Software-Engineering-project

Abstract

Police informant system to detect social gathering during covid-19 breakdown

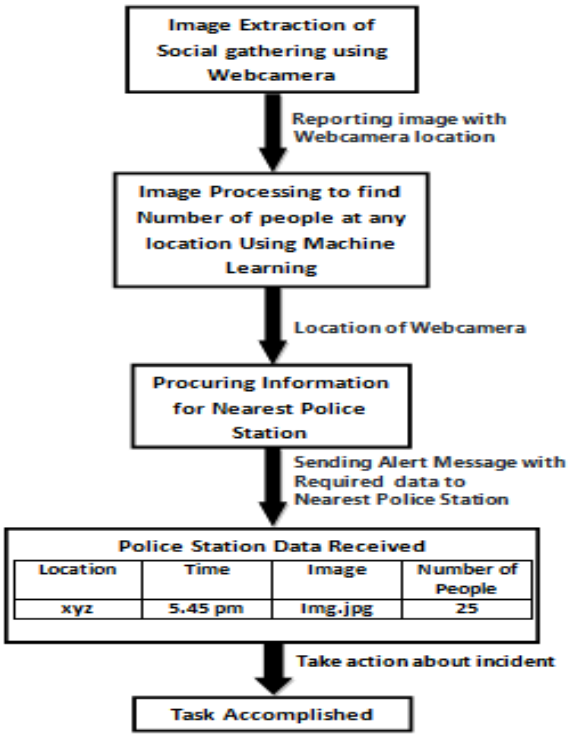
I. MOTIVATION

As the current scenario has brought us face to face with a pandemic disease, major steps needs to be taken to fight and recover from it. To avoid being infected by Covid-19, the best way is to break the chain i.e. avoiding social gathering. Our Government though has declared curfew in all parts of India, the citizens are not following it.

The motivation of our software is to inform the police about such social gatherings so that they can take strict actions and help to avoid the transmission of Covid-19. The advantage of this system is that it helps the Police to have an overall view of the town by just getting alert images, this way they don’t have to waste their time in patrolling all the time around the city.

II. INTRODUCTION

Our proposed software is "Police informant system to detect social gathering during covid-19 breakdown". The idea is to develop a distributed system in which initially we take images from each camera located on various streets. Then using Machine learning algorithm identify the number of people in that image and if the number is greater than the set threshold, it sends an alert with time and location to the nearest police station. Shown in the image below is an abstract view of the control flow of the model.



II. Proposed Model

A) Formation of Distributed System

- Distributed System is a system with multiple components located on different machines that communicate and coordinate actions in order to appear as a single coherent system to the end user.

- In our project, the role of Distributed System is that cameras are installed at different places and these cameras will store the data of that place and put the stored data on the server. The image obtained from the web camera server will be processed using Machine learning tools and the number of people at any point at any location will be obtained. The data of the server of these different places will be sent to the server of a nearest police station, so that police will find out how many people are standing in the crowd. If the number of people is more than the given threshold the police will act on them.

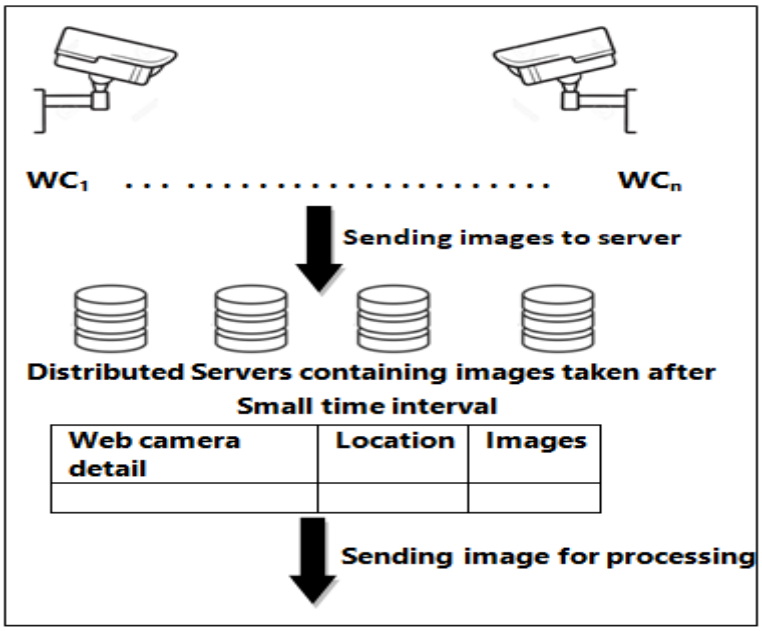
B) Image Extraction from Webcam and storing the image in database with webcam location.

