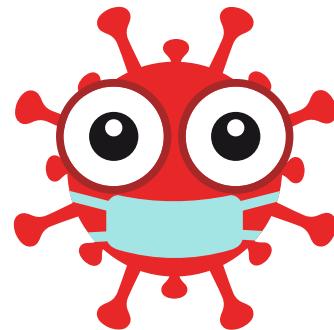


Presentation On



Face Mask Recognition System

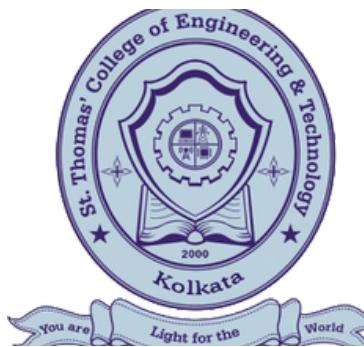
Presented By

**SAURAV PUSTI
NIKET RANJAN**

**CHIRASREE ROY
MOUPIA ROY**

Under the guidance of

PROF. SUMANI MUKHERJEE



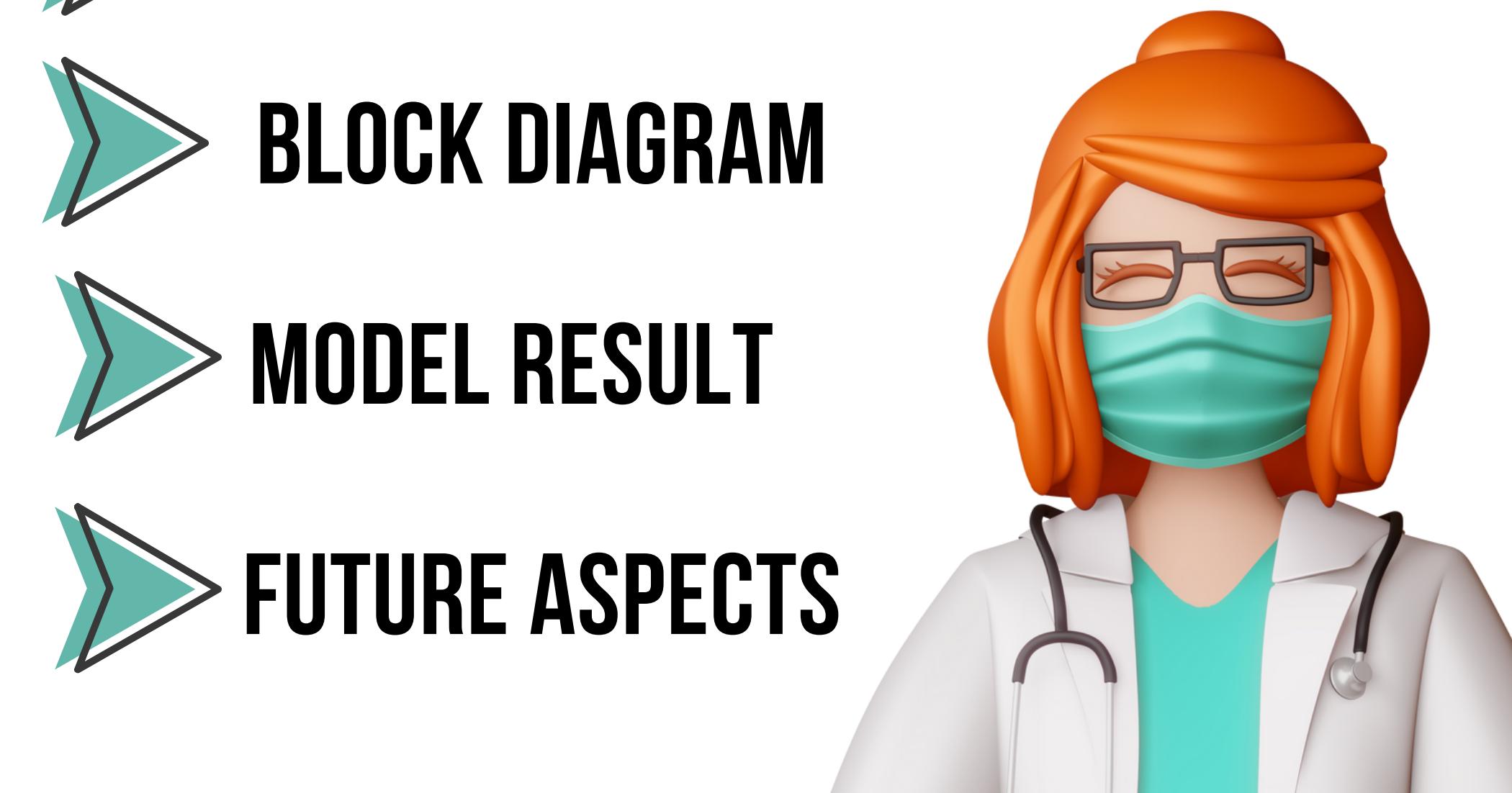
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
ST. THOMAS' COLLEGE OF ENGINEERING & TECHNOLOGY**





