# Trac-Mask

An Open CV based Face mask Detection system

# The team

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# The problem

## Situation

The Sars Covid-19 sent the world into pandemic. The Airborne disease made it the mandate of the day to wear FACE MASKS on a daily basis.

## Context

General Public started slacking off on wearing mask and started going out maskless.

## Problem statement

To use Machine Learning and computer vision to tackle the problem. And design an AI model that is capable enough to read the images and detect if the object (Mask) is present.

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# Solution

The process we undertook to classify the challenges into 3 major components and bring out the solution to each of the challenges. This brought down our development time considerably and allowed us to concentrate on a single problem at a time.

# Challenges deep-dive

## Challenge 1

**Data**

The first main challenge was to collect the data which we would use to train the ML model. We used dataset comprising of 1376 images.

## Challenge 2

**Training**

The ML model was trained using openCV2. The dataset used to train had ____ masked images and ____ unmasked images.

## Challenge 3

**Testing**

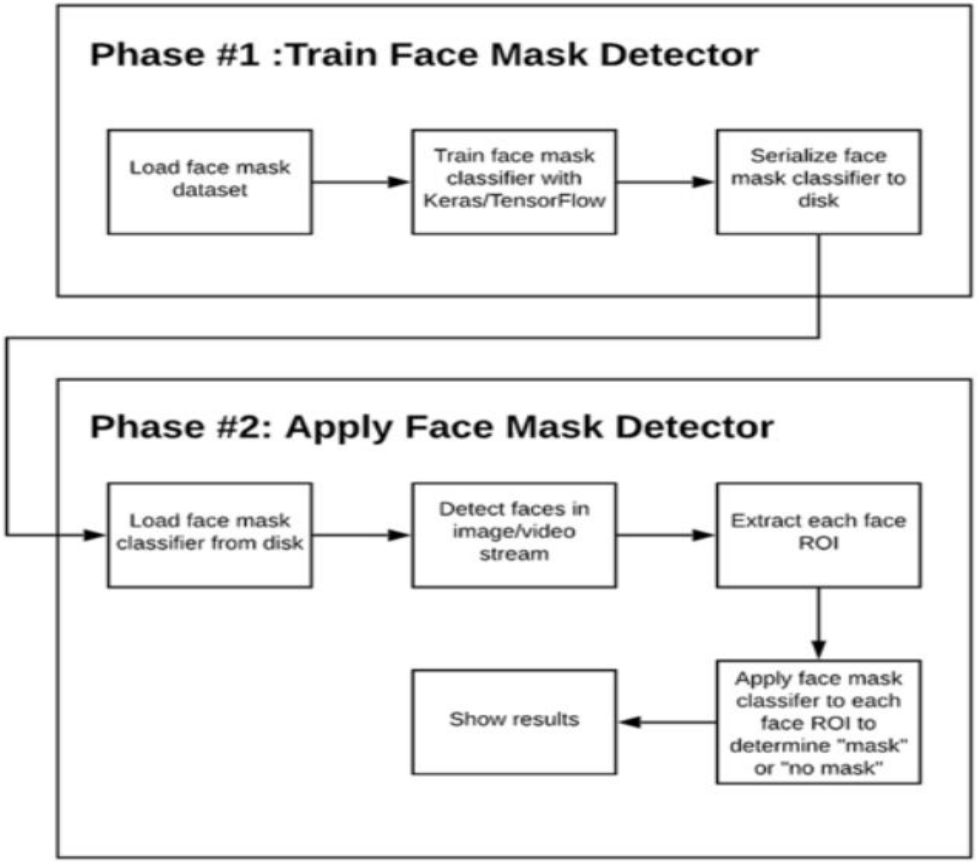
The ML model was tested live on fresher images found to be 83% accurate.

