

# Face Mask and Social Distance Detection Using Artificial Intelligence

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## ABSTRACT

Corona virus infection that hit us in 2020 is disturbing humanity significantly. The barely wellbeing compute that may take touching this pandemic is to put on “Face Mask” in community spots and preserve “Social Distancing”. Furthermore, various assistance benefactors need clients to use the maintenance provided that they wear Mask accurately and keep social separation, the spots incorporate air terminals, lodgings, hospitals, railway terminals and etc. It's unrealistic to inspect physically by any means at ones to look assuming that the standard of wearing Mask and social distance is adhered to as it consumes high human resources.

The proposed COVID-19 Face Mask and Social Distancing Detector System which is an one stage identifier, which comprises of a counterfeit neural organization to combine significant level semantic data with numerous element maps, and an AI module to zero in on identifying facial covering and social distances all the while. What's more, the framework will utilize existing IP cameras and CCTV cameras joined with PC vision to identify individuals without Mask and viciousness of social separating. This framework gives instruments to somewhere safe and security with practically no requirement for manual reconnaissance framework. The framework can be sent on any foundation like Hospitals, Office Premises, Government Offices, Schools and Education Institutes, Construction Sites, Airports and so forth Whenever sent accurately, the facial covering and social distance indicator framework we are building might actually be utilized to assist with guaranteeing individuals wellbeing and the security of others.

**Keywords:** Artificial Intelligence, Covid 19, Face Mask, Social Distancing

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## 1. INTRODUCTION

Covid illness 2019 has impacted the world genuinely. One significant assurance strategy for individuals is to wear Mask in open regions and maintain the social separation. The best way to forestall the spread of Coronavirus is social separating and wearing Mask. The objective of this task is to battle against the Covid, social removing and wear Mask has demonstrated to be an exceptionally compelling measure to dial back the spread of the infection by giving the observing framework that monitors the people groups by utilizing existing IP cameras and CCTV cameras joined with Computer Vision to recognize individuals without Mask and not adhering to guideline of social separating. Coronavirus Face Mask and Social Distancing Detector System (COVID FSD) is an AI and Computer Vision driven picture examination arrangement which takes special care of the Covid-19 related infringement. Coronavirus FSD System utilizes Artificial Network to perceive on the off chance that a client isn't wearing a veil. The framework can be associated with any current or new IP or CCTV's cameras to distinguish individuals without a veil.

It permits the application to run naturally and upholds the wearing of the cover. This framework gives apparatuses to somewhere safe and security with next to no requirement for manual reconnaissance framework. Its man-made brainpower program recognizes infringement like not wearing Face Mask and Social Distancing. This framework can be sent on the Hospitals, Office Premises, Government Offices, Schools and Education Institutes, Construction destinations, Manufacturing units, Airports and so forth Coronavirus FSD System is basic and prompt to use, with practically no requirement for specialized help. The framework guarantees absolute regard for client protection. Truth be told, the three applications don't record pictures however just delivery an alarm signal in the particular situation. Coronavirus FSD could give an extra simple to-get to apparatus during the most sensitive period of the battle against the pandemic.

## 2. SOCIAL DISTANCE

As indicated by Amesh A. Adalja, MD, irresistible illness master and head agent at the Johns Hopkins Center for Health Security, "Facial coverings can help safeguard against numerous respiratory diseases that are spread by the bead course, including the Covid and flu".

Talking behind this proposal, Dr. Adalja said "infections, for example, the Covid can spread from a tainted individual to others through the air by hacking and wheezing or by contacting a sullied surface, then, at that point, contacting their mouth, nose, or eyes prior to cleaning up. Whenever you wear a facial covering, you can keep the beads from coming into contact with your face or mouth before they tumble to the ground."

### 3. REVIEW LITERATURE

Akanksha Soni et al. (Soni, 2020) fostered a model that distinguishes whether an individual is wearing a head protector progressively in this way, recognizing any infringement. This task was likewise executed with the assistance of TensorFlow, Keras and OpenCV. Their proposed model showed significant upgrades when contrasted with a few past models that gave wrong forecasts at whatever point a rider wears garments over their face. They accomplished a general precision of 98% when tried.

S Chen et al. (Chen, 2020) carried out a model with the assistance of TensorFlow to distinguish ID card numbers. With the assistance of OpenCV the picture of an ID card is preprocessed and the number on the ID card is perceived and given as result with the assistance of a prepared CNN model. At the point when tried it was seen that preparing speed is quick and the precision is high.

Emily Caveness et al. (Caveness, 2020) created TensorFlow Data Validation (TFDV) which offers an adaptable answer for information investigation and approval for AI. It is conveyed underway which is incorporated with TensorFlow Extended (TFX), which is a start to finish ML stage. Their framework has acquired a great deal of footing since the time they publicly released their venture. Other open-source information approval frameworks, for example, Apache Spark were likewise vigorously roused from their venture. Apache Spark loads with worked in modules for streaming and has a quick, simple to involve framework for enormous information processing.(Nair, 2018)

Yonghui Lu et al. (Lu, 2020) proposed an effective YOLO Architecture, YOLO-reduced for a constant frame single class identification. As we probably are aware in most commonsense applications, the quantity of classifications in object discovery is consistently single and the creators planned to make identifications quicker and more proficient for these situations. By playing out a progression of examinations, the creators had the option to think of a proficient and minimized organization with the assistance of YOLOv3. It was seen that YOLO-conservative is just of 9MB size, multiple times less than YOLOv3, 6.7 times less than minuscule yolov2 and 3.7 times less than small yolov3. The normal accuracy of YOLO-minimized is 86.85% which is altogether higher than other YOLO models.

