

Social Distancing and Face Mask Detection For Covid Prevention

¹Sai Nikhil, ²Narasimha

^{1, 2} Student

Department of Computer Science Engineering
SRM Institute of Science and Technology,
Chennai, Tamilnadu.

³ DR.R.S.Ponmagal

³ Assistant Professor,

Department of Computer Science Engineering,
SRM Institute of Science and Technology,
Chennai, Tamilnadu

Abstract: -The novel virus additionally carries Covid-19 which has had a profound effect on numerous sectors in lots of regions and governments are growing around the arena to sell viral media coverage. This is a small step to carrying a face mask, following far from the network will keep many lives because the unfolding of the virus novel may be reduced. This article carries records on public dissemination and face protecting approximately instances of sicknesses consisting of the radical virus that may be resolved through worrying for its social distribution/management. This became used to provide Mask Detection the use of OpenCV, Keras / TensorFlow, and Deep Learning. This application may be effortlessly integrated/established established established on a whole lot of high-density embedded gadgets with the use of MobileNetV2 architecture. The gadget will come across faces mask on photos / images and real-time videos.

Keywords: - OpenCV, Keras/TensorFlow, deep learning, COVID-19, social distancing detection, face masks awareness, CNN

1. INTRODUCTION

The spread of the new child coronavirus has created a prime fitness trouble worldwide. In a country like China the spread of acute acute respiration syndrome (COVID-19), exacerbated a brand new fundamental respiration ailment in Wuhan, China that inflamed 7,723 humans and killed extra than 500 humans in China. To date there was no evaluation of any antimicrobials or any COVID-19 vaccine. The virus has unfold unexpectedly round the arena. Currently, the WHO (World Health Organization) has advocated that humans round the arena put on a masks to save you the hazard of transmission of the brand new coronavirus and ought to keep a social distance of at the least 3m among humans to save you the unfold of the virus. Public provider will best be supplied in the event that they put on a masks and keep public safety. This paper describes a way to save you the unfold of coronavirus through tracking in actual time if every body is retaining public distance and carrying a face masks in public places. During the closure, the Indian authorities recommended humans to return back and update the masks with a scarcity of PPE. So the mask aren't a preferred class and are available numerous colors, shapes and sizes.

2. RELATED WORK

There is lots of open dialogue approximately deep learning techniques for human adoption, however there's no concept approximately measuring the gap among people. This encourages us to give you a brand new set of rules to interrupt this down

problem. We reviewed below related information and existing methods.

- Some apps become created referred to as Face Mask Alert App it become evolved and manner with the aid of using Leeway Hertz software program solution. This app sends an alert message to the customers with the aid of using imposing them to put on masks..
- In a few groups like Uber that they showed to CNN Business that it's required to cowl the face with mask for each drivers and passengers in any united states like India, USA the generation became evolved to locate whether or not the drivers in Uber are accompanied through the ones rules.
- Febri Eye is a digital digicam that incorporates extra analytics with each social distancing tracking and faces masks detection which generates an alarm or an alert in case of any violations. This generation changed into applied through the Telangana state, India.
- The broadly used for face detection is the Viola-Jones Face Detector which makes use of cascaded Haar capabilities. Li et al every other version for face detector turned into a Multi-View Face Detector the usage of capabilities known as surf.

Limitations

Many picture processing techniques, mathematical formulation are proposed to calculate the gap among objects (humans) as a Manhattan distance formula. Jong Bae proposed a medium to locate the gap of humans the usage of a hot-powered rear digital digicam primarily based totally on a clever telecellsmartphone running withinside the location in negative light. This technique became received with 81% accuracy.

In our proposed technique Euclidean Distance formulation is calculated the gap among the item right here the item approach humans, this technique became 93% accurate

3. OBJECTIVES

The predominant cause of our machine is to locate the climate in someone carrying a face masks and to keep a distance among people. The machine offers binding packing containers for one face and one character. If someone wears a masks properly, our machine will positioned a inexperienced tie field at the face, in any other case the tie field can be red. Similarly, a aspect character should keep at the least 6 toes distance and our machine will location a inexperienced connecting field for everyone, any other binding field

it will be red. The fame is displayed at the screen, which incorporates the wide variety of human beings within the body and the wide variety of human beings now no longer much less than 6 ft apart, who aren't within the face masks might be displayed within the fame bar at the lowest of the screen. Our proposed version may be incorporated with a camera (CCTV camera) additionally on a webcam to save you the unfold of COVID-19.

