IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 10, Issue 5, May 2022

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.165

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 5, May 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1005256 |

Live Social Distancing Monitor Using Multiple Instance Learning & Yolo

Sivathmika Vinnakota [1], Haritha Rathamsetty [2], Bavitha Velivela [3], Kalyan Chakravarthy Battula [4]

B. Tech Students, Department of IT, Vasireddy Venkatadri Institute of Technology, Guntur,

Andhra Pradesh, India [1,2,3]

ABSTRACT: In the absence of a vaccine or treatment, the most pragmatic strategies against an infectious disease pandemic are extensive early detection testing and social distancing. This study aimed to summarize public and workplace responses to Corona virus Disease-19 and show how the system has operated during the COVID-19 pandemic. Description: COVID-19 social distancing detector using OpenCV, Deep Learning, and Computer Vision. Detect weather the community is following social distancing or not, using live cameras and make a count who violated social distancing. Object tracking has been widely used in various intelligent systems, such as pedestrian tracking, autonomous vehicles. To solve the problem that appearance changes and occlusion may lead to poor tracking performance, we propose a multiple instance learning (MIL) based method for object tracking. In this we use YOLO algorithm for object detection.

KEYWORDS: OpenCV, Deep Learning, YOLO, Social Distancing, Object Tracking.

I. INTRODUCTION

COVID-19 belongs to the family of corona virus caused diseases, initially reported at Wuhan, China, during late December 2020. On March 11, it spread over 114 countries with 118,000 active cases and 4000 deaths, WHO declared this a pandemic . On May 4, 2020, over 3,519,901 cases and 247,630 deaths had been reported worldwide. Several healthcare organizations, medical experts and scientists are trying to develop proper medicines and vaccines for this deadly virus, but till date, no success is reported. This situation forces the global community to look for alternate ways to stop the spread of this infectious virus. Social distancing is claimed as the best spread stopper in the present scenario, and all affected countries are locked-down to implement social distancing.

Our project is aimed to support and mitigate the coronavirus pandemic along with minimum loss of economic endeavours, and propose a solution to detect the social distancing among people gathered at any public place. The word “social distancing” is best practice in the direction of efforts through a variety of means, aiming to minimize or interrupt the transmission of COVID-19. It aims at reducing the physical contact between possibly infected individuals and healthy persons. As per the WHO norms it is prescribed that people should maintain at least 6 feet of distance among each other in order to follow social distancing.

The main purpose of our project is to monitor whether the people are maintaining social distancing or not and alert them who are violating. To achieve this we use YOLO algorithm for object detection, OpenCv, deep learning concepts, python play a major role.

II. RELATED WORK

Human detection using visual surveillance system is an established area of research which is relying upon manual methods of identifying unusual activities, however, it has limited capabilities. In this direction, recent advancements advocate the need for intelligent systems to detect and capture human activities. Although human detection is an ambitious goal, due to a variety of constraints such as low-resolution video, varying articulated pose, clothing, lighting

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 5, May 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1005256 |

and background complexities and limited machine vision capabilities, wherein prior knowledge on these challenges can improve the detection performance . Detecting an object which is in motion, incorporates two stages: object detection and object classification . The primary stage of object detection could be achieved by using background subtraction , optical flow and spatiotemporal filtering techniques . In the background subtraction method , the difference between the current frame and a background frame (first frame), at pixel or block level is computed. Adaptive Gaussian mixture, temporal differencing, hierarchical background models, warping background and non-parametric background are the most popular approaches of background subtraction. In optical flow-based object detection technique , flow vectors associated with the object's motion are characterized over a time span in order to identify regions in motion for a given sequence of images. Researchers reported that optical flow based techniques consist of computational overheads and are sensitive to various motion related outliers such as noise, colour and lighting, etc. In another method of motion detection Aslani et al. proposed spatio-temporal filter based approach in which the motion parameters are identified by using three-dimensional (3D) spatio-temporal features of the person in motion in the image sequence. These methods are advantageous due to its simplicity and less computational complexity, however shows limited performance because of noise and uncertainties on moving patterns . Object detection problems have been efficiently addressed by recently developed advanced techniques. In the last decade, convolutional neural networks (CNN), region-based CNN and faster region-based CNN used region proposal techniques to generate the objectness score prior to its classification and later generates the bounding boxes around the object of interest for visualization and other statistical analysis. Although 3 these methods are efficient but suffer in terms of larger training time requirements.

III. PROPOSED SYSTEM

Since all those CNN based approaches utilize classification, another approach YOLO considers a regression based method to dimensionally separate the bounding boxes and interpret their class probabilities. In this method, the designed framework efficiently divides the image into several portions representing bounding boxes along with the class probability scores for each portion to consider as an object. This approach offers excellent improvements in terms of speed while trading the gained speed with the efficiency. The detector module exhibits powerful generalization capabilities of representing an entire image.

The proposed system is quite effective unlike the existing system our proposed system benefits in terms of speed and the amount of time taken to train the model is less when compared to the existing system.