# Implementation

# How it works.

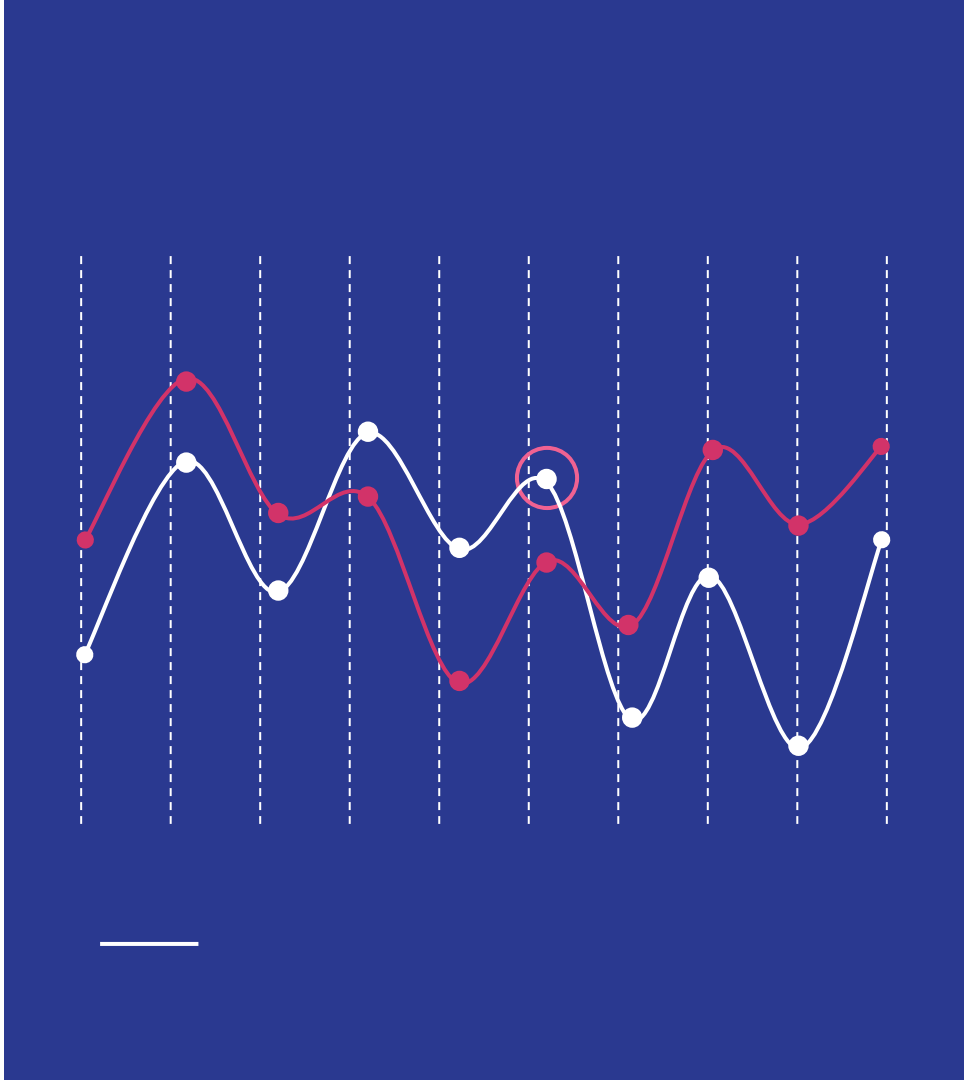
In order to train a custom face mask detector, we need to break our project into two distinct phases, each with its own respective sub-steps :

1. 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
2. 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`

