Covid 19 Facemask Detection

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Abstract **- COVID-19 is one of the challenging task that has caused huge problem in our country. To reduce the spread of coronavirus. The World Health Organization (WHO) has recommended to wear mask and use sanitizer and maintain distance. People used to often wear mask. To reduce this pandemic, the researchers are trying to find solution to these problems. We have developed a new algorithm that is based on deep learning and computer vision. Convolutional neural network algorithm is being used and we make use of MobileNetV2 architecture for image detection. The CNN will abstract all the pixel details. In this we also make use of binary classifier which will find any face is being present in the frame irrespective of its arrangement, starting from RGB image of any size. Training the dataset is done with fully convolutional network. It helps in detecting multiple face in a single frame.**

Index Terms **- Computer Vision, Tensorflow, Keras, CNN algorithm.**

I.INTRODUCTION

Due to the growth of COVID-19 virus and continuous lockdown across the country made people conscious. Before this pandemic people used to put mask to care for their health from air pollution. The World Health organization has suggested to wear mask and maintaining social distancing of about 2m among people to avoid the risk of virus to enter our body through nose (oral cavity). The government has forced the people to wear mask in public area. Accordingly, many methods have been organized to train the people regarding the precautionary measures to be taken to reduce the virus to enter our body. Many companies, industries and organization will have many CCTV cameras installed in it for security purpose. Monitoring in large group of people is very difficult. The motive is to reduce the virus transmission. The face masks come in different size, colors and shapes, the face mask detection is one the challenging task. To solve problem, we will propose a face mask detection algorithm that is based on computer vision and deep learning. Deep Learning technique is used to classify the mask or non-mask faces. If non mask face is detected an alert email will be sent to authorized user. So that the user can alert that person. The system is an integration of Deep learning and machine learning technique with OpenCV, tensor flow and keras. The neural model will give good accuracy. Hope this prototype will be helpful to Aware in People.

II.RELATED WORKS

Alyuz, B. Gokberk, and L. Akarun [1] Low occlusion with masking projection. Advancement in sensor technology have made the three dimensional biometric a great choice, mostly in security application. Moreover, dealing with occlusions is one of the greatest challenge. It should be treated as fully automated security system. This document proposes 3-D face recognition system face recognition system is powerful to occlusion. We will encounter two problems: 1. Processing occlusion for surface alignment 2. Dealing with missing data for sorting the subspace analysis methods. For problem caused during aligning they used an adaptively selected model based scheme. In this scheme face model is chosen for masked face. During grouping process, a masking policy called mask projection is recommended for the use of subspace analysis with partial data. Moreover, a regional program for occlusion were included for classification to produce the result. Discussion: Face recognition can be done easily. It will not be able detect masked faces, it achieves high computation. Bagchi,D. Bhattacharjee, and M. Nasipuri [2] Strong 3D face identification with occurrence of posture and half occlusion or lost parts. This paper provides a robust 3D facial recognition system that can handle

both posture and occlusions in real world. The system at first takes 3D extended image as input and saves it using ICP (Iterative Closest Point) algorithm. ICP is used to create input surface. A common model that minimizes the gap between a probe model and a gallery model. However, ICP performance is based on initial condition, so you must provide an initial registration. This will iteratively improve and eventually converge to the best alignment possible. Depth map value for 3D images. Once congested area is detected, a principal component analysis (PCA) is performed and recovery image is sent to identification system for classification after removal of congested block. The feature removed from unhindered face postures were recreated. The tentative effects obtained during facial image show the plane. Discussion: Easily implement facial recognition using machine learning. Mask recognition cannot be performed and it takes more time. U. Din, K. Javed, S. Bae, and J. Yi [3] Original GAN-based setup for rendering covered (mask) face. Latest Deep Learning based image editing techniques have shown promising results in deleting object in an image but the satisfaction of removing large objects that can complicate the nature of the image. You won't get good result. The purpose of this task is to remove masked objects in the face images. This problem is challenging because (1) In most cases, this problem is difficult the mask covers large area of face. (2) with or without mask will not be there for training. In the first step binary segment of the masked area is automatically generated. The second step is to remove the mask and synthesize the affected region in detail while maintain the overall uniformity of the facial structure. This network is created using 2 classifiers, one to learn the overall structure of the face and other to focus learning on the region of missing depth. It surpasses other typical approaches in qualitative and quantitative. Discussion: Use of Neural Network gives the flexible of face recognition. It is inaccurate. Drira, B. Ben Amor, A. Srivastava, M. Daoudi, and R. Slama [4] ,3D Face identification under occlusions, and Posture Dissimilarities. We endorse a unique geometric framework for studying 3-D looks, by means of particular dreams of relating, toning their figures. At this point we constitute postures with the aid of using radiated arcs originating from the nostril indicators plus usage of flexible form evaluating those arcs produces a Riemannian structure for studying forms of complete posture surfaces. The demonstration in Riemannian metric, appears herbal for finding posture distortion and strong in demanding situation which includes big facial expression, big posture deviations, lacking elements, and incomplete occlusions because of goggles, fur, and further more. In phrases of the empirical evaluation, our consequences fit or enhance upon the modern day strategies on 3 outstanding databases. FRGCv2, GavabDB, and Bosporus. From theoretic viewpoint, this structure permits for proper numerical readings, which includes valuation of lacking posture elements to use PCA to curve area and finding common structure. Discussion: Identifies facial expression with higher result and higher performance. But mask isn't identified in this. Duan,J.Lu,J. Feng,and J. Zhou [5] Topological conserving essential Toning for identifying spontaneous Half Appearance. Here we endorse TPGM approach for recognizing part face. Mostly this method abstracts capabilities from full snap shots. Conversely pictures in real life can be blocked with the aid of gadgets or different images, which can't offer complete snapshots for depiction. On the other hand, they measure the node wise connection without better direction of symmetrical graph evidence, there might be risk of noises. Transformation is done for encoding next level symmetrical shape. We endorse topology retaining similar structure for collecting a better shape and estimating alteration. Discussion: New consequences are broadly used for facial facts units display to leave behind maximum present modern day face reputation strategies. It is most effective explains approximately idea of face and identification.

