



Real Time Social Distance Detection : A Covid 19 Contamination Prevention Measure

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ABSTRACT

Deep learning models have been used to support a method for determining social distance. A red frame and line will appear between two people to indicate that they have violated the policy if they are within a certain distance of one another and the computer vision system is unable to tell them apart. With the use of a film depicting people strolling down a street, the applicability of the suggested technique was examined. The results visualization revealed that the technique suggested is an alternative that can be used in a variety of settings, including commercial organizations and educational institutions, among others. The results of this study can be improved in a number of ways, including adjustments to the algorithm used for pedestrian recognition, the addition of extra detection techniques like the detection of build temperature, the improvement of the processing power of the hardware, and calibration of the camera's field of view. These are merely a few ideas on how to complete the assignment more successfully

Keywords: Convolutional neural network, Deep Learning, Euclidean distance, Bounding box, Centroid, Threshold, Social Distancing, pedestrian identification.

1. Introduction

The potential for the new coronavirus known as Covid-19 to spread quickly raises concerns about the risk of a pandemic in the event that the virus cannot be effectively treated. The World Health Organization (WHO) has given the Covid-19 virus a pandemic designation as a direct result of an increase in the overall number of cases that have been reported in various parts of the world. In an effort to stop the disease from spreading further, the governments of a number of nations have proclaimed states of emergency and instructed their citizens to stay inside their homes during this crucial time. These steps were taken in an effort to slow the disease's progression and stop its future spread. [2] [3][4][5] [6] It is the responsibility of the Centers for Disease Control and Prevention (CDC) and other public health organizations to make it clear that avoiding close contact with other people is the most effective way to stop the transmission of the Covid-19 virus. One thing that is assisting in slowing the spread of the Covid-19 outbreak is people's better ability to gauge the distances between themselves and other people. In order to maintain a sense of social isolation during the quarantine, it was agreed that gatherings of more than one person as well as other activities involving groups of people would not be tolerated. When possible, it is more effective to communicate via phone or email rather than in person to allow for more time for other activities. Two examples of the severe hygiene practices that have been proposed as potential strategies for avoiding the transmission of the Ebola virus include hand washing and the use of face masks. However, preventing the transmission of a disease needs more than simply knowing how to do it[7][8][9][10]. The worldwide pandemic that Covid-19 started has not yet completely been brought under control since a vaccine against it has not yet been developed. In an effort to lessen the financial burden of the Covid-10 outbreak, some governments have resumed a restricted range of economic operations even if the number of new cases has fallen below a set threshold. To lessen the outbreak's negative economic effects, this is being done. In an effort to lessen the outbreak's financial impact, this is being done. Concern for the

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protection of their workers has grown as these nations warily carry on with economic activities in the new post-Covid-19 environment. You should try your hardest to avoid making any form of physical contact with one another, including shaking hands, even if you are in the same room. Prior to further action, this has been done as a prophylactic measure. The Ministry of Health Malaysia (MOHM) has offered guidance on how Malaysian enterprises, people, and families can lower their risk of being sick. [14][15][16][17]. One way to socially isolate people at work is to put them further apart physically. Other tactics include adopting staggered work schedules, minimizing unnecessary business travel, restricting big work gatherings, implementing staggered work schedules, doing routine health checks on employees and visitors entering facilities, and planning company activities. Everyone in a community is at risk from Covid-19, regardless of whether they are an individual, a group member, a corporate representative, or a member of a healthcare organization. Since economic activity has picked up again, the strategies that have proven to be most effective in reducing the negative impacts of the current coronavirus outbreak involve isolating people from one another and from the rest of the world. Unfortunately, a large percentage of people do not follow public health guidelines, especially those that are related to social isolation. Evidence has previously been presented to support this. It is common for people to occasionally forget to practice social isolation on themselves because they are so excited to get back to work. Our objective is to create a deep learning-based system that can automatically detect social distance violations in both public and private settings, such as the workplace. In the domains of computer vision and machine learning, object detection can be accomplished using a variety of techniques. The degree of emotional separation between people can also be measured thanks to these methods.

Some of the most crucial elements of the plan are listed below:

- a) Deep learning has gained more attention in the field of object recognition for the aim of human detection.
- b) Develop a social distance detection device that can gauge the distance between people in order to stay safe.
- c) The categorization outcomes are assessed using webcam real-time video data.

2. Mehtodology

It might be difficult to gauge the precise social distance between individuals in public settings. This study suggests using computer vision techniques and the Deep CNN network to measure social distance between individuals. The pedestrians in the video frames are recognized using the opensource object identification technique YOLOv3[14] [15] [16] [17] . Consequently, the YOLO approach is limited to simply detecting pedestrians. To identify the obtained pedestrians, boundary boxes are used, and the features inside the boundary boxes are gathered to determine how far apart the boundary boxes are from one another. The camera is held stationary with the designated acceptance angle to gather the video frames, which are then converted to still photos from the video. It is assumed that the pedestrians in the video frame are proceeding in this way along a level plane. In order to produce the top-down perspective, four filmed plane points were chosen from the frame. It is possible to determine where each pedestrian is based on the top-down image. The gap between pedestrians can be measured and scaled. Red lines that serve as cautionary warnings will be used to indicate any distance between any two people that is less than the minimum distance that has been established. By modeling the identification as a single regression problem, Deep CNN object detection was able to mitigate some of the problems brought on by computational complexity [14]. The Google-created YOLO model is currently leading the way in object detection using deep learning. It presents an example of one implementation of the YOLO model that was utilized as a strategy for detecting pedestrians and has been found to provide a significant gain in speed for usage with real-time applications. In order to train the YOLO method to recognize objects from images, bounding box coordinates (tx, ty, tw, th), object confidence, and class label probabilities were simultaneously taught (P1, P2,..., Pc). A dataset with 80 labels was utilized in the creation of YOLO. In addition to individuals, this dataset also includes pedestrians. In this experiment, pedestrian object class, object confidence, and lone box coordinates from the YOLO model were used to recognize pedestrians. Top-down, two-dimensional image with a resolution of 480 by 480 pixels that demonstrates how the ROI of an image can be converted into a three-dimensional model. The camera must be able to choose the fastest path from a perspective view to a top-down view in order for its vision to be calibrated. The perspective transformation can be used to rapidly and simply calibrate the camera in OpenCV. This method maps the four points to the four corners of a rectangle in a 2D picture view. It is therefore expected that everyone is positioned on a level, secure surface. The distance between any two pedestrians can be calculated using the pixel count.

3.Conclusion

Deep learning models are being employed right now to create a way for calculating social distance. Computer vision uses red frames and a red line to identify those who are breaking the law so that authorities can take the necessary action. This action on their behalf will directly result in them breaking the policy. Using pedestrians as test subjects allowed researchers to assess if the strategy might be used in real-world situations. These results have a good likelihood of identifying social distances between people, and the information they provide may be useful in a variety of contexts, including workplaces, dining establishments, and educational institutions, among others. For instance, the addition of further detection techniques, including mask detection or the capacity to detect a person's body temperature, the improvement of the hardware's processing power, and the alteration of its field of vision could all help with pedestrian identification. Although not all of the project's prospective improvements are included here, some of them are on this page.

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