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# A Review on COVID-19 Facemask Detection System

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**Abstract:** The corona virus COVID-19 pandemic is causing a worldwide fitness disaster so the powerful safety techniques is wearing a face masks in public regions according to the arena Health Organization The COVID-19 pandemic forced governments internationally to impose lockdowns to prevent virus transmissions. reports indicate that carrying face mask whilst at work simply reduces the hazard of transmission. An efficient and economic technique of using AI to make a secure surroundings in the course of a production setup. using this newly released technique we are able to assist many to hit upon and convey safety precautions, by means of the usage of this method many fitness and social employees will be able to discover the COVID-19 affected patients. in order that they may be privy to this and hold a distance from the individual to reduce the unfold of coronavirus disease. This machine now not only works at web sites however this approach can also be helpful for the home enterprise to discover the affected customers. A hybrid version using deep and classical system studying for mask detection are going to be provided. A mask detection dataset consists of with masks and without masks pictures, We have become to apply OpenCV to try to to real-time face detection from a stay circulate thru our webcam. we will use the dataset to create a COVID-19 masks detector with pc vision the use of Python, OpenCV, and Tensor flow and Keras. Our intention is to identify whether the character on photograph/video movement is sporting a masks or no longer with the help of computer vision and deep gaining knowledge of.

**Keywords:** Deep Learning, Computer Vision, OpenCV, Tensorflow, Keras.

## I. INTRODUCTION

In December 2019, a new and worryingly contagious primary atypical (viral) pneumonia broke out in Wuhan, China. The new disease, called COVID-19, was later found to be caused by a previously unknown zoonotic coronavirus, named SARS-CoV-2. To help limit the spread of this new coronavirus, the World Health Organization (WHO), medical experts as well as governments across the world now recommend that people wear face-masks if they have respiratory symptoms, if they are taking care of the people with symptoms or otherwise engage frequently with larger groups of people. In response to these developments, research in face-mask detection has attracted the attention of the computer vision community recently and initiated efforts towards developing automatic detection models that can help society (through monitoring, screening and compliance-assessment applications) containing the COVID-19 pandemic Face-mask detection represents both a detection as well as a classification problem because it requires first the location of faces of people in digital images and then the decision of whether they are wearing a mask or not. The first part of this problem has been studied extensively in the computer vision literature, due to the broad applicability of face-detection technology . The second part, on the other hand (i.e., predicting whether a face is masked or not), has only gained interest recently, in the context of the COVID-19 pandemic. Although a considerable amount of work has been done over the last year on this part , it typically only tries to detect whether a mask is present in the image. No special attention is given to whether the masks are properly placed on the face and are, hence, worn in accordance with the recommendations of medical experts. This limits the application value of existing face-mask detection techniques and warrants research into computer vision models capable of not only detecting the presence of facial mask in images, but also of determining if the masks are worn correctly. To further illustrate this issue, several sample images from the MAFA (MAsked FAces) dataset are shown in Figure 1. MAFA represents one of the most popular datasets for training face-mask detectors, and in a similar manner to most other datasets publicly available for this purpose, contains only binary labels indicating whether face-masks are present in the images or not. Masked facial images in such datasets typically belong to one of two groups: (i) faces with correctly worn masks (marked green), and (ii) faces with incorrectly worn masks (marked red). Because the correctness (or compliance with recommendations) of the mask placement is not annotated, existing mask detectors commonly learn from highly noisy data (considering the intended purpose of the detectors) and commonly do not flag

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faces where a mask is present, but does not cover the nose, mouth and chin. We note that this is a common issue seen across most of the existing work on face-mask detection and has important implications for the usefulness of the designed detectors in practice.