OUTLINES

- **OBJECTIVE**
- **INTRODUCTION**
- **PROBLEM STATEMENT**
- **LITERATURE SURVEY**
- **PROPOSED SYSTEM**
- **MODEL DESIGN**
- **COMPONENTS USED**
- **MODEL ARCHITECTURE**
- **DESIGN DETAILS**
- **BLOCK DIAGRAM**
- **MODEL RESULT**
- **FUTURE ASPECTS**





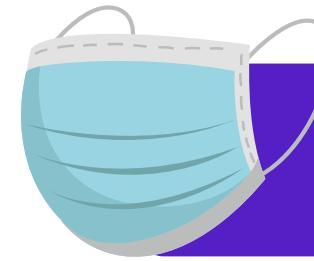
OBJECTIVE

Face mask detection refers to detecting whether a person is wearing a mask or not. In fact, the problem is reverse engineering of face detection where the face is detected using different machine-learning algorithms for the purpose of security, authentication, and surveillance.



INTRODUCTION

We are managing COVID-19 for the most recent 2 years and it can get transmitted through the air. In this way, to keep away from the immediate contact at public premises we are working on IoT Based framework which can distinguish masks, and assuming any issue appears, automatically it will send data of that individual to the proprietor or particular authorities and if it will detect mask then it will grant the access other access will be denied. The principle center is to recognize faces, not to distinguish or check it also detecting whether or not the individual is wearing a cover. Since these scenarios become vital to follow since the Covid19.and still we really want to follow these principles in light of the fact that Covid-19 isn't absolutely under control. In the future also we should be prepared for these sorts of pandemics. Likewise for safeguarding ourselves from viruses we want to observe the guidelines. We really want to check whether or not the individual wearing a mass. Along these lines, we can handle the transmission of infections or any viral illnesses which communicate through the air. Today CCTVs are utilized in many public and private regions for reconnaissance exercises we can utilize them to enforce the rules like wearing cover.



PROBLEM STATEMENT

The large-scale losses that have been noticed across the world due to the covid-19 pandemic have been highly shocking and led to much loss of property and life. The pandemic was sudden and the people and governments could not prepare themselves effectively beforehand to mitigate the effects of this epidemic. This virus is highly deadly and has caused multiple casualties which could be prevented through effective preventive measures. Therefore the use of the mask enables effective prevention and further spread of the virus which can be the main ingredient for stopping the infections in their path.

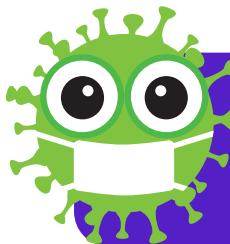
1. To ensure that the mask rule is been followed there needs to be an automatic technique that can provide highly accurate intelligent system for mask detection through image processing.
2. Wearing a mask in public settings is an effective way to keep the communities safe. As a response to the COVID-19 pandemic, we open-source a face mask detection application created by Neutral that uses AI to detect if people are wearing masks or not. We focused on making our face mask detector ready for real-world applications, such as CCTV cameras, where faces are small, blurry, and far from the camera.

