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Covid-19 Social Distance Monitoring and Alert Signal Using IOT in Temple

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ABSTRACT: To the info obtained by the planet Health Organization, the planet wide pandemic of COVID-19 has severely impacted the world and has now infected quite eight million people worldwide. Wearing face masks and following safe social distancing are two of the improved safety protocols got to be followed publicly places so as to stop the spread of the virus. to make safe environment that contributes to public safety, we propose an efficient computer vision based approach focused on the real-time automated monitoring of individuals to detect both safe social distancing and detecting signals in temple by implementing the model on raspberry pi4 to watch activity and detect violations through camera. After detection of breach, the raspberry pi4 sends alert signal to controller and also give alarm to temple. During this proposed system modern deep learning algorithm are mixed with geometric techniques for building a strong modal which covers three aspects of detection, tracking, and validation. Thus, the proposed system favors the society by saving time and helps in lowering the spread of corona virus. It are often implemented effectively in current situation when lockdown is eased to examine persons publicly gatherings, shopping malls, etc. Automated inspection reduces manpower to examine the general public and can also be utilized in anywhere.

KEYWORDS: Deep Learning, K-Nearest Neighbors algorithm (KNN), mean AveragePrecision (mAP) metric.

I INTRODUCTION

COVID-19 belongs to the family of coronavirus caused diseases, initially reported at Wuhan, China, during late December 2020. On March 11, it cover 114 countries with 118,000 active cases and 4000 deaths, WHO declared this a plague . On May 4, 2020, over 3,519,901 cases and 247,630 deaths had been reported worldwide. Several healthcare organizations, doctors and scientists attempt to develop proper medicines and vaccines for this deadly virus, but till date, no success is reported. This situation forces the worldwide community to look for alternate ways to stop the spread of this infectious virus. Social distancing is claimed because the best spread stopper within the present scenario, and each one affected countries are locked-down to implement social distancing. This research is aimed to support and mitigate the coronavirus pandemic in conjunction with minimum loss of economic endeavours, the reduced peak of the epidemic and matching with available healthcare capacity.

Social distancing is unquestionably the foremost trustworthy technique to stop the spreading of disease , with this belief, within the background of December 2019, when COVID-19 emerged in Wuhan, China, it had been opted as an unprecedented measure on January 23, 2020. Within one month, the outbreak in China gained a peak within the primary week of February with 2,000 to 4,000 new confirmed cases per day. Later, for the first time after this outbreak, there are a logo of relief with no new confirmed cases for five consecutive days up to 23 March 2020. this is often evident that social distancing measures enacted in China initially, adopted worldwide later to manage COVID-19. Since the COVID-19 pandemic took the planet by storm, tough but necessary measures were taken by governments throughout the planet to regulate its spread. This resulted in bringing normal day-to-day activities to an entire standstill Months into lock down.

(a) Data Collection

The proposed system uses a custom dataset consisting of face images with differing types of face masks which are labeled and used for the training of our models. We use the prevailing background subtraction [21,22] algorithm during a pre-processing step. The real-time automated detection of social distance maintenance and therefore the verification of persons wearing masks or not are performed by the SSD algorithm.

(b) Pre-processing

The dataset used to train our proposed mask detector consists of 3165 images. Before the custom mask image dataset is labeled, the info set is split into the training data set and therefore the testing data set. The Training data set should contain 80% images to coach the algorithm effectively and for prediction accuracy and therefore the Testing data set should contain 20% images to check the prediction accuracy. The pictures within the training data collection are classified into two categories: mask and no mask.

And maintain social distancing

(c) Distance calculation using knn

Object detectors are commonly evaluated based on the mean Average Precision (mAP) metric used to calculate distance between two objects, which is the average precision calculated per category, averaged over all categories. The prediction bounding boxes are filtered by their Intersection over Union (IOU) with the ground truth bounding boxes.



Fig.1 distance calculating

The K-NN working are often explained on the idea of the below algorithm:

- Step-1: Select the amount K of the neighbors
- Step-2: Calculate the Euclidean distance of K number of neighbors
- Step-3: Take the K nearest neighbors as per the calculated Euclidean distance.

Step-4: Among these k neighbors, count the amount of the info points in each category.

Step-5: Assign the new data points to the category that the amount of the neighbor is maximum. and model is ready

(d) Automatic alarm

This module sets the automatic Notification alarm to those who are not maintaining social distance in temple.

