JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue

JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Physical distance and information alert system forpandemic

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Abstract: **The paper presents a methodology for social distancing detection using deep learning to evaluate the distancebetween people to mitigate the impact of this corona virus pandemic. The detection tool was developed to alert people to maintain a safe distance with each other by evaluating a video feed. The video frame from the camera was used as input, and the open-source object detection pre-trained model based on the YOLOv3 algorithm was employed for pedestrian detection. Later, the video frame was transformed into top-down view for distance measurement from the 2D plane. The distance between people can be estimated and any noncompliant pair of people in the display will be indicated with a red frame and red line. The proposed method was validated on a pre-recorded video of pedestrians walking on the street. The result shows that the proposed method is able to determine the social distancing measures between multiple people in the video. The developed technique can be further developed as a detection tool in real- time application**

I. INTRODUCTION

When the novel corona virus (Covid-19) pandemic emerges, the spread of the virus has left public keep anxiety if they do Organization (WHO) has declared Covid-19 as a pandemic due to the increase in the number of cases reported around theworld [1]. To contain the pandemic, many countries have implemented a lockdown where the government enforced that the citizens to stay at home during this critical period. The public health bodies such as the Centers for Disease Control and Prevention (CDC) had to make it clear that the most effective way to slow down the spread of Covid-19 is by avoiding close contact with other people [2]. To flatten thecurve on the Covid-19 pandemic, the citizens around the world are practicing physical distancing. ***distancing, pedestrian detection, deep***

learning, not have any effective cure. The World Health

To implement social distancing, group activities and congregations such as travel, meetings, gatherings, workshops, praying had been banned during the quarantine period. The people are encouraged to use phone and email tomanage and conduct events as much as possible to minimizethe person-to-person contact. To further contain the spread ofthe virus, people are also informed to perform hygiene measures such as frequently washing hands, wearing mask and avoiding close contact with people who are ill. However,there is a difference between knowing what to do to reduce the transmission of the virus and putting them into practice.

The world has not yet fully recover from this pandemic and the vaccine that can effectively treat Covid-19 is yet to be discovered. However, to reduce the impact of the pandemic on the country's economy, several governments have allowed a limited number of economic activities to be

LITERATURE SURVEY

Author	concept	pros	cons
Murani , Francesco Setti and Alessandro Vinciarelli	**The Visual Distancing (VSD) problem** , defined as the automatic **estimation of the inter-personal distance** from an image , and the characterization of related people aggregations.	It is used in **detection of people** in the scene in possibly crowded environments.	Bounding boxes do not account for different body poses that might negatively impact the **estimate of height and thus a wrong VSD**.
Mohd Ezaneerusli, Mohmmad Ali	**My SD ' My Safe Distance'** helps users or public to observe social distance advice closely.	Due to its low cost it is very **easy to integrate** into other technologies like cell phone	Could be used only for **transferring small image** like documents
Geetha A V , Balaji	**Distance Between the two people pedestrian** is estimated through image processing techniques.	**Android development is cost effective** approach where people dont want to spend cost on other infrastructure for surveillance and monitoring	**Not extended in IOS** environment for supporting iPhone users.
JOHN YAWNEYAND STEPHEN	In disease modelling, the simplest compartmental model takes the form of an **SIR model**	**Robust and accurate numerical approximation techniques** are used to simulate the pessimistic base case for which no preventative measures	Extending the **search space using a naïve grid** search approach quickly makes the computational requirements infeasible.

ANDREW GADSDEN	.	are taken and for various social distancing regimes.	
JIE LI , ZHAOLONG NING , BEHROUZ	Socially aware networking is an emerging paradigm for high-efficiency data dissemination.	**Social Internet of Vehicles** are promising to tackle the	**Social Internet of Vehicles** are promising to tackle the
JEDAR ,FENG XIA IVAN AND AMR TOLBA		corresponding **Internet of vehicles in a scalable and distributed method.**	corresponding **Internet of vehicles in a scalable and distributed method.**

MOTIVATION AND GOALS:

When the novel Coronavirus (Covid-19) pandemic emerges, the spread of the virus has left public keep anxiety if they do not have any effective cure. The World Health Organization (WHO) has declared Covid-19 as a pandemic due to the increase in the number of cases reported around the world.Social distancing is a method used to control the spread of contagious diseasesAs the **name suggests, social distancing implies that people should physically distance themselves from one another, reducing close contact, and thereby reducing the spread of a contagious disease The people are encouraged to use phone and email to manage and conduct events as much as possible to minimize the person-to-person contact.**

Overview of the System

When the novel coronavirus (Covid-19) pandemic emerges, the spread of the virus has left public keep anxiety if they do not have any effective cure. The World Health Organization (WHO)has declared Covid-19 as a pandemic due to the increase in the number of cases reported around the world.

