A Protective Mask Distinguish System Using Image Visualization

Vivek Sharma, Shresth Gupta, Suryansh Sharma, Swapnil Saini, Swaroop Kumar

***Abstract*— The corona virus COVID-19 epidemic is producing a global health disaster so the effective conservation methods is fatiguing a protective mask in public areas according to the World Health Organization (WHO). The COVID-19 epidemic forced governments across the world to thrust isolation to prevent disease transmissions. Reports specify that wearing Protective masks while at work clearly bring down the risk of transmission. We will use the dataset to build a COVID-19 Protective mask distinguish with image vision using Python, OpenCV, and Tensor Flow and Keras. In our present system we will use live video stream and finally in output it gives efficiency of wearing mask or not when someone not wearing mask Our aim is to recognize whether the person on image/video stream is wearing a face mask or not with the assist of image visualization.Therefore, this research project wind up with show truth that social distancing and wearing protective masks helps decrease the roll out of the virus and thus construct a model to help detect these measures.**

***Index Terms* —Covid -19 epidemic,Jetbrains Pycharm, Protective Mask Distinguish, OpenCV,Tensor and Keras ,Python programming**

I. INTRODUCTION

The situation report of world health organization (WHO) propose that coronavirus disease2019 (COVID-19) has globally spoil over 2.7 million people and spawn over 180,000 dying.In addition, there are several similar large scale significant respiratory diseases, such as grave acute respiratory syndrome (SARS) and the Middle East respiratory syndrome (MERS), which occurred in the past few years reported that the reproductive number of COVID-19 is higher collate to the SARS. Therefore, more and more people are worried about their health, and citizens health is contemplate as the top preference for governments.Protective mask discernment refers to detect whether a person wearing a mask or not and what is the position of the face. The issue is closely associated to general object discernment to detect thecategory of objects and face discernment is to detect a particular category of objects, i.e. face.Further, it is not easy to expose faces with/without mask in popular as dataset available for discover mask on person faces is relatively small leading to hard training of model. So, notion of transfer learning is used here to convey the learned kernels from networks instruct for a similar face discernment task on a substantial dataset. The dataset shelter various faces images including faces with or without protective masks, faces with and without masks in one image and confusing images without masks. With ample dataset hold 45,000 images, our methodology arrive outstanding accuracy of 98.2%. The major benefaction of proposed work is given below:

1. A novel object discernment module that integrate one stage and two stage locater based on image complication is competent of accurately ascertain the object in real-time from video streams.
2. Upgrade related image sheathe technique is developed to batch the facial areas from uncontrolled real-time images having differences in face size, inclination and background.
3. Formation of unbiased Protective mask dataset with imbalance ratio equivalent to nearly one.
4. The present model need less memory, making it easily adjustable for embedded devices used for scrutiny purpose.

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II. RELATED WORKS

Some research have already been completed in this field which is shown below:
[1] A Novel proposal to discloser Protective Face Mask to Decrease Covid Using Image Processing.
[2] Precisely Distinguish Face-Masks for Corona from Visual Information.
[3]Literature contemplate of Human being Remembrance with Face.
[4] Performance Estimation of Intelligent Protective Face Mask Distinguish System with various Image processing Classifiers.
[5] Validating the Correct Wearing of Protection Mask by Taking a Selfie -Design of a Mobile Application 'Check Your Mask' to Limit the extend of Covid-19 virus.

III. THE PROPOSED SYSTEM

To divine whether a person has drawn a mask correctly, the starting stage would be to train the model using a proper dataset. An accurate face distinguish model is requisite to discloser faces, so that the this model can classify whether the person is wearing a protective mask or not. The job in this paper is to elevate the accuracy of mask distinguish without being too resource-heavy. This approach helps in detecting faces in real-time, even on embedded devices like Raspberry Pi.We will first traverse mask or unmasked classification in webcam videos then next shift to the mask or unmasked classification problem in live videos as our goal. Our project model will scanand train humanfaces and classify masked faces from unmasked faces in webcam livevideos.