This task needs to be done in 3 parts:

i. Extracting image from webcam: → Webcam will capture the video continuously, so we need to extract image frames from that video stream after some particular interval. This can be done using openCV and timer from time package in python. Also, we need to take care of deleting/overwriting images after a particular time interval in database.

ii. Fetching the location of webcam: → We will fetch the location of webcam, using already created database (which we have created while installing the cameras).The proposed structure of this database is <license_number,location>. Using this license number we will fetch the location of the webcam.

iii. Storing image with corresponding webcam location in the database: → After fetching the location of webcamera, the information containing webcam info.(i.e. license number in our case), image, location of the webcam will be stored in one of the distributed server, which can be further used for processing the image.

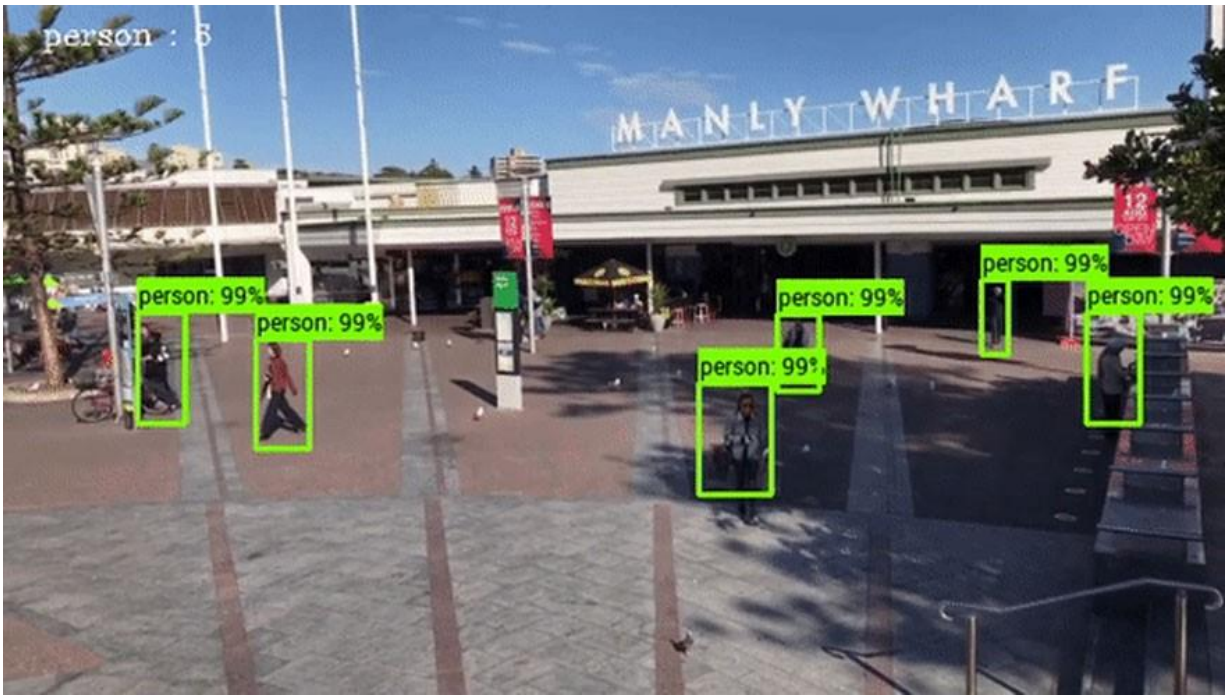


STAGE I : Image Extraction from Web camera

C) Applying ML based techniques to identify the number of people in a particular image.

The technique to estimate the number of objects/entities in an image is called “Crowd Counting”. In our case we will perform people counting ie., to find the count of people present in an image. There are various ways to perform this, which are as follows :

- Detection based methods
- Regression based methods
- Density Estimation based methods
- CNN(Convolutional Neural Network) based methods

