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Social Distance detection using Deep Learning

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Abstract: Our research paper presented below is about social distance among people in public places by utilizing Deep learning technique on captured video by at public place Camera for detecting and controlling distance between them so that virus spread can be contained.
This application is created to give alarms to individuals for keeping social separation in jam-packed areas. The real time video used to analysis objects by using object detection method and YOLOv3 calculation. We can figure out whether individuals are following social separating or not and in view of that we are alarming by making alert. It is likewise chipping away at web cameras, CCTV, and so forth, and can identify individuals continuously.
This might assist specialists with overhauling the design of public spots or to make preparatory moves to relieve high-hazard zones. The technology is useful in different fields likewise like independent vehicles, human activity acknowledgment, swarm investigation.
Keywords: Social separating. Object identification. Swarm examination, Coronavirus

I. INTRODUCTION

Corona pandemic have hit the world all across. Still it is affecting heavily with different variants year by year since 2019. the main cause of transmission of this virus is through sneezing or coughing in public places the transmission propagates at high magnitude . In march of 2020 proclaimed covid - 19 to be a pandemic.
Public health organizations like as the US CDC have to state unequivocally that avoiding intimate contact with other individuals is the most effective strategy to halt the spreading of Covid-19. Because India is the world's second most populated country, managing and executing social distance in public areas is tough. As omicron spreads to its peak, social distancing and mask wearing become increasingly crucial.
Lockdown have degraded the economy of every country it has stops development and manufacturing sector heavily. So in developing countries cannot afford long lockdown hence they are compels to open their economy which require solutions to carter this problem of spreading virus. This can be achieve by technologyonly.

A. Proposal

We propose a low cost vigilance system which is real time through CCTV Camera installed in public places which will monitor the public gathering if they are close to certain distance than it can alert them to make social distancing.

B. Related Work

This social distance detection tool is designed to determine a required distance from one person to other. Our work depend on three main steps like : (1) Detection of object, (2) Object Tracking (3) Measuring distances between objects. The transfer learning technology YOLO (view only once) is used for object recognition. There are numerous method by which object in image or video can be detected here we are using Yolo.
Yolo is capable of detecting 9000 classes. We're using the Coco dataset here, which was trained on 80 layers, but we're only using the person class, so we're only using the person class out of the 80 layers. With rise in COVID 19 the technology of Social distance detection become important but checking social distance manually is not possible hence importance of vision based technology become booming which is possible through recent developments in networking, and artificial intelligence (AI). Monitoring social separation is sometimes known to be Visual Social Distance Measuring. Our study measures distance among two people by detecting their center points.
The conversations are inspiring, but they do not produce reliable conclusions for social distance monitoring and leave the subject open. Many technologies equipped with sensors prototypes forced with ML have recently used to know distance between two people. Similar work is going on in manufacturing and crowd management sectors.

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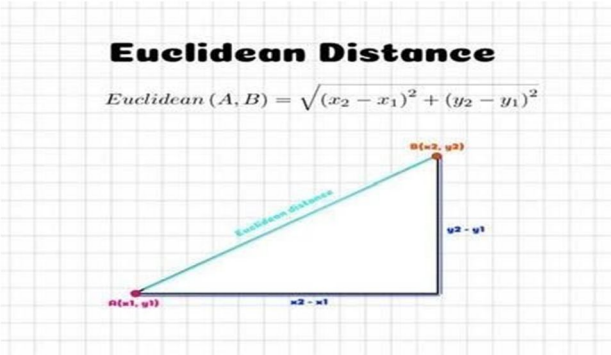


