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Covid-19 Monitoring System Using Social Distancing And Face Mask Detection

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Abstract

The Corona Virus Disease (COVID-19) epidemic has lately swept the globe, and social isolation has emerged as one of the most effective ways to avoid physical contact. This study looks at a surveillance method that leverages OpenCV, Computer Vision, and Deep Learning to keep track on pedestrians and avoid overcrowding. The system can be built utilising closed circuit television (CCTV) and drones, with the camera recognising the crowd using object detection and computing the distance between them. There is 2000 face mask datasets and videos for social distancing.

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1. INTRODUCTION

Corona Virus Disease (COVID-19) emergency has as of late spread quick over the world, and social partition and face mask wearing has gotten to be one of the foremost imperative preventive strategies to dodge physical contact. Using CCTV and drones, we are able keep up track of human exercises in open areas during the epidemic, and compute and summarize separations between individuals, as well as screen social separating breaches all through the city. This proposed survey will too restrain people's capacity to come together and prevent social get-togethers. As of late, all nations around the world were, and still are, in a state of lockdown, driving citizens to remain at domestic. Be that as it may, as time passes, individuals will start to visit more open places, devout locales, and traveler goals, so in those circumstances, this framework of social separating checking and face mask detection will be advantageous all over the world.

To screen social separating and face mask detection at open places, this overview paper gives a pinpointing arrangement. In this widespread period utilizing CCTV able to keep a track on human exercises at open places and from now on ready to compute and summarize distances between individuals and screen the social distancing violations over the city. Separated from that the individual who don't wear face mask too can be distinguished. Thus confine individuals from coming together and anticipate social get-togethers.

We can keep track of people and compute the distance between them in pixels using computer distance algorithms, set the standard maintained distance to be followed, and get an overview of people who are breaking the law so that the appropriate authorities can take action using computer vision and deep learning, as well as installed CCTV.

2. LITERATURE SURVEY

Here we look at some of the related works in the field of facemask and social distancing:
Shashi Yadav proposed a deep learning approach with Single Shot protest Location (SSD) utilizing Mobile Net V2 and Open CV for social separating and mask detection [2].Challenges confronted utilizing this approach was that it categorizes individuals with hand over their faces or blocked with objects as masked. These scenarios are not suited for this demonstrate. Here, in spite of the fact that an SSD is competent of recognizing different objects in a outline, it is constrained to the discovery of a single individual in this system.
Rinkal Keniya [6] developed a self-made model called SocialdistancingNet-19 for recognising a person's frame and presenting labels to determine if they are safe or harmful if the distance is less than a certain amount. It is vital to have individuals moving continually if a webcam is to be used, or else the detection will be wrong. This could be due to the network's detection strategy, which involves detecting the full frame and calculating the distance between people using centroids (brute force approach).
Adrian Rosebrock published a social distancing detector based on OpenCV, Computer Vision, and Deep Learning concepts in the year 2020. This approach focuses on social distance monitoring through CCTV cameras set across streets and sheds light on social distancing throughout the epidemic time. As a social distancing detector, the camera records the distance between people in pixels and compares it to a standard measurement. The file.py script, which is responsible for looping over frames of a video stream and ensuring that people keep a healthy distance from one another, contains the social distance detector application logic. It works with video files as well as webcam broadcasts [7].
In 2019, Neel Bhave and his co-authors proposed a system that includes a Reinforcement Model and Object Detection Algorithms and is a complete working model [4]. They employed YOLO (You Only Look Once) Real Time Object Detection in this experiment, which has fewer flaws, is considerably faster, produces reliable results, and can be trained for over 200 classes. Reinforcement learning is a type of machine learning that calculates the green phase timing based on the current traffic situation and learns from the actions made.
Dr. Syed Ameer Abbas and his co-authors suggested a system for people tracking and crowd control based on the Raspberry Pi and Open-CV in 2017 [5]. Through OpenCV, a cascade classifier was trained for head detection from the scene using Haar characteristics. The original idea was to use a camera and a Raspberry Pi 3 with a quad core ARMv8 central processing unit to record the packed scene and process the footage frame by frame. The crowd is measured and regulated by comparing the value to the threshold, and if it exceeds the threshold, appropriate prevention can be implemented.
Mohamed Loey et al proposed a model that incorporates both deep transfer learning (ResNet-50) and regular machine learning algorithms [1]. The last layer of ResNet-50 was removed and replaced with three classic machine learning classifiers (Support vector machine (SVM), decision tree, and ensemble) to improve model performance. One of the four types of datasets they used had the most pictures, which included both real and fake face masks, and took the longest to train compared to the others. In similar articles, there is likewise no known accuracy for this sort of dataset. When trained on a dataset with real face masks, the decision trees classifier failed to obtain a decent classification accuracy (68%) on false face masks.

