A PROJECT REPORT
ON

"SMART TRAFFIC CONTROLLER"

Submitted to
BHARATI VIDYAPEETH (DEEMED TO BE UNIVERISTY)
COLLEGE OF ENGINEERING,
PUNE, INDIA

In Partial Fulfillment of the Requirement for the Award of

BACHELOR'S DEGREE IN
COMPUTER ENGINEERING
BY

1914110196	Shimul Gupta
1914110092	Shradha Priya
1914110029	Avijit Chowdhury

UNDER THE GUIDANCE OF

MRS.VEENA JADHAV

DEPARTMENT OF COMPUTER ENGINEERNIG

BHARATI VIDYAPEETH (DEEMED TO BE UNIVERISTY)
COLLEGE OF ENGINEERING, PUNE, INDIA-411043

2022-2023

"SMART TRAFFIC CONTROLLER"

Project report submitted
in partial fulfillment of the requirement for the degree of

Bachelor of Technology

By

Shimul Gupta (1914110196)
Shradha Priya (1914110092)
Avijit Chowdhury (1914110029)

Under the Guidance of
Mrs.Veena Jadhav

DEPARTMENT OF COMPUTER ENGINEERING

BHARATI VIDYAPEETH DEEMED UNIVERSITY, COLLEGE OF ENGINEERING, PUNE- 43
(2022-2023)

BHARATI VIDYAPEETH DEEMED UNIVERSITY,
COLLEGE OF ENGINEERING, PUNE- 43

CERTIFICATE

This is to certify that the project report titled **Smart traffic Controller**, has been carried out by the following students –

1. Shimul Gupta
2. Shradha Priya
3. Avijit Chowdhury

under the supervision of **Mrs.Veena Jadhav** in partial fulfillment of the degree of **BACHELOR OF TECHNOLOGY** in Computer Engineering of Bharati Vidyapeeth Deemed University, College of Engineering, Pune during the academic year 2022-23

Guide Project Coordinator Head of Department

Place: Date:

BHARATI VIDYAPEETH DEEMED UNIVERSITY,
COLLEGE OF ENGINEERING, PUNE- 43

APPROVAL CERTIFICATE

This project report entitled **Smart Traffic Controller,** by **Mr. Shimul Gupta, Miss. Shradha Priya and Mr. Avijit Chowdhury,** is approved for the degree of **BACHELOR OF TECHNOLOGY**

Examiner Name & Sign

Guide's Name & Sign

Project Coordinator's Name & Sign

Head of Department

Place:
Date:

ACKNOWLEDGEMENTS

We would like to extend our sincere gratitude to the Principal Dr. Vidula S.Sohoni, Head of the Department Computer, Dr. Sandeep Vanjale, who was the pillar for support and whose guidance enabled us to carry out this project without any obstructions. I also acknowledge the contributions of faculties who were available and ready to help with even the most minor of the doubts, problems, and obstacles that we faced.

As this report is submitted, it becomes necessary to mention people without whom this would not be possible. We would like to appreciate the team efforts all the members put into the report to create this project with the best of their abilities.

I would like to thank our guide, Prof. Veena Jadhav, without their support, guidance and insights, this project would lack the strong background research and structure.

Lastly, I would like to acknowledge the contributions of friends and family members, their unquestionable support which was a pillar of strength when faced with doubts and uncertainties.

ABSTRACT

Traffic congestion is a major problem in many cities of India along with other countries. Failure of signals, poor law enforcement and bad traffic management has led to traffic congestion. Oneof the major problems with Indian cities is that the existing infrastructure cannot be expanded more, and thus the only option available is better management of the traffic. Traffic congestionhas a negative impact on the economy, the environment, and the overall quality of life. Hence it is high time to effectively manage the traffic congestion problem. There are various methods available for traffic management such as video data analysis, infrared sensors, inductive loop detection, wireless sensor network, etc.

All these methods are effective methods of smart traffic management. But the problem with these systems is that the installation time, the cost incurred for the installation and maintenanceof the system is very high. Hence a new technology called Radio Frequency Identification (RFID) is introduced which can be coupled with the existing signaling system that can act as akey to smart traffic management in real time.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Traffic congestion on road networks is nothing but slower speeds, increased trip time and increased queuing of vehicles. When the number of vehicles exceeds the capacity of the road, traffic congestion occurs. In the metropolitan cities of India traffic congestion is a major problem. Traffic congestion is caused when the demand exceeds the available road capacity. This is known as saturation. Individual incidents such as accidents or sudden braking of a car ina smooth flow of heavy traffic have rippling effects and cause traffic jams. There are even severe security problems in the traffic system due to anti-social elements which also leads to stagnationof traffic at one place. In a country like India, there is an annual loss of Rs 60,000 crores due tocongestion (including fuel wastage). Congestion in India has also led to slow speeds of freight vehicles, and increased waiting time at checkpoints and toll plazas.

The average speed of vehicles on key corridors like Mumbai-Chennai, Delhi-Chennai is less than 20kmph, while it is mere 21.35kmph on Delhi-Mumbai stretch. As per the transport corporation of India and IIM, India's freight volume is increasing annually at a rate of 9.08% and that of vehicles at 10.76%, but that of road is only by 4.01%. The major reason for this is traffic congestion. India is the 2nd most populated country after China in Asia, thus with increase in population, the number of vehicles also increase. The economic growth has certainly had an impact on urban traffic. As the income rises,more and more people begin to go for cars rather than two wheelers. Hence there is a need to manage traffic in a smart way as the management of traffic with the conventional way such as the signaling system is not having a major effect in curbing congestion of vehicular traffic.

About Research Domain

The Research is primarily based on image processing and the traffic congestion occurring in India. We are focusing on the situation by automating the whole thing and for this we are researching various technologies such as sensors, FAS-TTAG, cameras and machine learning and its various algorithms.

Current Scenario

Nowadays there is an important responsibility on the traffic controller section of the government. Traffic signal system in used is control the traffic but if any vehicle is passes duringred signal, then this system is not useful and as result there is chances of accidents and to avoidthis it requires a traffic police at every road of signal in these way human efforts is increase anditneeds more manpower for controlling traffic in better way. Smart Traffic Signal device is essential to make the traffic signal robust, secure, and safe, to reduce human efforts and to increase the efficiency of traffic signals for detecting the vehicles which are breaking the signal.

Purpose of Work

This project seeks to automate the traffic system of our country. We intend to make a system that minimizes the waiting time and maximizes the running time of traffic lights. The system isintended to identify the number of vehicles on each traffic node (embedded device with traffic lights and other components to control traffic on each road) with computer vision.

For this purpose, it is necessary to understand the automobile industry as it will help in providinga solution to our dilemma. Apart from this it is also necessary to understand that traffic congestion costs four major Indian cities Rs 1.5 lakh crore a year.

Arthur D. Little has released its 'Future of Urban Mobility 3.0' report, assessing the mobility maturity, innovativeness, and performance of 100 cities worldwide. The report covered 4 Indian cities – Delhi, Bangalore, Kolkata, and Jaipur.**Boston Consulting Group (BCG)** also conducted a study on traffic situation and impact ofridesharing in Southeast Asia and India (Delhi, Kolkata, Mumbai, and Bangalore).

Motivation

Under fast-paced life conditions, everyone is busy in their professional life and all the people using transport service frequently. So, there is a need to manage traffic signals efficiently.

We observed sometimes when a traffic lane is not in use, it's signal blocks traffic of the other lane.

Due to which there is a lot of time and economical loss.

Studies show that due to congestion there is annual loss of Approx. 60,000 Cr. In India.

Research Question

- Is the current traffic control system sufficient to handle the congestion?
- What is its effect on our environment?
- Is the Manual System efficient enough?
- Can the fuel wastage be reduced?

CHAPTER 2

REVIEW OF LITERATURE

A model and genetic algorithm for area-wide intersection signal optimization under user equilibrium traffic

Jianhua Guo et al introduced a new method for area-wide traffic signal timing optimization under user equilibrium traffic. The optimization model was formulated as a multi-dimensional search problem aimed to achieve minimized product of the total travel time associated with urban street network and the variance of travel time for unit distance of travel. A genetic algorithm was developed to derive the model solution. A simulation control protocol embedded in PARAMICS software tool capable of conducting area-wide micro simulation is adopted to design the logic frame and function module of the area-wide traffic signal control system. His results showed that mobility improvements are achieved after applying the proposed model along with the genetic algorithm for area-wide signal timing optimization, assessed by extendedcapacity ratio, and reductions in through and turning movement delays, as well as average and variance of travel time for unit distance of travel.

Feedback-based Traffic Light Control

Gustav Nilsson developed feedback control policies for traffic lights. With only information about the number of vehicles queueing up at each junction, the proposed control strategy determines both the cycle length of the upcoming cycle and how large fraction of the cycle eachphase should be activated.