4. METHODOLOGY

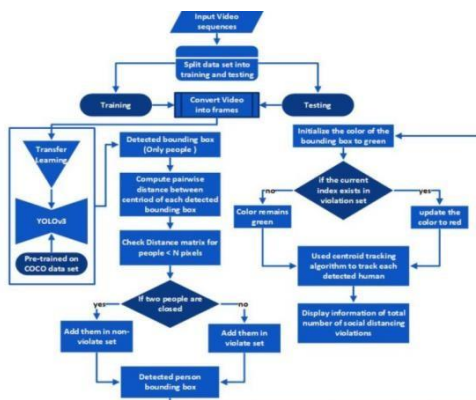


Figure: System Architecture

In the proposed gadget architecture, for the primary time our gadget takes enter to check enter within the shape of immediate imagery, stay streaming movies and recorded movies. What our gadget does is it reads the body body whilst it reaches the EOF (End OF Frame) and the gadget stops, and maintains to apply an set of rules known as YOLOv3 (Views Together) that detects face packing containers with a body. Then a exceptional set of rules for locating a face masks and public distance detection may be calculated, if the individual within the body is sporting a masks and preserving the space and the binding field may be highlighted in inexperienced if the individual does now no longer preserve touch and does now no longer put on a face masks at that time. the compilation field may be red.

FACE MASK DETECTION

Face Mask Detection is steps, one Face Discovery and the opposite Face Mask Classifier. If all people do now no longer put on masks then a caution could be released at the tracking screen. In this segment the technique used to construct the fashions is described.

A. Face Detection

The CNN-based Deep Learning version is used for face recognition, we've used this version as it has exquisite benefits in comparison to different models, different benefits CNN version can hit upon faces regardless of low resolution [420 X 420]. Also the use of the MobileNetV2 version with 94.2 curacy, ninety X ninety pixels are the premise of to be had face size. The output is displayed with a field that binds to the complete face, after which this reduce face is loaded into the version of the face mask.

B. Collecting Data

To teach the face masks model, we used the Face Recognition model. Custom facts units accrued in our assignment that encompass real-time snapshots of the character experiencing it without shielding the face masks. The database we accrued is 3835 snapshots and is split into categories, one with a_mask and one without a_mask masks with a 1916 image and

without_mask has 1916 images. Initially we collected more than 4,400 image snippets where a few were rejected / deleted due to blurring, not deletion. Here we can see the data cutting done. The database is divided into 80% of training data and 20% of test data this is done using the help of sklearn lib. The images used for the training set are approximately 3067 images and the data analysis is around 764 images.



Sample data for **with_mask**



Sample data for **without_mask**

C. Mask Detection

OpenCV face detector is primarily based totally on the Single Shot Multi-container Detector (SSD) framework that includes the MobileNetV2 structure. To get the binding container (x, y) item hyperlinks in this example the item manner the masks, we want to apply a snap photograph for the item detection. The Single Shot Multi-container Detector (SSD's) turned into advanced with the aid of using Google initially, among R-CNN and YOLOv3 acquisition methods. This is a sincere set of rules and plenty quicker than RCNNs. The contemporary version is incorporated with each the MobileNetV2 structure and the Single Shot Detector (SSD) framework, so our version can have a fast, green technique primarily based totally on in-intensity getting to know of masks detection.

D. Limitations

The proposed version has a few limitations. The app has problem locating faces in photos while the face is in part or in part seen on cameras, even in low mild situations our version fails to locate faces..

SOCIAL DISTANCE DETECTION

A. Person Detection

The proposed version makes use of ResNet50 that's a subclass of the convolution neural community and MobileNetV2 via the detection system the usage of the TensorFlow framework. A key characteristic of this version is that it can locate more than one class of items at once. On the alternative hand, this version will want the extra calculations to get extra correct results. GPU acceleration is enabled to assist make the pc quicker in comparison to

preceding models. A various set of capabilities which include eyes, nose, mouth, body movements are extracted to obtain effective results. Histogram scaling is used to maximize the difference in the embedded video.