Figure 1 The formula of Euclidean Distance

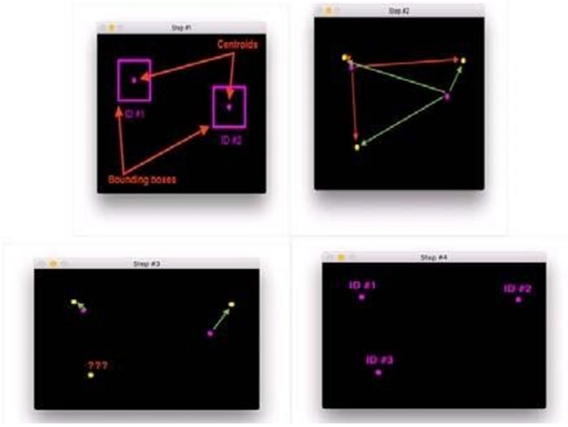


Figure 2

In above fig. we can see two person are close. The box drawn around them and centered of the box are measured here so how can we know that the person has moved from o For this, we will calculate the Euclidean distance between old and new centroids, and close

pairs will be identified as the same individual. We can measure the distance between two persons after identifying their form.

f = (P*d)/W Where f = focal length ,
P = pixel of the object,
d = distance from d' = (W*F)/P the object, W = width

II. METHODOLOGY

To get distance between two people for social distance detection the camera is target toward people walking on street. and camera directed top to bottom for accuracy of perspective view The a mark around walking people indicated who are closer to another pedestrian than the permissible distance, The system raises an error if one person moves so close to another that there seems to be an overlap on video.

The pedestrian recognition method also has an impact on the finding distance between two people. The YOLO method c recognize the pedestrian as object and mark the boundary around; though this method is not accurate when measured from bottom line of people

This method of detecting distance between two people was conceived for crowd management to maintain safety of people but in pandemic period it become more significant.

This project is combination three steps in AI

1) Object detection
2) Object tracking
3) Distance measuring between the discovered items

We use the YOLO (You only look once) transfer learning technique for object detection. There are various transfer learning methods for identifying objects, such as mobile net SSD, but we are utilizing Yolo in this case. Yolo is capable of detecting 9000 classes. We're using the Coco dataset here, which was trained on 80 layers, but we're only using the person class, so we're only using the person class out of the 80 layers.

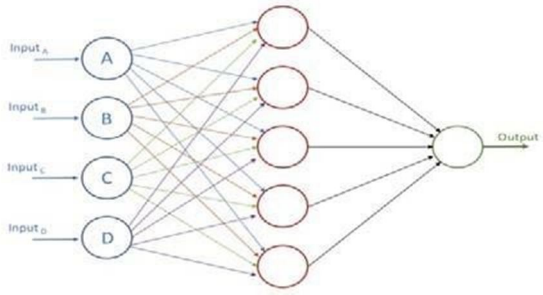
III. TECHNOLOGIES

The main purpose of this technology is to find distance between two people. For this, We have Used Open CV with Python & Neural Networks to calculate the Distance between the Persons and Identifying the people who are Violating the Social distance and who are non- Violating the Social Distancing Rules. Artificial Intelligence (AI) is the current technological wave. If you want to be a part of the revolution but lack the necessary abilities, this series of courses is for you. Branches of Machine learning and AI have huge possibilities in solving day to day problems of mankind so require many skill force who know the technology

IV. IMPLANTATION



here we can see the two people very closed indicated by their distance in ft.



Just like human body Neural networks in computer science play vital role for making computer think and classifying information given to them in form of data or images. The computer an learn to detect photographs like: using neural networks. Computer can also make very accurate predictions and judgments based on data inputs.

V. NATURAL-LANGUAGE-PROCESSING

It enables machines to understand human language. As technology progresses, machines will learn to reply in a way that a human audience can comprehend. This will have a significant impact on how we interact with all computers in the future.