1.A self-adaptive evolutionary algorithm for dynamic vehicle routing problems with traffic congestion

Nasser R. Sabar et al controlled the movement of traffic on urban streets by determining the appropriate signal timing settings. Proposed algorithm was based on the so-called memetic algorithm that combines the strengths of the genetic algorithm and local search in an adaptive manner. It used two important techniques for improving the performance of traditional memetic algorithms. First, a systematic neighborhood based simple descent algorithm was employed as a local search to effectively exploit the search space. Second, an indicator scheme was proposed to control the local search application based on the quality and diversity of the search process. The proposed algorithm was coded in the commercial microscopic traffic simulator, AIMSUN, and tested on two different real world case studies in Brisbane, Australia, and Plock, Poland. The results demonstrated that the proposed algorithm was better than genetic algorithms and fixed-time settings, indicating that the proposed algorithm was an effective solution method for traffic signal optimization problems.

2.Adaptive traffic signal control with actor-critic methods in a real-world traffic network with different traffic disruption events.

Mohammad Aslani et al utilized RL (Reinforcement learning) algorithms to design adaptive traffic signal controllers called actor-critic adaptive traffic signal controllers (A-Cat's controllers). Worked done rested on the integration of three threads: (a) shows performance compared of both discrete and continuous A-CATs controllers in a traffic network with recurred congestion (24-h traffic demand) in the upper downtown core of Tehran city, (b) analyzed the effects of different traffic disruptions included opportunistic pedestrians crossing, parking lane, non-recurring congestion, and different levels of sensor

noise on the performance of A-CATS controllers, and (c) compared the performance of different function approximators (tile coding and radial basis function) on the learning of A-CATs controllers.

Dynamic traffic routing in a network with adaptive signal control.

Huajun Chai et al captured the interaction between travelers' route choice and traffic signal control in a coherent framework. They tested their algorithm and control strategy by simulation in OmNet++ (A network communication simulator) and SUMO (Simulation of Urban Mobility) under several scenarios. The simulation results showed that with the proposed dynamic routing, the overall travel cost significantly decreases. It was also shown that the proposed adaptive signal control reduced the average delay effectively, as well as reduced the fluctuation of the average speed within the whole network.

STUDY OF AUTOMATIC TRAFFIC SIGNAL SYSTEM FOR CHANDIGARH.

Ishant Sharma and Dr. Pardeep K. Gupta proposed to replace existed traffic signals with a system that are monitored the traffic flow automatically in traffic signal and sensors are fixed in which so the time feed is made dynamic and automatic by processed the live detection

Automatic Intelligent Traffic Control System

- The author proposes a solution for mainly three cases:
    - The problem faced by ambulances during traffic congestion, FID can be used to makeambulance's signal turn green.
    - Priority vehicles like (police, VIP), IR transmitters and receivers can be used.
    - Finally, the third case of traffic congestion and delay can be solved using IR transmittersand receivers to provide dynamic control.

Intelligent Traffic Light and Density Control using IR Sensors and Microcontroller.

The system contains IR Transmitter and IR Receiver. IR counts the vehicles on the road and themicrocontroller gives the results.

Smart Traffic Light Control System

- The authors propose a system based on PIC microcontroller that evaluates the traffic density using IR sensors and accomplishes dynamic timing slots with different levels. Moreover, a portable controller device is designed to solve the problem of emergency vehicles stuck in the overcrowded roads**.**
- The controller could be powered by solar power panels to reduce grid electricityconsumption and realize green energy operations.

Real Time Traffic Density Count Using Image Processing

- The density counting algorithm works by comparing the real time frame of live video bythe reference image and by searching vehicles only in the region of interest (i.e., road area). The computed vehicle density can be compared with other direction of the trafficto control the traffic signal smartly.
- The work is divided into 4 parts. The first part is to process the video signal and image acquisition from fixed camera using MATLAB. The second part is to select the target area where the vehicles could be present by using image cropping technique. The third part is the object detection which is performed by enhancing features of the image. Finally, the last part is the density counting in which we are counting the number of vehicles.

CHAPTER 3

PROBLEM DEFINITION

Problem Statement:

Aim: The number of vehicles using the road is increasing exponentially every day. Due to this reason, traffic congestion in urban areas like Bengaluru is becoming unavoidable these days. Inefficient management of traffic causes wastage of invaluable time, pollution, wastage of fuel, cost of transportation and stress to drivers, etc. Hence, design a system to avoid the above casualties thus preventing accidents, collisions, and traffic jams.

Proposed Solution:

We propose a technique that can be used for traffic control using image processing. Traffic density of lanes is calculated using image processing which is done of images of lanes that are captured using digital camera. According to the traffic densities on all roads, our model will allocate smartly the time period of green light for each road. We have chosen image processing for calculation of traffic density as cameras are very much cheaper than other devices such as sensors.

Scope of Work:

- We intend to make a system that minimizes the waiting time and maximizes the runningtime of traffic lights. The system is intended to identify the number of vehicles on eachtraffic node (embedded device with traffic lights and other components to control trafficon each road) with computer vision.
- Further using computer vision, we have automated the process of deducing traffic congestion thus human operators are not required to continuously monitor the video feedand update the current traffic situation in the city. Our Project will solve major problemsand will have scope to solve furthermore.

Problem Formulation:

Accidents:

In India near about 4.40.123 accidents happen per year and most of the accidents happen at Traffic Signals.

Deaths:

In India near about 1, 34, 834 people are dying per year only because of road accidents and mostof the accidents are caused at Traffic Signal.

• At Every 3 minutes an Indian loses life just only because of road accidents

• Bribe taking one another big issue found at Traffic Signal by Traffic Police then how can werecognize the irresponsible people.

CHAPTER 4

METHODOLOGY

The idea revolves around image processing but after an elaborated research for the same we think that it will not be enough as there are a lot of restrictions to the idea. For instance, image processing will become quite inefficient at night. Apart from this, weather aspects will also pose a lot of problems. So, we are proposing a mixed system of image processing, thermal camera and infra-red as they will eliminate most of the problems and making the system more effective as a unit.Further studies are also being done considering the introduction of FAST-TAG from our country. We believe that we can come up with a better system using the technology of fast-tag and enhancing it for the purpose of the project.

Data Collection Techniques/ Methods

- OpenCV-Python Template Matching

Methods = ['cv2.TM_CCOEFF', 'cv2.TM_CCOEFF_NORMED', 'cv2.TM_CCORR', 'cv2.TM_CCORR_NORMED', 'cv2.TM_SQDIFF',' 'cv2.TM_SQDIFF_NORMED']

- OpenCV-Python Blob Detection

Parameters =[Area, Thresholds, Circularity, Inertia, Convexity]OpenCv-Python Cascade Classifier

Use Case = [Machine Learning, Feature Detection, Data Training]