III.PROPOSED SYSTEM

Once Know the Existing System, concluded that this detection part is based on camera processing. So drawbacks will overcome with AI techniques to handle automatically. For this we applied a neural Network Concept. Here one of the Architecture Mobile Net v2 used in CNN Algorithm to predict the Desired mask classification. The Dataset is collection of human faces with divide into two parts: with mask and without Mask. Once its trained by the network it will capable of detection. Now we Pass our sample inputs through camera to identify. If the person is without mask a mail will be sent to authorized user.

IV.ARCHITECTURE

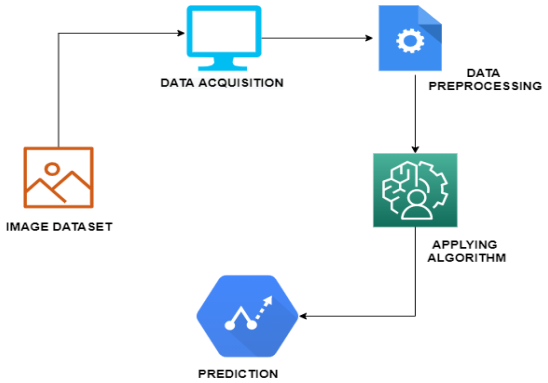

figure 1. architecture

Step1: First Collect the Dataset;
Step2: It will Load to algorithm for training;
Step3: Compare with images with Trained Model;
Step4: Prediction is made with mask or without mask;
Step5: If without mask mail will be sent to the user.

Algorithm is like a machine; we need to train them using some data. Here for training we are using images and we will convert the images with mask and without mask into arrays. We need to pass all the data to CNN algorithm. It'll observe all the data called as labels. We need to divide the data or images to arrays which are numbers. Data stored into labels which are converted into label binarizer i.e., it'll be converted as numbers as JPEG, PNG etc, formats are not understood. We are dividing the images into two parts: with mask and without mask. (Split size =0.8) Once the input image is passed the data enter into algorithm it will train the train data i.e., It'll compare with training data and predict the data with mask or without mask.

The architecture that is used here is Mobile Net V2. It is very faster process and it uses less parameter. It has multiple layers: i) the data will be read as arrays (i.e., the image will be converted to arrays) ii) convolutional layer and pooling layer: It'll observe and extract the features of data like color, pixels etc. and training themselves and ones it'll get all features of the data it'll move to next layer that is fully connected (Classification layer) (its help for classifying the images with mask or without mask), in that dataset images will be stored. Any image that is identified will be added to label (Which category it belongs to). iii) the method is using matrix method. It'll be classified based on the input given. Array conversion is the property or value it'll identify all the features in pooling layer and finally classification is done. iv) Pass input image it'll go through the algorithm and retrieve the features and classification is done. After comparison of the data is done and it'll check whether the model or property is already there and it will make prediction whether the input image is with mask or without mask.