3. PROPOSED SYSTEM

We provide a Deep Learning-based system for detecting instances of improper use of face masks. Our system is made up of two parts. Architecture of a Convolutional Neural Network (CNN) stage Detects both masked and unmasked faces and can be used to CCTV cameras are pre-installed and integrated. This will be beneficial to keep track of safety infractions, encourage people to wear face masks and ensure that the working environment is safe. The study is currently underway by investigating the technology required for the procedure preceding study and the creation of a viable model with the help of Deep Learning and Computer Vision.
we propose a Python-based image processing and machine learning technique to achieve the robust structure and the feasibility of considering a wide range of scenarios with a high level of trust and accuracy in the proposed method social distancing monitoring and risk assessment. After getting the frame, It has two stages: Face mask detection and monitoring distance. It recognizes the face mask from the frame and after that extracts the Region of interest. Apply the face mask classifier on ROI. In the event that the mask isn't worn show a notice. At that point, it screens the distance between individuals. The separate is compared with the standard remove, On the off chance that the distance is not kept up at that point incorporate them within the violation list.

4. CONCLUSION

As we consider the world after the COVID-19 epidemic, the need for self-responsibility becomes clear. The scenario would primarily focus on embracing and adhering to the safeguards and rules that the WHO has set, as the responsibility for one's own actions will be solely their own and not that of the government. Because COVID 19 spreads by close contact with infected people, social distancing would surely be the most crucial aspect. An effective method for supervising huge crowds is critical, and this survey study focuses on that. Authorities can maintain watch of human activities and control big crowds using installed CCTV and drones, preventing law violations. In the pandemic era and other scenarios, the proposed method is predicted to identify wearing masks as well as social distancing to crowd monitoring. Hopefully, our research can aid in the fight against COVID-19.

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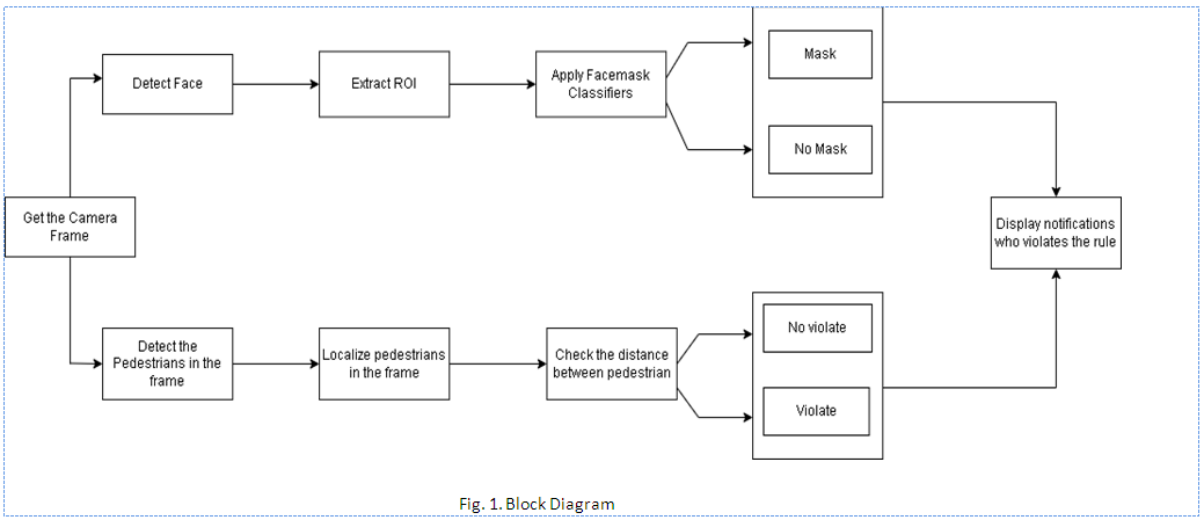

Fig. 1. Block Diagram