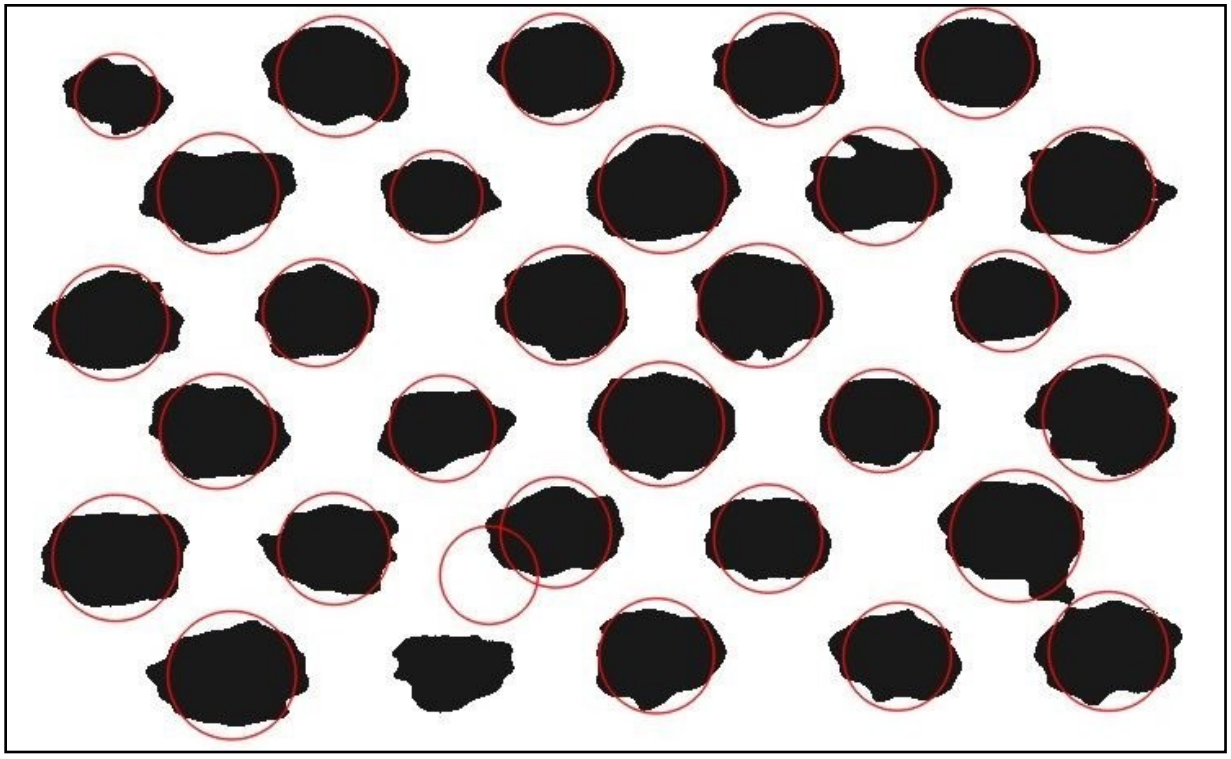


Figure 4.1-Blob Detection processing

OPENCV-PYTHON FOR IMAGE PROCESSING

OpenCV was started at Intel in 1999 by **Gary Bradsky**, and the first release came out in 2000. **Vadim Pisarevsky** joined Gary Bradsky to manage Intel's Russian software OpenCV team. OpenCV supports a wide variety of programming languages such as C++, Python, Java, etc., and is available on different platforms including Windows, Linux, OS X, Android, and iOS. Interfaces for high-speed GPU operations based on CUDA and OpenCL are also under active development. OpenCV-Python is the Python API for OpenCV, combining the best qualities ofthe OpenCV C++ API and the Python language.

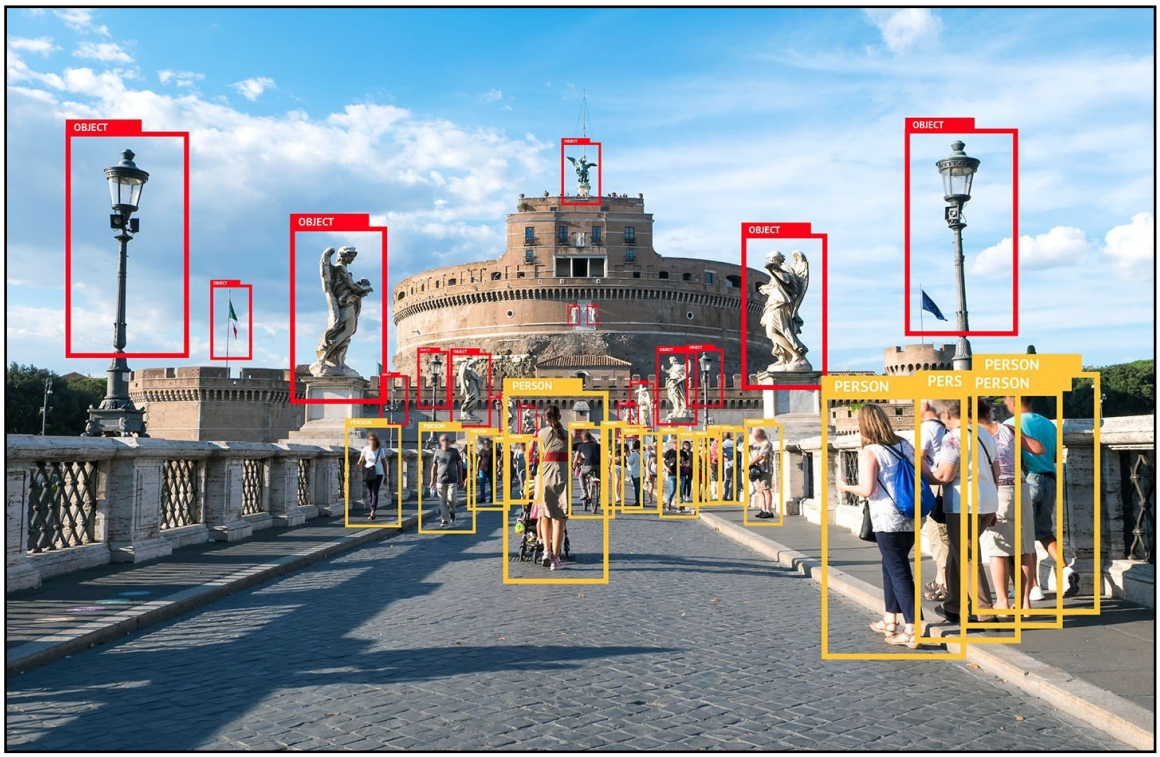


Figure 4.2 - Image Processing Illustration

SOCKET PROGRAMMING-PYTHON

Socket programming is a way of connecting two nodes on a network to communicate with eachother. One socket(node) listens on a particular port at an IP, while another socket reaches out tothe other to form a connection. Server forms the listener socket while the client reaches out to the server. They are the real backbones behind web browsing. In simpler terms there is a serverand a client. Socket programming is started by importing the socket library and making a simple socket.

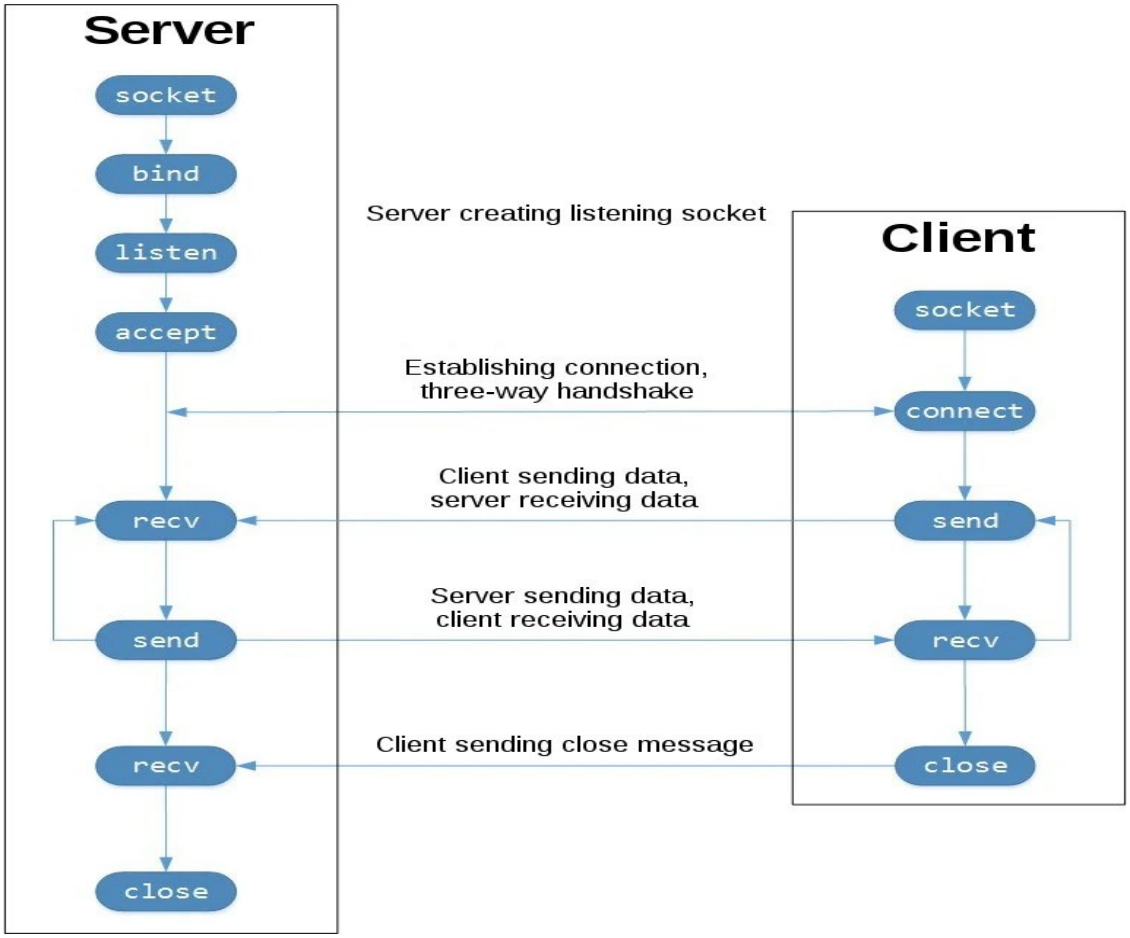


Figure 4.3- Socket Programming Explanation

ABOUT OPENCV-PYTHON

OpenCV is a cross-platform library using which we can develop real-time computer vision applications. It mainly focuses on image processing, video capture and analysis including features like face detection and object detection. In this tutorial, we explain how you can use OpenCV in your applications.

