International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 6 June 2022, pp: 1494-1497 www.ijaem.net ISSN: 2395-5252

Face Mask and Social Distance Detection

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Submitted: 05-06-2022 Revised: 17-06-2022 Accepted: 20-06-2022

ABSTRACT
With the recent outbreak and rapid transmission of the COVID-19 pandemic, the need for the public to follow social distancing norms and wear masks in public is only increasing. According to the World Health Organization, to follow proper social distancing, people in public places must maintain at least 3ft or 1m distance between each other and they have to wear face mask Our project focuses on a solution to help enforce proper social distancing and wearing masks in public using YOLO object detection on video footage and images in real time.

I. INTRODUCTION

Since COVID- 19 has come a epidemic, the entire world is chancing ideas and system to stop the spread of it. As the ground rule to stop the spread is to maintain social distance and wearing a mask while going out Our main motive, Face mask discovery with Social Distancing is the task of relating an formerly detected object as that person wear mask or not and they're walking with maintaining Social Distance to each other. Face Mask Detection Platform utilizes Artificial Network to perceive if a person does/ doesn‘t wears a mask. Social Distancing discovery will descry those two or further persons in a single frame are walking with maintain social distancing with at least 3 feet of range with each other. By using Euclidean Distance system, it'll descry that person maintaining or following social distancing under guidance of WHO.Our proposed system can be applied in various areas like airports, railway stations, malls and all other crowded places as a preventive measure which has a considerable importance in the current scenario. Monitoring the social distancing norms and checking face masks on people manually is not only restrictive with limited resources but can also lead to human errors. This includes social distance violation detection and face mask classification to determine the safety of the citizens by checking if enough distance is maintained and if face masks are used. This system has a wide range of applicability in various public places with cameras such as in Supermarkets, Petrol Bunks and Traffic signals.

II. METHODOLOGY

The aim of this project is to detect face mask and monitor social distancing between the people. The system ensures that the COVID safety protocols are followed in an efficient way.

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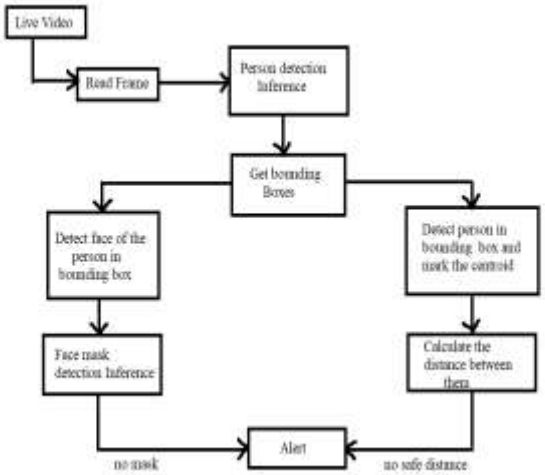

III. IMPLEMENTATION

A. Dataset

The dataset used comprises 2000 images containing specific images downloaded from the internet, with facial annotations belonging to two classes, masked faces and unmasked faces. Data set should be pre-processed before it is used for training. Training phase includes creating a CNN model, splitting the data set into training and test data set and checkingthemodelaccuracy.Trainingprocessshould be continued till we get expected accuracy byadjustingmodelparameter.

B. YOLOv3 Algorithm

YOLO is a clever convolutional neural network(CNN)fordoingobjectdetectionin real-time. Thealgorithm applies a single neural network to the fullimage, and then divides the image into regions andpredictsboundingboxesandprobabilitiesforeachr egion.YOLOisaconvolutionneural network.

It consists of a total of 24 convolutional layers and followed by 2 fully connected layers. Each layer has its own importance, and the layers are separated by their functionality. YOLOv3 is extremely fast, easy to train, robust, stable and gives promising results even for tiny objects, hence, we selected it as our object detector of choice. For an input image/frame, it detects objects belonging to three classes — unmasked faces, masked faces and people.

C. Haar Cascade Detection Algorithm

ItisanObjectDetectionAlgorithmusedtoide ntify faces in an image or a real time video. Thealgorithmisgivenalotofpositiveimagesconsisting of faces, and a lot of negative images not consisting ofany face to train on them. The model created from thistrainingisavailableattheOpenCVGitHubreposito ry.

Usingintegralimagessystemcanachieveconstanttime evaluationofHaarfeatures.