Social distancing is a method used to control the spread of contagious diseases. As the name suggests, social distancing implies that people should physically distance themselves from one another, reducing close contact, and thereby reducing the spread of a contagious disease

The people are encouraged to use phone and email to manage and conduct events as much as possible to minimize the person-to-person contact.

To reduce the possibility of infection, it is advised that people should avoid any person-to-person contact such as shaking hands and they should maintain a distance of at least 1 meter from each other.

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According to the defined requirements by the WHO, the minimum distance between individuals must be at least 6 feet (1.8 m) in order to observe an adequate social distancing among thepeople .Recent research has confirmed that people with mild or no symptoms may also be carriersof the novel coronavirus infection

METHODOLOGY

- Yolov3 algorithm
- Coco dataset
- Open CV

1. Yolov3 algorithm

In traditional computer vision approaches, a sliding window was used to look for objects at different locations and scales. Because this was such an expensive operation, the aspect ratio ofthe object was usually assumed to be fixed.Early Deep Learning based object detection algorithms like the R-CNN and Fast R-CNN used a method called Selective Search to narrow down the number of bounding boxes that the algorithm had to test. Another approach called Overfeat involved scanning the image at multiple scales using sliding windows-like mechanisms done convolutionally This was followed by Faster R-CNN that used a Region Proposal Network (RPN) for identifying bounding boxes that needed to be tested. By clever design the features extracted for recognizing objects, were also used by the RPN for proposing potential bounding boxes thus saving a lot of computation.

2. Coco dataset

The Common Objects in Context (COCO) dataset is one of the most popular open source object recognition databases used to train deep learning programs. This database includes hundreds of thousands of images with millions of already labeled objects for training. Arguably the most important element of supervised machine learning is access to a large and well documented dataset to learn from. Sponsored by Microsoft, COCO segments images into categories and object, while also providing machine-readable context captions and tags. This all drastically cuts down on the basic training time for any AI that needs to process image

