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Breaching Personal Bubble Detector Using YOLO V4 Image Processing Algorithm

Mr Abhishek Mohite[1], Mr Unmesh Sorate[2], Mr Himanshu Mishra[3], Mr Ashish Shrivastava[4], Prof Sumit Mali[5]

Department of Computer Engineering, NBN SINHGAD School of Engineering, Pune, India[1,2,3,4,5]

Abstract: *This topic consists of a method detecting objects in video/pictures using YOLO v4 image processing algorithm. The Covid-19 has adversely affected different sectors in almost every country, which eventually caused a lot of problems for the people around the globe. Some small steps like wearing face mask as well as avoiding breaching of personal bubble would save lots of lives as the spread of this virus could be taped. YOLO stands for You Only Look Once algorithm is used for object tracking and object detection. We used YOLO algorithm for calculating breaching of personal bubble. Object tracking is used to track people in the frame for counting the objects and keeping a record of that object in the next frame. Minimum distance required for not breaching personal bubble is 6 feet. So, we keep this as a base for calculating distance, our model is trained and used for object detection and object tracking.*

Keywords: Yolo Algorithm, Object Tracking, Image Processing, etc.

I. INTRODUCTION

Computer vision is the part of artificial intelligence that uses machine power in turn returns meaningful information from provided datasets and datasets can be videos, images etc. Pandemic had a great impact on different sectors of world. This research based on social distancing used computer vision to understand different aspects of video based on frames that is provided as input to algorithm in order to achieve the above objective, moving objects are detected in real time using YOLO algorithm which supports convolutional neural network which is responsible for detection and determining the distance between moving objects. Deep learning is subset of machine learning that works with algorithm it offers image detection from video per frame and convolutional neural networks. Convolutional neural network CNN can be used for accurate detection.

II. LITERATURE SURVEY

Covid -19 has brought global crisis conditions. The novel corona virus disease (covid-19) has already affected over seven million people claiming more than 4,00,000 lives in over 200 nations all over the world. One of the main reasons for this pandemic to spread on this scale is not maintaining social distancing. Motivated by this, the topic proposed a deep learning-based framework for automating the task of monitoring social distancing using surveillance video. The following framework uses the YOLO v3 object detection model to separate humans from remaining background and deep sort approach to trace the identified people with the help of bounding boxes and assigned ID's. The results of this algorithm (YOLO v3) are compared with faster region-based CNN and single shot detector (SSD).

Further on a Creative technique was investigated by Nadikattu et al. [7] The primary reason for this technique was to give a caution on the off chance that an individual comes in touch inside 6-ft span with someone else. For this strategy a simulated intelligence Shrewd Gadget was utilized reason it came about to be a lot of convenient and more exact for the recognition reason. Ghorai et al. [8] introduced a profound learning module that essentially cautioned two people coming in touch inside a CCTV camera outline. The dataset utilized was Posture Net module for individuals' identification. For this situation as the essential in the middle between people as prompted was 6-ft from the technique suggested by Feng et al. [11] To secure the module we thought about numerous modules like RCNN, SSD, YOLO V3.

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Yang et al [3] presented a simulated intelligence camera-based-constant framework to screen Social Separating. Individuals in CCTV Film. First and foremost are doled out a square edge assuming the accompanying individual is found on a more secure distance the alloted outline was demonstrated in green casing and it the two people interacted with one another disregarding their 6-ft distance the relegated outline transformed into red tone showing that the social distance in abused from following people. In Sener et al [2] proposed a technique for separating movement of individuals on open spaces. They accomplished an exactness of 93.8%. For a superior comprehension a standard correlation was in the middle between PASCAL VOC, COCO and ILSVRC datasets. furthermore, the end was that SSD had more exactness among them and is more precise. The exactness of SSD300 is 74.99% and for SSD512 is 75.3%.

III. IMPLEMENTATION

For the purpose of object detections, we have used YOLO as our main object tracking Algorithm. Yolo generally stands for you only look once. The main dataset we used is the COCO dataset for further to improve our Accuracy in case we literally used almost 200 images from the dataset where each had more than one labels inside of it and which were actually used for the purpose of training the dataset and above it with, we used auxiliary dataset so Basically auxiliary dataset does the work to provide images in terms for rotation, scaling, and cropping. Later on, the dataset was then for the sake of training and testing was divided into two parts the 56% for training and 14% for validation and the rest 30% for testing of trained detectors.

As mentioned above we have used the yolo algorithm which is the fastest image processing algorithm further on about the parameters of yolo algorithm there are three tuning parameters the feature extraction network, anchored box and network input size. Each person in the frame gets assigned with a rectangular frame using the box coordinates and further the top-left coordinates are derived. For finding the distance Between the Centroids Euclidean distance is used.