LITERATURE SURVEY

Paper Name	Year of Publication	Models	Accuracy	Purpose
"Facial Mask Detection using Semantic Segmentation"	October 2019	Fully Convolutional Networks(FCN)	93.884%	To have an accurate face segmentation mask from a random sized picture.
"Crowd Counting Method Based on Convolutional Neural Network with Global Density Feature"	July 2019	Multi-column Convolutional Neural System (MCNN).	Compared with the experimental results of previous models, the index MAE is 7.1 points lower and the index MSE is 6.0 points lower.	An improved convolutional neural network combined with global density feature is proposed. Focuses on uneven crowd distribution.

CONTINUED

Paper Name	Year of Publication	Models	Accuracy	Purpose
"Deep Learning based Safe Social Distancing and Face Mask Detection in Public Areas for COVID-19 Safety Guidelines Adherence"	July 2020	Single Shot object Detection (SSD) using MobileNet V2 and OpenCV	91.7%	Focused on monitoring real time individuals and detected both, social distancing and face masks in public places and open ground areas.
"A Vision-based Social Distancing and Critical Density Detection System for COVID-19"	July 2020	Faster R-CNN and YOLOv4.	mAP (%) Faster R-CNN: 42.1-42.7 YOLOv4 : 41.2-43.5	AI based real-time social distancing detection and warning system considering four factors: (1) never record/cache data, (2) the warnings should not target the individuals, (3) no human supervisor should be in the detection/warning loop, (4) the code should be open-source.