COMPUTER VISION

Computer Vision can be defined as a discipline that explains how to reconstruct, interrupt, andunderstand a 3D scene from its 2D images, in terms of the properties of the structure present inthe scene. It deals with modeling and replicating human vision using computer software and hardware.

COMPUTER VISION VS IMAGE PROCESSING

Image processing deals with image-to-image transformation. The input and output of image processing are both images.

Computer vision is the construction of explicit, meaningful descriptions of physical objects from their image. The output of computer vision is a description or an interpretation of structures in 3D scene.

APPLICATION OF COMPUTER VISION

Here we have listed down some of the major domains where Computer Vision is heavily used.

FEATURES OF OPENCV LIBRARY WE HAVE USED

CONVERTING COLORED IMAGES TO GRAYSCALE

A method named cvtColor () is used to convert colored images to grayscale. Following is the syntax of this method.

Input Image

Figure 4.4 - Input.Image

Figure 4.5-Output Image

DILATION

This procedure follows convolution with some kernel of a specific shape such as a square or acircle. This kernel has an anchor point, which denotes its center.This kernel is overlapped over the picture to compute maximum pixel value. After calculating,the picture is replaced with anchor at the center. With this procedure, the areas of bright regionsgrow and hence the image size increases.

Input

Assume that the following is the input image sample.jpg specified in the above program.

Figure 4.6- Input Image

On executing the program, you will get the following output.

Figure 4.7 - Output Image

EROSION

Erosion is quite a similar process as dilation. But the pixel value computed here is minimum rather than maximum in dilation. The image is replaced under the anchor point with that minimum pixel value. With this procedure, the areas of dark regions grow, and bright regions reduce. For example, the size of an object in dark shade or black shade increases, while it decreases in white shade or bright shade.

Input

Assume that the following is the input image sample.jpg specified in the above program.

Figure 4.8 - Input Image

On executing the program, you will get the following output.

Figure 4.9 - Output Image

CHAPTER 5

MORPHOLOGICAL OPERATIONS

In the earlier chapters, we discussed the process of erosion and dilation. In addition to these two, OpenCV has more morphological transformations. The morphologyEx() of the method of the class Imgproc is used to perform these operations on a given image.

Input

Assume that following is the input image morph_input.jpg specified in the above program.

Figure 5.1- Input Image

Output Image

On executing the program, you will get the following output.

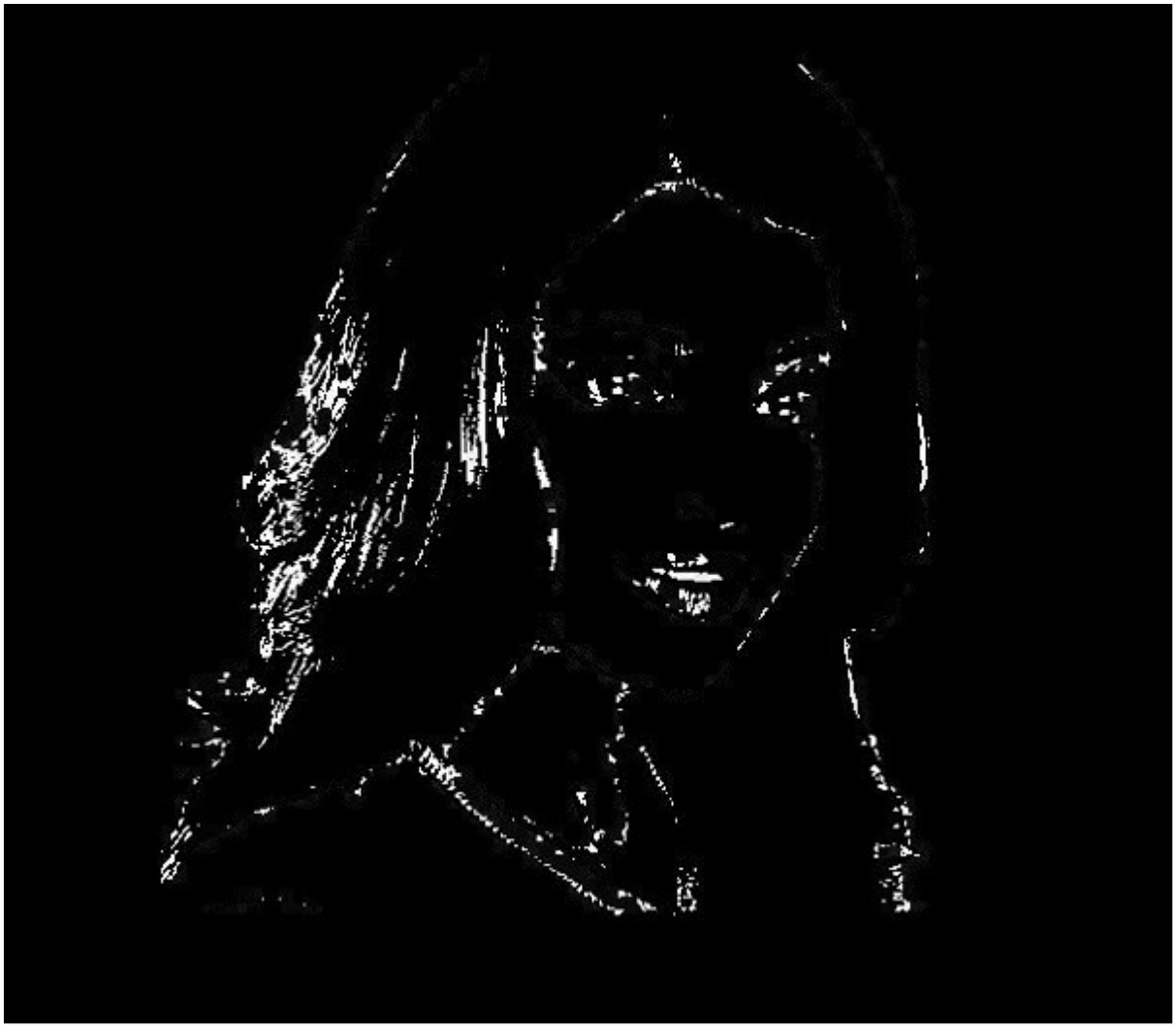


Figure 5.2 - Output Image

ADAPTIVE THRESHOLD

In simple thresholding, the threshold value is global, i.e., it is the same for all the pixels in the image. Adaptive thresholding is the method where the threshold value is calculated for smaller regions and therefore, there will be different threshold values for different regions.

INPUT

Assume that the following is the input image thresh_input.jpg specified in the above program.

Figure 5.3- Input Image

OUTPUT IMAGE

On executing the program, you will get the following output.

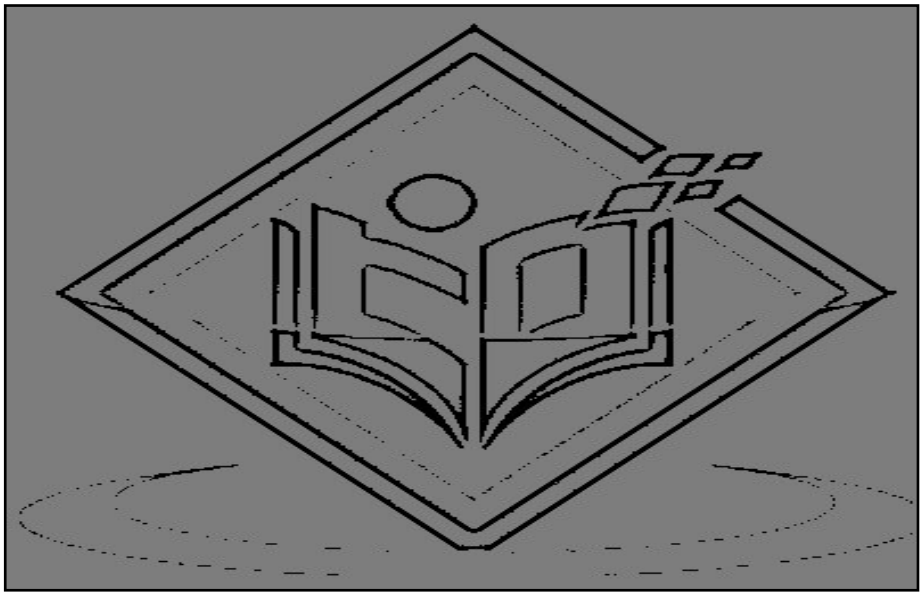


Figure 5.4 - Output Image

CANNY EDGE DETECTION

Canny Edge Detection is used to detect the edges in an image. It accepts a gray scale image as input, and it uses a multistage algorithm.You can perform this operation on an image using the Canny () method of the imgproc class,following is the syntax of this method.

