SOCIAL DISTANCING AND MASK DETECTOR

Ankush Pawar, Dhanashree Kamble, Chetana Pawar, Arpita Sagar

And Dr. Gitika Narang(co-author)

Department of Computer Engineering, Trinity College of Engineering and Research.

I.ABSTRACT

Social Distancing finder utilizing Machine learning is one of the profound methods at the side of computerization to identify infringement of social Separate between individuals. Here we used YOLOv3 Calculation for following and identifying individuals, with the assistance of Ruddy and Green colour outline or Bounding box utilized to appear the infringement of social separating and inviolability of social removing individually. Caution framework is playing an imperative important part to preserve the infringement of social Remove.Covid19 has given a new identity for wearing a mask. Accurately and efficiently detecting masked faces is increasingly meaningful. As a unique face detection task, face mask detection is much more difficult because of extreme occlusions which lead to the loss of face details. Besides, there is almost no existing large-scale accurately labelled masked face dataset, which increases the difficulty of face mask detection. The CNN-based deep learning algorithms have made great breakthroughs in many computer vision areas including face detection. In this, we propose a new CNN-based cascade framework, which consists of three carefully designed convolutional neural networks to detect face masks and their type. Besides, we have made provision for a sanitization tunnel after the first task of detecting proper masks and checking body temperature.

Keywords: Yolo algorithm, Social Distancing, machine learning, face mask detection.

II.INTRODUCTION

On 11 March 2020, WORLD HEALTH ORGANIZATION declared Covid-19 as a pandemic. when cases have increased then WHO gives guidelines to maintain at least 1m distance among each other. Maintaining the social Distance between people is one of the important aspects for preventing new ones affected by covid-19. Social distancing is playing an important role to reduce the spread of disease. To a little bit contribution to breaking this chain for that, we proposed a digital solution i.e Social Distancing Detector using Machine learning. This is one kind of deep learning Technique to detect the violation of social distancing of people. In our proposed system we implement an alert system to maintain the violence of social distancing you Look Only Once[YOLO] Algorithm is used for detecting people.COCO which means the common object in context is a high-quality dataset for computer vision used for real-time object detection systems.

At the end of this decade, the face has got a new identification due to the rise in COVID19 cases. COVID-19 is that that gets inflicted when infected person comes in contact with any other person. An infected person can leave traces of the virus on things around him. His spit or touch is observed to be most infectious medium to carry this virus. Hence as way of precaution people all around need to wear famasks tosto prevent them and everyone aroan und them to get infected by the VIRUS. This discipline has been made compulsory which is helping in curbing the COVID-19 The governmenternment have utilized strict law for wearing mask when in public area. People are fined for not wearing mask or not wearing it properly. Keeping the need of time in mind we have proposed a method for detecting the mask on face. The paper proposes astepwisee method to detect the block of face in images and surveillance videos. The next step involves the detection of mask on this block. Further steps involve whether the mask is worn properly or not. The first step of face detection is one of the longest-researched computer vision problem, which can be traced back about half a century ago. However, most of the early face detection algorithms cannot meet the practical need. In 2001, Viola and Jones's seminal work," Viola-Jones face detector", made it possible for real-time face detection in practice [1]. The Viola Jones face detector consists of a series of classifiers ranging from simple to complex ones. Later researchers continued to study based on it, and many of them apply more complex and descriptive features [2,3,4] to make the detector more powerful. In recent years, deep learning has made great breakthroughs in many computer vision areas, such as general object detection, object classification, object segmentation and of course, face detection. Deep learning does not need to manually design features, the CNN (Convolutional Neural Networks) can automatically take learning useful features from the training images. The proposed system involves use of cascaded CNN for face detection and detection of mask at later stage. The system will help detect the people wearing masks as wellas people not wearing mask. This in course will help to bring discipline to public as well as precaution through which they can easily roam around and help curb the COVID-19 infection. The system further extends to create sanitization tunnel which involves the IoT part of system wherein tunnel is activated after detection of proper mask.

III.LITRATURE SURVEY

After the rise of the COVID-19 pandemic since late December 2019, Social distancing is deemed to be an utmost reliable practice to prevent contagious virus transmission and opted as standard practice on January 23, 2020 (B. News, 2020). During one month, the number of cases rises exceptionally, with two thousand to four thousand new confirmed cases reported per day in the first week of February 2020. Later, there has been a sign of relief for the first time for five successive days up to March 23, 2020, with no new confirmed cases (N. H. C. of the Peoples Republic of China, 2020). This is because of the social distance practice initiated in China and, latterly, adopted worldwide to control COVID-19. Ainslie et al. (2020) investigated the relationship between the region's economic situation and the social distancing strictness. The study revealed that moderate stages of exercise could be allowed for evading a large outbreak. So far, many countries have used technology-based solutions (Punn, Sonbhadra, & Agarwal, 2020a) to overcome the pandemic loss. Several developed countries are employing GPS technology to monitor the movements of infected and suspected individuals. Nguyen et al. (2020) provide a survey of different emerging technologies, including