- EdgeFeaturesor2RectangularFeaturesrequireso nly6memorylookups.
- LineFeaturesor3RectangularFeaturesrequireso nly8memorylookups.
- Diagonal Featuresor four Rectangular features requiresonly9memorylookups.

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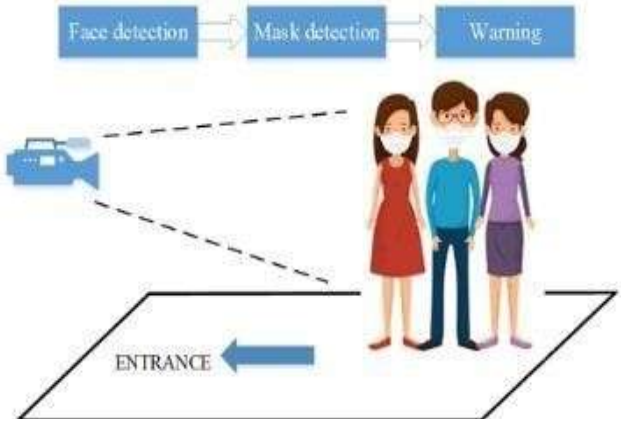
Fig(3.a)FlowchartforFaceDetection

In order to demonstrate the proposed system in a real application, we built a whole system for real- time face mask detection and Social distancing. The system consists of a computer and camera.



Fig(3.b)System Architecture

D. Finding Social Distancing

In our proposed method uses a Euclidean Distance formula for calculating distance between object here object means persons, this method will give enhanced accuracy. To calculate the distance between two people we can use Euclidian Distance formula. If person 1 is assumed to be at (0, d1) and person 2 at (w, d2).

$$socialdistance=\sqrt{(w-0)2_{+}(d2-d1)2}$$

IV. RESULTS

Figure4.ashowsthatdetectionoffacemask andsocialdistancingitgiveanalertmessagebecausepe oplearenotwearingthefacemaskandnotmaintaining social distance. Figure 4.b also detect thefacemaskandsocialdistance;itshowsthatpeopleare wearingthefacemaskandmaintainingsocialdistance. Figure 4.c shows that one person is wearingthe mask and other person is not wearing the mask soitshows thealertmessageaccordingly.

Fig(4.a)Detection of face mask and alert message

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Fig(4.b)Detection of face mask and Safe message

Fig(4.c)Detection of face mask and alert message

V. CONCLUSION

Wehavehencecreatedawellintegratedrealtimefacemaskandsocialdistancingdetectionsystem,whereobjectdetectiontakesplaceusingYOLO v3 and Haar algorithm. The three classes thataresimultaneouslydetectedaremaskedandunmasked faces, as well as whole people. Using thecoordinates given by the detection of the class person,the relative distance between 2 individuals is henceestimatedusingtheprinciplesofoptics.Afterrigorous testing,weobservethatthe modelyieldsfairly accurate results for a wide field of view, whichis an essential criterionforusage in public places.Withoutanyadditionoftime-consumingcomputationsorimagewarping,thislightweight model is easy to calibrate and can be well used in realtimeduetohighFPS andgoodaccuracy.

VI. FUTURE SCOPE

This method was developed with an efficient way forthe people who are not wearing face mask and notmaintainingsocial distance and notifiedto officialsbyemail.Asafutureenhancement,wecanpredict/detect time at which it gets crowded and heatmapcanbeplottedinanaccurateway.

REFERENCES

[1] AlokNegi,"FacemaskDetectionClassifierand modelpunning", 2020.

[2] SahanaSrinivasan,DistancingandFace MaskDetectiononSurveillancevideodatasets‖, 2021.

[3] MohammedIhtishamAmin,"PersonorcrowdIdentificationwithMaskedFaceandThumbImages underpandemicofCOVID-19", 2021.

[4] KrishnaBhambani,"Real-timeFacemask andSocialDistancingViolationDetectionusingYOLO",2021.

[5] MayuriDiwakarKulkarni,"SocialDistancingusingIoTapproach", 2020.

[6] JunZhangi,"ANovelDetectionFrameworkAboutConditionsofWearingFaceMaskforHelpingControltheSpeedofCOVID-19",2021.

[7] Hemanth Kumar H J,"Social Distancing and Face Mask Detection with Reporting", 2020.

[8] SaharshArya,"StudyofVariousMeasuretoMonitorSocialDistancingusingComputerVision: A Review",2020.

[9] VishweshMS,"SocialDistancingandFaceMask DetectionfromCCTVCamera".2020.