KEY FEATURES

1. The system is accurate and simple to perform in any prevail commanding system.

2. Convention alerts can be send to the person with or without a Protective face mask or the one whose face is not properly identifiable in the admin system.
3. No required to install or use of any hardware as the system model can be easily connected with your subsist surveillance system only.
4. The system can be used easily with any video apprehend device or hardware like observations cameras.
5. The system can easily access for those who are not wearing mask and inform the official group.
6. We can personalize and adjust the Protective face mask distinguish system based on your occupation requirements and demands.
7. You can check the inquiring based on the system produce output reports.
8. Easy and simple to entrance and control the movements from any device through Protective face mask distinguish applications.
9. Partially occluded faces either with mask or hair or hand, can be simply acknowledge.

Fig 1: Training Loss and Accuracy graph for the face mask distinguish system

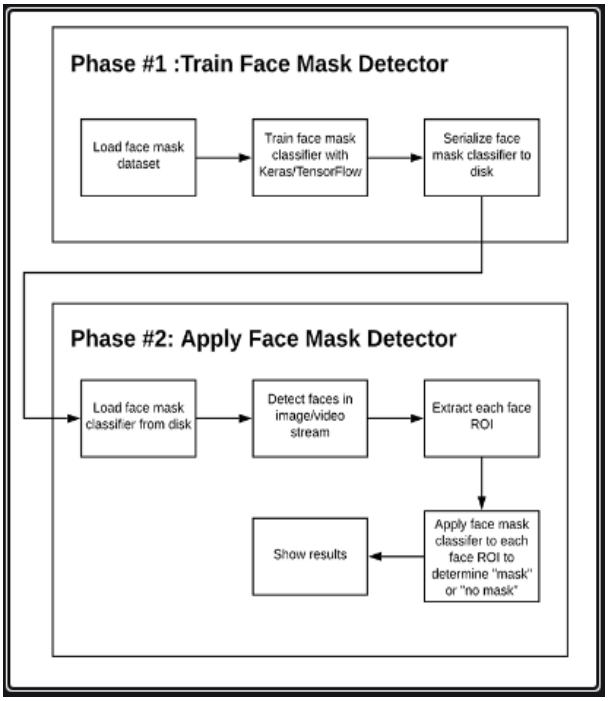

Fig 2: Implementation Plan

In order to train a custom face mask distinguish, we have to split our report into two dissimilar sections, each with its own respective sub-steps:-

Training: In this we will pay observation on loading our Protective face mask distinguish dataset from hardest then training our model (using Keras/Tensor Flow) on this dataset and after thatsequencing the face mask locator to hard disk.

Deployment: Once the model is instructed strongly, after that we can move on to loading the mask distinguish, executing face observation, and then classifying each face as masked or without mask.

IV. RESULT AND TEST CASES

The first stage of Protective face mask distinguish system is to Initialize the video and then bring out the image from video into the framesand load face observation model for face images and then apply the image preprocessing and vanload the faceMask.

Both observation model and this model converts the output result into frames and then exhibit face with a colored box spotting and then show the face mask classification which exhibit the masked and no mask faceswith showing the accuracy level on the face.

If face have properly masked then the accuracy level is approx. 99.9% to 100% and if face have unmasked then Accuracy 100% of no mask and if mask is not perfectly placed means mask is not close the nose or not covering the mouth then accuracy is about 50% to 60%.
For a perfectly masked face the color of the box is green and for unmasked or inappropriate masked face it shows red box.
We have performed the following test cases:

Test Case Id	Test Case	Test Case I/P	Actual result	Expected Result
001	Properly working video camera	Check if video camera is working properly and execute the cases.	As soon as project runs, video camera starts working	As project starts, camera also starts working
002	Check whether the video is bur or unfocused	Execute the code and check whether video is clear and focused	Video is neitherdist orted and blur, and is focused properly	Video should be focusedand clearand it should not be blur
003	Face Mask Accuracy	Mask wearing is recognized by video	Accuracy is shown with wearing	Face mask is shown with accuracy

		camera	mask	
004	No mask or unmasked accuracy	No mask is detected by video camera	Unmasked or no mask accuracy is shown	No mask or unmasked is shown along with accuracy

