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Covid19 Social Distancing Tracker

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Abstract: COVID-19 has brought global crisis with its deadly spread. In the fight against the coronavirus, social distancing has proven to be a very effective measure to slow down the spread of the disease. India's government is promising to vaccinate the whole of the adult population by the end of 2021, although it's biggest vaccine maker has been struggling to meet demand as there is shortage of raw materials therefore, social distancing is thought to be an adequate precaution (norm) against the spread of the pandemic virus. This deep learning based framework is used for automating the task of monitoring social distancing. The framework uses the YOLOv3 object recognition paradigm to identify humans in video sequences.

Keywords: COVID, social distancing, YOLO.

I. INTRODUCTION

Coronavirus caused diseases, initially reported at Wuhan, China, during late December 2019. On March 11, 2020, the World Health Organization (WHO) announced it as a pandemic disease. The virus mainly spreads in those people; who are in close contact with each other (within 6 feet) for a long period. The virus spreads when an infected person sneezes, coughs, or talks, the droplets from their nose or mouth disperse through the air and affect nearby peoples. The droplets also transfer into the lungs through the respiratory system, where it starts killing lung cells. One best practice known in stopping the spread of Covid-19 is by implementing social distancing between people with at least 2 meter away. YOLOv3 (You Only Look Once) is applied for human detection. After human detection, the Euclidean distance between each detected centroid pair is computed using the detected bounding box and its centroid information. If the distance violates the minimum social distance set or two people are too close, then the information is added into the violation set. The bounding box's colour is formerly initialized as green; if the bounding box comes under the violation set, its colour is updated to red.

II. METHODOLOGY

This framework utilizes the YOLO v3 object detection model to segregate humans from the background and deep sort approach to track the identified people with the help of bounding boxes. The model was originally trained on the COCO (Common objects in context) data set.

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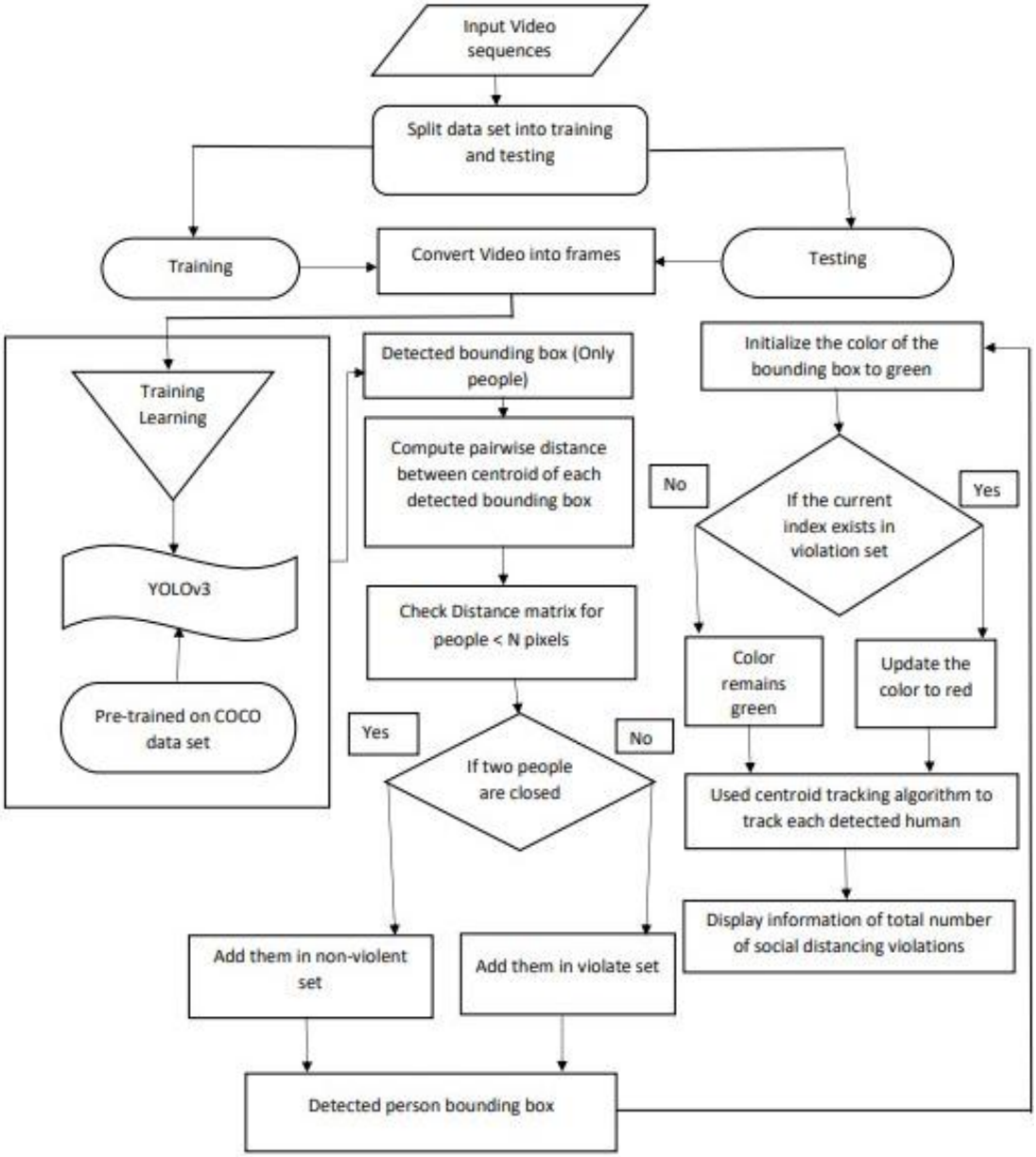