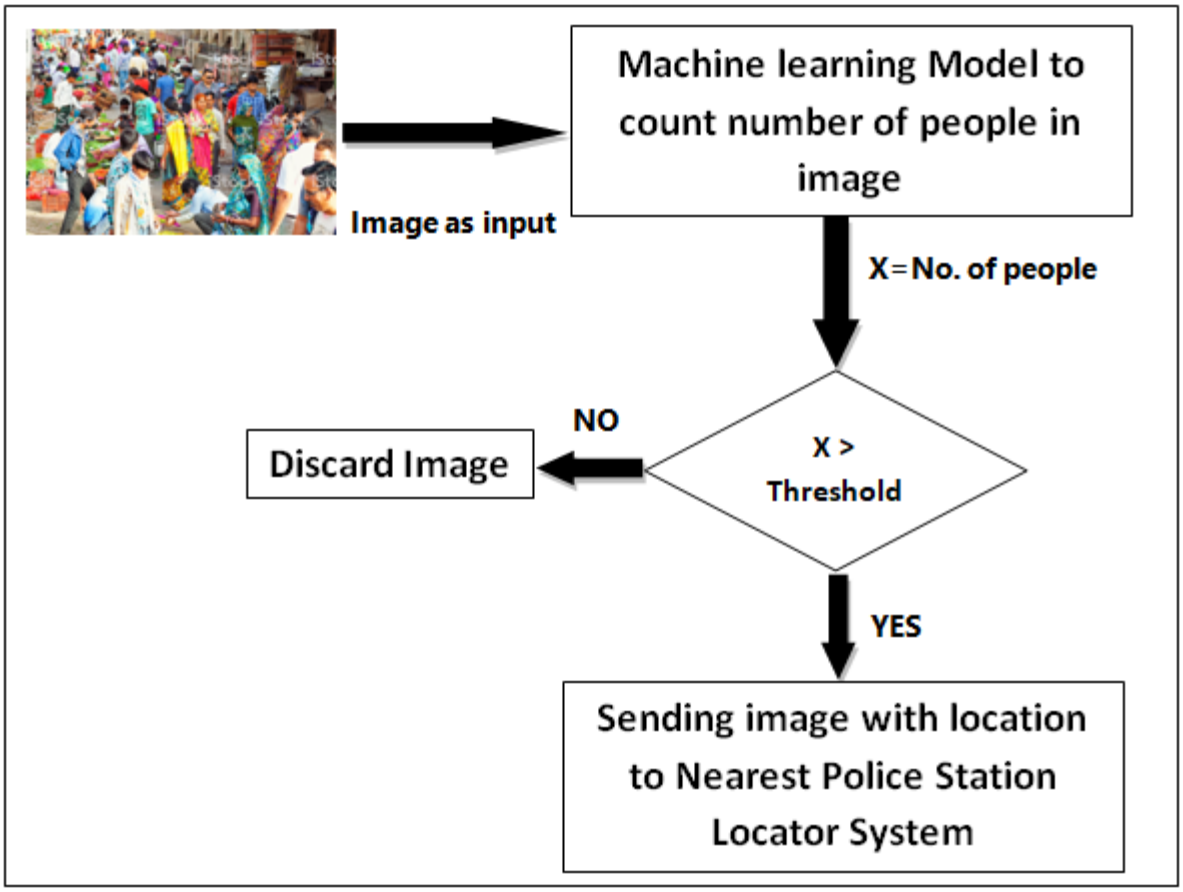


We will employ the optimum performing method based on our experimentation with empirical data. The steps that need to be performed for Crowd Counting are :

1. Data Acquisition
2. Loading Input Data
3. Cleaning
4. Segmentation and Classification

5. Counting

After performing the above mentioned steps, we will obtain the number of people in a particular image of a location, which will be used for further action.

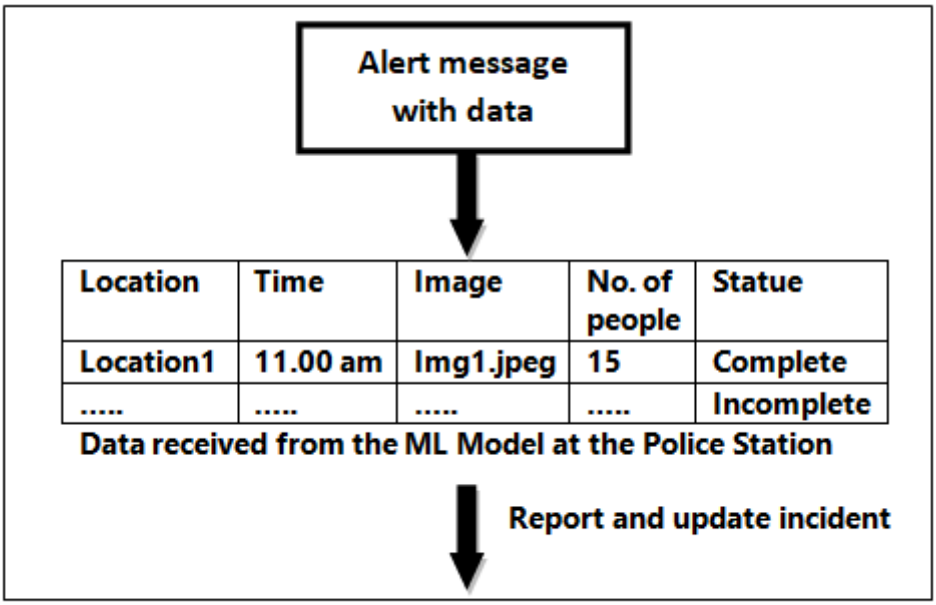


STAGE II: Image Processing using Machine Learning

D) Data transmission and Alert message.

(i)Data transmission: The incoming picture will hit the image sensor of the Web camera which will break it up into individual pixels. The individual pixels will be converted into numeric form and stored in the database.

(ii)Alert message: If data from a particular Webcam involves gathering of people then the location of the corresponding Webcam will be extracted from the database and a message will be generated.



STAGE III : Generation and Sending of Alert Message

IV. Language to be used: Python

V. Team Members

2019201028- Divyani Indurkhya

2019201031- Richa Rathore

2019201047- Aditya Mohan Gupta

2019201067- Aditya Gupta

2019201068- Deeksha Sahu

2019201075- Kritika Singh