Mobile Net SSD Based Face Mask Detection and Crowd Monitoring Using Python Open CV

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Abstract - *In 2020 covid become the biggest threat to the whole world. It started affecting people's day to day life. many people lost their love ones in these years. Thus, the emphasis is on taking extensive precautions such as social distancing, wearing a mask and using sanitizer etc. which is great for everyone's health but taking care of this that others are following this precautions or rules in public places are difficult to do manually and to overcome the problem we can use system who has mask detection and people counting program. Which requires more processing because we work with real time video, so our technique is to transform a color image into binary for diminish the data of image. In this proposed system commuting processing time is an necessary part to build a powerful effective working system. Checking whether the people wearing a mask or not and then counting a peoples based on head detection and evaluating that count of people to system is basic goal. There are four important features in this proposed system mask detection, crowd counting, alarm alert and scan ID. The main features are mask detection and people counting. A technique for mask detection uses three different steps estimating eye line, facial part, and eye detection is used in this system. Alarm alert is used to alert the peoples who are not wearing mask or wearing a mask improperly in the public places.*

*Key Words***:** *Convolution Neural Network , MobileNet SSD, Dataset*

INTRODUCTION

Nowadays people are more concern about their health. specially after the global pandemic everyone realize that taking care of ourselves and taking necessary precautions are important but sometimes taking precautions in public places are difficult because Some people follow them and some don't meanwhile knowing the fact that covid virus is dangerous for us some people just ignore or disbelieve. Also in public crowded places we cannot ensure that everyone is following the rules. In such places chances are very high of spreading the virus. WHO (World Health Organization) also said that avoid going to public places, wear mask to avoid getting

contact with virus, maintain a social distancing and used sanitizer if you going outside touching anything just maintain hygiene for your own health. but at some point we need to go to public places and we cannot avoid that for that the automated system are very helpful to maintain all rules and precautions precisely. The system uses head detection to detect the person and also count every person to maintain the count using that we can avoid more peoples in one shop also we can maintain social distancing between them. After that face mask detection also detect the face first for mask detection and alert them if they are not wearing the mask. By ringing the alert alarm which is already set in the system. This system can be very useful for public places like shops, malls, school, college and public transports etc.

RELATED WORK

Misbah Ahmad [3], m this paper, a deep neural network model SSD(Smgle Shot multibox Detector) is explored to solve problems like perspective distortion, variations in human pose, size or orientation, which gives a better accuracy

Akshay Mangawati [5], This paper elaborates the exhaustive survey of various object tracking algorithms under different environmental conditions and identifies efficient algorithms in various types of tracking

Prof P Y Kumbhar[7]. In this paper the author presents that face detection is an computer technology that determines. location and sizes of human faces in digital umage, which detects face and ignores other things like buildings, trees or bodies Locating and tracking human faces is a prerequisite face recognition analysis

Zebin Car [9]. In this paper we propose a people counting method a crowded scenes by detection the head information from the video taken from a camera installed straight down on the ceiling is proposed for people detection Combining the bead detection and tracking together a people counting strategy is presented to count the number of the people in the video frames

Heemoon Yoon[10]. Withm this paper the aim is to develop an user friendly Graphical Framework for object detection

API on TensorFlow which is called TensorFlow Graphical Framework (TF-GraF) The TF- GraF provides independent virtual environments according to user accounts in server-side, additionally, execution of data preprocessing, traming, and evaluation without CLI m client-side Since TF-GraF takes care of setting and configuration, it allows anyone to use deep leammg technology for their project without spending time to mstall complex software and environment.

Gretchel Karen L Alcantara[11], In this paper, the researchers familiarizes and exposes themselves with Open CV OpenCV is an open source computer vision library that is written m C and C++ Furst the group aims to have a deeper knowledge and understanding about head detection and tracking using OpenCV.