Fig 3: No Mask distinguish with Accuracy

Fig 4: With Mask distinguish and Accuracy

V. CONCLUSION

COVID-19 (Coronavirus) epidemichas come with many and differentprovocation to the world and the lay out of this virus should be controlled as this virus has affected more than ten million humans around the world and the destruction is still going on. One of the major provisions is to wear protectivemasks for the prevention of the spread of the respiratory droplets of infected personsvia cough or sneeze as well as the healthy person should wear mask. So here we have proposed an approach that utilizes deep learning algorithm and the MObileNetV2 framework is used for the implementation along with the OpenCV and PyTorch of python. The results state that the presented model is capable of detecting the persons with or without masks from the images as well as from the camera streams. The accuracy for the training and validation set is compared and came out to be 90%.

As the technology are developing with emerging and new trends the availability, so we have face mask detector which will possibly contribute to public healthcare system. We have usedkeras, tensor flow, OpenCV,Pytorch and CNN to detect whether people wore masks or were they unmasked. The modelsweretested with image sent fromlive videostreams.Furthermore, the presented method achievedstate_of_the_art results on a public face mask dataset. FaceMaskdetector system can deliver the information to the concerned authorities or the in charges, if a person is found not wearing face mask. With facemaskdetection system in hospitals or healthcare organizations, the isolated people, who are required to be masked, can be easily identified whether they are masked or not.

VI. LIMITATIONS AND FUTURE WORKS

The developed system faces difficulties in classifying faces covered by hands since it almost looks like the person wearing a mask. While any person without a face mask is traveling on any vehicle, the system cannot locate that person correctly. For a very densely populated area, distinguishing the face of each person is very difficult. For this type of scenario, identifying people without face mask would be very difficult for our proposed system. In order to get the best result out of this system, the city must have a large number of CCTV cameras to monitor the whole city as well as dedicated manpower to enforce proper laws on the violators

The proposed system mainly detects the face mask and informs the corresponding authority with the location of a person not wearing a mask. Based on this, the authority has to send their personnel to find out the person and take necessary actions. But this manual scenario can be automated by using drones and robot technology [22], [23] to take action instantly. Furthermore, people near to the person not wearing a mask may be alerted by an alarm signal on that location, and displaying the violators face in a LED screen to maintain a safe distance from the person would be a further study.

REFRENCES

[1] Abadi M., Agarwal A., Barham P., Brevdo E., Chen Z., Citro C.Ghemawat S. 2016. Tensor flow: Large-scale machine learning on heterogeneous distributed systems.ert545

[2] T Subhamastan Rao, S Anjali Devi, PDileep, M Sitha Ram A Novel Approach to Detect Face Mask to Control CovidUsingDeep Learning uropean Journal of Molecular & Clinical Medicine.

[3] Borut Batagelj1,*, Peter Peer1, Vitomir Štruc2 and Simon Dobrišek2 How to Correctly Detect Face-Masks for COVID-19 from Visual Information.
[4] Dr. Vandana S. Bhat Literature Survey of Human Recognition with Face.
[5] Ahmed I., Ahmad M., Rodrigues J.J., Jeon G., Din S. A deep learning-based social distance monitoring framework for COVID-19. Sustainable Cities and Society
[6] W.zhao, R.chellappa, P.J.phillips, A.rosenfeld. Face Recognition: A Literature Survey ACM COMPUTING SURVEY
[7] Karim Hammoudi, AdnaneCabani, Halim Benhabiles and Mahmoud Melkemil, Validating the Correct Wearing of Protection Mask by TakingaSelfie : Design of a Mobile Application “Check Your Mask” to Limit the Spread of COVID-19
[8] MoeinRazav, HamedAlikhani, VahidJanfaza, Benyamin Sadeghi, EhsanAlikhani. An Automatic System to Monitor the Physical Distance and Face Mask Wearing of Construction Workers in COVID-19 Pandemic
[9] G. JigneshChowdary, Narinder Singh Punn, Sanjay Kumar Sonbhadra, and SonaliAgarwa Face Mask Detection using Transfer Learning of Inception V3 LNCS
[10] KaihanLin,XiaoyongLiu,Huimin“FaceDetectionandSegmentationbasedonImprovedMaskR-CNN”,2017.