

# **FACE MASK DETECTION SYSTEM**

**PROJECT ABSTRACT**

**SUBMITTED BY**

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## **INTRODUCTION:**

This project named “**Face Mask Detection System**” can detect a person in real-time if he/she is wearing a mask or not using CCTV camera with quite a good accuracy. After that, he/she is denied access to places where authorities have strictly asked to wear the face mask. After denying access to the person, authorities will get an alert email in real-time where the person’s photo will be attached. May be screen panels could be installed at the entrances where a person when denied can see a pop-up Warning Message where he/she would be advised to wear a mask before getting access. This project will be useful during the times of pandemic when people will be suggested to wear a mask when going in public. Wearing a face mask is a new norm today when going in public. It is very important to wear the mask to restrict the spread of virus.

## **PURPOSE OF THE PROJECT:**

The end of 2019 witnessed the outbreak of Coronavirus Disease 2019 (COVID-19), which has continued to be the cause of plight for millions of lives and businesses even in 2020. As the world recovers from the pandemic and plans to return to a state of normalcy, there is a wave of anxiety among all individuals, especially those who intend to resume inperson activity. Studies have proved that wearing a face mask significantly reduces the risk of viral transmission as well as provides a sense of protection. However, it is not feasible to manually track the implementation of this policy

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## **APPROACH:**

Our system consists of a dual stage Convolutional Neural Network (CNN) architecture capable of detecting masked and unmasked faces and can be integrated with pre-installed CCTV cameras. This will help track safety violations, promote the use of face masks, and ensure a safe working environment.

## **Libraries used:**

- Basic python libraries
- OpenCV
- TensorFlow

### **DATASET:**

The dataset images for masked and unmasked faces will be collected from image datasets available in the public domain, along with some data scraped from the Internet. Masked images are to be obtained from the Real-world Masked Face Recognition Dataset (RMFRD) and Face Mask Detection dataset. Our dataset also includes images of improperly worn face masks or hands covering the face, which get classified as nonmasked faces.

### **APPLICATIONS:**

This kind of face mask detection system has applications at

- Airports
- Hotels
- Public buildings like driving offices
- Temples, churches and mosques
- Educational institutions
- Other major places where large gatherings are expected

### **METHOD OF LEARNING:**

#### **Supervised learning-CNN**

A **convolutional neural network (CNN, or ConvNet)** is a class of deep neural networks, most commonly applied to analyzing visual imagery. They are also known as **shift invariant** or **space invariant artificial neural networks (SIANN)**, based on their shared-weights architecture and translation invariance characteristics. They have applications in image and video recognition, recommender systems, image classification, medical image analysis, natural language processing,[5] and financial time series

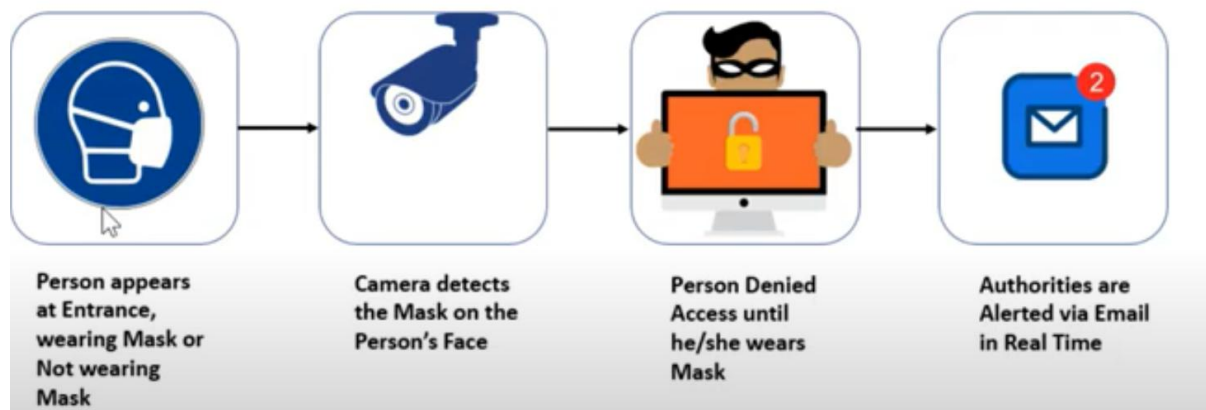
### **INPUT:**

Input is the labelled dataset which consists of images of persons wearing masks and persons without wearing masks

### **OUTPUT:**

Output is classification output i.e., mask or without mask

## **FLOW OF THE PROJECT :**



- 1) Person appears at entrance and this person may or may not be wearing a mask
- 2) CCTV camera looks for the faces and detects faces without the mask
- 3) Person will be denied access until he/she wears a mask and he/she could see a message appearing on the screen/panel flashing some kind of alert message. He won't be given access to a facility until he/she wears a mask
- 4) Authorities will be alerted via an email in real time if the person is not wearing a mask. That email could have the photo of the person as an attachment

## **EVALUATION:**

In order to evaluate the performance of the model, the following metrics will be used.

- Accuracy : Refers to the percentage of correctly classified test samples. This metric evaluates how accurate the model's prediction is compared to the true data.
- Precision : Refers to the ratio of the number of correct results to the number of predicted results.
- Recall : Refers to the ratio of the number of correct results to the number of returned results.

Higher the value of recall and precision will give better efficiency in classification

## **CONCLUSION:**

In this paper, we proposed an approach that uses CNN architecture to help maintain a secure environment and ensure individuals protection by automatically monitoring public places to avoid the spread of the COVID-19 virus and assist police by minimizing their physical surveillance work in containment zones and public areas where surveillance is required by means of camera feeds in real-

time. Thus, this proposed system will operate in an efficient manner in the current situation when the lockdown is eased and helps to track public places easily in an automated manner. We have addressed in depth the tracking of social distancing and the identification of face masks that help to ensure human health. The solution has the potential to significantly reduce violations by real-time interventions, so the proposed system would improve public safety through saving time and helping to reduce the spread of coronavirus. This solution can be used in places like temples, shopping complex, metro stations, airports, etc.