SYSTEM ARCHITECTURE
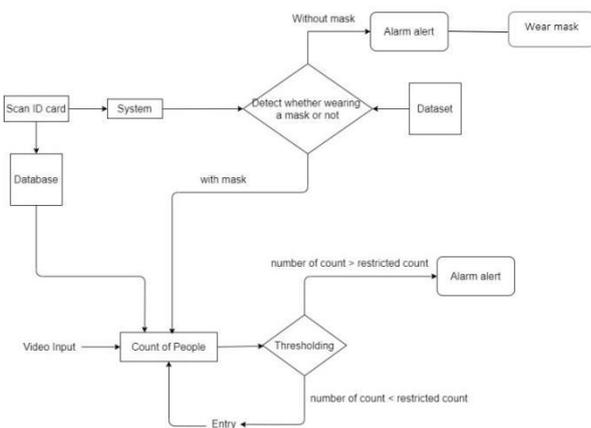
METHODOLOGY

The Crowd Monitoring and Mask Detection is a easy device used for humans counting and detection of masks in crowded places. This device makes use of Convolution Neural Network (CNN), that is an photograph category set of rules as nicely as MobileNet SSD that is used for the same. CNN is made of neurons, every having an unbiased weight assigned to it. CNN is a category of deep neural networks particularly used for photograph popularity and photograph processing. MobileNet is a easy however green and now no longer very intensive convolutional neural community for cell imaginative and prescient applications. MobileNet is broadly used in lots of actual-international applications which consist of fine-grained classifications, item detection, face attributes, and localization. CNN takes the enter as an photograph, identifies and assigns precedence to numerous capabilities

of the photograph and it differentiates the capabilities. Mobilenet is a neural community this is used for category and popularity while the SSD is a framework this is used to comprehend the multi detector. Only the aggregate of each can do item detection. SSD may be interchanged with RCNN. The preprocessing required for CNN is much less and has the ability to research photograph characteristics. CNN includes numerous units of convolution layers, pooling layers, flatten and dense. The units of convolution and pooling layers are used for function extraction and the wide variety of such units may also vary. Convolution layer is the primary constructing block of the CNN and is used for extracting capabilities from an enter photograph. The proposed device makes use of Convolution version which includes a couple of layers for the motive of function extraction from the photograph. Training statistics is furnished to the version for higher prediction of humans sporting a masks or now no longer. The category of humans sporting masks, the enter video is transformed into frames after which into RGB layout after which is flattened in matrix to extract the data with the aid of using convolution layer. Multiple convolutional layers used to offer higher predictions with better accuracy. The masks detection device float the use of CNN with MobileNet set of rules is used on this device as it consumes much less statistics processing time. The trying out of the module is accomplished the use of actual time snap shots of humans with mask and no masks to mirror the accuracy of the version. Hence, the version classifies the actual time humans counting and mask detection in an green way.

IMPLEMENTATION
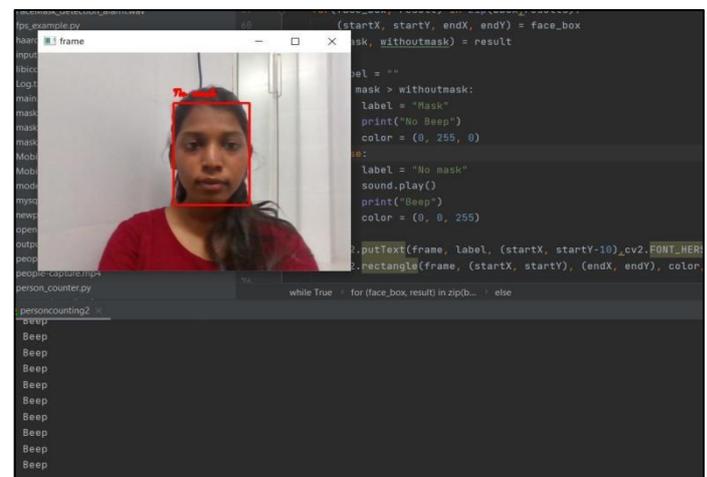
Figure 1: No Mask Detection

