

Facial Mask Detection System based on COVID-19 Protocol

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Abstract:- A mask detection system which compares the images of faces with and without masks, and alerts the user to follow covid norms without any manual intervention using CNN-convolutional neural network and facial recognition algorithm while creating an alert mechanism for the general public. In this report, in order to address the issue of the masked face region, we propose a model based on discarding the masked region and deep learning-based features.

Keywords:- Deep learning; CNN; MobilenetV, OpenCV.

I. INTRODUCTION

It has been almost 3 years that we are facing the wrath of COVID-19 all over the world affecting the lives of many people. India is also not far away from this. India recorded one of the worst effects of COVID leading to the economical crisis. Lots of people lost their lives. Lockdown was imposed leading to strain on the world economy. After the two waves got over, relaxations were given. WHO gave instructions on how to take care of this virus. They said that masks are a great weapon to keep coronavirus away. Proper sanitization should be maintained whenever people go out. People after getting relaxed in covid regulations started going out. Often we saw people not maintaining social distancing when going out in public places. As we know how important it is to maintain social distancing, sanitization, and wearing masks when we go out in public. After the revocation of covid rules, we have seen people going out in crowded places without masks and maintaining social distance. Surveys tell that almost 90% of people are aware whereas only 40 percent of people wear masks. From these surveys, we will say that people often neglect to wear masks either because they are not comfortable or they don't believe that there is such a thing called covid. This kind of behavior by people leads to the quick spread of covid viruses rapidly affecting the lives of many people. The WHO has thus said that only wearing masks and maintaining social distancing is the key to keeping away the virus. The areas where people are freely moving without masks are the key culprits. Also, the people living in rural areas where there is no proper awareness, need to be aware of these facts and tips to keep away these viruses. This uncertain outbreak of the COVID-19 virus has led us to the importance of wearing masks in public places and keeping us safe from such viruses.

II. METHODOLOGY

A. System Design

Software design should be a method for converting requirements into the appropriate representation on a regular basis. This graphic will be used to construct the structure and targeted plan diagrams, as well as the mission method.

B. Existing System

Yolov3 is now being used to construct a system that is aware of face masks. They introduced a spine community that will distribute more resources inside the current system, and they used Glou and focus loss to speed up the coaching process and improve performance. It has an accuracy rate of 86 percent. When using the appliance with one-of-a-kind algorithms, the accuracy will be doubled.

C. Proposed System

The mask detection in the proposed machine has been done using MobileNet V2. In comparison to the previous system, MobileNet V2 will be able to detect face masks in a large group of men and women and provide greater accuracy. As a result of the entry dataset and therefore the segmented photo of the equation being received as output, provide an image of some persons wearing masks and now without wearing masks. The mannequin is then performed employing a camera, with the video being checked by way of body and scaled as needed. The preprocessing feature is then used to encourage the impacts of those wearing masks and those who aren't.

III. RESULTS & DISCUSSION

The primary goal is to come up with an idea that can motivate people to wear masks in public places by detecting the people who are not wearing masks. In order to address the issue of the masked face region, we are proposing a model based on discarding the masked region and deep learning-based features. We will detect the people who are not wearing masks by eliminating the masked faces using the Neural Network algorithms. After recognizing the facial features and checking if the faces are with or without mask, an alert can be triggered to them for following the covid rules and regulations.

A) Image Segmentation using Mask CNN

The Mask R-CNN is a CNN for image segmentation and event segmentation that is built on top of a quicker R-CNN that can come across objects and limits. Instance segmentation or instance recognition is the process of detecting all objects in a photograph and segmenting each event. It emerges as a result of the harsh realities of object detection, localization, and classification penalties. During this method of segmentation, a clear separation between each item classified as a similar circumstance is noted. Everyone is treated as a single entity during the event segmentation process. It's also known as foreground segmentation because it works on the picture's subject matters rather than the background-CNN and can produce two outputs for each object, a class label, and a bounding field offset, whereas Mask R-CNN can produce three outputs, including article masks in addition to the class label and bounding container offset. The more masks output is exclusive from the opposite two outputs, implying that the finer the spatial design of an item, the more masks output is required. Mask R-CNN is a faster version of R-CNN that includes an output for object masks in addition to current outputs such as classification labels and bounding boxes.

B) Implementing the Model in OpenCV

The model will be constructed with the help of a webcam, which reads the video frame by frame and resizes it as needed. Then, in connection with the accuracy in %, the preprocessing feature is known as achieving the final result of human people wearing masks and now not wearing a mask.

C) Implementing the Face Recognition

The method of detecting a human face using technology is known as facial reputation. Biometrics is used in a facial reputation device to map face functions from a picture or video. To find a match, it compares the information to a database of known faces.

Step 1: Detection of Face

Both by myself and in a crowd, the digital digicam recognizes and locates a snapshot of a face. The image might also show the character searching ahead of time or in profile.

Step 2: Analysis of Face

Following that, a snapshot of the face is taken and examined. Because it may be simpler to integrate a 2D image with public photographs or those in a database, most facial interest period is based on 2D as a potential rather than 3D images. The gap between your eyes, the depth of your eye sockets, the space from the forehead to the chin, the form of your cheekbones, and the outline of your lips, ears, and chin are all crucial factors that the program interprets. The objective is to learn the facial landmarks, which are perhaps the most important aspect of facial recognition.

D) Sending SMS and Email to Person who is not wearing Mask

We're employing a face recognition system to identify folks who aren't wearing masks, which will aid us in locating their information. We will send a preventive message in the form of SMS and email to such persons in order to reward

them, advising them to wear masks in public. We utilized Twilio for delivering SMS, which provides programmable communication tools for sending and receiving text messages via its web service APIs, and the smtplib module for email, which simply establishes an SMTP session for the client object and can then be used to send mail to another computer.

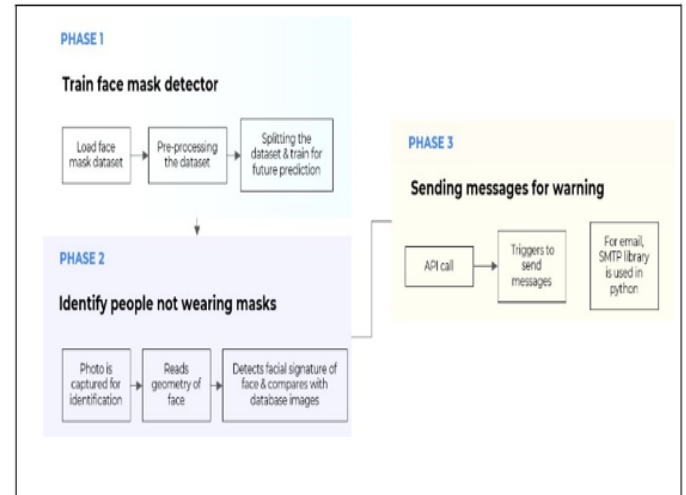


Fig 2: General Frame of connection of the above modules

IV. CONCLUSION

In this mask detection, we used the MobilenetV2 set of rules to correctly distinguish persons wearing masks and those without masks, as well as send an email to those involved. Its overall performance in photographs is generally accurate, and our detecting effects were also rather accurate. This detection will be utilized for video flow or digital digicam-fed inputs, as well. This can be used in places of work and establishments by way of training the database with personnel photos or students' photos and by way of face reputation, and the character is diagnosed by way of a mobile number that is unique for each person, and other information about the individual is obtained from the database, and it will be simple to tell that specific character or beneficial for taking any actions concerned. The suggested version can be improved by including other aspects such as the number of persons and the social distance between individuals.

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