TEAM ROCKET

TRAFFIC MANAGEMENT SYSTEM

TEAM MEMBERS:

1. Onkar Litake
2. Rohit Kulkarni
3. Aparna Ranade
4. Maithili Sabane
5. Pratik Agarwal
6. Vipul Shinde

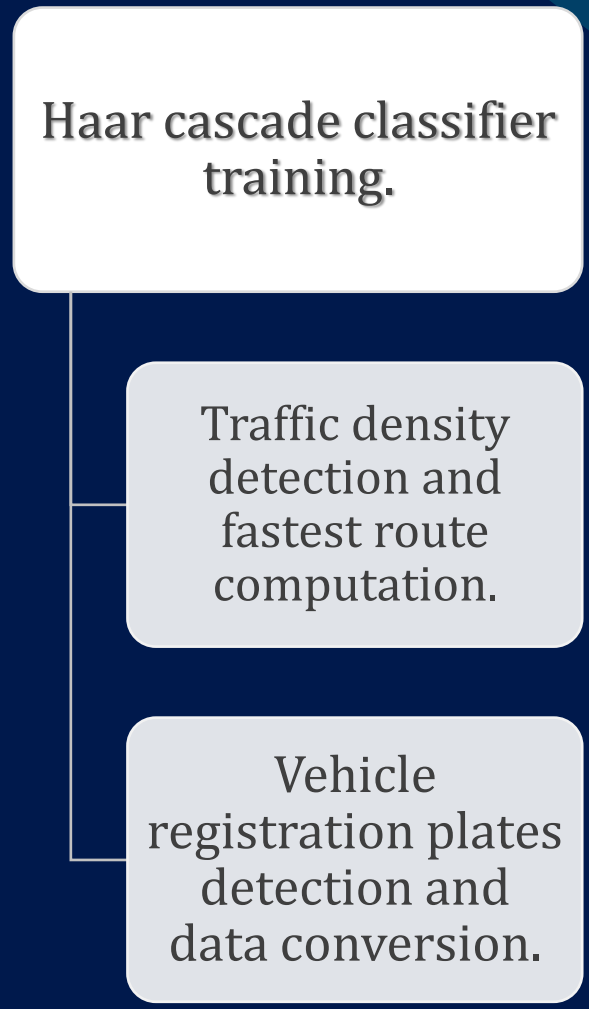
CONTENT:

ABSTRACT:

- The ongoing pandemic has resulted in a worldwide lockdown. As the unlock process will gain momentum, traffic density and issues will again come to light as the normal traffic will see an increase with many people opting out of using public transport.
- The existing traffic light system in India functions on a preset timer system. The system may be relatively inefficient considering the time wasted on unwanted green lights.
  Along with that, a growing number of motorbike thefts is also an alarming issue.
- These issues can be resolved using an efficient system wherein the traffic density will be determined and smart timers will be set accordingly and consecutive traffic lights will be linked to maintain coordination and have efficient traffic distribution.
- The determined density will also be used to find the fastest route for emergency services vehicles by implementing the Dijkstra's algorithm.
- The software will also help detect the passing of stolen vehicles by detecting the vehicle registration plates and converting the images to text and then cross-checking with the complaints.
- This project has been implemented using OpenCV and Tesseract software and aims to provide a smart solution for traffic light management hence resulting in effective cost reduction.

WORKFLOW:

- The system is developed innovatively to solve many pivotal traffic management issues.
- Detection of vehicles and vehicle registration plates is done using the Haar-cascade classifier.
  The Haar-cascade classifier is trained using OpenCV and the Tesseract engine is used to convert the images of the vehicle registration plates to text.
- The fastest route for emergency services vehicles is computed using Dijkstra's algorithm.



HAAR-CASCADE CLASSIFIER TRAINING:

Collect positive and negative sample images from dataset (video).

Create info.txt, bg.txt and vector file and train Haar classifier using these files.

Using the classifier, create an XML file for the required object.
This file is used in the code to detect objects which have bounding boxes.

To increase accuracy, change the minHitRate and the maxFalseAlarmRate to accurate values as required. Also train the model so that the acceptance ratio is not equal to or less than 7.83885e-07.

TRAFFIC DENSITY DETECTION AND FASTEST ROUTE COMPUTATION:

- The traffic density is determined by detecting the vehicles using the trained Haar-cascade classifier. The lights at every square will be linked using graphs to maintain coordination and ensure the efficient distribution of traffic, thus reducing road congestion.
- The timer will be set based on the following factors:

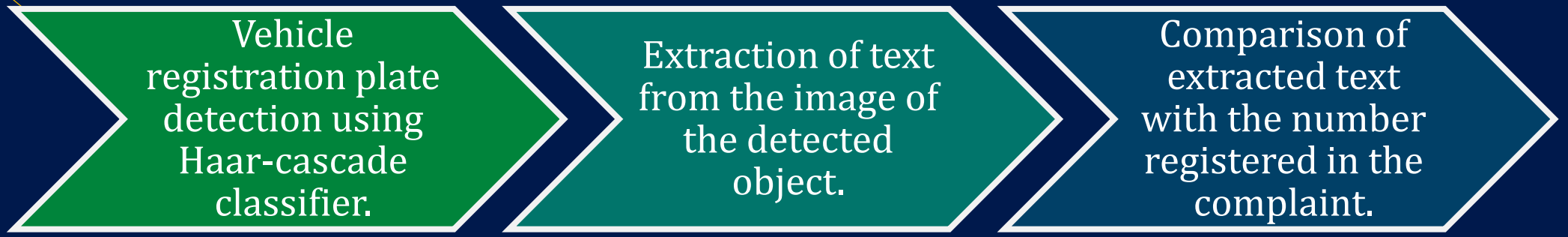
  1. Traffic density at the traffic light.
  2. Original timer of the light.
  3. Category of vehicles present at the light i.e. Cars, Scooters, Buses, Trucks etc
  4. Density of traffic at previous traffic light.

- The data from these traffic lights will be utilized to determine the fastest route for emergency services vehicles.
  This path will be determined by implementing Dijkstra's algorithm where the lights of every square will be considered as nodes.

VEHICLE REGISTRATION PLATES DETECTION AND DATA CONVERSION:

- Vehicle registration plates are detected using Haar-cascade classifier and are stored in image form.
  Tesseract engine is used to extract the text i.e. the vehicle registration number from the image.
  The database connectivity to store the extracted numbers will be done using MySQL.

- Once the registration number is extracted, it can be compared with the number registered in the complaint of the stolen vehicle, thus **estimating the location of the stolen vehicle.**



THANK YOU!