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A Result Analysis of Mask Detection based Notification System

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Abstract: ***Face mask detection system will be the best option for preventing covid-19 spread at public places. Those models are mainly required for ensuring safety and hygiene in a public premises .The research paper consist of full face scan using a pre-trained model such that all the facial characters can be imprinted on the pixel basis by the pre-trained model that takes input from the camera associated with the program. The whole of the program is based on convolutional neural networks which extract features and associate them in the form of neurons.***

Keywords: Mask detection, Convolutional neural networks, Neurons, Video proctoring, Web camera, Alert notification system .

I. INTRODUCTION

As everyone has noticed the tough times through which Covid-19 has led us to. From losses in businesses to shutdown of every business in a short-span due to momentarily lockdown by government to shutdown everything which comes under non-essential category. We will be contributing to an idea which will lead people to adhere to strictly follow Covid-19 safety guidelines, one of which is wearing of masks at public places.

A. Existing System

Existing systems only help in surveillance of people using existing camera modules installed to a central module. The camera system can be used to deploy many other features like object tracking, thermal vision etc.

B. Problem Definition

The statement is to implement mask detection feature to existing systems in such a way that if a person is detected without mask then system will generate a email-notification on authorities.

C. Purpose

The motive of the project is to deploy a full-fledged working model on the existing camera modules.

D. Goals and Objectives

The Goals and Objectives of the given system are as follows:

1) To eliminate the need of police persons at public places for the regulation of Covid-19 protocols.
2) To remove manual intervention for monitoring public places.
3) To provide locations of intruder.

E. Features

1) Face-mask Detection.
2) Deployment on multiple cameras at a time.
3) Alert in real time to respective authorities.
4) Remove the need of external graphics card to detect faces in real-time.

F. Proposed Architecture



Fig – Proposed Architecture

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II. METHODOLOGY

In this approach, the software which we generated will be clubbed with the existing system in such a way that, the system will be analyzing face masks along with the regular monitoring purpose. The system works on the pre-trained model which once trained can be used at multiple places. The model while training was fetched with images labelled as "Mask" and "No Mask" by us. The model uses concept of taking input via camera and then converting it into BGR format, then again converting it into fixed size numpy array.

We used Tensorflow and OpenCV to train the model using Google colab. The model while training extracts pixel specific features from datasets, which in turn helps it to perform sementation in labels, while working on real-time face detection on camera modules connected to a central identity. We just needed to perform addition of each camera once on the central system using cv2.capture() function.

The overall system finds the difference of pixels in real-time by capturing and analyzing frames, then classifies the person in wearing or not wearing mask, and if mask is not detected then it will generate a custom notification along with location of the camera with the help of SMTP libraries. Thus, respective authorities could be alerted to take action against the intruder.

A. Software Requirements

1) Programming language used – Python
2) Libraries – Tkinter, CV2, Keras, SMTP
3) Frameworks - Tensorflow

B. Area of Project

Artificial Intelligence, Video- Proctoring, Deep-learning, CNN

C. Advantages

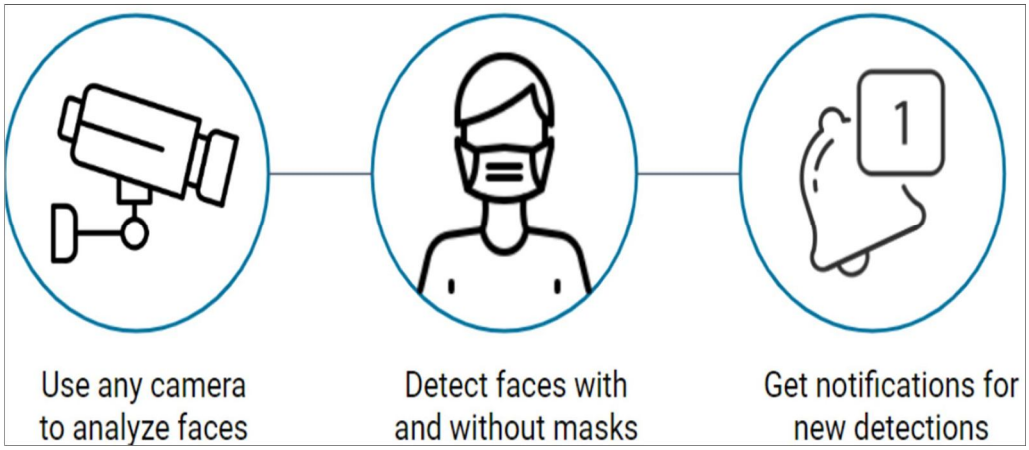
1) Application could be easily deployed on any surveillance camera.
2) Reduce number of mask rule intruders.
3) Tracking via address of premises where intruder was detected.
4) Instant generation of Alert for Respective Authorities via screen pop-up.

D. Limitations

1) For taking action authorities have to manually send their person to fine the intruder.
2) The system currently needs at-least integrated graphics support.
3) System security depends on surveillance system.

III. RESULTS

It gives perfect detection once deployed after training. We implemented this system on multiple cameras at the same time, and it notifies once intruder gets captured in camera, then the system notifies with an email.