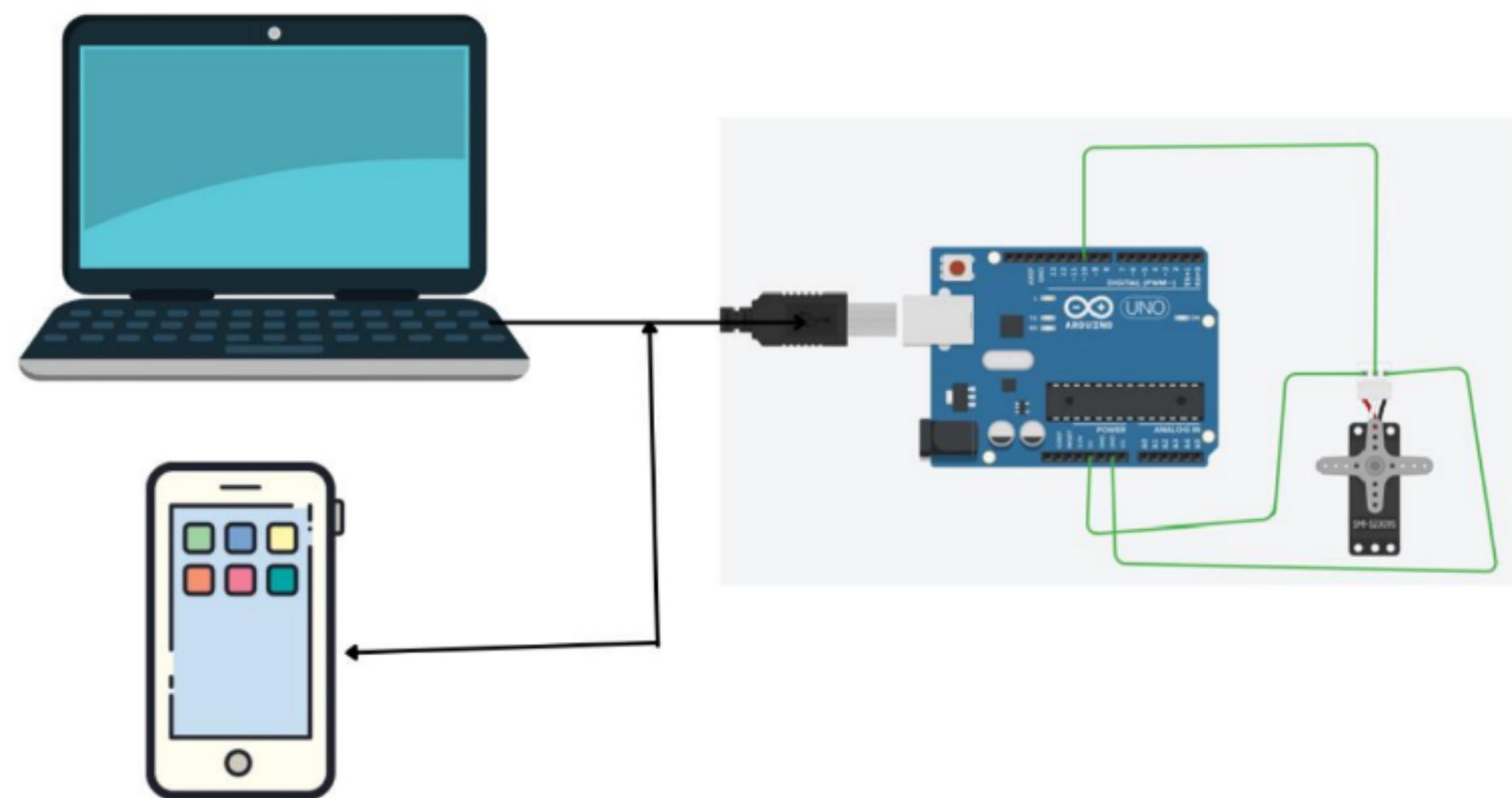
PROPOSED SYSTEM

The proposed system consists of two parts, the first one is the software part other is The hardware part. The first one is the face mask detection i.e, the software part done Using python libraries: Tensor Flow, Keras, Open CV, Sklearn, Numpy, & OS. Now, the second part is the hardware part where we have used Arduino & servo motor. This model will work for two kinds of people first they wear a face mask & the second one is not wearing a mask. In both cases, our model will work for some operations.

- In the first case, it will detect our mask using ML Model & then it will grant access to the user to enter.
- In the second case if the model detects the person is not wearing the mask, then the access will deny the user to enter.



MODEL DESIGN



Here, mobile camera & laptop camera is taking input as images.



COMPONENTS USED

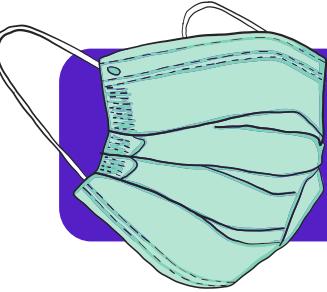
1. Hardware Parts: The hardware requirements for executing this model are:

- (a) Arduino Uno
- (b) Servo Motor
- (c) Jumper Wire
- (d) USB Cable
- (e) Mobile Phone

