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Social Distancing using Computer vision

1st Yamuna U
Assistant Professer,
Information Science and Engineering,
SJB Institute Of Technology
Bangalore, India

2nd Nityanand
Information Science and Engineering,
SJB Institute Of Technology
Bangalore, India

3rd Khushi Tulsyan
Information Science and Engineering,
SJB Institute Of Technology
Bangalore, India

4th Himanshu Chauhan
Information Science and Engineering,
SJB Institute Of Technology
Bangalore, India

5th Osho Chamoli
Information Science and Engineering,
SJB Institute Of Technology
Bangalore, India

***Abstract*—Social distancing may be an advised solution by the WHO to minimize the spread of COVID-19 publicly places. The proposed system uses the YOLOv3 object detection model to identify people within the background and in-depth tracking of identified people with the help of binding boxes. The model results of YOLOv3 are compared to other popular modern models, e.g. CNN-based regional speed (convolution neural network) and single-shot detector in terms of average accuracy, frames per second and loss values are defined by object classification and location. Later, the L2 line shown in pairwise is calculated based on the three-dimensional feature space obtained using links and therefore the size of the binding box. In addition, the system will use existing CCTV cameras and IP cameras. combined with computer vision to detect people. We are using the YOLOv3 object acquisition model and therefore the OpenCV image processing library to run this project.**

***Index Terms*—Social distancing surveillance, computer vision,COVID-19,Yolov3,human detection and tracking,convolution neural network.**

I. INTRODUCTION

Covid disease 2019 has affected the planet seriously. One major protection method for people is to stay the social distance. On May 2020 the planet (WHO) announced things because the pandemic. The aim of this project is to fight against the Covid, social distancing has proven to be a really effective measure to hamper the spread of the disease by providing the system that keeps track of the peoples by using existing CCTV and IP cameras. Using cameras with Computer Vision to detect people not following rule of social distancing. Social distancing aims at decrease the physical contact between possibly infected individuals and healthy persons. As per the WHO norms it's prescribed that people should maintain a minimum of 2 feet of distance among each other so as to follow social distancing. Proper social distancing is that the simplest because of reduce infectious contact, hence reduces the infection rate. This decrease peak may surely match with the available health care infrastructure and help to provide better facilities to the patients battling against the corona virus pandemic. This system provides tools for safety and security with none need for manual closed-circuit television . Its artificial intelligence program detects violations like not Social Distancing. this technique are often deployed on the Hospitals, Office Premises, Government Offices, Schools and Education Institutes, Construction sites, Manufacturing units, Airports etc. Emerging technologies like Convolutional Neural Networks and Deep learning can enable us to enforce social distancing. YOLOv3 are being proposed to detect and track followed by calculating a violation index for non-social distancing behavior.

Identify applicable funding agency here. If none, delete this.

II. MOTIVATION

Social distancing is unquestionably the foremost trustworthy technique to stop the spreading of infectious disease. some law enforcement departments have been using drones and other surveillance cameras to detect mass gatherings of individuals , and taking regulatory actions to disperse the crowd. Such manual intervention in these critical situations might help re-duce the curve, but it also brings a set of threats to the general public and is challenging to the workforce. Many research findings are reported in the last few years. Social distancing is an effective measure against the coronavirus Disease(COVID-19) pandemic. However, the overall public isn't wont to keep an imaginary safety bubble around themselves. Every place where their is chances of crowd gathering such as a mall or cinema or an airport can use this application

III. METHODOLOGY

The proposed project helps to ensure the safety of the people at public places. In this project, we are using a YOLOv3 and COCO Detector for our task. we've created 2 different folders one for keeping the detection and one for configuration and other consisting of the pre-trained model. YOLOv3 andCOCO file consists of coco.names, yolov3.weights,yolov3.cfg.We are using the pre-trained models for object detection. Other than

the two folders we have kept within the main folder within the main folder we've the social distancing analyser 2.0 python file which we are going to run in order to check if the system is running successfully or not. The social distancing analyser 2.0 python file is interconnected internally with the other two files which has configuration and therefore the one which use the trained model for detecting the people and labeling them. When we call the social distancing analyser 2.0 file it access the camera to take the input of the video file. Once the live video is detected and the trained model start doing its work and the social distancing analyser 2.0 file then uses all the feature and detecting the people in the frame not following and following social distancing. As per the program their is kept a certain second gap between the pop up of notification if the number of people not following social distancing norm increases. The pop up can be seen in the side of the screen.

