Social Distancing Violation Alert System

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Abstract - *The act of social distancing is basic to checking the spread of infectious illnesses and has been worldwide embraced as a non-drug avoidance measure during the COVID-19 pandemic. This work proposes a novel system named SD-Measure for distinguishing social distancing from video recordings. The proposed system use the Mask R-CNN deep neural organization to recognize individuals in a video outline. To reliably recognize whether social distancing is worked on during the collaboration between individuals, a centroid following calculation is used to follow the subjects throughout the span of the recording. With the guide of credible calculations for approximating the distance of individuals from the camera and between themselves, we decide if the social distancing rules are being clung to. Items are followed across the edges utilizing YOLOv3 and Simple Online Real Time Tracking (SORT) on reconnaissance video. The algorithms give real-time, accurate, precise identifications suitable for real time applications.*

Key Words: CNN (Convolution Neural Network), IDE(Integrated Development Environment), SD(Social Distancing), Region Based Convolutional Neural Networks(R-CNN), You Only Look Once(YOLO), Single Shot Detector(SSD).

1.INTRODUCTION

The beginning of the COVID-19 pandemic has prompted an increment in the significance of social distancing to mediate in the spread of the infection by controlling social communications and keeping up a distance. Social separating can be characterized as a nonpharmaceutical illness counteraction and control intercession authorized to check contact between the individuals who are contaminated with a sickness and the individuals who are not, in order to stop or reduce the rate and degree of the transmission of the illness inside a local area. At last, this prompts a reduction in the spread of the illness and the fatalities brought about by it. Centers for Disease Control and Prevention (CDC) wellbeing rules direct that a distance at any rate 6 feet should be kept up between two people in both indoor and outside spaces. Social distancing is deliberately increasing the distance between people to avoid spreading illness by reducing groups of people and crowded spaces.

2. PROPOSED SYSTEM

This system explains a innovative system called SD Measure which plans to decide if a bunch of individuals re following 'Social Distancing' rules of keeping a least distance of 6 feet (or 1.8 meters) when noticed rom video film of a public territory. The principle reason for this framework is to deal with caught video film for individual location and further preparing for social distancing or wellbeing infringement. Along these lines, the cycle begins with perusing the edges of a video feed individually. The proposed structure performs for significant undertakings in the accompanying request:

A) Person Detection.
B) Person Tracking.
C)Distance from Camera Estimation.
D)Violation alert message.

We perform object detection using Mask R-CNN to detect people in a video frame. We use Mask R- CNN as it broadens and improves Faster R-CNN. In the wake of performing object detection, effectively distinguished individuals are held dependent on their group IDs and identification scores after filtration from every one of the recognized articles. When individuals in the edge have been accurately distinguished what's more, followed, we will probably gauge the genuine distance of every individual from the camera. After we have estimated the real distance of each tracked person from the camera, our next objective is to determine the person-to-person distance between each pairwise-distinct set of people. In this project, Caffe deep learning model system is utilized to run the article discovery model. The model picked is MobileNet SSD because of the brief timeframe taken for the execution. MobileNet SSD object detection model has a quicker execution time for object detection. Thusly, because of equipment constraint, MobileNet SSD object detection model will be utilized in this System. For monitoring social distancing in crowded area, system display the number of individuals violating the social distancing. After detecting violation of social distancing in video frame alert message of social distancing violation is send with capture image of social distancing violation.