Further on the distance or the safe distance between the present centroids is calculated and the centroids or the frames those are coming in contact with each other the frame turns into red indicating that the safe distance is violated in if the frame turns green indicating that the distance between them is on the safer side. Based on the obtained results the study satisfies all its objectives on data augmentation was also carried out that mainly added more variety and to our dataset. Further we found that there are even more limitations in it to the obtained results and in case for better results a better trained dataset.

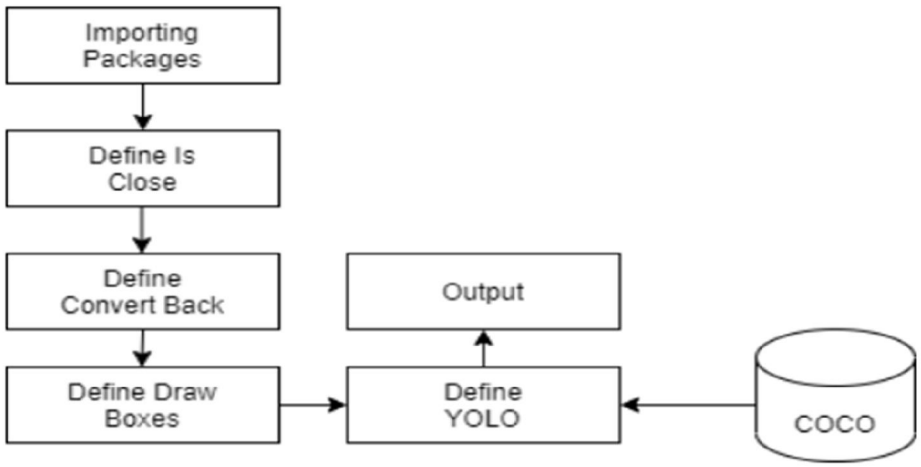

Figure 1: Block Diagram for Object Tracking

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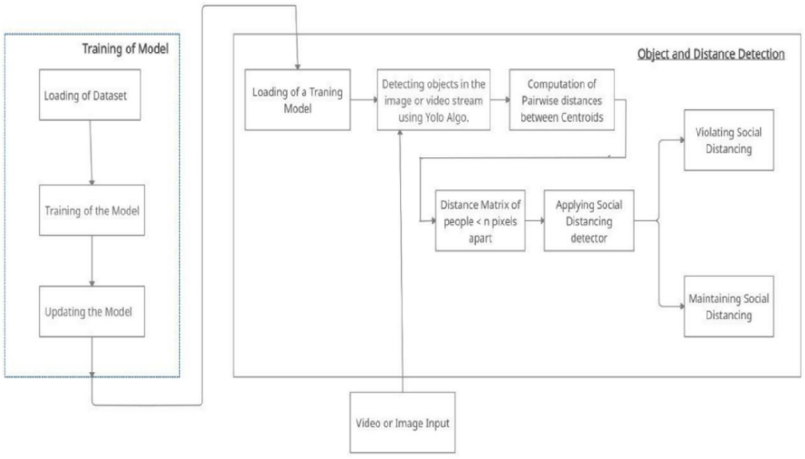

Figure 2: System Architecture Design

IV. RESULTS

Figure 3

Figure 4

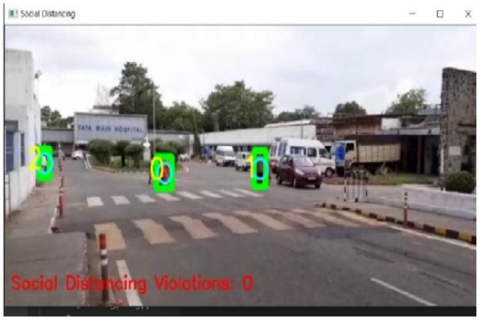

Figure 5

Figure 6

V. CONCLUSION AND DISCUSSION

Somewhat recently beginning from Coronavirus' most memorable wave we have seen that Web-based entertainment plays had a significant influence in controlling the spread of infection So on a module in light of python and open cv appointed with coco dataset and consequences be damned calculation makes feasible for recognizing individuals disregarding friendly removing in a specific CCTV film prompting generally controlling of social distance infringement and causing individuals to keep social separation.

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In view of the tasted results the general goal is accomplished and with great precision. But there are a few constraints on this module in view of various outside Ecological Circumstances the Troublesome scenes for distinguishing individuals. Further on in Future with better enhancements and a few cutting-edge innovations a superior and more precise module can be imagined.

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