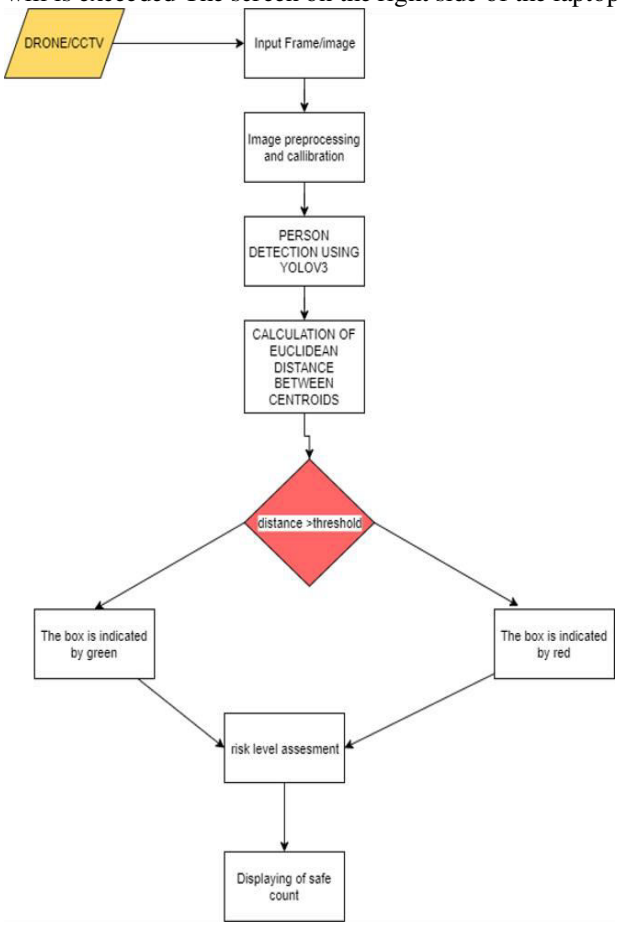
A. Algorithm

YOLOv3 is a real-time object detection algorithm that identifies specific objects in videos, live feeds, or images. It runs significantly faster than other detection methods with comparable performance as com pared to R-CNN family (R-CNN, Fast R-CNN, Faster R-CNN, etc.) The R-CNN family of algorithms uses regions to localise the objects in images which suggests the model is applied to multiple regions and high scoring regions of the image are considered as object detected. But YOLO follows a completely different approach. Instead of selecting some regions, it applies a neural network to the whole image to predict bounding boxes and their probabilities. YOLOv3 is trained on COCO dataset (Common Objects in Context) for object detection This dataset contains 120,000 images with a total 880,000 labelled objects in these images. These models are trained to detect the 80 different types of objects labelled in this dataset