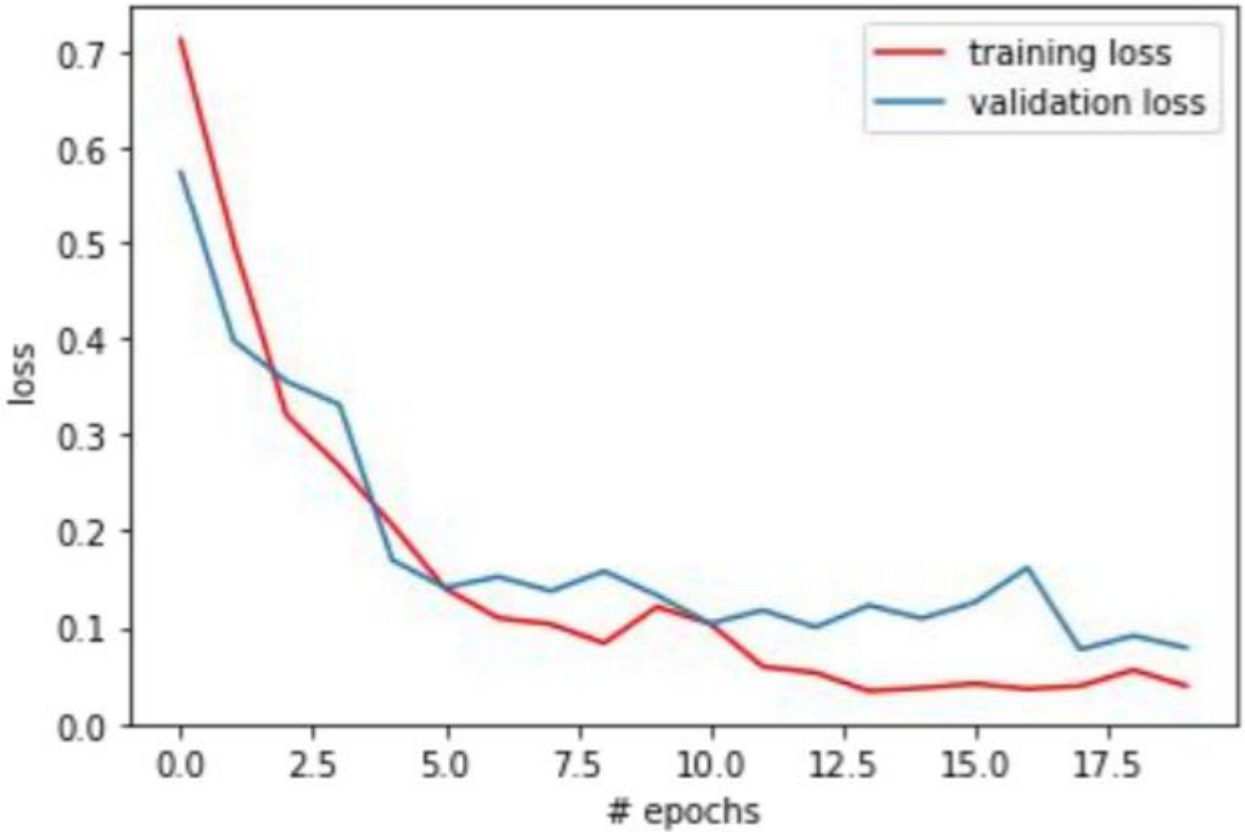



Phases of development

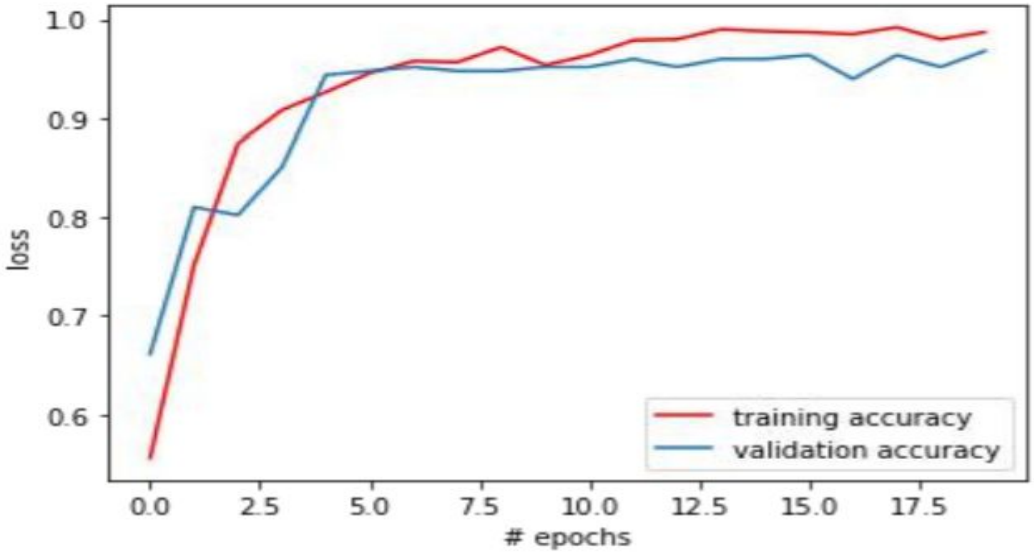
# Impact and result analysis



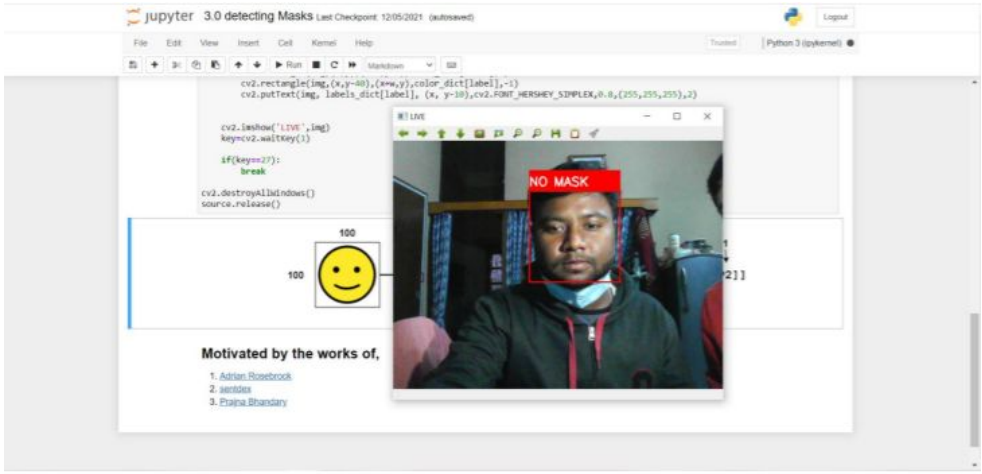
We got the following graph of the losses that occurred:

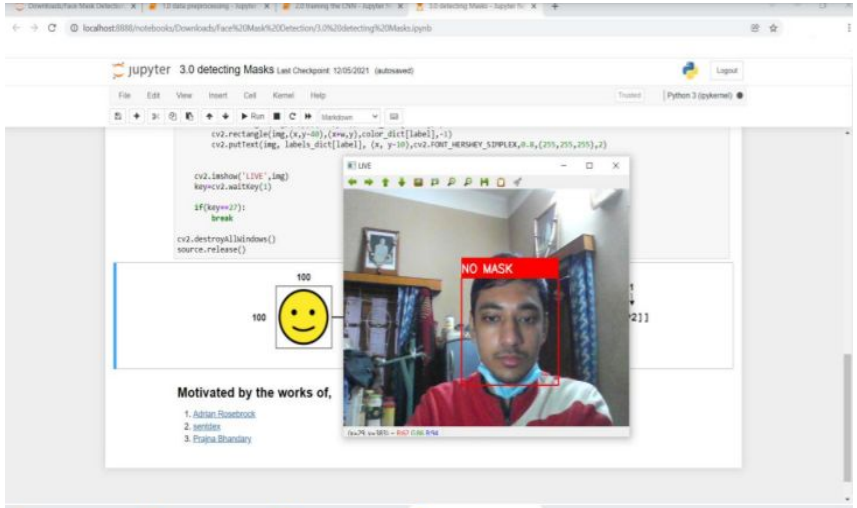


This is the graph of the accuracy we got after training:




As we can see from the above graphs, the losses gradually decreased with each model and the accuracy gradually increased. After training, we chose the best model which got the maximum accuracy among the other trained models.