INPUT IMAGE

Assume that following is the input image canny_input.jpg.

Figure 5.5 - Input Image

Output Image

On executing the program, you will get the following output.

Figure 5.6- Output Image

OTHER METHODS

TM_CCOEFF_NORMED-PYTHON

The function slides through image, compares the overlapped patches of size w×h against templusing the specified method and stores the comparison results in result. Here are the formulae for the available comparison methods (I denote image, Template, R result). The summation is doneover template and/or the image patch: x′=0...w−1, y′=0...h−1. After the function finishes the comparison, the best matches can be found as global minimums (when **TM_SQDIFF** was used) or maximums (when **TM_CCORR** or **TM_CCOEFF** was used) using the **minMaxLoc** function. In case of a color image, template summation in the numerator and each sum in the denominator is done over all the channels and separate mean values are used for each channel. That is, the function can take a color template and a color image. The result will still be a single-channel image, which is easier to analyze.

Figure 5.7 - Template Matching Explained

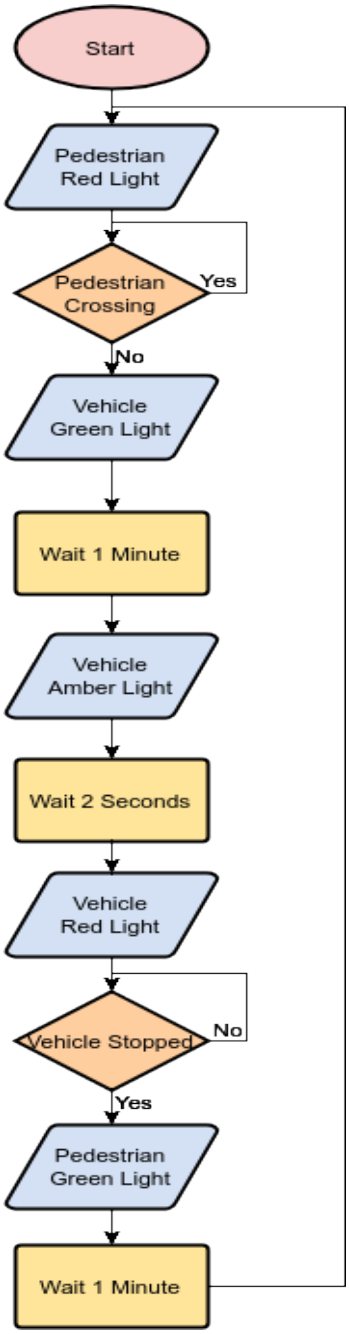
HAAR CASCADE CLASSIFIER-PYTHON

Object Detection using Haar feature-based cascade classifiers is an effective object detection method proposed by Paul Viola and Michael Jones in their paper, "Rapid Object Detection usinga Boosted Cascade of Simple Features" in 2001. It is a machine learning based approach wherea cascade function is trained from a lot of positive and negative images. It is then used to detectobjects in other images.

OpenCV provides a training method (see **Cascade Classifier Training**) or pretrained models, that can be read using the **cv::CascadeClassifier::load** method. The pretrained models are in the data folder in the OpenCV installation or can be found here.

Figure 5.8 -Haar-Cascade explained

Workflow Representation



CHAPTER 6

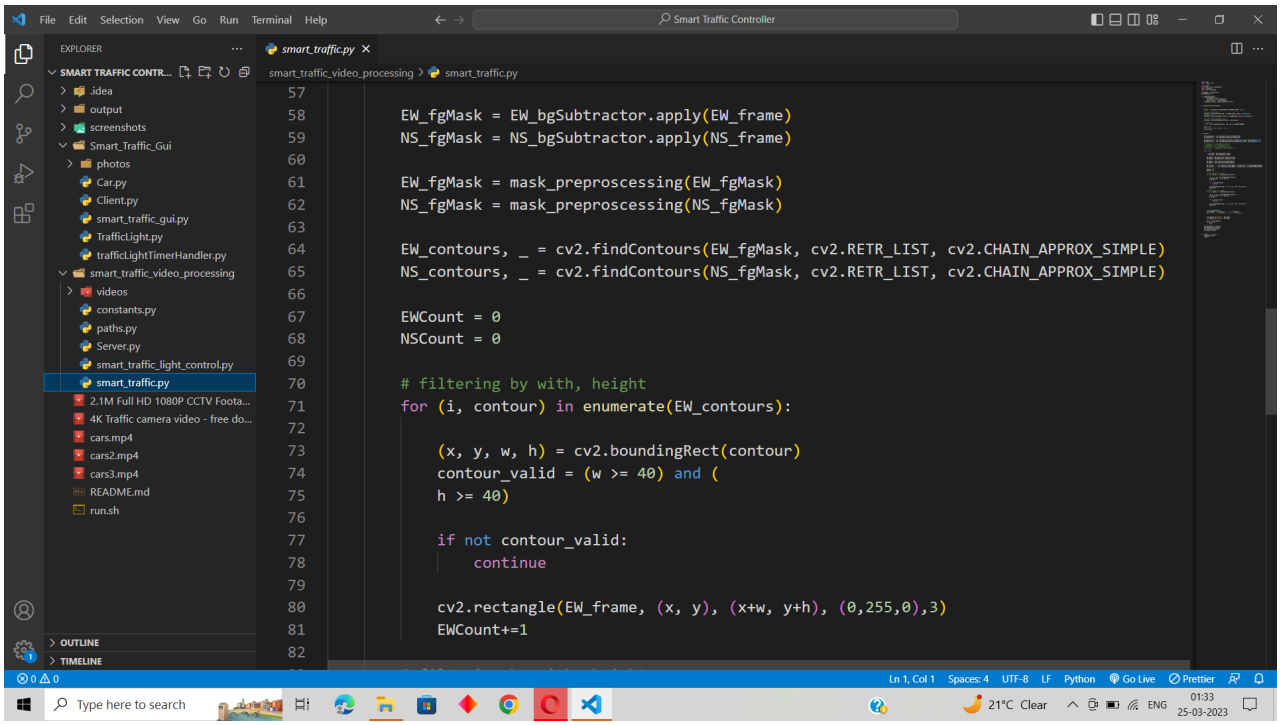
SOFTWARE AND HARDWARE REQUIREMENT SPECIFICATION

- **Hardware Requirements (Recommended):**
- Camera
- Traffic Light
- Radio Bridge
- i-5 7th Generation (minimum)
- 8GB RAM (minimum)
- Nvidia 940MX graphic card

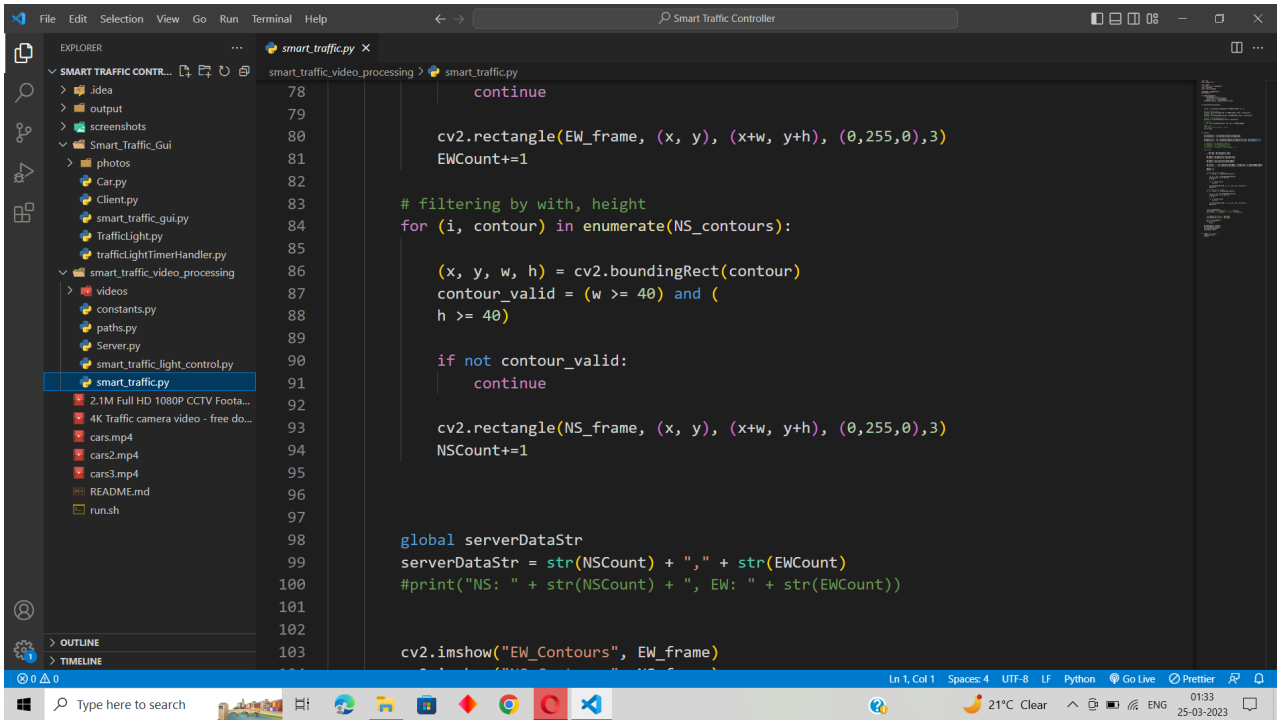
- **Software Requirements:**
  Server to Process
  The hardware components, including the camera, traffic light, radio bridge, processor (i-5 7th Generation), RAM (8GB minimum), and Nvidia 940MX graphic card, are physical devices that form the infrastructure of the smart traffic control system.
- On the other hand, the "Server to Process" is a software component that refers to the server software responsible for receiving, processing, and analyzing data from various sources in the smart traffic control system. It includes algorithms, analytics, and other software functionalities for optimizing traffic flow and managing congestion