II. METHODOLOGY

The proposed system helps to ensure the safety of the people at public places by automatically monitoring them whether they maintain a safe social distance, and also by detecting whether or not an individual wears a face mask and social distancing. This section briefly describes the solution architecture and how the proposed system will automatically function in an automatic manner to prevent the coronavirus spread. This method is a function that is associated with an object. In Python, a method is not unique to class instances. Any object type can have methods.

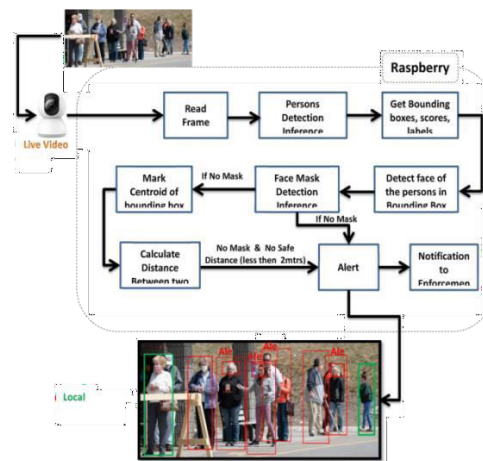


Fig.2 Testing model

III. MODEL IMPLEMENTATION

The system uses Raspberry Pi4 with camera to automatically track public spaces in real-time to stop the spread of Covid-19. The trained model with the custom data set is installed within the Raspberry Pi4, and therefore the camera is attached thereto. The camera feeds real-time videos of public places to the model within the Raspberry Pi4, which continuously and automatically monitors public places and detects whether people keep safe social distances and also checks whether or not those people wear masks.

Our solution operates in two stages: first, when an individual identified without a mask, his photo is taken and sent to an impact center at the State Police Headquarters; and second, when the detection of a social distance violation by individuals is detected continuously in threshold time, there'll be an alarm that instructs people to take care of social distance and a critical alert is shipped to the center of the State police station for further action.

IV. EXPERIMENTAL RESULTS

Since this application is supposed to be utilized in any working environment; accuracy and precision are highly desired to serve the aim. Higher number of false positive may raise discomfort and panic situation among people

being observed. There may also be genuinely raised concerns about privacy and individual rights which can be addressed with some additional measures like prior consents for such working environments, hiding a person's identity Generally and maintaining transparency about its fair uses within limited stakeholders. In Future this paper implemented in Hospitality, Shopping Malls, etc.

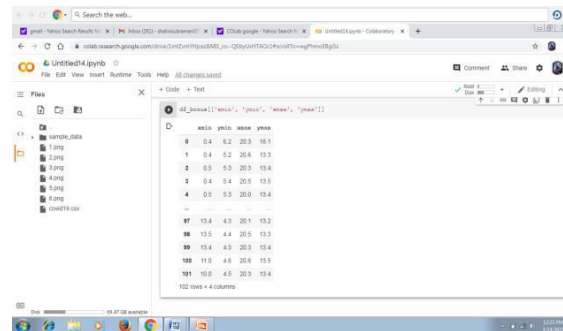
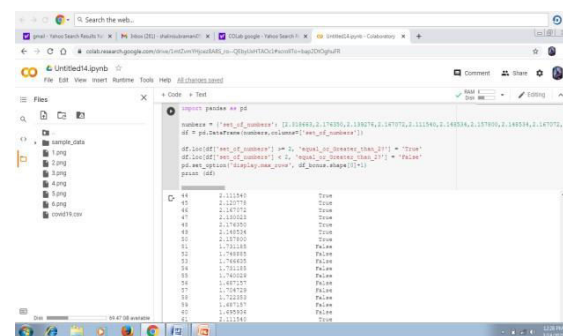


Fig 1. Distance calculation Result



(e) Automatic alarm result

V. CONCLUSION AND FUTURESCOPE

This paper proposes an efficient real-time deep learning based framework to automate the tactic of monitoring the social distancing via object detection and tracking approaches in Temple. Where each individual is identified within the real-time with the assistance of bounding boxes, the generated bounding boxes aid in identifying the clusters or groups of people satisfying the closeness property computed with the assistance of pair wise victories approach. the amount of violations are confirmed by computing the amount of groups formed and violation index term computed because the ratio of the amount of individuals to the number of groups. This paper automatic notification alarm generate social distance in shopping mall, hospitality etc.,

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