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Covid-19 Face Mask Detection using Support Vector Machine

Afiya Khanum, Mr Sunil M.D
Dept. of ECE JNN College of Engineering Shivamogga, India
Dept. of ECE JNN College of Engineering Shivamogga, India

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ABSTRACT— Covid-19 epidemic has caused worldwide health emergency hence useful safety method is to wear face-mask in the public-spaces as per the World Health Organization. Coronavirus epidemic has made governments all around the world for imposing lockdowns for preventing infection transmissions. The report shows that wearing facemasks during work decreases the transmission risk. The effective and productive method of utilizing artificial intelligence for creating protected surroundings in the production step.

Keywords–Covid-19, Facemask detection, Support Vector machine, OpenCV, Tensorflow and Keras.

I. INTRODUCTION

Covid-19 seriousness indications are completely different, going through undetectable to dangerous. Serious sickness is further probable in older corona-virus-patients, just as the individuals who have basic clinical status. Coronavirus forwards when human does inhalation in air polluted via drop and little airborne-particle. Danger of inhalation all of this within has been most important when individuals will be within close contact, however these will be breathed to about prolonged spaces, especially inside. Spreading can likewise happen whenever sprinkled or showered with polluted liquids.

A face-mask-detection model is introduced here that depends on machine learning algorithm, Support Vector Machine and also the libraries with Opencv, Tensorflow and Keras. This model is combined with surveillance cameras to prevent the Coronavirus spreading through permitting detection of person that who are wearing facemask and not wearing mask.

This paper implements to develop model using Support Vector Machine and PC Web Camera to detect people with or without-masks. This helps for implementing the face-mask-detection model in college, airport, office and hospital at point where possibilities of coronavirus transmission is more. The objectives are;

- Training deep-learning-model for detecting either individual is wearing-mask or not.
- Training model utilized by means of deep learning.
- To use the date collection images to build a SVM model using TensorFlow to detect face-mask by using the webcam of PC.

II. SYSTEM ARCHITECTURE

For training facemask detector, figure 1 is broken into two phases, along with step by step stages. In first phase that is training, facemask detection set of data is loaded from disk, then model is trained using tensorflow and keras over dataset and then facemask detector is serialized to disk. In the second step deployment, after training the face-mask-detector, one is able to load face-mask-detector followed by face-detection subsequently identifying faces with or without-mask.

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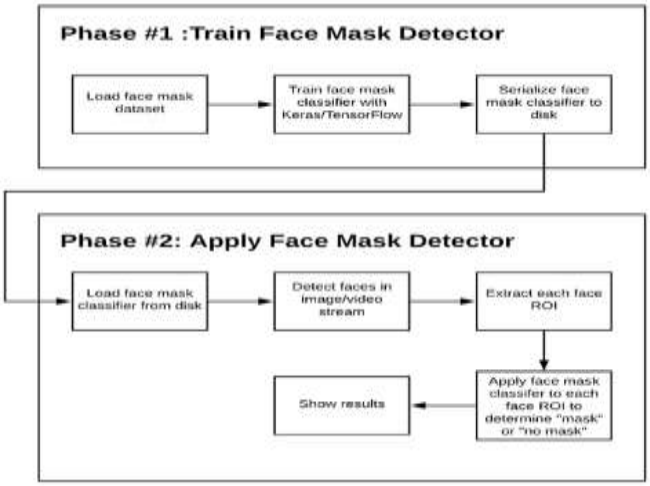

Fig 1: Face-mask-detector phases and its particular stages

III. METHODOLOGY

The proposed methodology focuses on face mask detection of people from which they will be safe and it comprises of three steps:

A] Training a facemask detector

B] Plotting

C] Detecting facemask video

First script accepts input collection of information and then fine tunes the MobileNetV2 over it for creating one's-mask detector prototype. The second script is one that trains history which contains accuracy and loss curve and the third script uses webcam to apply face-mask-detection each frame within stream.

After reviewing face-mask-information collection, we are going to find out by what means tensor flow and keras are used for training classifier that involuntarily identify either individual wearing the face-mask or no.

In order to complete the work, structural design of mobilenetv2 is fine tuned. The use of face-mask-detector for the sake of emitting device is able to decrease fabrication price of those system, therefore this is the reason to employ above structure.

Implementation of path of imutils allows for finding and to enumerate images within information collection and Matplotlib is used for plotting training curves. The final step is to plot the graph that is accuracy or loss versus epoch that is efficiency.

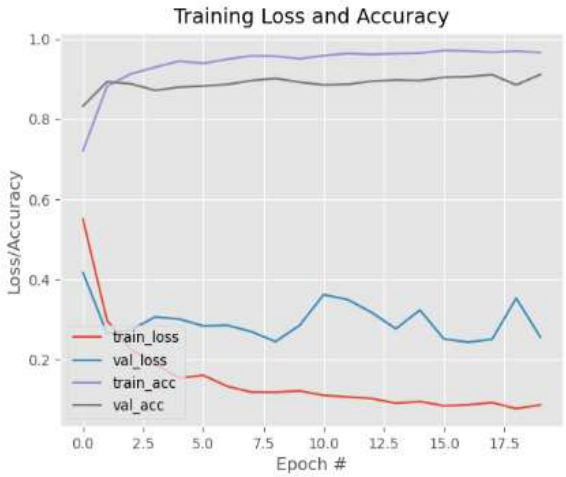

Figure 2: The plot between loss/accuracy and epoch which is efficiency.

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IV. RESULT AND ANALYSIS

Fig 3: Facemask detector distinguished numerous individuals those wearing face-mask by various situation as of one another.

In figure 3a-c, three individuals are standing at different position wearing the facemask which verifies that facemask detected will be steady in detecting the face mask of user with the confidence percentage of each user. In figure 4a, when first person with white T-shirt is trying to remove his mask, the mask detector has identified him with no mask and other two who are wearing mask as with mask.

Similarly in fig 4b-c, facemask detector detects individual's face who is wearing mask as with mask and who is not wearing as without mask.

Fig 4: Face-mask-detection distinguished not-wearing individual by means of various point of posture.

V. CONCLUSION

In this project, we figured out how to make a covid-19 face-mask-detector utilizing OpenCV, Keras/TensorFlow and SVM. To make the face-mask-detector, here we prepared two-class model of individuals wearing face-masks as well as individuals those not wearing face-masks then MobileNetV2 is adjusted on our mask and no-mask dataset and achieved classifier which is approximately 99% precise. Then, at that point we brought this face-mask-detector and employed so on to pictures and real-time-video-stream by identifying faces within pictures/video, taking out every individual face and implementing our face-mask-detector. Therefore, our face-mask-detector is precise and since we have utilized MobileNetV2 framework, it's moreover

approximately capable thus making it simpler for deploying model to embedded-systems.

VI. FUTURE SCOPE

In the future, facemask detector will help to reduce spreading of covid-19 as safety is the key to prevention in the crowded areas like colleges, offices, airports and so on.

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