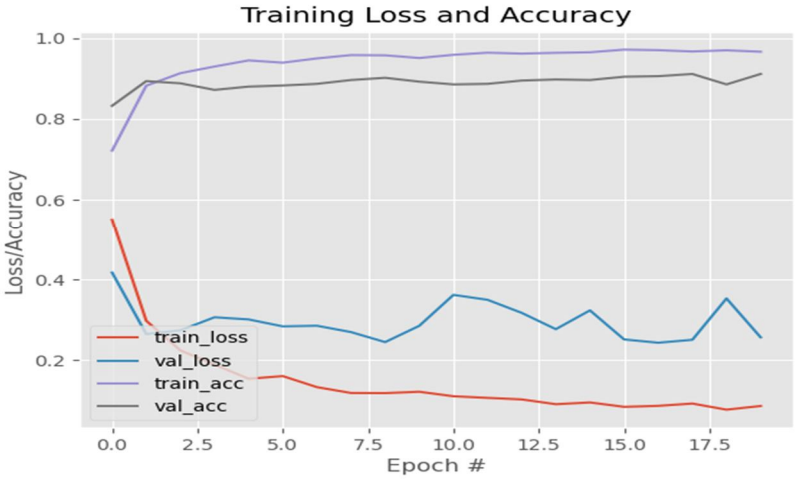


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The following figure shows the system implementation as per the requirement of his project.



And the following diagram shows the accuracy we achieved while training the model.



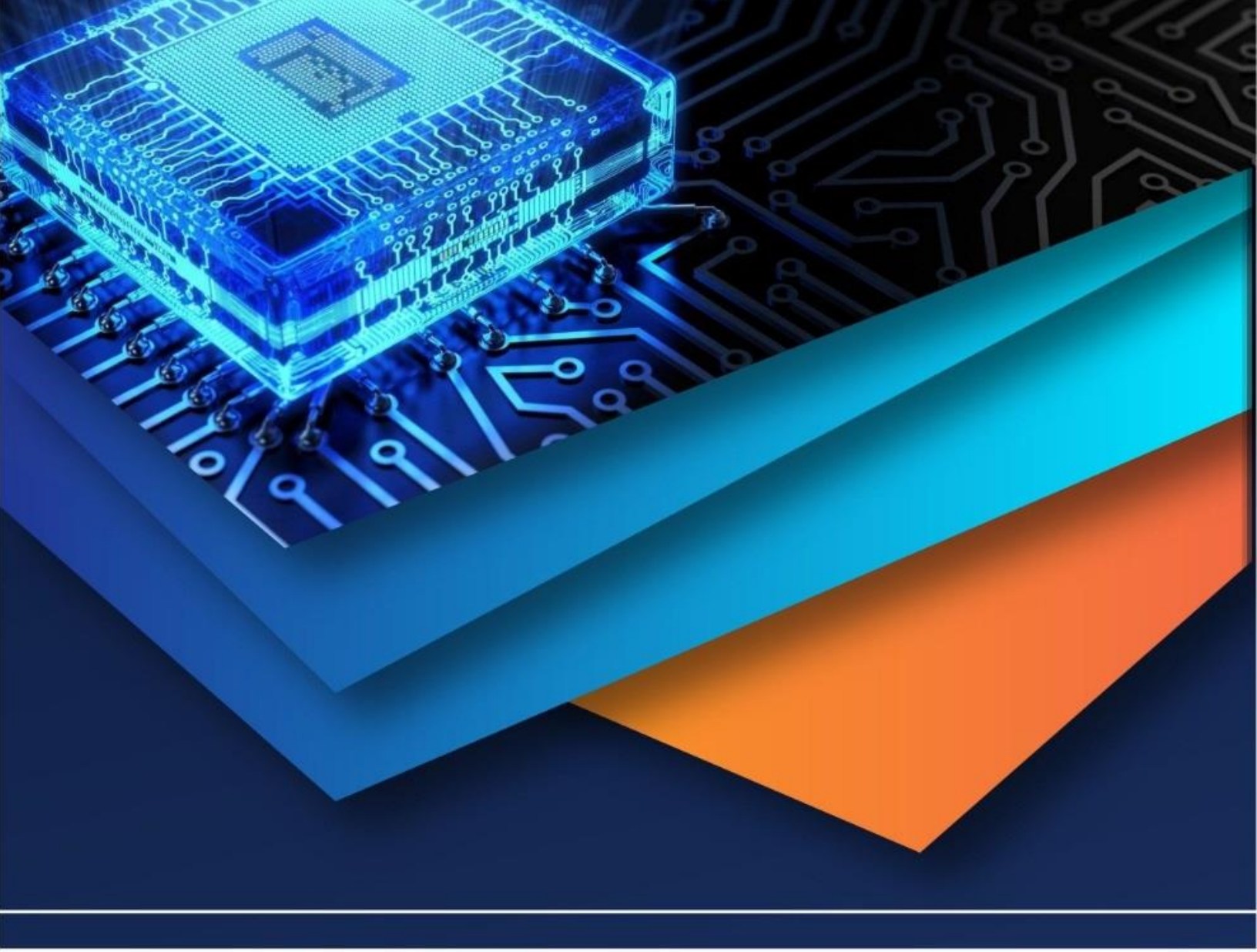
IV. CONCLUSION

The proposed system detects mask whosoever comes in front of cameras, installed in public premises. The existing camera modules in colab with the pre-trained module of us to detect an intruder not following mask wearing protocols. The notification generated by system will be in the form of email and will be an instantaneous process, so that action could be taken against the intruder. The system works in a seemless way with the existing system.

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