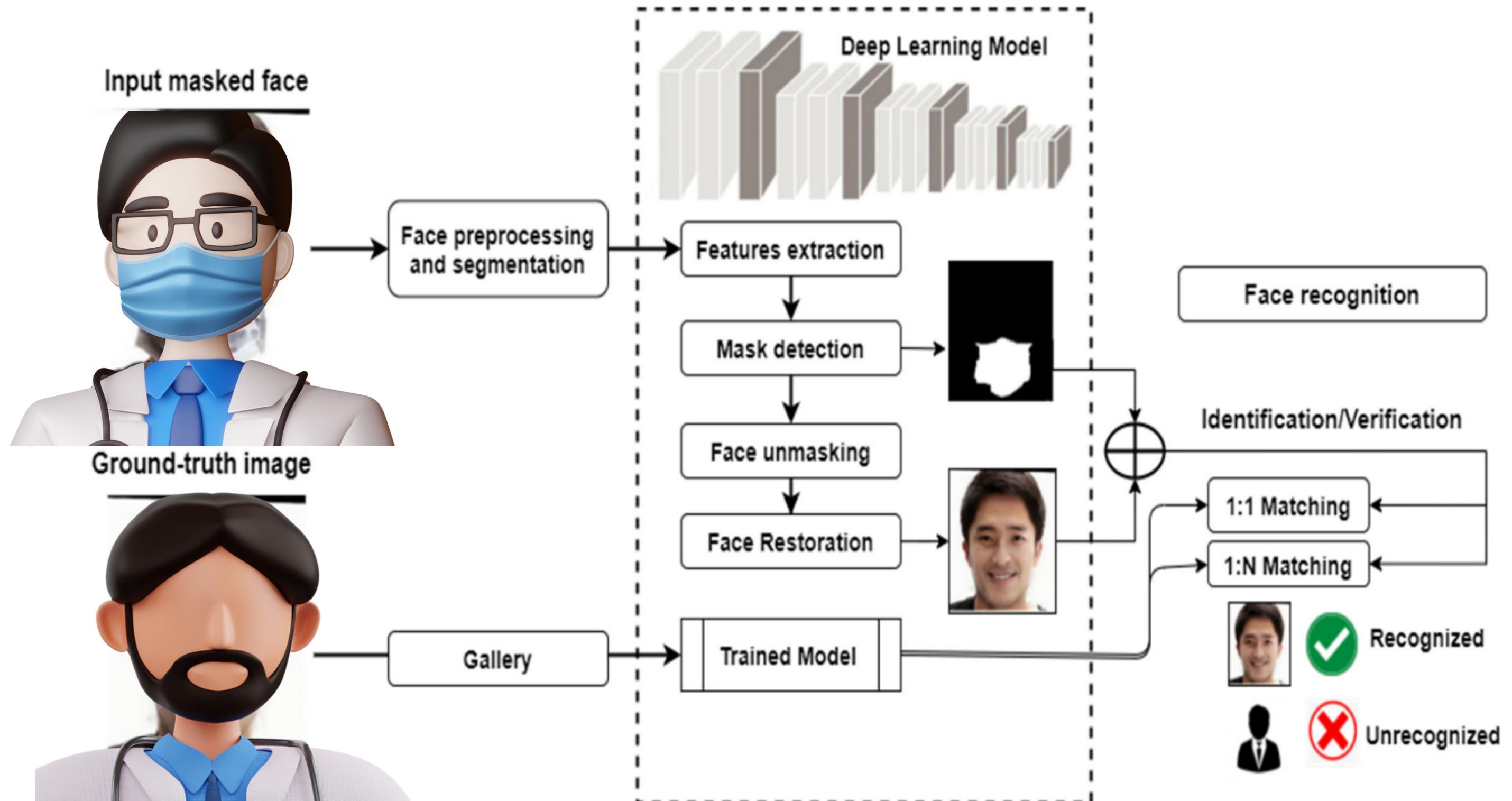
2. Software Parts: The programming language used to develop this application is Python

and the IDE used is Jupyter Notebook.

- (a) Programming Language: Python
- (b) Python IDE: Jupyter Notebook
- (c) Framework: OpenCv ,Keras, Tenser Flow
- (d) Technology Used : Web Server, Deep Learning



MASK DETECTOR MODEL ARCHITECTURE





DESIGN DETAILS

➤ TRAINING PHASE

- 1. DATA SET- MASK & UNMASK**
- 2. PRE-PROCESS IMAGE**
- 3. MOBILENETV2 - LOW LATENCY**
- 4. TRAINING - 20 EPOCHS TO GET MAXIMUM ACCURACY**