3. SYSTEM ARCHITECTURE

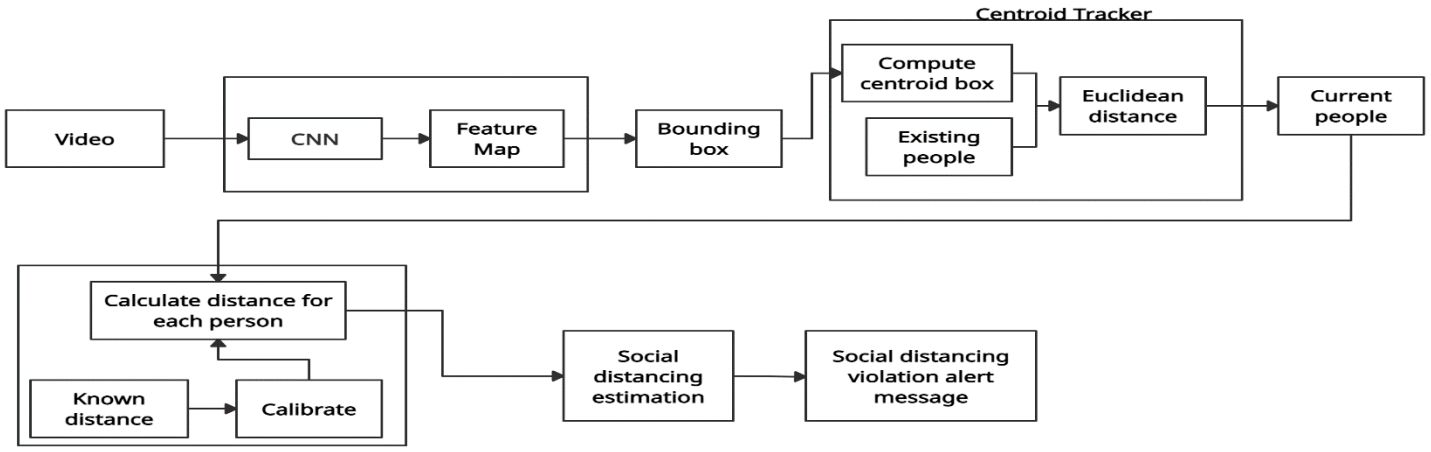

FIGURE 3.1 SYSTEM ARCHITECTURE

The working of project is easy to understand, from the video it detect the individuals in a provided video frame.

The architecture of the system is represented in the above figure 3.1. Track the object and calculate distance between persons to check social distancing condition. Social Distancing rules of keeping a least distance of 6 feet (or 1.8 meters).So known distance provide by the system is 6 feet Compute the centroid tracker in the frame. For model determination, a correlation has been made on a few pre-prepared models with different informational collections like MobileNet SSD, COCO, Kitti, YOLOv3 and Open Images. The examination was done to assess the time taken for execution, exactness and number of items identified with chosen Test Images Set. Thinking about the precision and the time taken for the execution, SSD MobileNet V1 COCO is better for the proposed thought in recognizing object as we need the framework to be precise as conceivable with a fun time rate for the execution. The count of individuals violating social distancing display in the system. To monitor the social distancing, we have display bounding box around the person to check whether the person is following social distancing or not. If the person in the video frame does not violate social distancing then display green box else display red box and send alert message of social distancing violation with capture image in the video frame.

4.FLOWCHART

Flow of the system is represented in the below figure

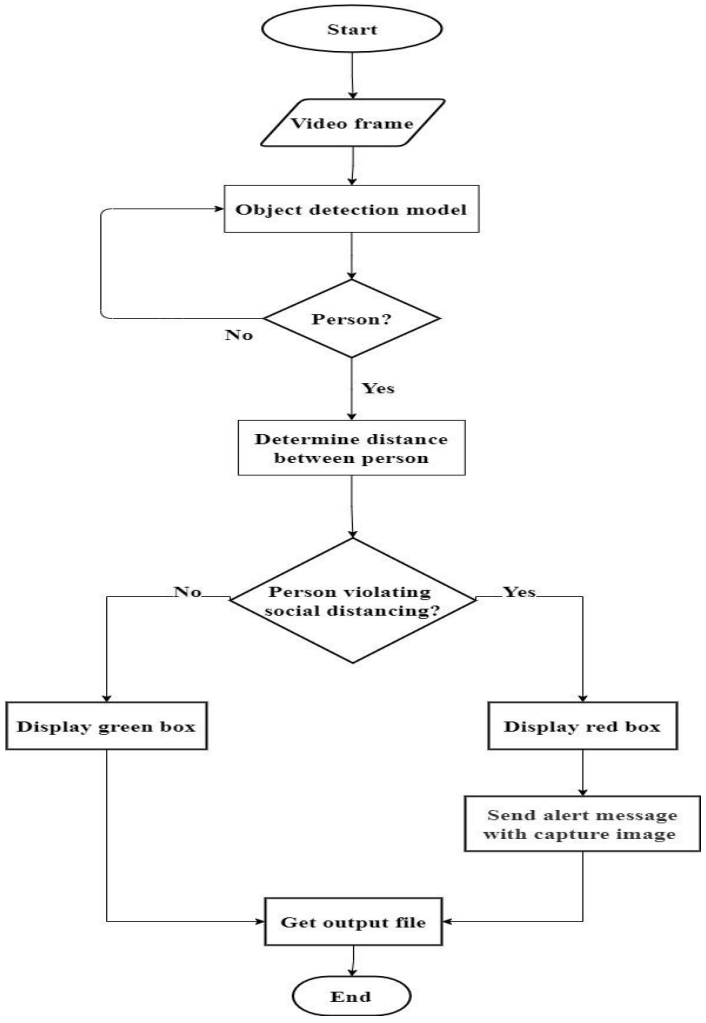

FIGURE 4.1 FLOWCHART

5. CONCLUSION

In this project, a novel system for distinguishing social distancing from video film is proposed. By utilizing cutting edge object identification models for recognizing individuals followed by a credible distance from camera and a pairwise distance assessment calculations, we conclude whether social removing rules are being followed. The subsequent methodology is compelling and was assessed on a custom video recordings dataset acquired for this exploration, as proven by the high exactness esteem alongside great accuracy and review esteems. The low bogus caution rate further approves the intensity of the proposed approach. The methodology can be adjusted for better execution as indicated by the particular environment in thought. Also, enormous snags discouraging the field of perspective on the cameras may influence the following of individuals and thusly right assessment of social distancing, which can be tended to in future work.

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