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FACE MASK DETECTION USING PYTHON

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ABSTRACT:

This paper focuses on the discussion of automation of computers which is set by our project of face mask detection using python. To break the conventional concept of automation we created a fully automated machine learning model which could easily detect faces, Person and multiple people and if they are wearing face mask or not. This project proves to be a breakthrough solution during the difficult times of pandemic by detecting if people are wearing face mask or not without any human intervention. The project focuses on utilization of python module and creation of a machine learning model to do the same. The model studies common patterns from data sets that we provide it and hence intelligently detect if a person has facemask

I. INTRODUCTION

• India recorded 16,159 new cases of the novel coronavirus, along with 28 deaths due to the infection on July 06, 2022. The key to control COVID-19 pandemic is to maintain social distancing, improving surveillance and strengthening health systems.

• The aim of the Project was to develop a Face Mask Detection system. For face mask identification, the project uses Python programming with help of KAGGLE Data sets. This system can be used in real-time applications which require face-mask detection for safety purpose due to the outbreak of coronavirus pandemic.

• As machine learning algorithms progress rapidly, the threats posed by face mask detection technology still seem effectively handled. This innovation is becoming increasingly important as it is used to recognize faces in images and in real-time video feeds.

• The system's method is set up in such a way that it uses a video camera to capture people's images and apply detecting algorithms. After the successful implementation of face mask detection with a video camera that helps in the detection of people wearing and not wearing a face mask. Using the visualisation algorithms, it is possible to show the detection percentage of calculation in various ways. viii

• The python programming language, as well as machine learning and deep learning methods were used to identify the face masks. Inside the project path, several required libraries were installed. Libraries were installed using the cmd-command prompt. Packages like tensorflow, numpy, imutils, keras, opencv, scipy, and matplotlib were imported after the installation. These packages take care of their own functions as needed within the application.

II. EASE OF USE

• To begin with we considered two Kaggle Data sets one containing images of persons without masks and the other with persons wearing masks. Then we downloaded a list of modules which were required to train and execute the model e.g: Tensorflow, Open-CV Python, MatPlotLib etc.

• As the given requirements were satisfied, we first created a python file to train our model. As the training took time we also decided to make a graph which would tell the accuracy of our model and so by using MatPlotLib we plotted the accuracy of our model.

- As shown in the graph our model has a pretty good accuracy and there has been very less loss.
- After this we created a second python file which detected faces and with the help of the model detected if there was face mask or not.

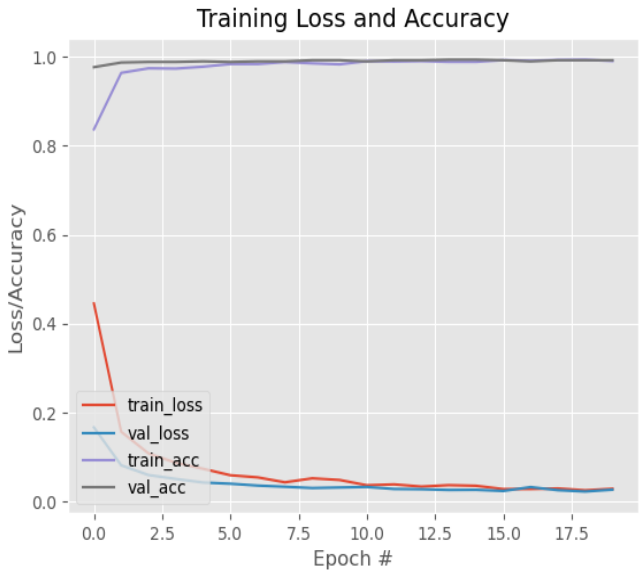

Fig2.1 Accuracy Graph

III. WORKING:

- Initially the model with the help of open CV detects faces and makes a frame around it after which there is a machine learning model which we have trained which detects if a person is wearing mask or not. And for the input it takes the input from the camera which has been marked as the primary camera for the device.