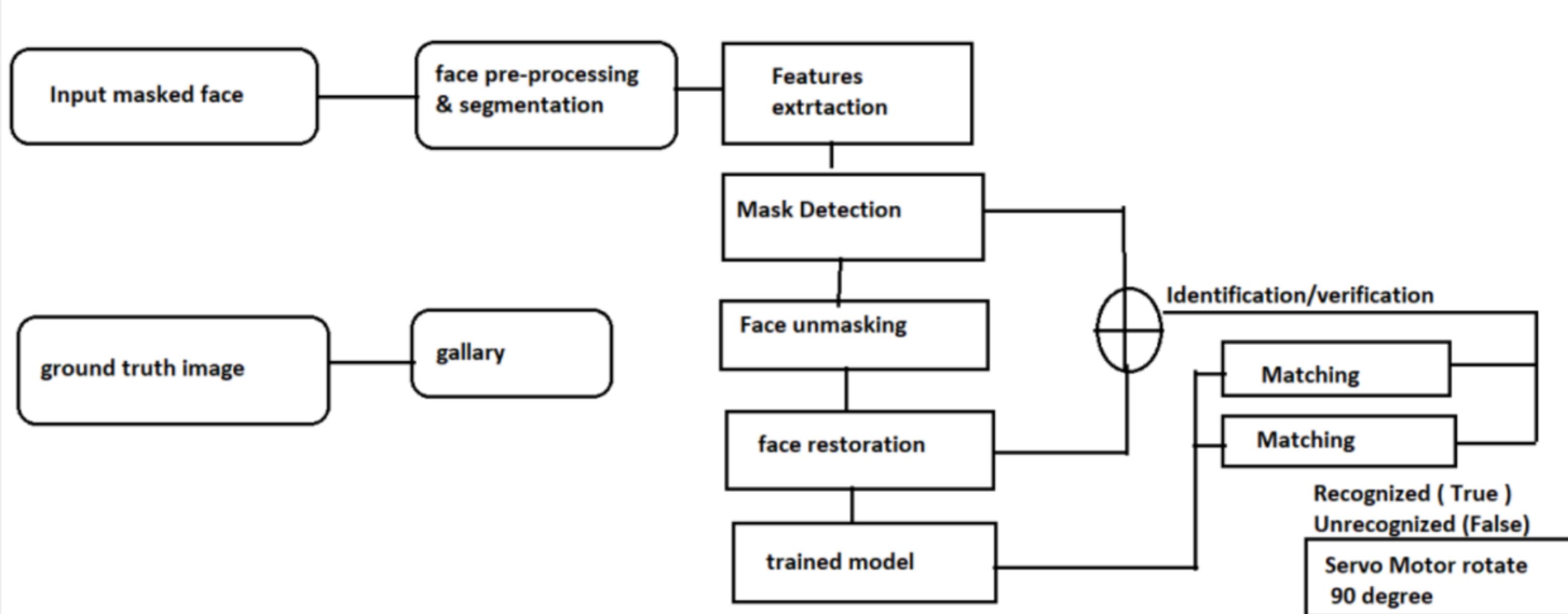
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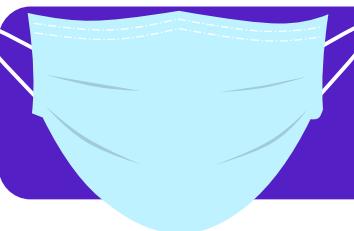


DEPLOYMENT PHASE

- 1. CAPTURE VIDEOS -READ FRAMES**
- 2. LOOPING THROUGH FRAMES**
- 3. VIDEO STREAMING- SPECIFIED AMOUNT OF TIME**
- 4. DETECTING FACES - HARCASCADE MODEL**
- 5. LOAD THE CLASSIFIER - CATEGORICAL OUTPUT BASED**