VI. CONCLUSION AND RESULTS

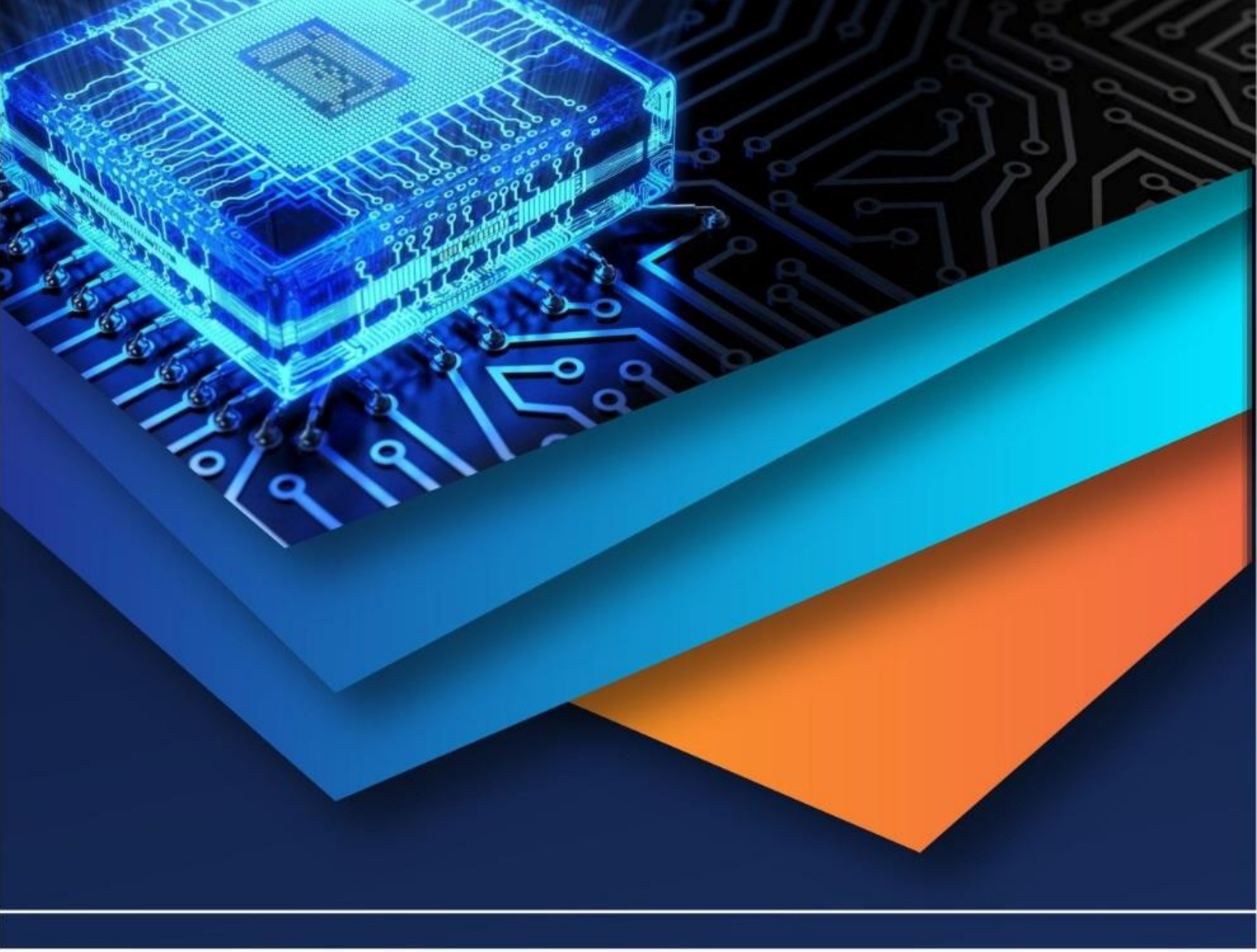
In the next couple of years, there will be many gadgets that will be work on ML models for SEDs for helping mankind. This research, we take the advancement of a social distance ready framework utilizing SEDs. In particular, we present a start to finish social distance structure for continuous handling on SEDs utilizing model.

The investigation shows promising effects of this technique that it is worth to continue. According to our view, there were a few issues that could work on the proposed framework as follows: I) working on the precision by calibrating a portion of the secret boundaries ii) broadening the framework by taking on multi-camera following utilizing the proposed structure, which can empower the enormous scope social distance ready framework.

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