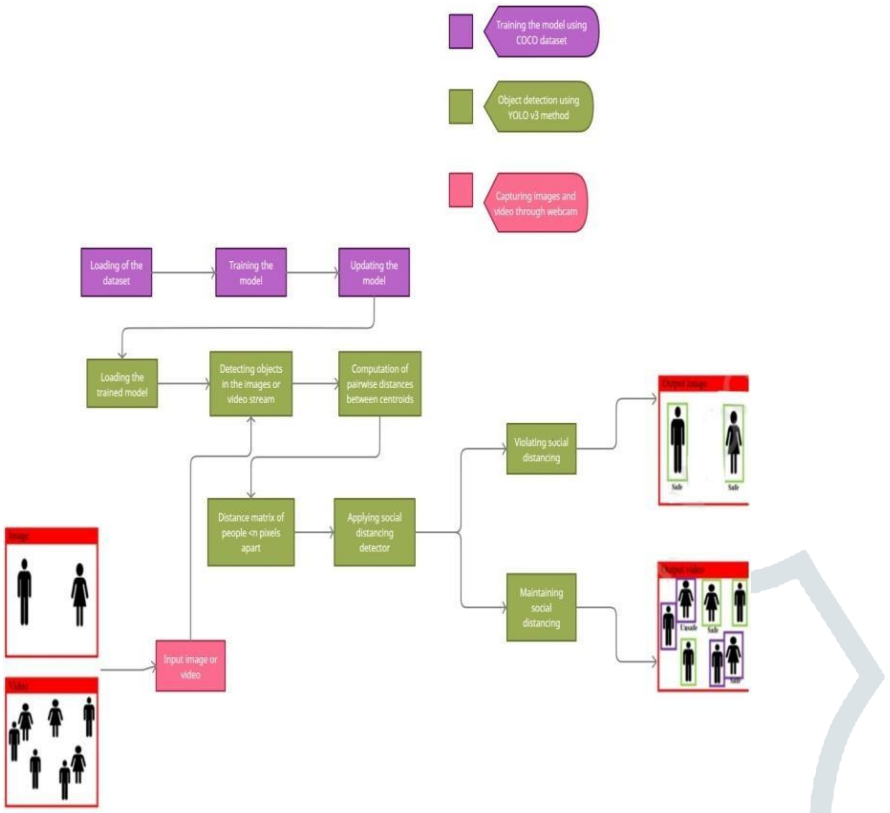
3. Open cv

It features an implementation for a very fast human detection method

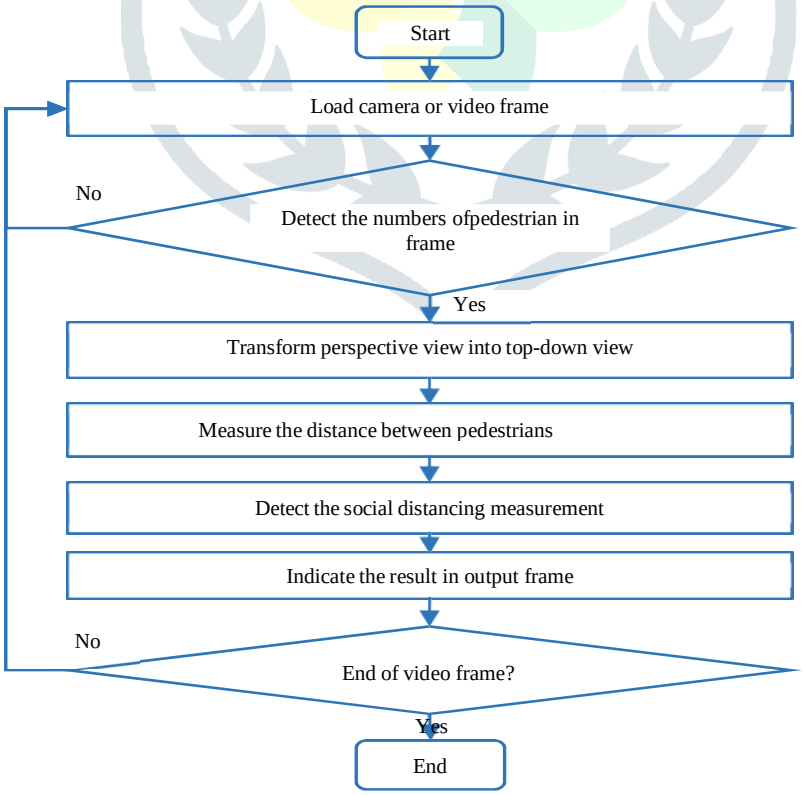
This methodis trained to detect pedestrians, which are human mostly standing up ,and fully visible.

Video Input and **Output** , **Object Detection** can be done .

ARCHITECTURE DIAGRAM:

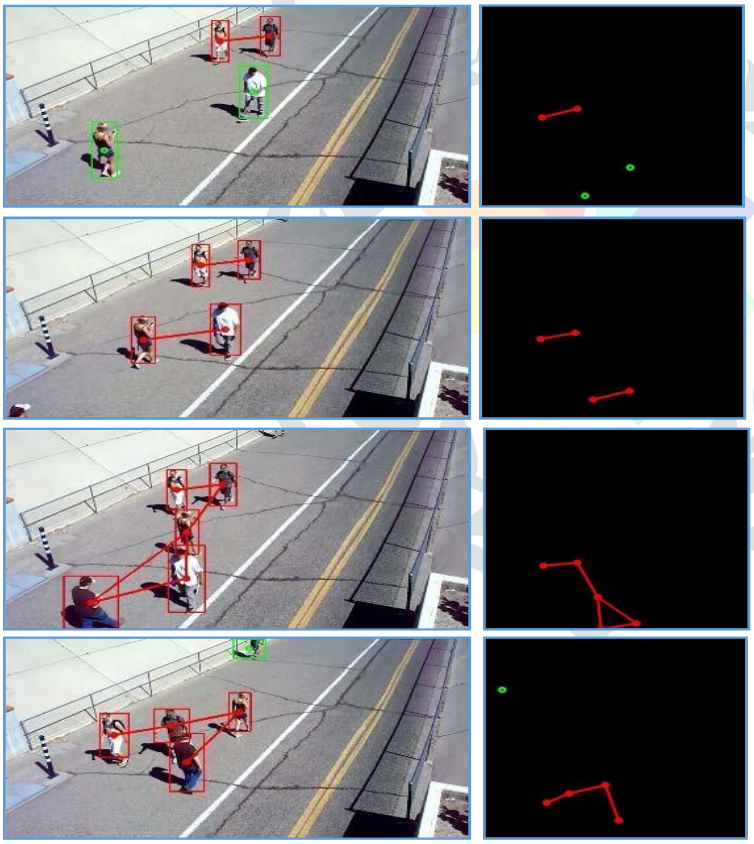


SYSTEM FLOW



OUTPUTSCREENSHOT 1

OUTPUTSCREENSHOT 2



CONCLUSION

A methodology of social distancing detection tool using adeep learning model is proposed. By using computer vision, the distance between people can be estimated and any noncompliant pair of people will be indicated with a red frame and a red line. The proposed method was validated using a video showing pedestrians walking on a street. The visualization results showed that the proposed method is capable to determine the social distancing measures betweenpeople which can be further developed for use in other environment such as office, restaurant, and school. Furthermore, the work can be further improved by optimizing the pedestrian detection algorithm, integrating other detectionalgorithms such as mask detection and human bodytemperature detection, improving the computing power of thehardware, and calibrating the camera perspective view.

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