## II. LITERATURE SURVEY

In advance days face detection models are carried out the usage of side, line and centre close to features and styles are diagnosed from those feature. these methods are used to locate binary styles domestically. those approaches are very effective to deal with gray-scale pix and the computation attempt required additionally very less AdaBoost is a regression based classifier which is going to in shape regression function on authentic data set even a few miss labeled objects waits additionally adjusted at some stage in lower back propagation to optimize the consequences Viola Jones Detector proposed an real time object model used to discover distinctive classes of objects. It makes use of 24x24 base window size to evaluate any photograph with aspect, line and four rectangular features. Harr-like capabilities are like convolutions to test whether or not given feature is available inside the picture or not. This version fail to work in when image brightness varies even it exhibits poor performance when photographs are in one of a kind orientations. Convolution networks are especially used for class issues there are various varieties of CNN architectures consisting of VGG-sixteen this architecture consists of 2 convolution layers with enter size224 kernel (sixty four,3x3) followed by max pool with size 2x2 on the other hand two convolution layers followed by way of max pool then three convolution layers with max pool again three convolution layers and max pool and 3 fully linked layers very last FC is smooth max this structure works fine whilst as compared to AlexNet. Google internet architecture essentially using inception method via constructing small convolution layers to reduce quantity of parameters it having round 22 layers With convolution and max pooling etc. it can able to paintings efficiently over Alexnet it may capable to convey down 60 million capabilities in Alex internet to four million capabilities. on this paper Deepnueral networks which adopts residual mastering to educate the models extra deeper around 152 layers are used on this that's eight times greater than VGGnet with minimal complexity. This technique carried out noticeably higher performance in item detection over COCO data set on this paper UNet and SEnet are used to perform segmentation of heart ventricular segmentation. This model is set up the weights in the sort of way like extra weights are given to beneficial capabilities and much less weights are given to unimportant functions. assist vector machines are used to perform category on items which goes to build an equation for building line and classifies the objects primarily based at the values mapping to this line. Semantic segmentation approach was used to detect facial mask in this paper they have used VGG internet for training and FCN is used to Semantically segment the faces to be had in the picture achieved experiments on multiparsing human records sets and carried out higher accuracy. in this paper scientific photograph processing turned into done. they've taken human mind photographs and are trained via the usage of FCN to identify tumours very correctly in this paper as opposed to using 2d segmentation for detecting tumour we've used 3-d segmentation.

## III. PROBLEM STATEMENT

- Many people have come up with creative ideas for detecting face-masks (like putting artificial mask images on top of non-mask people images) but the authors found that most of them solved this issue using simple CNN models considering it as a binary classification problem.
- This problem needs to be handled using object detection models for detecting multiple people in the frame, then putting bounding boxes of particular colour around them depending on whether they are wearing masks or not, and analysing the ratio of people wearing masks.
- There was a need for a dataset with labels and annotations. So, the authors have generated a small custom dataset manually, carefully provided labels, and used transfer learning to achieve this task.
- They have also used some datasets available on the web and provided their description. We trained both our models on the same dataset of ~7500 images.
- Each face in every image was labelled with carefully prepared bounding boxes. Annotation records containing all the data about bounding boxes, image names, and labels are prepared in the various formats as required by both the models considered in this work.

## IV. OBJECTIVE

- The main objective is to reduce the risk of transmission.
- By Using this newly launched technique it can help many to detect and bring safety precautions.
- By using this technique many health and social workers will be able to identify the COVID-19 affected Patients.
- To identify the person on image/video stream wearing face mask with the help of computer vision and deep learning algorithm.

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## V. CONCLUSION

In this paper, we studied the problem of face-mask detection relevant in the scope of monitoring applications for the COVID-19 pandemic. We introduced a novel (annotation) dataset for studying face-mask detection problems and conducted an experimental study that looked at: (i) the performance of existing face detectors with masked-face images, (ii) the feasibility of recognition techniques aiming at the detection of properly worn face-masks and (iii) the usefulness of existing face-mask detection models for monitoring applications in the fight against COVID-19. Our results showed that all tested detection models significantly deteriorate in performance when trying to detect masked faces compared to the performance observed with faces without masks. The most stable here was the RetinaFace model that also includes a generative component in the detection procedure. Furthermore, we observed that it is possible to design efficient techniques for recognizing faces with properly placed masked and that the selection of model architecture plays only a limited role in the final recognition performance. Finally, we demonstrated that existing models for face-masked detection have only limited value for real-life applications, as they only detect the presence of facial masks in the images, but not how these masks are placed. Because the tested models work well and in real time, we plan to integrate the best performing approaches into a real-world monitoring system. We also plan to extend our analysis to other datasets that contain a wider range of mask types. Since measures to contain the spread of COVID-19 infections go in the direction that a certain group of people must use a certain type of mask, it would also make sense to design a classifier that can differentiate between different types of face-masks.

## VI. FUTURE SCOPE

The developed system can detect the live video streams but does not keep a record. Unlike the CCTV camera footage the admin can not rewind, play or pause it. As whenever a strict system is imposed people always try to break it. Hence when a person is detected with no mask, the head of the organization can be notified via mail that so and so person entered without mask. The proposed system can be integrated with databases of respective organizations to keep a record of the person who entered without mask. With more complex functions a screenshot of the person's face can also be attached to keep it as a proof

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