IV. IMPLEMENTATION DETAILS

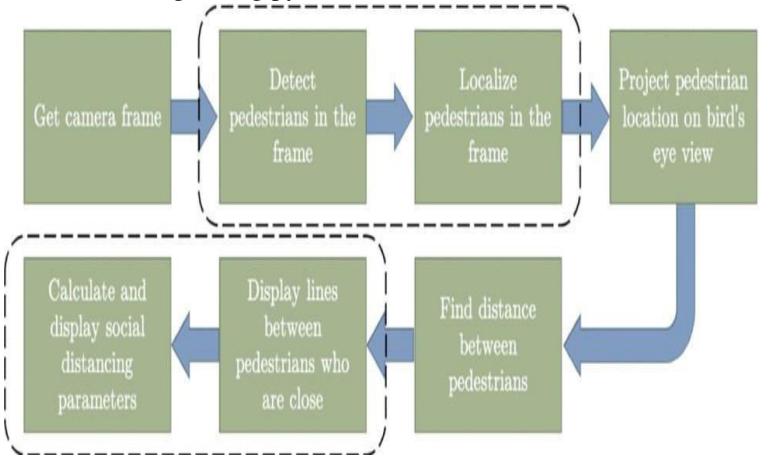
A. sequence design

As you can see in the sequence design below The program begins with reading the frame after the object In this case the detection model, YOLO v3. A time item Detection starts working using a pre-trained model After this everyone's social distance is checked. The person in the live video frame Dis-covered by webcam. Elections will be held Red or depending on the situation applicable and accordingly The green box surrounds a person identified by a pre-trained model in a live video frame Is currently detected and sends alerts based on it The person who likes the Count Alert will see To monitor the video at that time and accordingly he or She can take the necessary actions and actions Make sure social distance is followed. Done Counting those who do not follow social distances The people in the red boxes appear at the bottom left According to the screen count and when there is a certain limit The notification will pop up at the bottom after their will is exceeded The screen on the right side of the laptop



B. Proposed Data Flow diagram

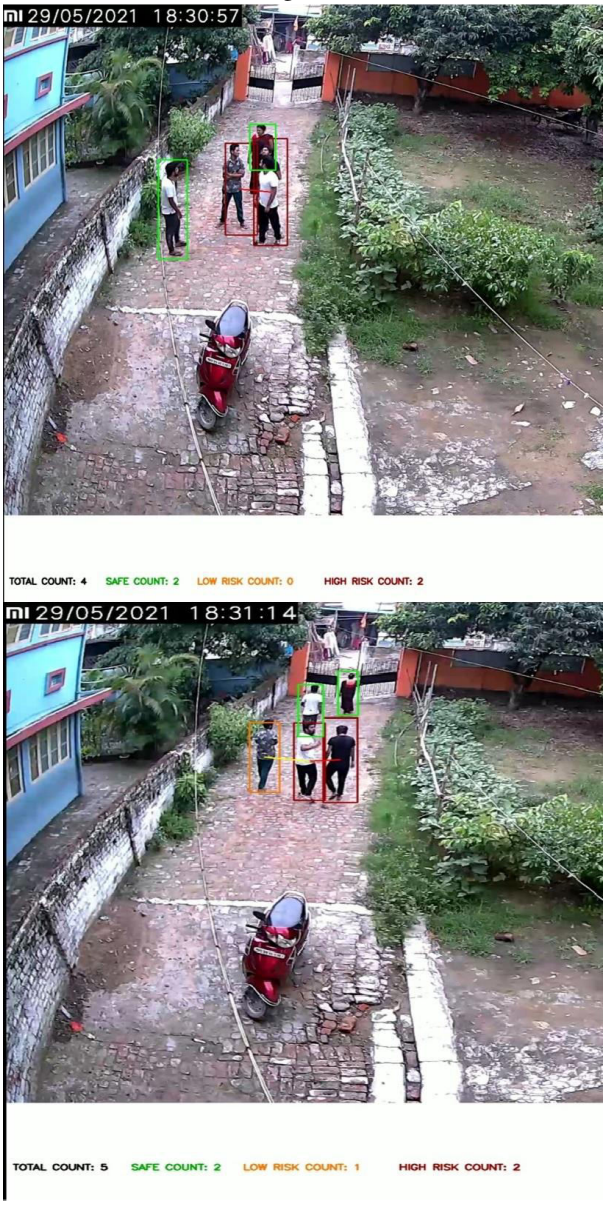
Application will drive A single Python file is linked to another Both the files in the folder and they also have access The trained model is useful for finding people. It uses when we run the social distance detector.py file Detection.py file to identify people and how far the social distancing config.py file is Should be warned



V. RESULTS

Below are some snapshots of the output of Working program model. It is classified into two stages, The

first step is to identify pedestrians Video input and total number are displayed on the right In the lower corner. In the second step we added a warning notification which can be seen in the lower right corner Of the screen



CONCLUSIONS

Through this project we have developed a Social distance analyzer system which can be deployed on real time cctv drone to capture live surveillance..Our software can automatically detect the status of social distance being followed in any given area also it provides real time status about the count of people are at higher risk lower risk or are safe. Deploying it on real time CCTV can help authorities to regulate and monitor which can be huge step for our fight back with this novel corona virus.

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