

Face Mask Detection using Convolutional Neural Network, TensorFlow & Python

Project by – Samyak Swain [Institute of Technical Education and Research] [Regd.1841012008]

Brief Description of The Project

This project is made with the help of a dataset downloaded from Kaggle.com.

The project detects and shows if a person is wearing a face mask or not.

The dataset contains two types of images namely: `with_mask` and `without_mask`.

The python program “`train_mask_detector.py`” trains the model with the given dataset and predicts the accuracy and loss of the model.

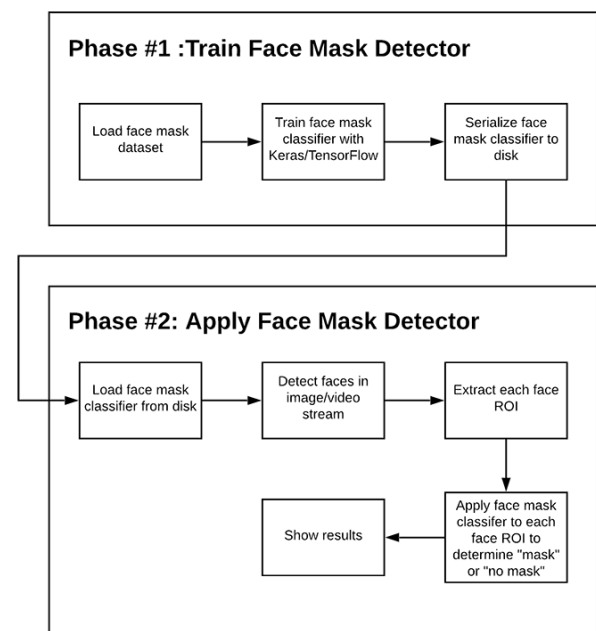
A plot is obtained showcasing the same. When the “`detect_mask_video.py`” is executed, the web camera app is launched and detects if the user is wearing a mask or not.

Code: https://github.com/balajisrinivas/Face-Mask-Detection/blob/master/train_mask_detector.py

Understanding the Face Mask Detection Algorithm

There are given a dataset which is further divided into two parts : one being a folder with approximately 1,910 images of people without mask and another folder consisting people only with masks.

Phases of training and applying the algorithm to the model:

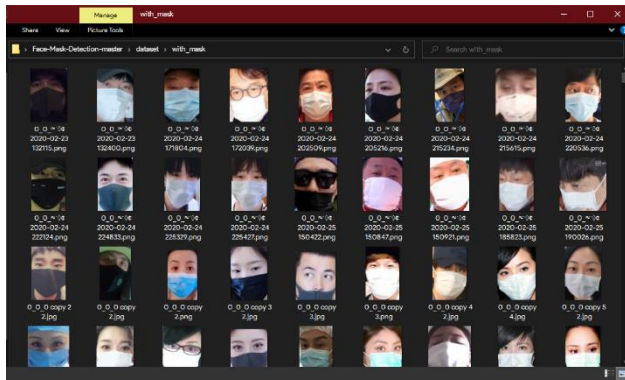


In order to train a custom face mask detector, we need to break our project into two distinct phases, each with its own respective sub-steps (as shown by Figure 1 above):

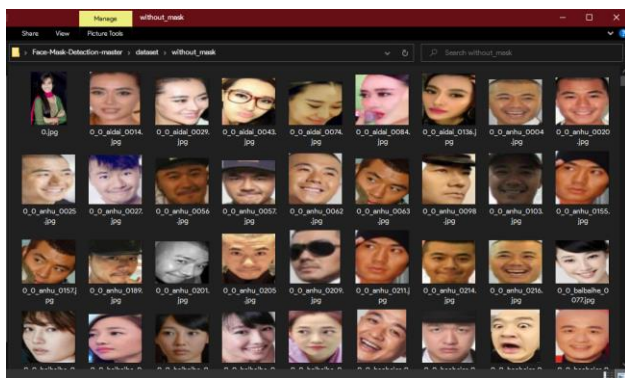
Training: Here we'll focus on loading our face mask detection dataset from disk, training a model (using Keras/TensorFlow) on this dataset, and then serializing the face mask detector to disk

Deployment: Once the face mask detector is trained, we can then move on to loading the mask detector, performing face detection, and then classifying each face as `with_mask` or `without_mask`

The Dataset



Pic I : Dataset folder consisting images of people wearing masks



Pic II : Dataset folder consisting images of people not wearing masks

The dataset used here was created by Kaggle.com

This dataset consists of 4000 images belonging to two classes:

with_mask: 1910 images

without_mask: 1918 images

The goal is to train a custom deep learning model to detect whether a person is or is not wearing a mask.

Project Structure

The dataset/ directory contains the data described in the “Our face mask detection dataset” section.

Three image examples/ are provided so that you can test Open terminal. Go into the cloned project directory and type the following command:

```
$ python3 train_mask_detector.py --dataset dataset
```

To detect face masks in an image type the following command:

```
$ python3 detect_mask_image.py --image  
images/pic1.jpeg
```

To detect face masks in real-time video streams type the following command:

```
$ python3 detect_mask_video.py
```

the static image face mask detector.

Three Python scripts in this project are being used :

train_mask_detector.py: Accepts our input dataset and fine-tunes MobileNetV2 upon it to create our mask_detector.model.

A training history **plot.png** containing accuracy/loss curves is also produced.

detect_mask_image.py: Performs face mask detection in static images

detect_mask_video.py: Using your webcam, this script applies face mask detection to every frame in the stream

Code:https://github.com/balajisrinivas/Face-Mask-Detection/blob/master/train_mask_detector.py

Installation

[Github Repository: <https://github.com/balajisrinivas/Face-Mask-Detection>]

We will be using VS Code and Windows Terminal for importing, training and testing the data.

