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FACE MASK DETECTION AND COUNTER IN THINGSPEAK WITH EMAIL ALERT SYSTEM FOR COVID19

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Abstract - *Due to this unexpected pandemic, we are going these days, wearing a face mask became mandatory to save ourselves as well as others from the virus. But it is difficult to monitor every customer whether he is wearing a mask or not. But it is very important. So, to overcome this problem we came up with a solution to monitor every customer using a deep learning concept. So, we are developing a face mask detector with OpenCV/Keras and updating the count of customers waiting outside with an email alert system if at least one customer is not wearing a mask. This helps us easily identify the customers wearing masks or not, which helps us to take safety measures according to it. We tried using different types of platforms such as mobilev2net and resnet architecture but the accuracyof resnet architecture is more compared to the other architecture (Size 10 & Italic , cambria font)*

Key Words: **Mask detection, OpenCV, E-mail, Thingspeak**

1. INTRODUCTION

As we all know that there is an ongoing pandemic of coronavirus disease 2019 (COVID- 19) which is accelerating day by day, self-protection is the only wayout which can be done by wearing masks. Given this current situation, our team decided to make a face mask detector with people counter and an alert system. The basic task at hand is to check whether the person is wearing a mask or not through an available image or video. So in this era of automation and artificial intelligence, we decided to come up with a project that isgoing to automate the process of face mask detection using open CV and deep learning thereby making the lifeof frontline warriors easy. Developing this face mask detector is not only the way but we should develop it in amore portable way that can be used in any area. So, to make it portable we are using a Resnet classifier. This is the only way to make this project portable and user- friendly. There are two phases in this face mask detector.Phase1: Train the face mask detector. Phase2: Apply face mask detector. Phase 1 is the basic step in which wewill train the project using the datasets and train it to vary between different types of images. This will be the testing and comparison set to the real images. In phase 2,the given image is compared with the stored dataset and gives us the original output of whether the person is wearing a mask or not. The detailed explanation is in phase 2 the face mask classifier is loaded from the disk, then the camera detects the image and extracts the ROI of each face. This ROI is applied to each face mask classifier to detect the mask. Finally, it gives the output

1.1 OBJECTIVE

We aim to design a hands-free entry system using a face mask detector in surveillance to combat the further spread of the virus. This will ensure to reduce the transmission of pathogens on high-touch surfaces, like door handles, and to prevent entry in a community area without a face mask. To accomplish this task, we will fine-tune the Resnet architecture which will help us train hundreds of layers quickly and make sure that there won't be a drop in the training percentage.

1.2 PROPOSED SYSTEM

We will take an input from Realtime video as an input and this video is processed using the algorithm developed by us. We use the testing algorithm to detect if the person identified in the image is wearing a mask or not this then gives a digital output which includes the status of the person and the accuracy of the output. This output will be displayed on the screen

1.3 LITERATURE REVIEW

[1] The vision towards computers is changing every 13 months. During this change using computer technologyin the neuro-scientific field also came to light in which this face detection is also one of the parts. [2] Algorithms based on principal component analysis are the basis of numerous studies in neuroscience and algorithmic face detection literature. eigenvector is one of the main concepts in differentiating and grouping thedata to train the device.

[3] Every face is treated as a two-dimensional face rather than three-dimensional oneto make identifying easier. But these images can be identified in any colour but the image should not be tinted with green colour.

[4] A view-based multiple-observer eigenspace technique is proposed for use in face recognition under variable poses. In addition, a modular eigenspace description technique is used which incorporates salient features such as the eyes, nose, and mouth, in an eigen feature layer. This

modular representation yields higher recognition rates as well as a more robust framework for face recognition. An automatic feature extraction technique using feature eigen templates.

[5] For face detection, Haar-Cascades were used and for face recognition Eigenfaces, Fisherfaces, and Local binary pattern histograms were used. The difference between face detection and identification is that face detection identifies a face from an image and locates the face. Face recognition is making the decision" whose face is it?", using an image database. The technologies are available in the Open-Computer-Vision (OpenCV) library and methodology to implement them using Python.

[6] Human face localization and detection is often the first step in applications such as video surveillance, human computer interface, face recognition and image database management. Locating and tracking human faces is a prerequisite for face recognition and/or facial expressions analysis, although itis often assumed that a normalized face image is available.In this paper we intend to implement the Haar- Classifier for Face detection and tracking based on the HaarFeatures. This is done using Haar Classifier through Raspberry Pi BCM2835 CPU processor which is a combination of SoC with GPU based Architecture.