Wi-fi, Bluetooth, smartphones, GPS, positioning (localization), computer vision, and deep learning that can play a crucial role in several practical social distancing scenarios. Some researchers utilize drones and other surveillance cameras to detect crowd gatherings Researchers provide effective solutions for social distance measuring using surveillance videos along with computer vision, machine learning, and deep learning-based approaches. Penn et al. (2020b) proposed a framework using the YOLOv3 model to detect humans and the Deep sort approach to track the detected people using bounding boxes and assigned IDs information. They used an open image data set (OID) repository, a frontal view data set. The authors also compared results with faster-RCNN and SSD. Ramada's et al. (2020) developed an autonomous drone-based model for social distance monitoring. They trained the YOLOv3 model with the custom data set. The data set is composed of frontal and side view images of limited people. The work is also extended for the monitoring of facial masks. The drone camera and the YOLOv3 algorithm help identify the social distance and monitor people from the side or frontal view in public wearing masks. Pouw, Toschi, van Schadewijk, and Corbetta (2020) suggested an efficient graph-based monitoring framework for physical distancing and crowd management. Sathyamoorthy, Patel, Savle, Paul, and Manocha (2020) performed human detection in a crowded situation. The model is designed for individuals who do not obey a social distance restriction, i.e., 6 feet of space between them. The authors used a mobile robot with an RGB-D camera and a 2-D lidar to make collision-free navigation in mass gatherings.

Single sample face recognition has always been a hot but difficult issue in face recognition. By considering selecting robust features and generating virtual samples simultaneously, the paper proposes a multi-scale support vector transformation (MSSVT) based method to generate multi-scale virtual samples for single image recognition. The methods to solve the problem are divided into two categories. One is to look for and select features that are robust to the number of samples, from the point of view of feature selection, such as PCA and 2DPCA. But when each person has only one face to be trained, the feature information extracted from the feature extraction algorithm will also be very limited, resulting in bad recognition performance. The other is to generate multiple virtual samples from the point of view of the extended sample, thus reducing the impact of the sample size.

The authors propose a multi-feature fusion face recognition method based on sparse representation. The core idea is to find the sparseness through training, and then use the sparse coefficient and training samples to represent the test samples, and then the optimal sparse solution is obtained by solving the l1- norm problem. The recognition results of the feature fusion method are better than any single feature algorithm under the condition of non-occlusion or occlusion. When there are less than 10 pictures of each category of people in the training sample and the occlusion type is not controllable, our algorithm can still obtain a high recognition rate

Ordinarily, a calculation that distinguishes and recognizes distinctive objects in a picture (in real-time). Challenge disclosure in YOLO is done as a backslide issue and

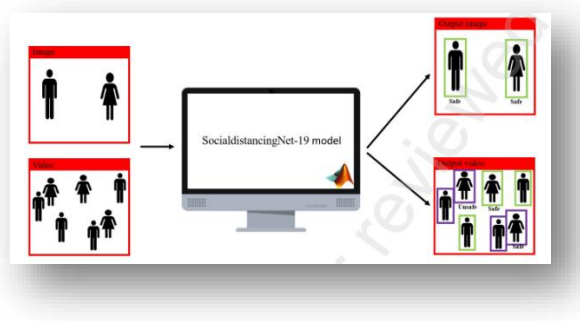
IV. YOLO Algorithm

YOLO is an abbreviated frame for the term 'You Because it was See Once'.

gives the course probabilities of the distinguished pictures.

YOLO calculation utilizes convolutional neural frameworks (CNN) to recognize objects in real-time. As the title suggests, the calculation requires because it was a single forward expansion through a neural orchestrate to distinguish objects.

This infers that desire inside the complete picture is depleted by a single calculation run. The CNN is utilized to expect diverse lesson probabilities and bounding boxes at the same time. The YOLO calculation comprises distinctive varieties. A couple of the common ones consolidate unassuming YOLO and YOLOv3.



YOLO algorithm 1.1: YOLO

Our proposed system is a creative AI-driven course of action depending on Honest to goodness Time Picture affirmation and Video. Dealing with and is competent of recognizing any encroachment of Social Evacuating and recognizing within the occasion that the number of people at a put is more than the restrain regard esteem regard. It'll allow much-required live feedback and cautions to open to staying at a slightest of 6 feet evacuate from each other at open places in this way offer help in keeping up Social Expelling.

Our proposed system comprises of two perspectives:

1. Area of encroachment of Social Expelling

(a) No of people more vital than the edge in each video diagram. (swarm disclosure)

(b) The expel between two people is less than the specified constrain.

2. Caution System

(a) Caution system that gets enacted at anything point there's an encroachment of social evacuating.

1. Area of encroachment of Social Evacuating:

This will be considered as honest to goodness time address disclosure device in where the protest is an individual(person) and we ought to check the number of objects being recognized inside the input source. There are distinctive significant learning approaches that have fulfilled the comes almost for the given task. One must strike a alter between accuracy and speed in this real-time application.