Fig. 1 Dataflow diagram

III. MODELING AND ANALYSIS

The steps involved for people detection and social distancing

- Give image or streaming video or recorded video as an input which contains people.
- Applying the deep learning object detector to detect people in the images or video streams.
- Check the number of persons that are in the images or video stream.
- Compute the distance between the centroid of the bounding boxes which are enclosed to the detected people.
- Finally, the algorithm will decide for safe or unsafe social distancing based on the number of persons and the measured distance between the centroid of bounding boxes.

IV. RESULTS

To monitor the social distancing, we provide image or video as an input. If people follows social distancing then they are displayed in bounding box which is green in colour but as soon as they violate the rules the colour of bounding box changes from green to red.

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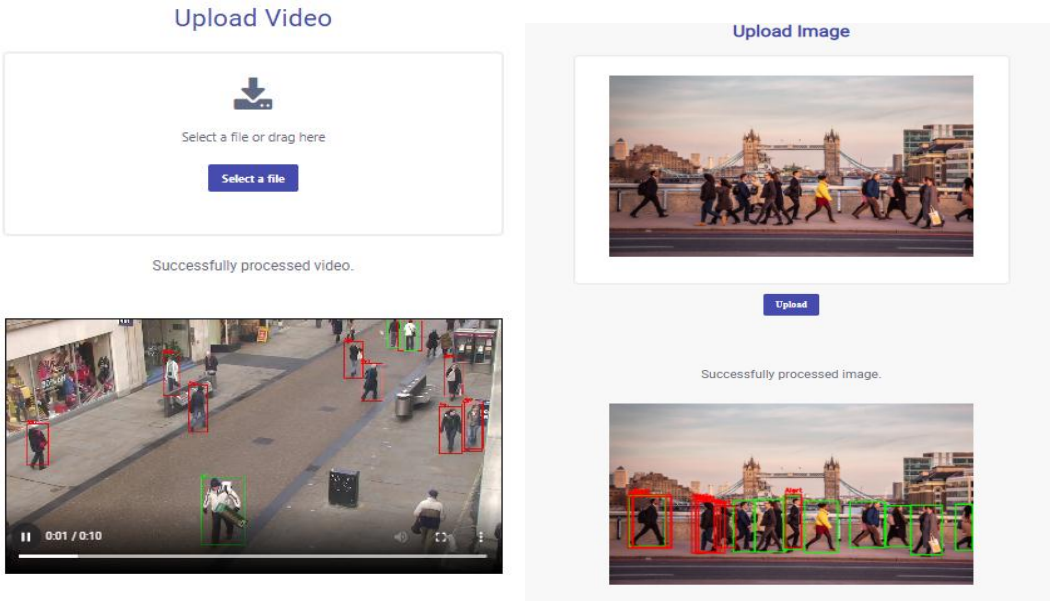

Fig. 2 Input taken from user and output given by social distance tracker.

V. CONCLUSION

The proposed approach is an efficient real-time deep learning-based framework to automate the process of monitoring the social distancing via object detection and tracking approaches, where each individual is identified in the real-time with the help of bounding boxes. We can keep a track of human activities and control large crowds to come together and prevent violating the law. As far as people are maintaining a safe distance they would be indicated with green light, and as the system captures more and more crowd gathering, red light would pop-up and the situation can be analyzed immediately. We can utilize time wisely and save energy for suitable situations.

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