jupyter 3.0 detecting Masks
NO MASK
Motivated by the works of,
1. Adrian Rosebrock
2. sentdex
3. Prajna Bhandary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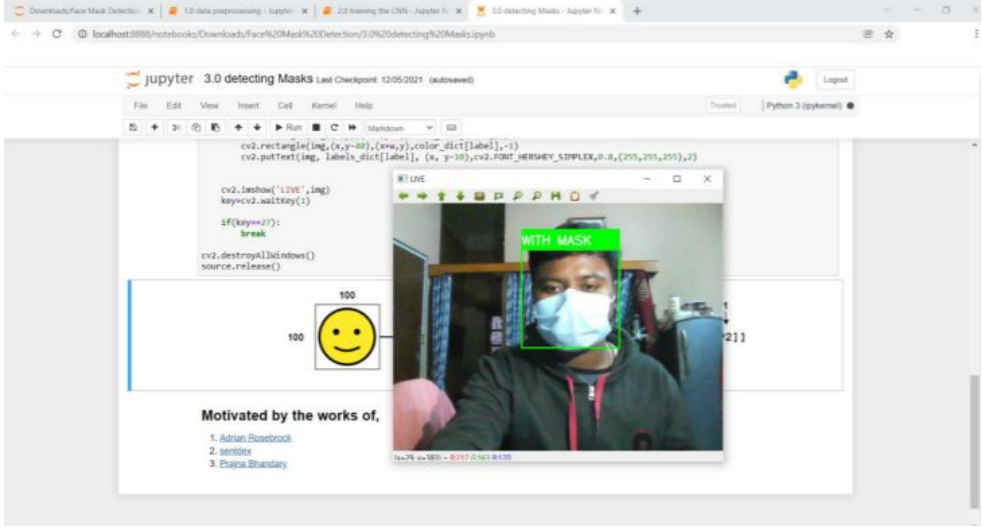
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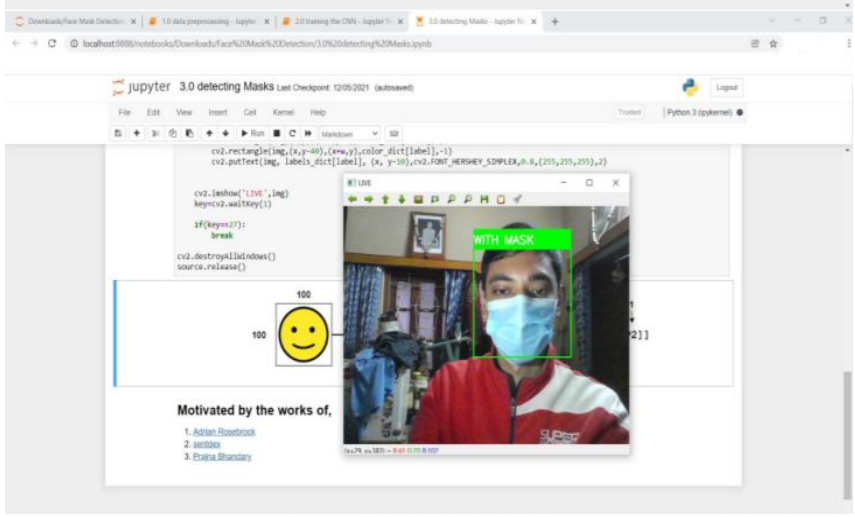
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# Future Scope

Human recognition with face mask has various applications in different domains. The various methodologies discussed in this paper can be based on the particular demands of the application. As every approach has its very own pros and cons we need to determine the best approach according to the necessity.

- Face detection is gaining the interest of marketers. It can be used at various domains like airports where this system can be of great importance at airports to detect travellers whether they are wearing mask or not. Travellers data can be captured as videos in the system at the entrance.
- Hospitals – This system can be integrated with CCTV cameras and that data may be administered to see if their staff is wearing mask or not. Offices – This system can help in maintaining safety standards to prevent the spread of Covid- 19, to detect whether the person is wearing mask or not.
- The scope of this system extends to security systems of wide range right from Malls, hospitals, IT companies and in many such public areas

# Conclusion

Due to the urgency of controlling COVID-19, the application value and importance of real-time mask and social distancing detection are increasing. This work reviewed, firstly, many research works that seek to surround COVID-19 outbreak. Then, it clarified the basic concepts of deep CNN models. Finally and after evaluating the numerical results, best models are tested on an embedded vision system consisted of Raspberry Pi board and webcam where efficient real-time deep learning-based techniques are implemented with a social distancing task to automate the process of detecting masked faces and violated or maintained distance between peoples. The embedded vision-based application can be used in any working environment such as public place, station, corporate environment, streets, shopping malls, and examination centers, where accuracy and precision are highly desired to serve the purpose. It can be used in smart city innovation, and it would boost up the development process in many developing countries. Our framework presents a chance to be more ready for the next crisis or to evaluate the effects of huge scope social change in respecting sanitary protection rules.

# Thank you