B. Distance Computing

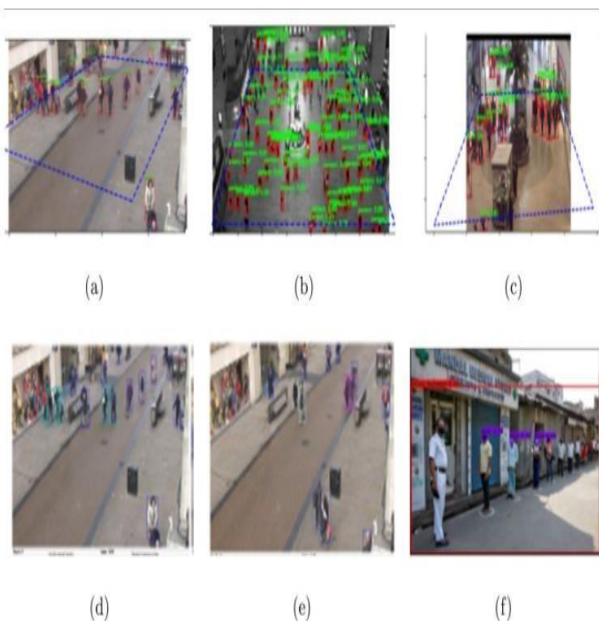
The version used on this software has MobileNetV2 that's pretty skilled to locate someone withinside the video. The version will take the video body as entering and extract the hyperlinks from the square binding container to anybody located withinside the body. A square binding container is represented as [x-min, y-min, wide, height]. Each individual withinside the video body may have a centroid of the ensuing container. By calculating the space among inches, the version will calculate the space among people. The calculation of the space among centroids turned into achieved the use of the Euclidean Distance formula. The Euclidean distance is commonly used to calculate the space among any real vectors of value. if the calculated distance is much less than three toes then one does now no longer holds the touch distance if the space is 6 toes or more than 6 toes then the individual maintains a secure distance.

$$v = \sum_{i=1}^n \sum_{\substack{j=1 \\ j \neq i}}^n \mathbb{I}(d_{i,j}),$$

Real world links i.e., $P = (p_1, p_2, \dots, p_n)$, find a corresponding list of pedestrian distance D straight. A pedestrian i , the nearest distance camera is $d_{\text{minimum}} = \text{minimum}(d_i, j), \forall j = i \in \{1, 2, 3, \dots, n\}$. With the calculated value of d_{minimum} , we continue to calculate two metric distances.

$$d_{i,j} = \|p_i - p_j\|.$$

C.



Limitations

Illumination condition: Different digital digicam stage and lighting fixtures situations without delay have an effect on someone's detection. Uncontrolled layer: It is tough to locate someone and calculate the space in numerous places.

FUTURE SCOPE

This approach becomes evolved correctly for folks that do now no longer put on a face mask and who do now no longer hold public distance and are notified through officers through email. As a destiny developer, we will predict/see the time while it's far crowded and the temperature map may be adjusted accurately.

CONCLUSION

In this undertaking, we've got carried out cutting-edge strategies withinside the subject of pc visualization and in-intensity learning. Custom databases may be created by the use of the Google / Bing Search API, Kaggle statistics units, and RMFD statistics set. The proposed device will locate the presence of face masks and the man or woman is in a secure location withinside the distance. The device is accurate, as we used the MobileNetV2 structure to get a face mask and a pc pc we used the Euclidean grade formula. Therefore, it makes it smooth to export our version to an embedded device together with Raspberry Pi, Goole Coral, etc. We accept as true that this technique will grow the protection of people in instances of violence.

BIBLIOGRAPHY

- [1] Yadav, S. (2020). Deep Learning based Safe Social Distancing and Face Mask Detection in Public Areas for COVID19 Safety Guidelines Adherence. IJRASET, 8(VII), 4. doi:10.22214/ijraset.2020.30560
- [2] Sohan, M. (2020). So you need datasets for your COVID-19 Detection Research using Machine Learning. ArXiv. doi:abs/2008.05906
- [3] M. Cristani, A. D. Bue, V. Murino, F. Setti and A. Vinciarelli, "The Visual Social Distancing Problem," in IEEE Access, vol. 8, pp. 126876- 126886, 2020, doi: 10.1109/ACCESS.2020.3008370
- [4] A. H. Ahamad, N. Zaini and M. F. A. Latip, "Person Detection for Social Distancing and Safety Violation Alert based on Segmented ROI," 2020 10th IEEE International Conference on Control Page | 29 System, Computing and Engineering (ICCSCE), Penang, Malaysia, 2020, pp. 113-118, doi: 10.1109/ICCSCE50387.2020.9204934.
- [5] S. Sharma, M. Bhatt and P. Sharma, "Face Recognition System Using Machine Learning Algorithm," 2020 5th International Conference on Communication and Electronics Systems (ICCES), COIMBATORE, India, 2020, pp. 1162-1168, doi: 10.1109/ICCES48766.2020.9137850