output layer used “softmax” activation function



Flow chart:



Model Reports.

```
Accuracy CNN: 0.9246861924686193

Accuracy RNN: 0.8075313807531381

Confusion Matrix CNN:
[[124  14   6   3]
 [  5 489   0   2]
 [  8   4 139   5]
 [  6   1  18 132]]

Confusion Matrix RNN:
[[ 71  61   5  10]
 [  4 477   7   8]
 [  4   7 115  30]
 [  5  12  31 109]]

Classification Report CNN:
              precision    recall  f1-score   support

       covid       0.87      0.84      0.86       147
    forged-1       0.96      0.99      0.97       496
      normal       0.85      0.89      0.87       156
       virus       0.93      0.84      0.88       157

    accuracy                           0.92       956
   macro avg       0.90      0.89      0.90       956
weighted avg       0.92      0.92      0.92       956
Classification Report RNN:
              precision    recall  f1-score   support

       covid       0.85      0.48      0.61       147
    forged-1       0.86      0.96      0.91       496
      normal       0.73      0.74      0.73       156
       virus       0.69      0.69      0.69       157

    accuracy                           0.81       956
```

Training and Validation Accuracy /losses :