

FACE MASK DETECTION

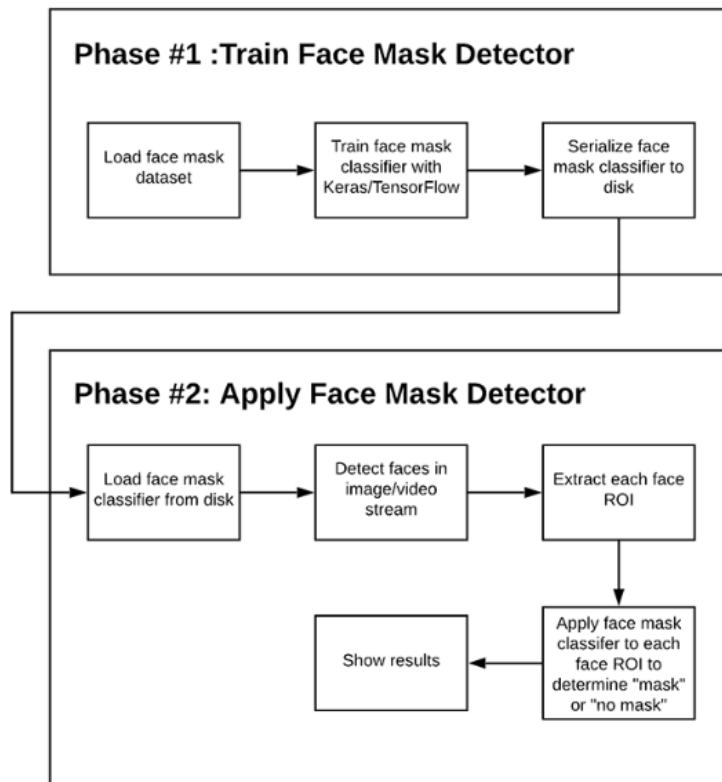
Abstract

Coronavirus disease has affected the world seriously. One of the best ways or method to prevent people from this virus infection is to wear masks in public areas. Moreover many public service providers want their customers wear masks and utilize their service as one of the safety precaution , it is hard to look each and every customer and moreover the rate of spread of this virus is very high and the symptoms of this virus may look like common cold fever and the victim will realize that he/she is affected by covid-19 only after 14days and in between this 14days there is a chance of spread of Virus to people whoever come close to the victim. So, to stop the spread of from one person to other, wear the mask is the one of the best way, so we developed a model that uses Artificial Neural Network to identify whether the customer or user is wearing mask or not.

TOOLS

- Jupyter notebook
- Convolutional neural network (using TensorFlow and Keras)
- Open cv
- Python 3

procedure



We have divided the work into two part, that is **phase 1** and **phase 2**.

Phase 1

We collected the dataset from Kaggle and for importing the dataset in our program we make use of a package called ImageDataGenerator. In this dataset we have two classes mask and unmask. Where mask consist of 2605 images and unmask consist of 1919 images.

We have imported the necessary packages from TensorFlow.keras. From there we initialized a model and we have added a convolutional neural network architecture that consist of 9 layers (5 convolutional layers, 4 pooling layers) which acts as base architecture. Then we have done flattening and feeded the data in neural network that consist of only 2 layers and at last layer we used sigmoid activation function for classification.

After defining the entire architecture, we have compiled using Adam optimizer, with loss function BinaryCrossEntropy and trained the data with 10 Epochs and batch size of 32. Then we have done tuning of hyper parameters in order to get better accuracy.

After getting satisfiable accuracy we saved the model.

Phase 2

In phase 1 we predicted the output based on the images but now we will predict from live stream either from webcam or any other source. In order to perform this, we need to import OpenCV python package. We have initialized an xml file called

'haarcascade_frontalface_default.xml' to detect faces from the frames in the cv2.CascadeClassifier. Once we detected the face, we going to get the location of face in frames using DetectMultiScale function. After getting the image of face we passed it to the model to predict whether mask is present or not. Based on the model output we are shown the rectangular box on image for better understanding whether a person is wearing mask or not.

CONCLUSION

The face mask detection system can be used at airport to detect travelers without mask and also in hospital to monitor their stuff is wearing mask or not.