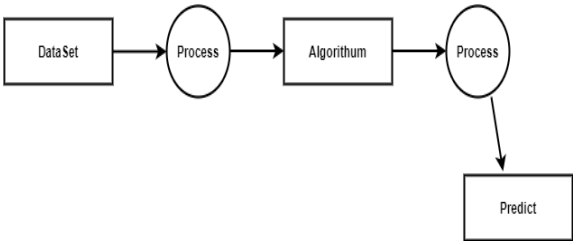

figure 2. data flow diagram

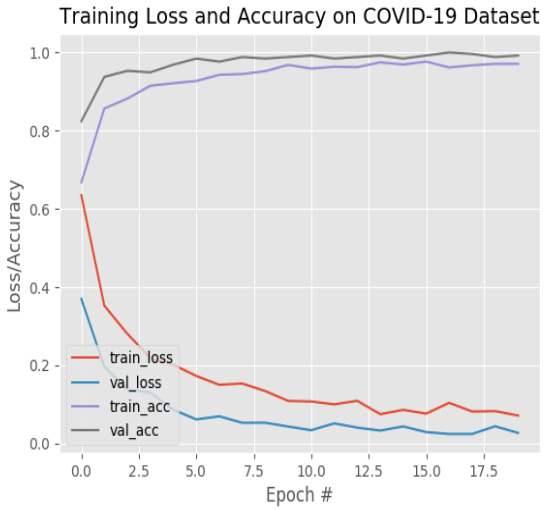

figure 3. training loss and accuracy

V.RESULT ANALYSIS

Dataset that is used are images with mask and without mask

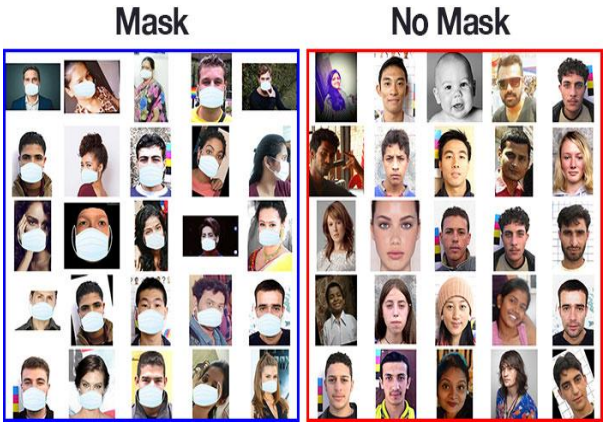

figure 4. dataset images

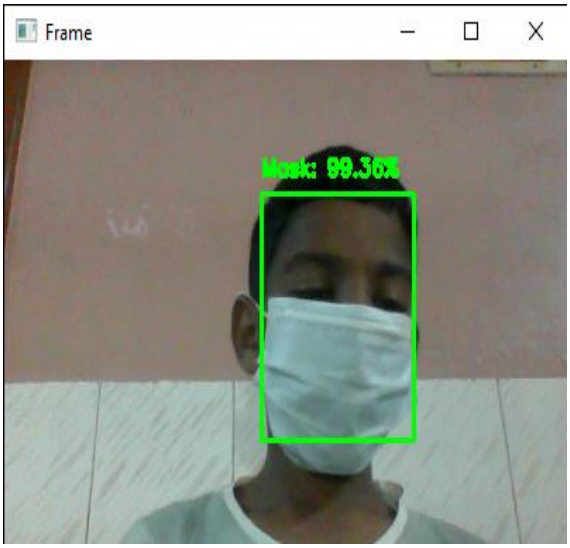

figure 5. with mask

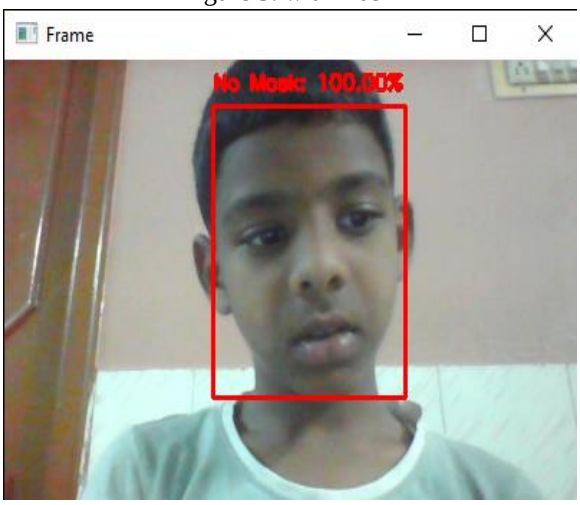

figure 6. without mask

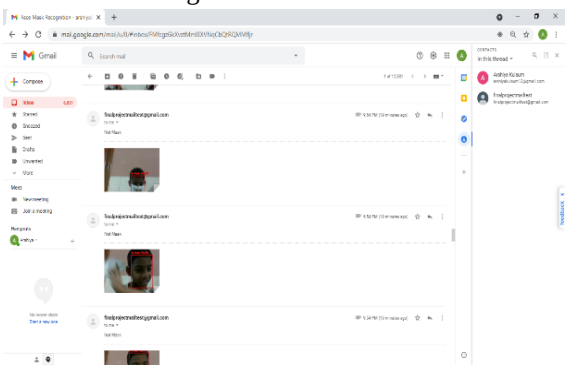

Figure 7. Notification sent to user

VI.CONCLUSION

We have verified our outcomes on multi human parsing dataset. The proposed model can detect multiple faces in a single frame. This approach is helpful for facial mask detection. It uses computer vision to monitor face mask detection to maintain a safe environment in our plants in post COVID world.

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