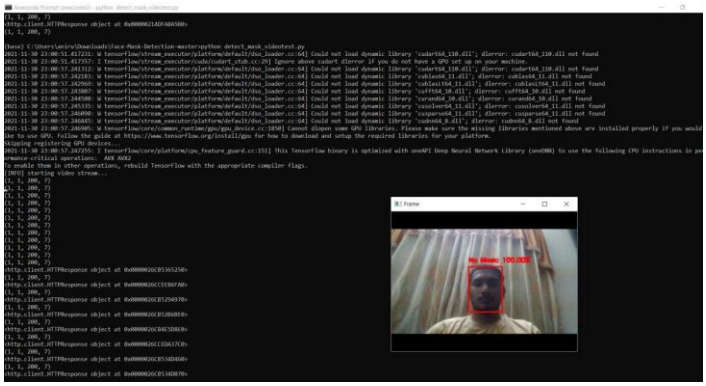
2. WORK FLOW

Data Pre-processing to convert images to Grayscale and separate out labels and build a Convolutional Neural Network using Sequential API of Keras. images. Train the Face Mask Detection Classifier on Image Data using Keras and Tensorflowas Backend. Evaluate the model to see the Loss and Accuracy in Graphical form. Save or Serialize the Face Detection Classifier Model. Download the modelon the Local System and Load It In the program. Use the Live Webcam Video stream to Detect and extract the Region of Interest of the face. engage trained Face Mask Detection Model to the face identified and determine if the person is wearing Mask or Not. Updates the count of people waiting outside on ThingSpeak. gives green and red label to the face withmask and without mask respectively. trigger an Email to the concerned person/authority alerting them if anyof persons is not wearing the mask.

2.1 WORKING AND RESULTS

As training and validation loss are converging to zero over the number of epochs and accuracy of both training and accuracy also increasing, we can say that the model is giving accurate results

Fig1.1



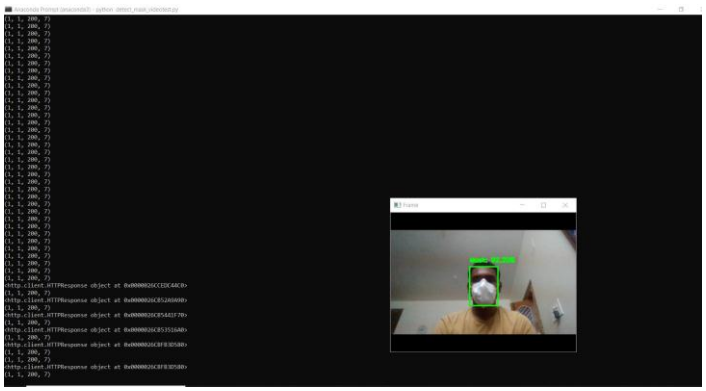
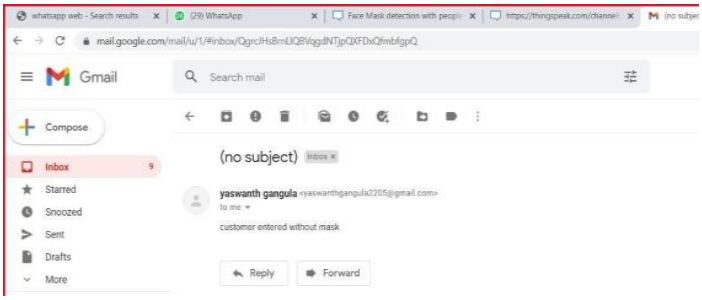


Fig 1.2 and Fig 1.3

Fig1.2, fig1.3 green and red label to the face with mask and without mask

Getting an email alert if the person found withput mask in realtime



As we integrated the whole system to thingspeak we can see the real time count of number of people at any time. If anyone is found withput mask then we get an alert mail as shown above

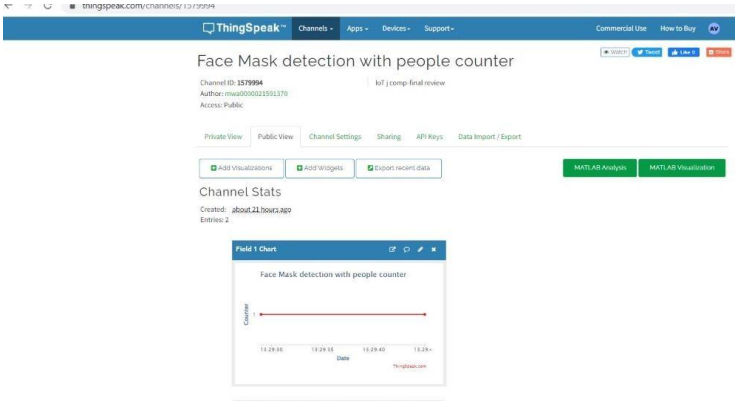


Fig1.4

3. CONCLUSIONS

We successfully detected mask and mail is being sent real time if anyone is found without mask. Integrated the whole system with thingspeak and can check the number of people in the area real time . This helps us easily identify the customers wearing masks or not, which helps us to take safety measures according to it and Even though we are focused on detecting face masks,. This project is also applicable in real time detection of weapons, helmets etc. provided we have an appropriate dataset

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