Figure 1 represents part of face mask detection here we used A technique for masked face detection which involves three

different steps estimating eye line detection, facial part detection, and eye detection is used in this system. Then it will detect the face then if the person is not wearing a mask or wearing a mask inappropriately it will show the 'no mask' message after that it will start a beeping sound to alert the person. the sound will be continuously beeping until the person wears a mask.
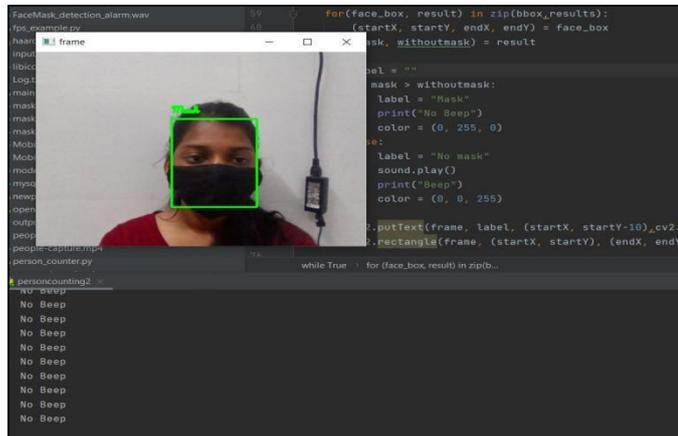

Figure 2: Mask Detection

As shown in the 1 figure This 2 figure is similar to that but here you can see the face detection is done with no beep sound because the person is wearing a mask. also it displays a 'mask' message and green color if the person is wearing a mask properly.

This system only allows those persons who are wearing mask also the employees who works there has to wear mask before entering shop if they are not wearing mask their entry will be prohibited and alarm will be alerted.
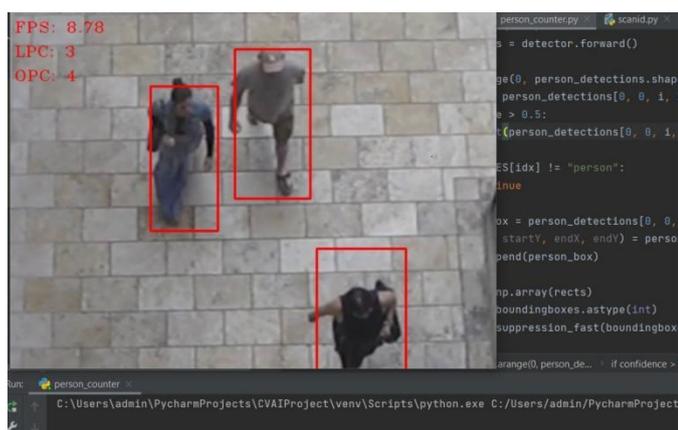
Figure 3: Persons Count

In this 3 figure we are counting how many people are entering the shop. We can take the count of that using this. here you can see we have two values LPC and OPC that stands for live person count where we can see the count of persons who are in the frame or we can say coming to the shop and the other one is OPC which is overall person count that showcase the

count of people who enter the shop or how many persons are there in the shop.

CONCLUSIONS

The mask detection system we have used CNN with Mobile Net algorithm because it consumes less data processing time. This System keeps count of people to manage crowds. Ny keeping the Pandemic situation in mind we have added the Mask-Detection feature so if the count exceeds the count which is set or if the model recognize or found that people are not wearing masks then the alarm gets alerted. This system will reduce the time taken for humans for counting or checking purposes and ensure them, this work is done by the system itself in no time. We reduced the human errors as the system itself gets trained through large datasets. This process give good accuracy and requires less time. Because the system ia get trained itself by doing the same tasks of detection of mask so that there is less loss and provides a better accuracy. As this system is still under progress so we can't predict accurate accuracy but it gives good accuracy.

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