IV. PSEUDO CODE

The steps involved in an OpenCV-based social distancing application. The steps to build a social distancing detector include:

1. Apply object detection to detect all people (and only people) in a video stream with boundary boxes.
2. Compute the pairwise distances between all detected people.
3. Based on these distances, check to see if any two people are less than N pixels apart.

This social distancing detector implementation will rely on pixel distances, which won't necessarily be as accurate.

4. If the detected pair is at safe distance it is considered that they are following social distance and are bounded by blue boundary boxes.
5. Else it counts to the violating of social distancing factor and objects are bounded by red boundary boxes.
6. Hence the violation count is increased by one on successful detection of social distance violation.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 5, May 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1005256 |

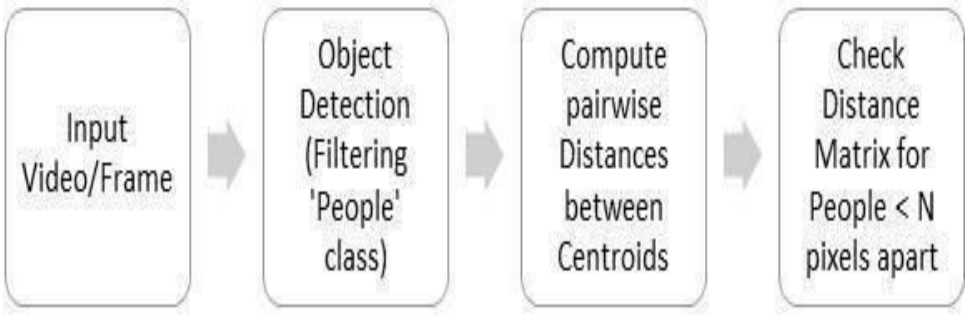

Fig. 1. Computing the distance factor

V. SIMULATION RESULTS

System testing is an investigation conducted to provide stakeholders with information about the quality of the software product or service under test. Software testing can also provide an objective, independent view of the software to allow the business to appreciate and understand the risks of software implementation.

Test techniques include the process of executing a program or application with the intent of finding failures, and verifying that the software product is fit for use.

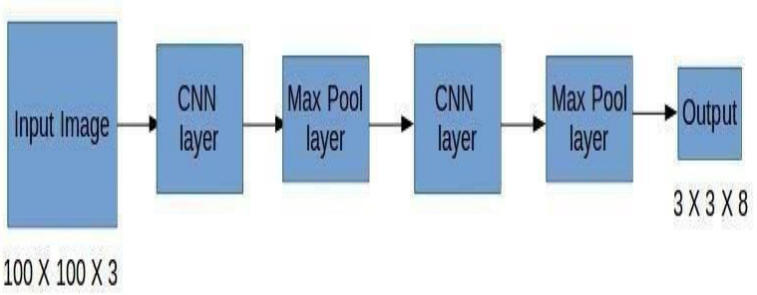

Fig. 2. Conversion of input to target vector

TEST CASES

S. No	Input	Expected Output	Actual Output	Result
1.		The people who violated are in red color bounding box and remaining are in green color bounding box. Violation count is displayed		Yes
2.		The people who violated are in red color bounding box and remaining are in green color bounding box. Violation count is displayed and alert sound is raised.		No

Fig. 3. Test cases of social distancing monitor

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 5, May 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1005256 |

VI. CONCLUSION AND FUTURE WORK

The article proposes 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. The generated bounding boxes aid in identifying the clusters or groups of people satisfying. The closeness property computed with the help of pairwise vectorized approach. The number of violations are confirmed by computing the number of groups formed and violation index term computed. YOLO v3 illustrated the efficient performance with balanced FPS and AP score. Since this approach is highly sensitive to the spatial location of the camera, the same approach can be fine tuned to better adjust with the corresponding field of view.

The possibility of getting effected to different types of viruses in future is high and the risk of such pandemic situations may arise in future so it is always better to avoid such situations there by enhancing and implementing an effective method such as “Social Distancing” is important.

Not just for the sake of viruses but it is good to maintain distance in other areas to prevent a huge crowd pushing over each other which may lead to serious injuries, in this way we can also apply the factor of social distancing in many other areas like shopping malls, temples etc.

REFERENCES

1. Blob from image - https://opencv-tutorial.readthedocs.io/en/latest/yolo/yolo.html
2. YOLOv3Algorithm - https://en.wikipedia.org/wiki/Object_detection
3. https://pjreddie.com/darknet/yolo
4. https://www.geeksforgeeks.org/opencvoverview/
5. https://arxiv.org/pdf/2005.01385.pd
6. https://medium.com/analytics-vidhya/object-detection-using-yolov3-d48100de2ebb
7. https://www.pyimagesearch.com/2020/06/01/opencv-social-distancing-detector/
8. https://www.pyimagesearch.com/2014/11/17/non-maximum-suppression-object- detection-python

INNO SPACE
SJIF Scientific Journal Impact Factor

Impact Factor: 8.165

doi cross ref

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details