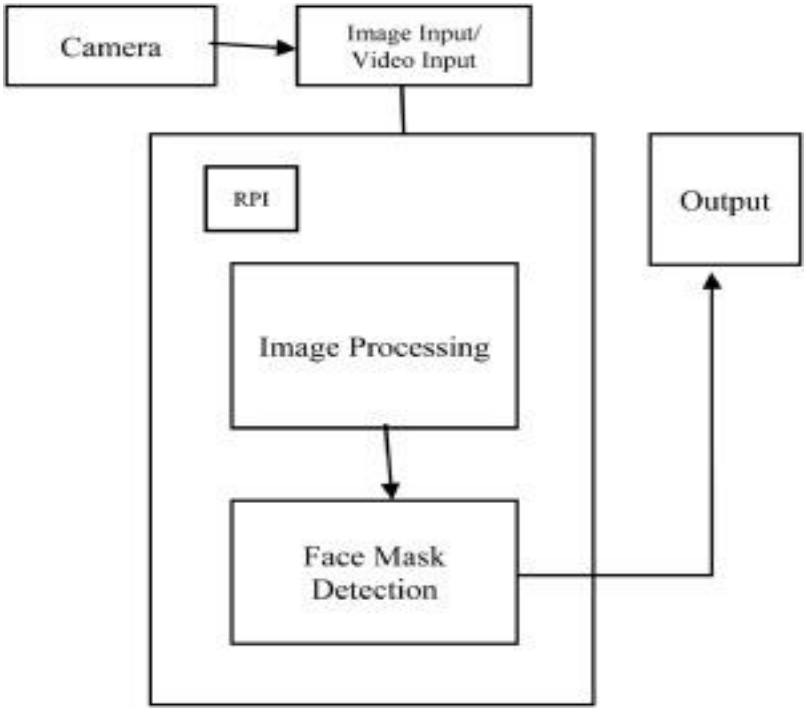

Fig3.1 Block Diagram

On large scale we can use multiple cameras or even higher resolution cameras for multiple and advanced face detection. With the help of python modules which we had earlier downloaded we have created an extensive model office detection which takes the input in the form of images detect it in real-time and then chooses the output if a person is wearing the mask or not. As output the box around the face or the facial recognition turns red if a person is not wearing the mask or green if the person is wearing one

IV: ALGORITHM

Step I: The input is collected from the camera. The input is analysed and as the videos is considered as a cluster of photos.

Step II: With the help of Open CV face is detected and a box is made around it. This is the basic face tracking done by the algorithm.

Step III: Percentage of mask worn by a person is analysed and according to it the box around the person's face turns red or green. The constantly monitored video is displayed on the display as a frame. Then the real time face mask detection is executed.

Step IV: The real-time results are shown at the end and the percentage of mask is displayed.

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V: RESULTS:

The Face Mask Detection by our project:

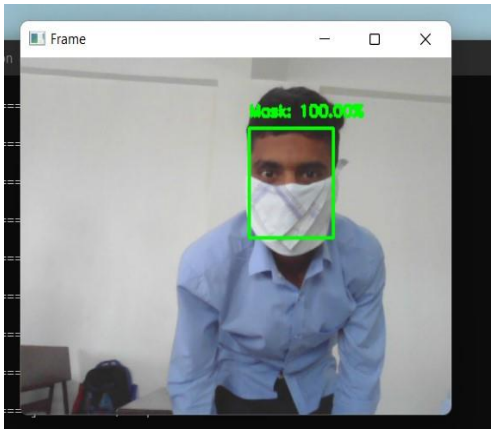

Fig5.1 Person wearing Mask

Fig 5.2 People without and with mask

Fig 5.3: Multiple Persons with masks and one behind them without mask

Fig 5.4: Real time mask detection with motion

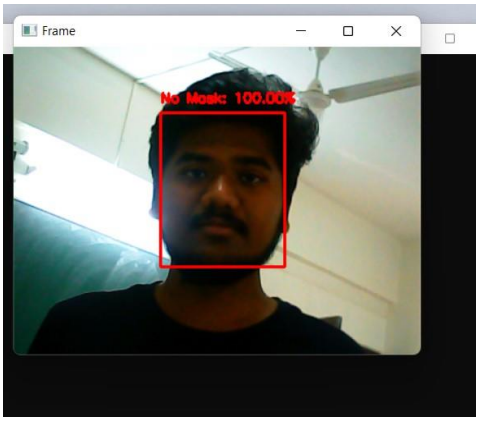

Fig 5.5: Person Without Mask

VI: CONCLUSION:

• The application of transfer learning on pretrained models with extensive experimentation over an unbiased dataset resulted in a highly robust and low-cost system. The identity detection of faces, violating the mask norms further, increases the utility of the system for public benefits. From the experiment results, the algorithm is able to detect and distinguish a non-wearing and a wearing-mask precisely with any condition of surrounding environment. In the future, we will add the thermal detection on this device to help the guard's work easier. Furthermore, this device is hopped to be installed in other crowd area which need face mask detector.

• In the absence of immunization, masks are one of the few ways to protect against the corona virus, and they play an important role in protecting people's health from respiratory illnesses. To ensure human safety, this project can be integrated with embedded technology and deployed in a range of public venues such as train stations, offices, schools, and public spaces.

VII: FUTURE WORK:

• The proposed technique can be integrated into any highresolution video surveillance devices and not limited to mask detection only. Secondly, the model can be extended to detect facial landmarks with a facemask for biometric purposes.

• In the future, physical distance integration could be introduced as a feature, or coughing and sneezing detection could be added. If the mask is not worn properly, a third class can be introduced that labels the image as 'improper mask'. In addition, researchers could propose a better optimiser, improved parameter configuration, and the use of adaptive models.

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