Prediction of COVID Face Mask Detection With Email Warning Using Deep Learning Technology

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Abstract: After the breakout of the worldwide pandemic COVID-19, there arises a severe need of protection mechanisms, face mask being the primary one. The basic aim of the project is to detect the presence of a face mask on human faces on live streaming video as well as on images. We have used deep learning to develop our face detector model. The architecture used for the object detection purpose is Single Shot Detector (SSD) because of its good performance accuracy and high speed. Alongside this, we have used basic concepts of transfer learning in neural networks to finally output presence or absence of a face mask in an image or a video stream. Experimental results show that our model performs well on the test data with 100% and 99% precision and recall, respectively. Identifying a person by face is quite a trend nowadays. but here we are going to check whether the person is wearing mask or not. And then we can detect whether the person is an authorized person or an unauthorized person. We are going to use the Open-CV and CNN (Convolution Neural Network) to detect the presence of mask and to detect the person's identity. For face detection, Haar-cascade is used, for face recognition Eigen faces and fisher faces are used. When we find an unauthorized person. The system can be able to generate an alert e-mail and send it to the concerned e-mail address. And the graphs are drawn using Matplotlib library.

Keywords: covid, facemask, deeplearning, detection, email, warning

I. INTRODUCTION

There are several countries in the world that have actually made mask wearing mandatory by law, and it has been observed that certain private organizations in the other countries have also been following in their footsteps. In vast establishments, it's hard to ensure that people are adhering to these crucial social distancing rules. To allow for easy tracking of such violators, an automated system is an absolute need of the hour. Recognized this need and have developed a model particularly suited to detect certain violations in real time. The first use of our model is to actually detect people's faces to determine whether or not they're wearing an acceptable mask. The second use is to determine whether or not social distancing is being maintained between 2 individuals, in the most efficient, accurate and simple manner, hence requiring overseeing authorities to take minimum effort. Here we introduce a mask face detection model that is based on computer vision and deep learning. The proposed model can be integrated with surveillance cameras to impede the COVID-19 transmission by allowing the detection of people who are wearing masks not wearing face masks. The model is integration between deep learning and classical machine learning techniques with opencv, tensor flow and keras. We have used deep transfer leering for feature extractions and combined it with three classical machine
learning algorithms. We introduced a comparison between them to find the most suitable algorithm that achieved the highest accuracy and consumed the least time in the process of training and detection.

II. MOTIVATION

To reduce the possibility of infection, it is advised that people should wear masks. Deep learning has gained more attention in object detection and was used for human detection purposes. Develop a face mask detection tool that can detect whether the individual is wearing mask or not.

III. SCOPE OF THE PROJECT

This can be done by evaluation of the classification results by analyzing real-time streaming from the Camera. In deep learning projects, we need a training data set. It is the actual dataset used to train the model for performing various actions. This method was developed with a efficient way of the people who are not wearing a face mask are notified to officials by email.

IV. OBJECTIVE

The main aim of this work is face detection in video or images. To identify dissimilar patterns in images that can give a sign of irony. Build a model that classify new not in the past seen documents with an accuracy statistically higher than the proposed baseline. An important sub goal we have is to get hold of high-quality data that enable us to reach our detection. Detecting the face detection images only using the main concept of CNN.

V. EXISTING SYSTEM

The LDA is a method to find a linear combination of features which characterize or separate two or more classes of objects or events. Linear classifier can be obtained from the resultant. Large number of pixels are used to represent face mask in computerized face mask recognition. Before classification Linear discriminant analysis is used to reduce features and makes it more manageable. New dimensions are a linear combination of pixel values which forms a template.

Disadvantages:
• Although LDA is one of the most common data reduction techniques, it suffers from two main problems: The Small Sample Size (SSS) and linearity problems.

Linearity Problem:
• LDA technique is used to find a linear transformation that discriminates between different classes.
• However, if the classes are non-linearly separable, LDA cannot find a lower dimensional space.
• In other words, LDA fails to find the LDA space when the discriminatory information is not in the means of classes.

VI. PROPOSED SYSTEM

The main aim of this work is face detection in video or images. To identify dissimilar patterns in images that can give a sign of irony. Build a model that classify new not in the past seen documents with an accuracy statistically higher than the proposed baseline. An important sub goal we have is to get hold of high-quality data that enable us to reach our detection. Detecting the face detection images only using the main concept of CNN.

Advantages:
• The main advantage of OpenCV compared to its predecessors is that it automatically detects the important features without any human supervision.
• It is used for real time videos which are recorded at public places for surveillance.
• Instead of images, videos are used as an input which is the big advantage of this system on the previous once.
• It is used as a precaution for the human safety from the killer virus like COVID-19 or any other upcoming viruses.
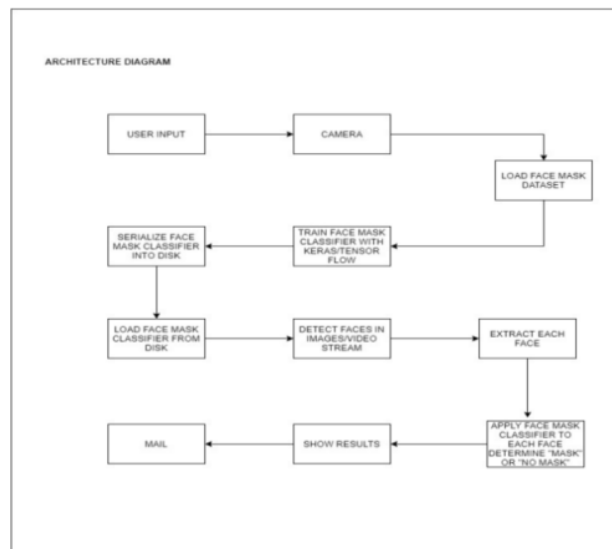

Fig. System Architecture

VII.   CONCLUSION

To mitigate the spread of COVID-19 pandemic, measures must be taken. We have modeled a face mask detector using SSD architecture and transfer learning methods in neural networks. To train, validate and test the model, we used the dataset that consisted of masked faces images and unmasked faces images. These images were taken from various resources like Kaggle and RMFD datasets. The model was inferred on images and live video streams. To select a base model, we evaluated the metrics like accuracy, precision and recall and selected MobileNetV2 architecture with the best performance having 100% precision and 99% recall. It is also computationally efficient using MobileNetV2 which makes it easier to install the model to embedded systems. This face mask detector can be deployed in many areas like shopping malls, airports and other heavy traffic places to monitor the public and to avoid the spread of the disease by checking who is following basic rules and who is not.

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