CHAPTER 7

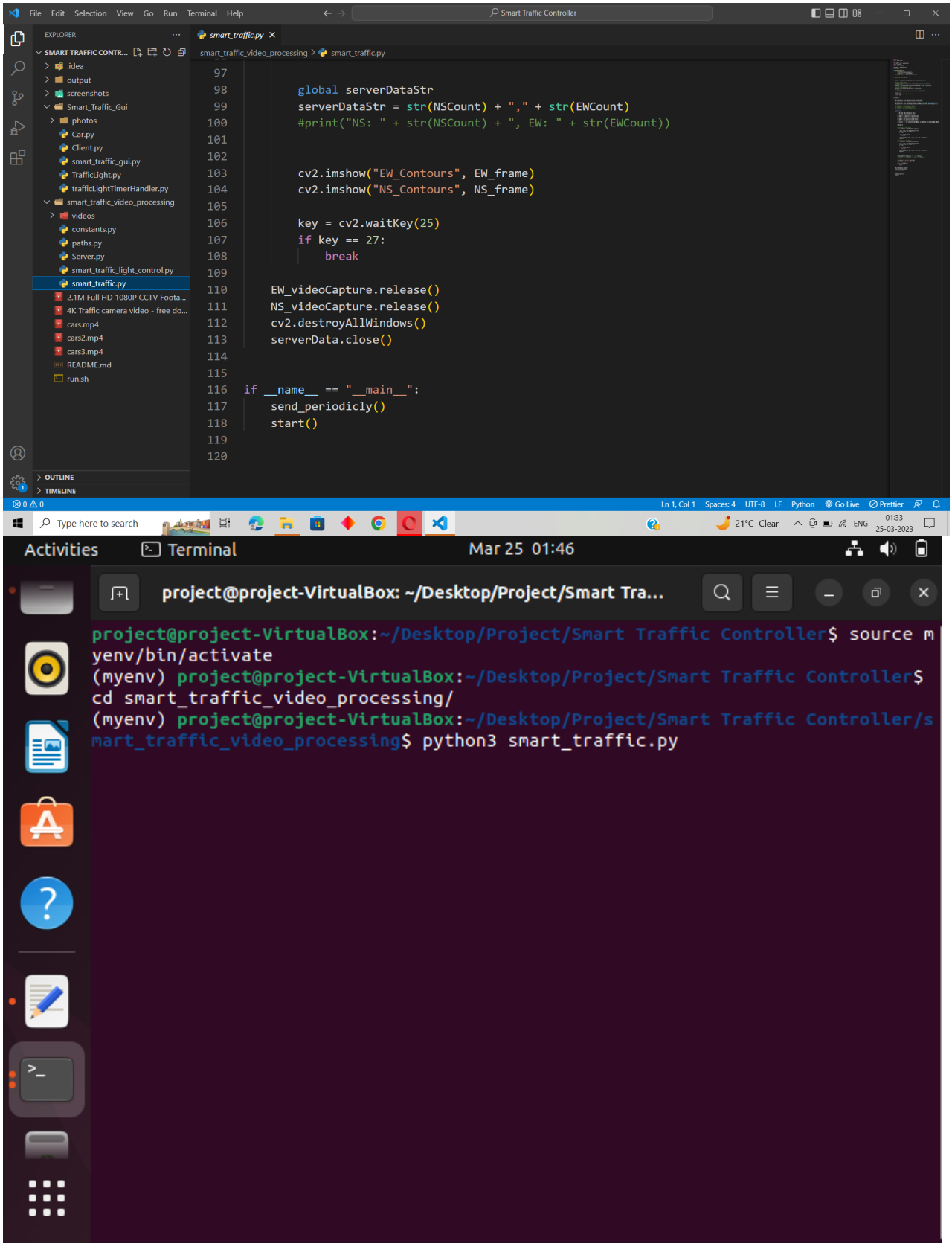
CODE AND IMPLEMENTATION



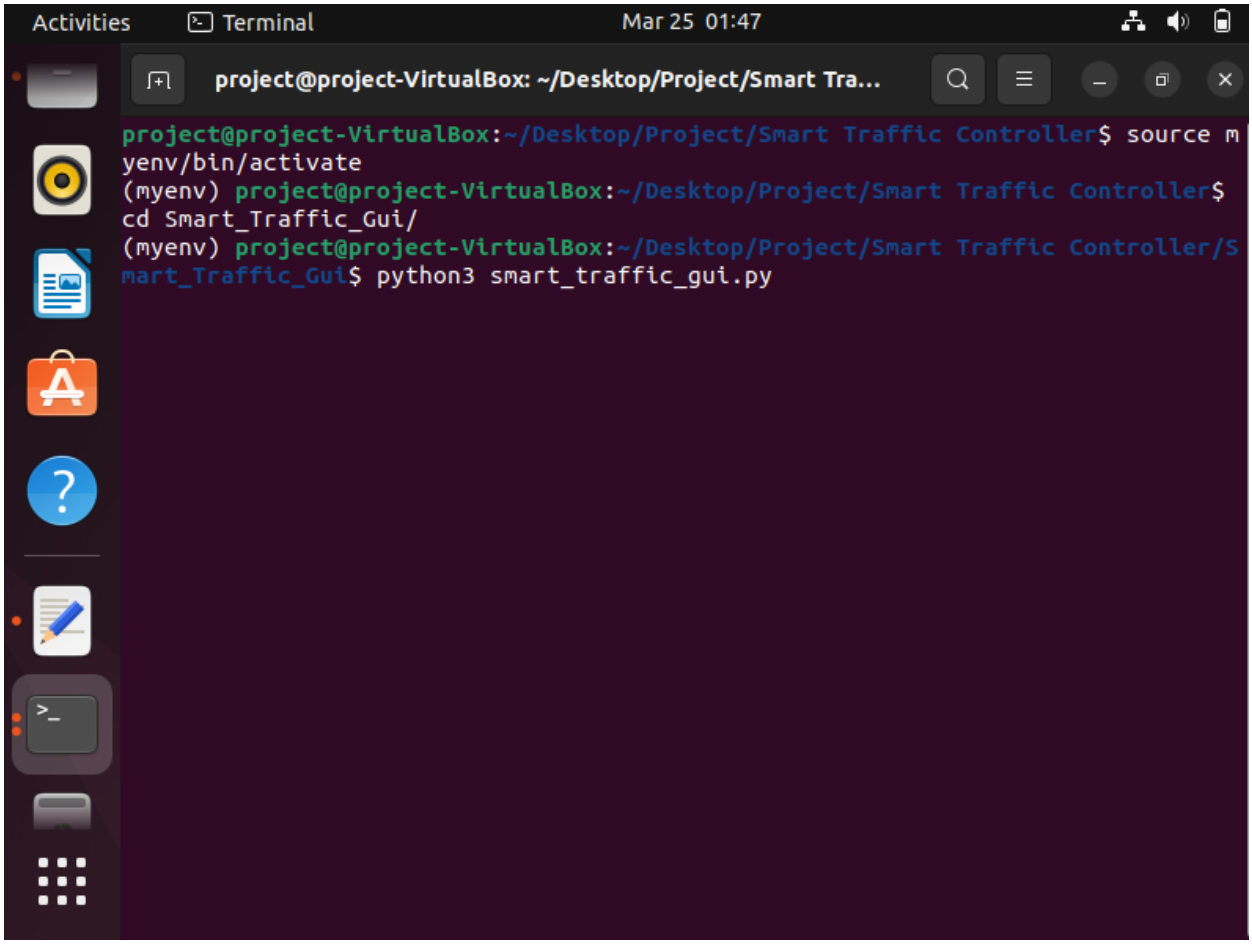
```
57
58      EW_fgMask = EW_bgSubtractor.apply(EW_frame)
59      NS_fgMask = NS_bgSubtractor.apply(NS_frame)
60
61      EW_fgMask = mask_preproscessing(EW_fgMask)
62      NS_fgMask = mask_preproscessing(NS_fgMask)
63
64      EW_contours, _ = cv2.findContours(EW_fgMask, cv2.RETR_LIST, cv2.CHAIN_APPROX_SIMPLE)
65      NS_contours, _ = cv2.findContours(NS_fgMask, cv2.RETR_LIST, cv2.CHAIN_APPROX_SIMPLE)
66
67      EWCount = 0
68      NSCount = 0
69
70      # filtering by with, height
71      for (i, contour) in enumerate(EW_contours):
72
73          (x, y, w, h) = cv2.boundingRect(contour)
74          contour_valid = (w >= 40) and (
75          h >= 40)
76
77          if not contour_valid:
78              continue
79
80          cv2.rectangle(EW_frame, (x, y), (x+w, y+h), (0,255,0),3)
81          EWCount+=1
82
```