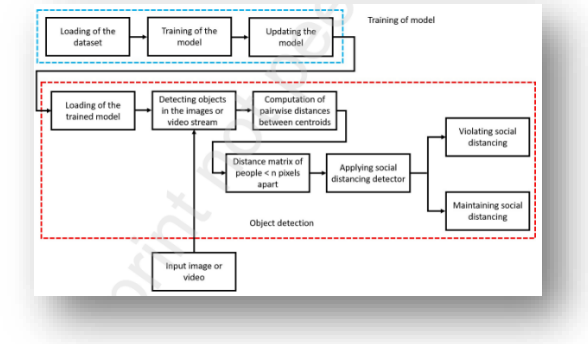
We'll compare the diverse models and survey them based on diverse components such as speed, accuracy, incorporate extractor, extractor surrender walk, input picture assurance, NMS(Non-Max Concealment), mAP(Mean Ordinary Precision), and IoU(Intersection Over Union) restrain.

Definition of terms utilized in our application:

• Non-Max Concealment:

Non-max concealment can be a strategy utilized essentially in protest areas that focuses on selecting the finest bounding box out of a set of covering boxes. Various proposals for the taking after organize, the

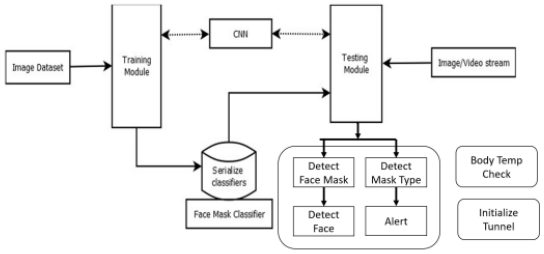
classification handle, are made during the address disclosure plan. The thought is an extend bounded around the dissent that has got to be recognized. Planning a broad number of recommendations over classification frameworks is direct and gravely planned. As a result, a time-saving technique is utilized to forbid any of the considerations based on particular parameters. This strategy is known as the Non-Max Concealment.



YOLO algorithm 1.2: Training Model for Social Distancing

IV.METHODOLOGY

Before Analysis 1.3: Input



YOLO algorithm 1.3: Training Model for Mask Detection

3. Alarm System:

The alarm is a movement that's actuated when some individual does not take after social evacuating benchmarks.

a) Sound caution system is an alarm sound made e.g. a sound will be made by the application when Social Expelling rules are manhandled.

b) Appear message alert is an alert that can be a popup flashed onto the screen by the application in case of encroachment

After Analysis 1.4: Output

By using CCTV Cameras, we can automate the detection of any social distancing violations and then alert the authorities if people gather in large groups or if people do not maintain a precautionary distance between them.

We used various Deep Learning Techniques like OpenCV and YOLO Object Detection to detect and track

human bodies. To detect any social distancing violations distance between two bodies has toe calculated. It is done usng the traditional Euclidean Distance formula :

Distance= $\sqrt{\ }(x2-x1)^{2}+(2-y1)^{2}$

Our proposed system is an innovative AI-driven solution relying on Real-Time Image recognition and Video Processing and is capable of detecting any violations of Social Distancing and detecting if the number of people at a place is more than the threshold value. It will provide much-needed live feedback and alerts to the public to stay at a minimum of 6 feet distance from each other at public places thus helping in maintaining Social Distancing.

Our proposed system consists of two aspects:

1. *Detection of violation of Social Distancing*

(a) No of people greater than the threshold in each video frame. (crowd detection)

(b) The distance between two people is less than the specified threshold.

2. *Alert System*

(a) Alert system that gets triggered whenever there is a violation of social distancing.

Here, there are two images in 1) we take input before analysis in the image frame and after analysis, we get an output image in which the people who are following the social distancing are shown in the green box and the people who are not following social distancing are shown in the red box.

System Architecture

This is our system architecture

The proposed framework performs four major tasks in the following order:

1. Object Detection
2. Object Tracking
3. Distance Calculating Between Objects
4. Social Distancing Estimation

Here we are taking the video frame as input. We perform object detection to detect people in a video frame. Once the people in the frame have been correctly identified and tracked, our goal is to estimate the real distance of each person in meters using the effective mathematical distance formula.

If the distance between two people is less than 6 feet then the trigger is generated and it gives a red alert otherwise the output is stored in the output stream.

V.CONCLUSION

Social distancing is very important to protect ourselves from the virus covid-19 for this situation our paper proposed a digital solution to enforce social distancing.so, this system used recording for surveillance of people during a pandemic. It can be used in crowded places like schools, colleges, streets, bus stops, etc. by monitoring the distance between two people we can make sure that an individual is maintaining social distancing. based on the result obtained the social distancing detector is correctly marking people who violate the social

distancing rule. while the people who are following rules are enclosed in the green box and the people who violate social distancing are enclosed in the red box. This solution is very helpful in enforcing social distancing**.**

VI.REFRENCE

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