### 4. SYSTEM ARCHITECTURE

OpenCV, Keras, and TensorFlow to distinguish covers and the MobilenetV2 as the premise of the classifier.

To prepare an altered cover location system, we separated our plan into two free stages, then, at that point, further isolated into sub-stages. The Adams streamlining agent, paired cross-entropy, and learning rate minimizer are utilized to assemble the model.

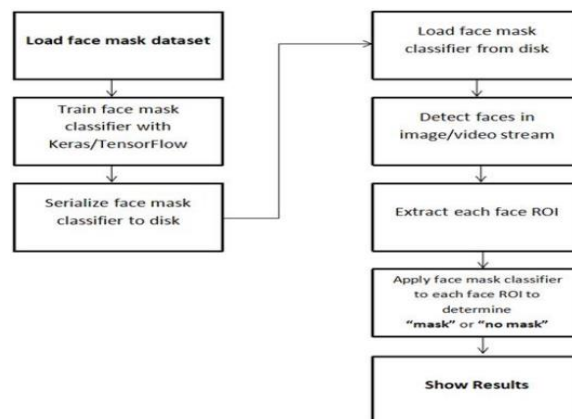


Figure 1

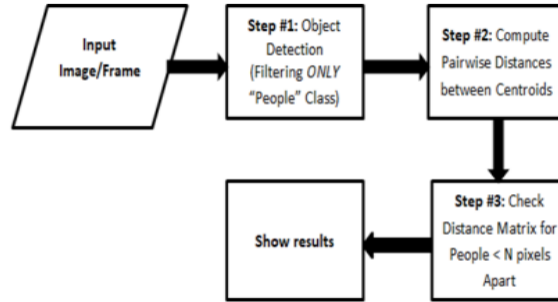


Figure 2

CNN design with loads being come down in advance is brought out through YOLO object recognition records. Object acknowledgment to distinguish everybody (just individuals) in the stream, Calculate the Euclidean distance between totally perceived individuals. Utilize these distances to check assuming the distance between two individuals is not as much as N (predefined distance). Pixels and show protected or dangerous.

## 5. METHODOLOGY

The proposed framework assists with guaranteeing the security of individuals at public spots via consequently observing them whether they keep a protected social separation, and by recognizing whether and individual wears facial covering. This segment momentarily portrays the arrangement engineering and how the proposed framework will consequently function in a programmed way to forestall the Covid spread.

The proposed framework utilizes an exchange learning way to deal with execution streamlining with a profound learning calculation and a PC vision to naturally screen individuals out in the open spots with a camera coordinated with a nearby machine and to recognize individuals with cover or no veil. We additionally adjusting, which is one more type of move learning, more impressive than simply the element extraction. In this interaction camera video takes care of from the Network Video Recorder (NVR) are transferred utilizing RTSP and afterward these edges are changed over to grayscale to further develop speed and exactness and are ship off the model for additional handling inside machine. We have involved the RestNet50 engineering as the center model for identification as RestNet50 gives an enormous expense advantage contrasted with the typical 2D CNN model. The cycle additionally includes the YOLOV3Detector, a neural organization engineering that has as of now been prepared on a huge assortment of pictures like ImageNet and Pascal for great picture order.

We are stacking the RestNet50 with pre-prepared ImageNet loads, leaving the organization head off and developing another FC head, joining it to the base rather than the old head, and freezing the base layers of the organization. The loads of these base layers won't be changed during the tweaking period of the backpropagation, while the head layer loads will be changed. After information is ready and the model engineering is set up for calibrating, then, at that point, the model is ordered and prepared. A tiny learning rate is utilized during the retraining of the design to guarantee that the convolutional channels previously educated don't veer off significantly and tests have been completed with OpenCV, Keras involving Deep Learning and Computer Vision to assess the protected social distance between distinguished people and facial covering identification continuously video transfers. The primary commitment of the proposed framework is three parts: individual recognition, safe distance estimation between recognized people, facial covering discovery. Constant individual discovery is finished with the assistance of YOLOV3 (You Only Look Once) utilizing RestNet50 and OpenCV, accomplishes 91.2% mAP, beating the equivalent state-of-the-workmanship Faster R-CNN model. A jumping box will be shown around each individual distinguished. Despite the fact that YOLOV3 is fit for identifying different items in an edge, it is restricted to the location of a solitary individual in this framework. To ascertain the distance between two people first the distance of individual from camera is determined utilizing triangle comparability method, we work out apparent central length of camera, we accepted individual distance  $D$  from camera and individual's genuine tallness  $H=165\text{cms}$  and with YOLOV3 individual location pixel stature  $P$  of the individual is distinguished utilizing the jumping box facilitates.

## 6. CONCLUSION

The proposed framework will work in a proficient way in the current circumstance when the lockout is facilitated and assists with following public places effectively in a robotized way. We have tended to inside and out the following of social separating and the recognizable proof of facial covering that assistance to guarantee human wellbeing while at the same time keeping the

security and protection of clients' information. The execution of this arrangement was effectively tried progressively by sending model in my neighborhood Working stage (Computer). In this way, the facial covering location and social removing framework will be the main advanced answer for most ventures, particularly retail, medical care, and corporate areas. Find how we can assist you to serve the networks with the assistance of advanced arrangements. This framework can be conveyed on the Hospitals, Office Premises, Government Offices, Schools and Education Institutes, Construction destinations, Manufacturing units, Airports and so on whenever sent accurately, the COVID-19 cover finder we are working here today might actually be utilized to assist with guaranteeing your security and the wellbeing of others. The arrangement can possibly altogether lessen infringement by constant intercessions, so the proposed framework would work on open security through saving time and assisting with decreasing the spread of Covid.

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