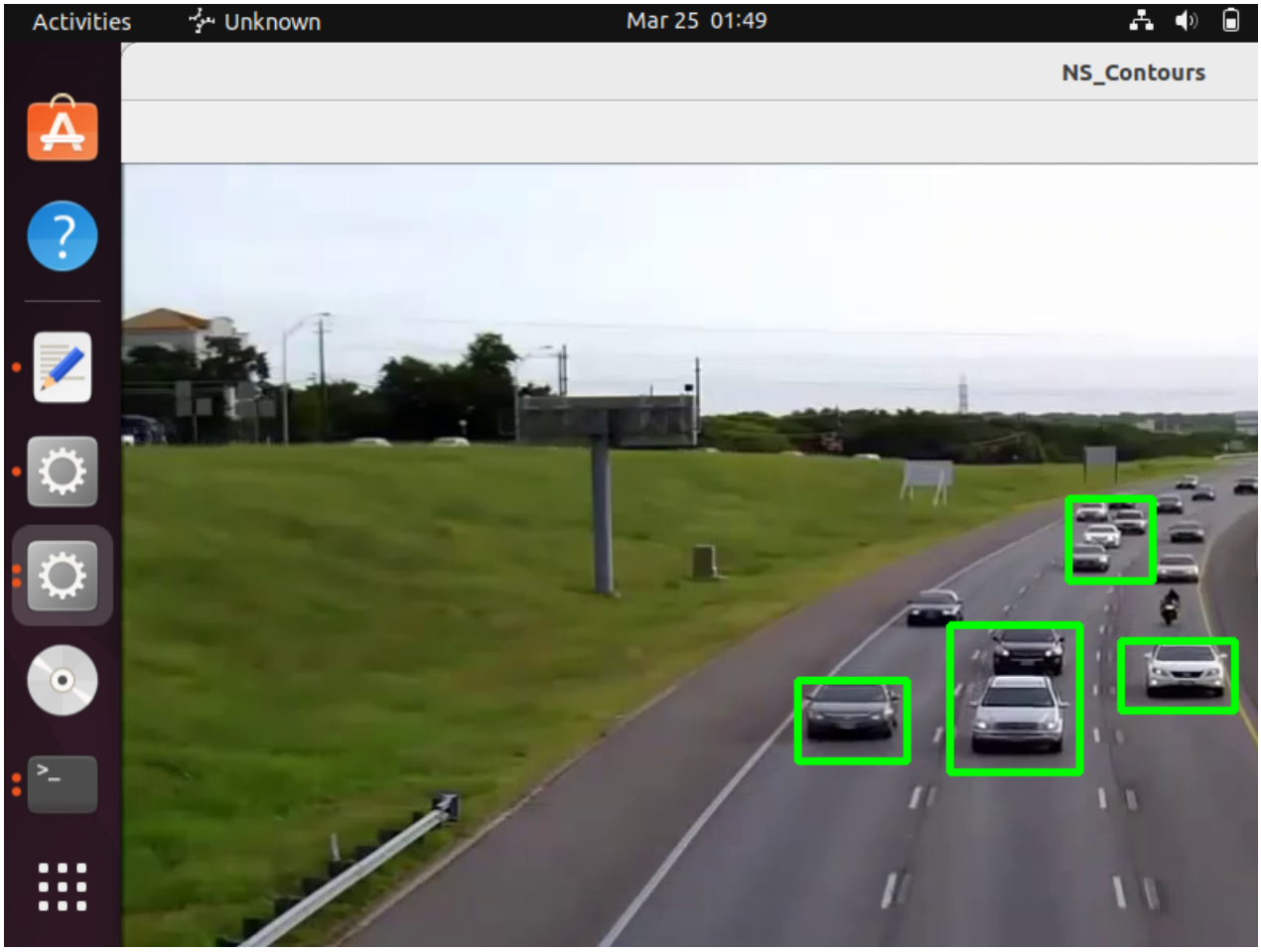


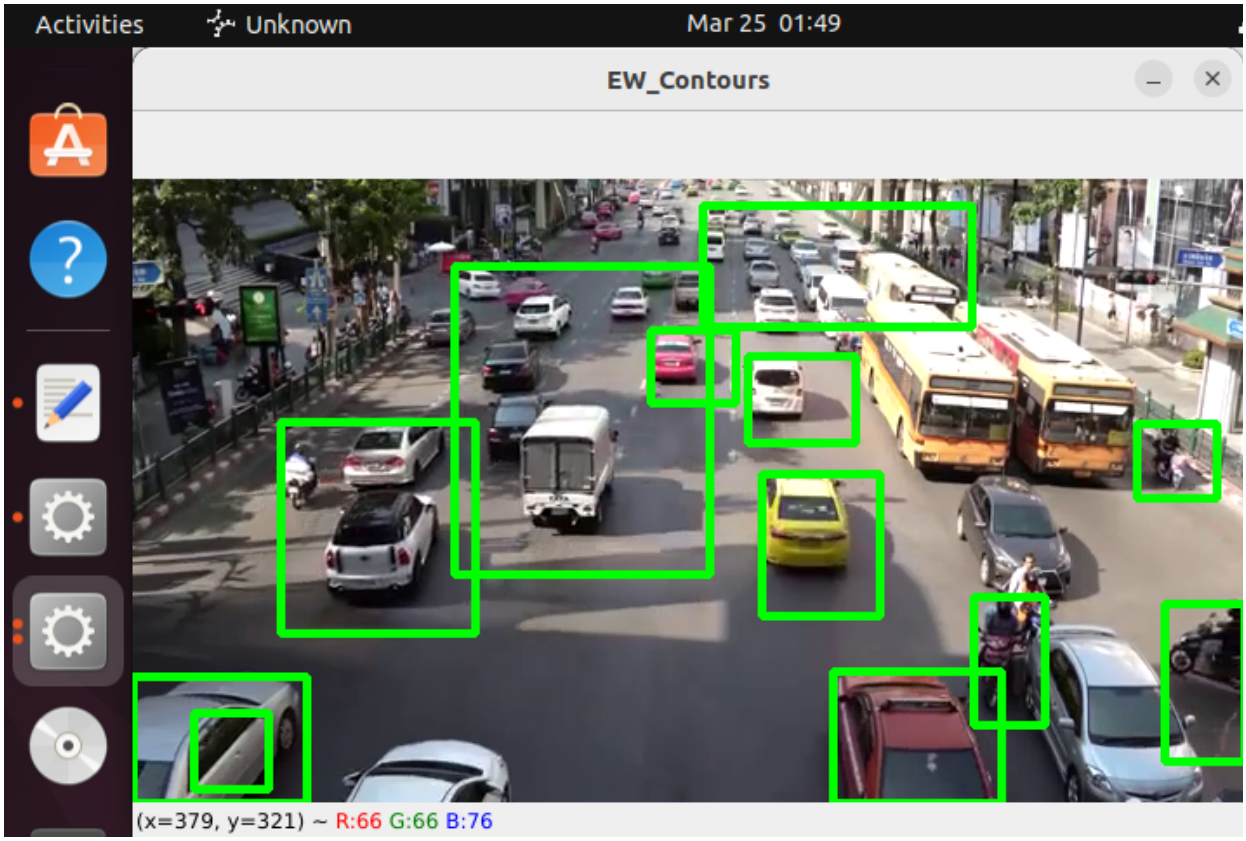
```
78              continue
79
80          cv2.rectangle(EW_frame, (x, y), (x+w, y+h), (0,255,0),3)
81          EWCount+=1
82
83      # filtering by with, height
84      for (i, contour) in enumerate(NS_contours):
85
86          (x, y, w, h) = cv2.boundingRect(contour)
87          contour_valid = (w >= 40) and (
88          h >= 40)
89
90          if not contour_valid:
91              continue
92
93          cv2.rectangle(NS_frame, (x, y), (x+w, y+h), (0,255,0),3)
94          NSCount+=1
95
96
97
98      global serverDataStr
99      serverDataStr = str(NSCount) + "," + str(EWCount)
100     #print("NS: " + str(NSCount) + ", EW: " + str(EWCount))
101
102
103     cv2.imshow("EW_Contours", EW_frame)
```