1.Clone the repo:

```
$ git clone  
https://github.com/chandrikadeb7/Face-  
Mask-Detection.git
```

2.Change your directory to the cloned repo:

```
$ cd Face-Mask-Detection
```

3.Create a Python virtual environment named 'test' and activate it:

```
$ virtualenv test
```

```
$ source test/bin/activate
```

4.Now, run the following command in your Terminal/Command Prompt to install the libraries required:

```
$ pip3 install -r requirements.txt
```

Working

1. Open terminal. Go into the cloned project directory and type the following command:

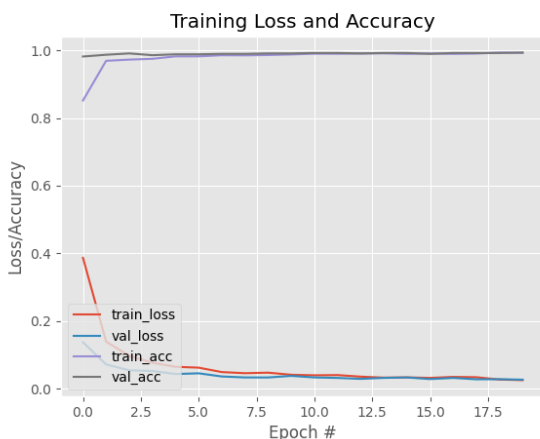
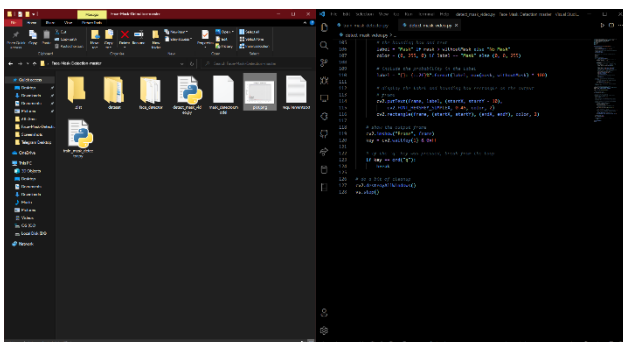
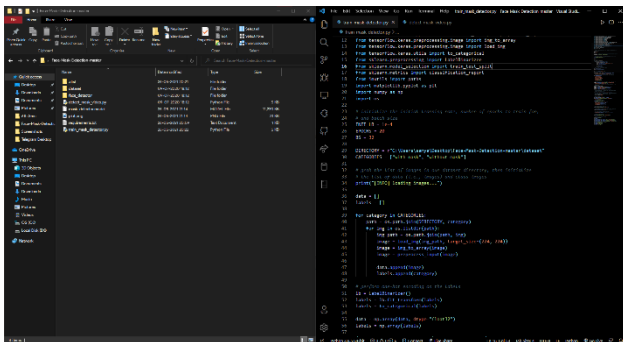
```
$ python3 train_mask_detector.py --dataset dataset
```

2. To detect face masks in an image type the following command:

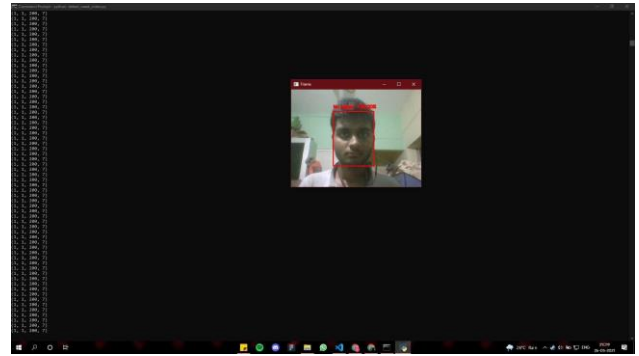
```
$ python3 detect_mask_image.py --image images/pic1.jpeg
```

3. To detect face masks in real-time video streams type the following command:

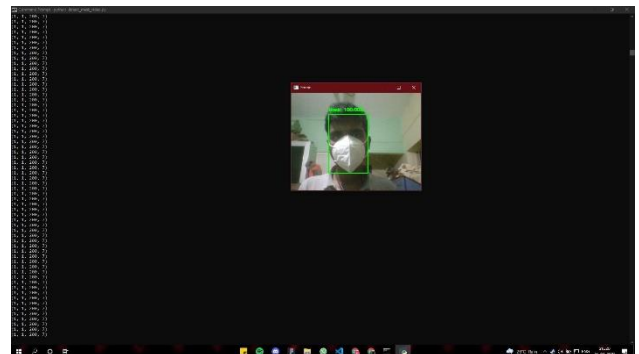
```
$ python3 detect_mask_video.py
```



Results



Pic 1 : Without mask detection



Pic 2 : With mask detection

Problems faced during the project

While installing the required packages required for the project, the system couldn't install due to mismatch in versions of various packages.

As the version of the packages were interfering with each other, hence I removed the version number after which the cmd automatically found the most compatible version of numpy which suited all the other packages.

Though this problem was solved by me, another error showed up. The system could not install in directories made while installing the packages as those were more than 260 characters. To resolve this error, LongNamesEnabled DWORD file was made in the registry and rebooted. After which it installed perfectly.

Resource Links

<https://www.pyimagesearch.com/>

https://github.com/balajisrinivas/Face-Mask-Detection/blob/master/train_mask_detector.py