BLOCK DIAGRAM





ML PIPELINE

DATA SET

FEATURE SELECTION

DATA PRE-PROCESSING

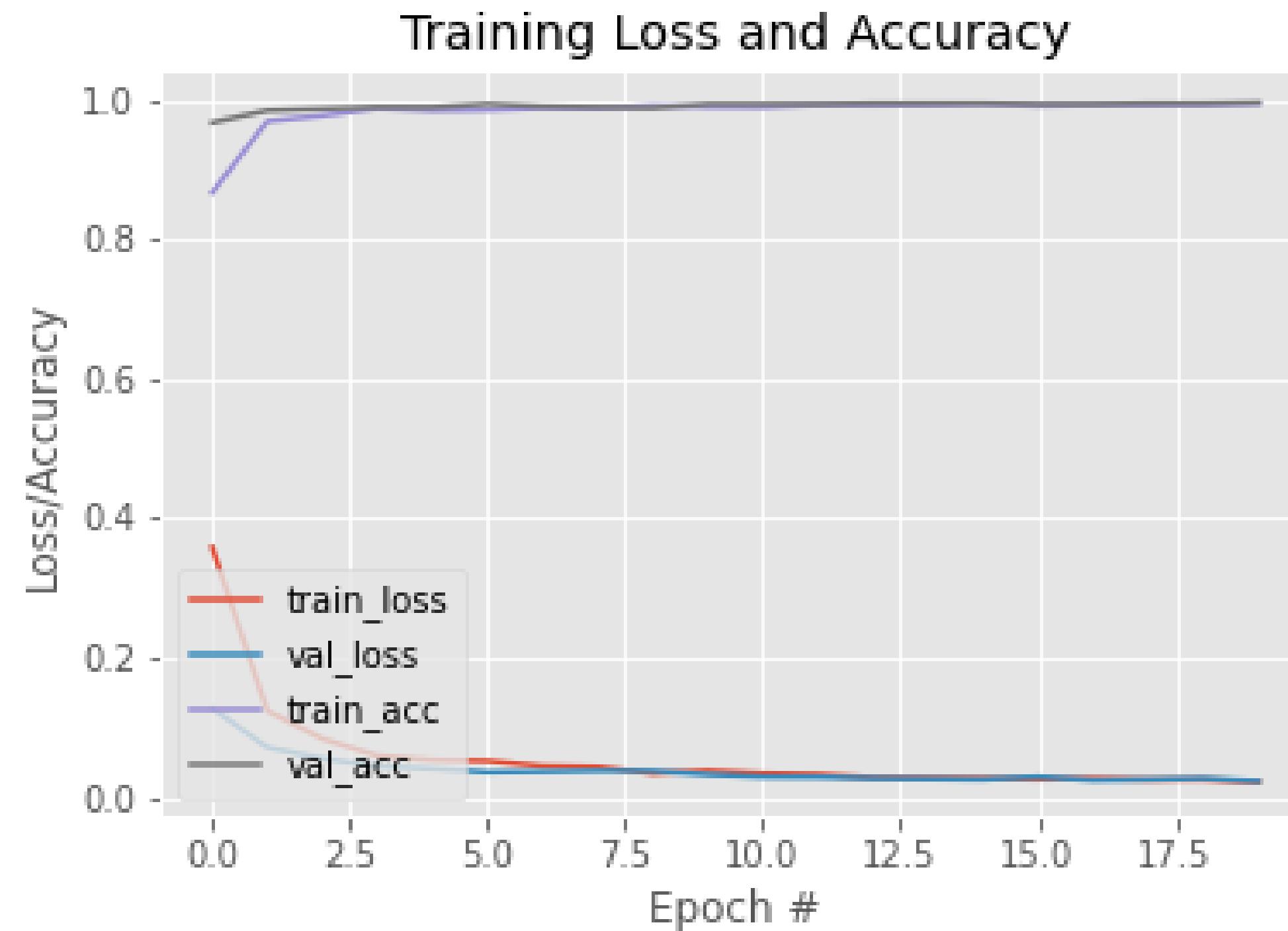
MODEL TRAINING

MODEL PREDICTION

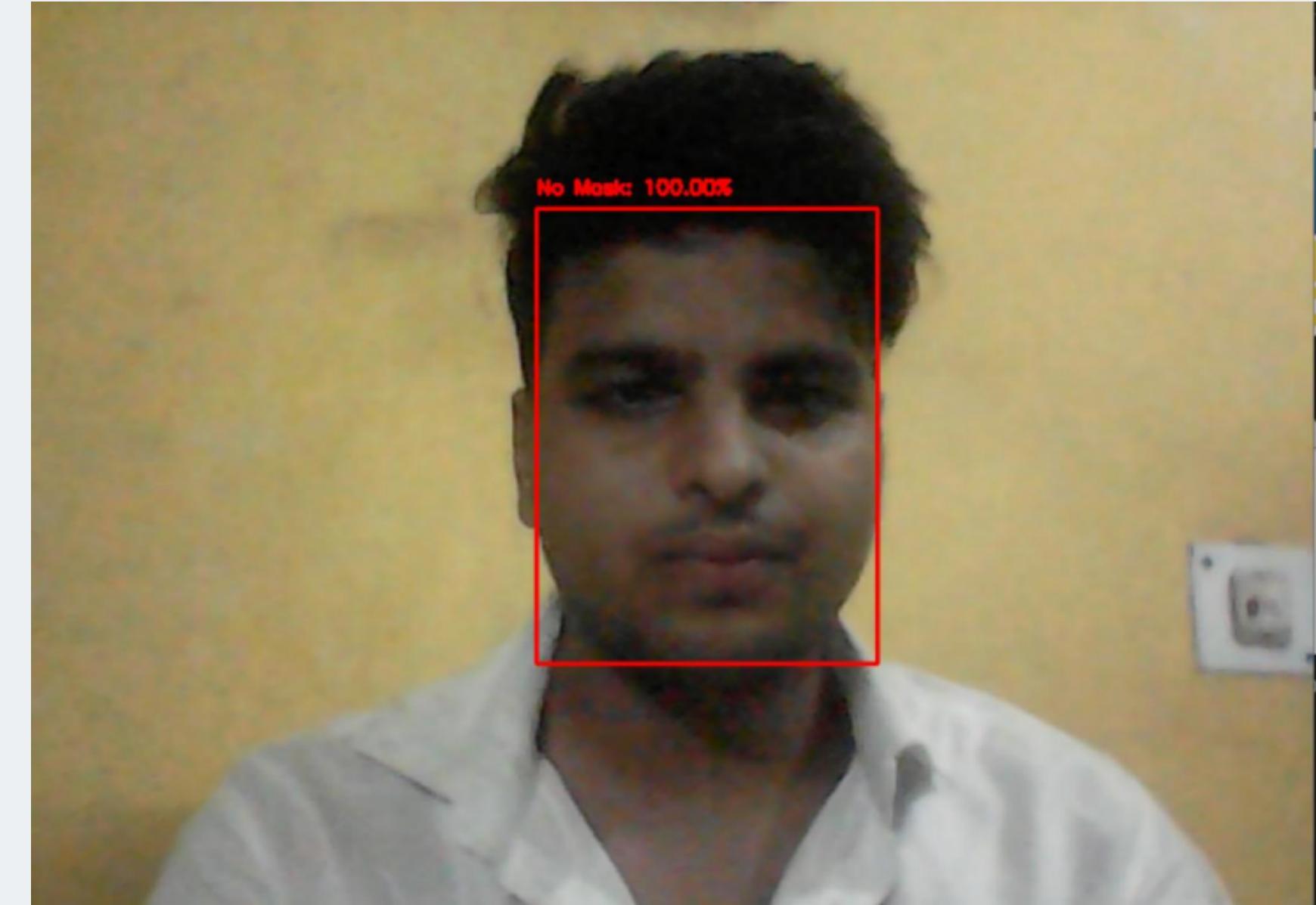
MODEL TESTING



RESULT ANALYSIS



MODEL OUTPUT



FUTURE ASPECTS

- Purpose of security
- For the Private & Public Sector
- Used in Autonomous drone systems
- Biometric scans with a mask on the face.
- Implemented in Mobile Application

CONCLUSION

Detection of various factors makes an effort at curbing the spread of Coronavirus. Face mask detection is the most important factor as to what people think of when prevention for coronavirus takes place. But, the other model proposed by us-crowd counting mechanism-is just as important. Implementation of all the methods proposed in this system will help lead-safe life in various areas and the implications of the system are long-lasting.

Corona is not leaving us anytime soon, and all we can do is try to take preventive measures in order to protect ourselves. This system does the same thing on a larger scale. It requires no human supervisor to check or keep track of the measures thereby making it an independent and truly contactless system. Taking steps to check the disease necessary effort to be taken and thus the social implications of this project are also widespread.