File Edit Selection View Go Run Terminal Help
Smart Traffic Controller
EXPLORER
smart_traffic.py
smart_traffic_video_processing > smart_traffic.py
SMART TRAFFIC CONTR...
.idea
output
screenshots
Smart_Traffic_Gui
photos
Car.py
Client.py
smart_traffic_gui.py
TrafficLight.py
trafficLightTimerHandler.py
smart_traffic_video_processing
videos
constants.py
paths.py
Server.py
smart_traffic_light_control.py
smart_traffic.py
2.1M Full HD 1080P CCTV Foota...
4K Traffic camera video - free do...
cars.mp4
cars2.mp4
cars3.mp4
README.md
run.sh
OUTLINE
TIMELINE
global serverDataStr
serverDataStr = str(NSCount) + "," + str(EWCount)
#print("NS: " + str(NSCount) + ", EW: " + str(EWCount))
cv2.imshow("EW_Contours", EW_frame)
cv2.imshow("NS_Contours", NS_frame)
key = cv2.waitKey(25)
if key == 27:
break
EW_videoCapture.release()
NS_videoCapture.release()
cv2.destroyAllWindows()
serverData.close()
if __name__ == "__main__":
send_periodicly()
start()
Ln 1, Col 1 Spaces: 4 UTF-8 LF Python Go Live Prettier
Type here to search
21°C Clear
ENG
01:33
25-03-2023

Activities
Terminal
Mar 25 01:46
project@project-VirtualBox: ~/Desktop/Project/Smart Tra...
project@project-VirtualBox:~/Desktop/Project/Smart Traffic Controller$ source myenv/bin/activate
(myenv) project@project-VirtualBox:~/Desktop/Project/Smart Traffic Controller$ cd smart_traffic_video_processing/
(myenv) project@project-VirtualBox:~/Desktop/Project/Smart Traffic Controller/smart_traffic_video_processing$ python3 smart_traffic.py

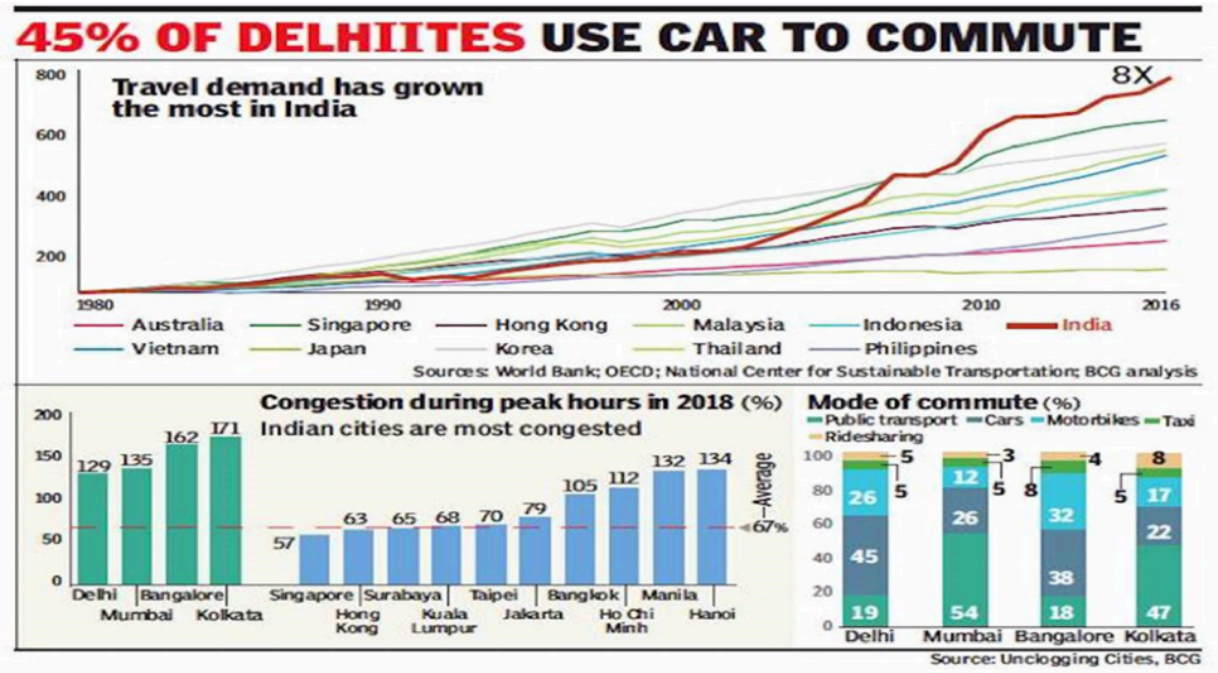

Activities
Terminal
Mar 25 01:47
project@project-VirtualBox: ~/Desktop/Project/Smart Tra...
project@project-VirtualBox:~/Desktop/Project/Smart Traffic Controller$ source m
yenv/bin/activate
(myenv) project@project-VirtualBox:~/Desktop/Project/Smart Traffic Controller$
cd Smart_Traffic_Gui/
(myenv) project@project-VirtualBox:~/Desktop/Project/Smart Traffic Controller/S
mart_Traffic_Gui$ python3 smart_traffic_gui.py


Activities
Unknown
Mar 25 01:49
NS_Contours


Activities
Unknown
Mar 25 01:49
EW_Contours
(x=379, y=321) ~ R:66 G:66 B:76

Conclusion

With the continued increase of automobile industry and the congestion occurring because of the density of cars on road. Our project can help in managing that congestion dynamically.



It can be seen from the above statistics that congestion in India is the highest in Asia. Hence there is an eminent need of traffic management in India and our solution can help in doing the same.

Appendix

- Why Python

  Python is a general purpose programming language created in the late 1980s, and named after Monty Python, that's used by thousands of people to do things from testing microchips at Intel, to powering Instagram, to building video games with the PyGame library, also powering image processing such in our project.

- Why linux in on field device

  TinkerOS has been carefully designed to be extremely lightweight and responsive. Running on top of the base Debian 9 is a the LXDE desktop environment. This GUI is optimized specifically for BC boards. It also features plug & play NTFS support allowing for easy access to Windows based flash drives and external hard drives. The included web browser has also been carefully selected and optimized. It based on Chromium allowing for speed and stability along with a number of extensions. The ASUS team has help to enable hardware acceleration of the browser allowing for improved web rendering and video playback including HD resolutions in YouTube.

- Why OpenCV

  OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products. Being a BSD-licensed product, OpenCV makes it easy for businesses to utilize and modify the code.

REFERENCES

- https://www.researchgate.net/publication/321761759_A_model_and_genetic_algorithm_for_area-wide_intersection_signal_optimization_under_user_equilibrium_traffic
- http://gustavnilsson.name/research/
- Nasser R. Saber concluded and came up with an illuminating algorithm that helps intraffic modulation. https://www.sciencedirect.com/science/article/abs/pii/S2210650218303407
- https://www.researchgate.net/publication/321098959_Adaptive_traffic_signal_control_with_actorcritic_methods_in_a_realworld_traffic_network_with_different_traffic_disruption_events
- https://scholar.google.com/citations?user=YT8sf2MAAAAJ&hl=en#d=gs_md_citad&u=%2Fcitations%3Fview_op%3Dview_citation%26hl%3Den%26user%3DYT8sf2MAAAAJ%26citation_for_view%3DYT8sf2MAAAAJ%3AqjMakFHDy7sC%26tzom%3D-330
- https://www.researchgate.net/publication/317080861_STUDY_OF_AUTOMATIC_TRAFFIC_SIGNAL_SYSTEM_FOR_CHANDIGARH
- **Automatic Intelligent Traffic Control System** Linganagouda R1, Pyinti Raju2, Anusuya Patil3 Assistant Professor, Dept. of EEE, RYM Engineering College, Ballari,Karnataka, India1 Assistant Professor, Dept. of EEE, RYM Engineering College, Ballari, Karnataka, India2 Associate Professor, Dept. of EEE, RYM Engineering College, Ballari, Karnataka, India3
- International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (An ISO 3297: 2007 Certified Organization) Vol. 5, Issue7, July 2016 Copyright to IJAREEIE DOI:10.15662/IJAREEIE.2016.0507013 5902