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TRAFFIC DENSITY DETECTION USING RASPBERRY Pi

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Abstract- In today's generation of twenty first century, we have to face several issues a well-known of that is traffic jam becoming a lot of serious day by day. The traffic congestion can also be caused by large Red light de-lays, etc. The delay of respective light is hard coded and it is not dependent on actual density. Therefore, for simulating and optimizing traffic control to better accommodate this increasing demand is arises. this paper is about optimization of Image processing based traffic light controller in a City using raspberry pi microcontroller. The system tries to reduce possibilities of traffic jams, caused by traffic lights, to an extent. The system is based on image processing using python. The micro-controller used in the system is Raspberry pie. one camera is placed on respective road and capture images to analyse traffic density. Then according to density priorities of traffic light signals are decided. The system contains three LEDs which are mounted on the one side of road. According to this project if traffic density is higher the traffic signals automatically stop the signals and give green signal for this vehicles. These techniques are in brief delineated in next section. Here traffic density is detected using image processing, the algorithm used to detect vehicle is canny edge detection, canny edge detection is used to detect the edges of an object and according to the no objects traffic density can be detected.

Keywords: *Traffic density, image processing, raspberry pi, led, etc.*

I INTRODUCTION

In an old automatic traffic controlling a traffic light uses timer for every phase. Using electronic sensors is another way in order to detect vehicles, and produce signal that to this method the time is being wasted by a green light on an empty road. Traffic congestion also occurred while using the electronic sensors for controlling the traffic. All these drawbacks are supposed to be eliminated by using image processing. We propose a system for controlling the traffic light by image processing. The vehicles are detected by the system through images instead of using electronic sensors embedded in the pavement. A camera will be placed alongside the traffic light. It will capture image sequences. Image processing is a better technique to control the state change of the traffic light. It shows that it can decrease the traffic congestion and avoids the time being wasted by a green light on an empty road. It is also more reliable in estimating vehicle presence because it uses actual traffic images. It visualizes the practicality, so it functions much better than those systems that rely on the detection of the vehicles' metal content. Image Processing is a technique to enhance raw images received from cameras/sensors placed on space probes, aircrafts and satellites or pictures taken in normal day-to-day life for various applications. An Image is rectangular graphical object. Image processing involves issues related to image representation, compression techniques and various complex operations, which can be carried out on the image data. The operations that come under image processing are image enhancement operations

such as sharpening, blurring, brightening, edge enhancement etc. Image processing is any form of signal processing for which the input is an image, such as photographs or frames of video; the output of image processing can be either an image or a set of characteristics or parameters related to the image. Most image processing techniques involve treating the image as a two- dimensional signal and applying standard signal- processing techniques to it. Image processing usually refers to digital image processing, but optical and analog image processing are also possible. Many techniques have been developed in Image Processing during the last four to five decades. Most of the methods are developed for enhancing images obtained from unmanned space probes, spacecraft's and military reconnaissance flights. Image Processing systems are becoming widely popular due to easy availability of powerful personnel computers, large memory devices, graphics software's and many more. Image processing involves issues related to image representation, compression techniques and various complex operations, which can be carried out on the image data. The operations that come under image processing are image enhancement operations such as sharpening, blurring, brightening, edge enhancement. Traffic density of lanes is calculated using image processing which is done of images of lanes that are captured using digital camera. We have chosen image processing for calculation of traffic density as cameras are very much cheaper than other devises such as sensors. Making use of the above mentioned virtues of image processing we propose a technique that can be used for traffic control. Here the traffic density is detected according to the number of objects detected and the threshold value. If threshold value is defined to be ***n*** *and* the number of vehicles detected are greater than ***n*** then it is considered as traffic density is high or else traffic density less. Now the threshold value can be set according to our requirement. Threshold value is a static value and it is a developer dependent.

II LITERATURE SURVEY:

Highway traffic density control based on the composite of CACMAC and PID controller

Xinrong Liang ; Jiexia Fu ; Mu Yan Xinrong Liang

Published in: 2017 Chinese Automation Congress(CAC)

In this paper, a composite control method based on credit assignment cerebellar model articulation controller (CACMAC) and proportional-integral-derivative (PID) controller is applied to highway density control. Firstly, a macroscopic traffic model is established to describe the evolution process of highway traffic flow accurately. Secondly, the principle and algorithm of CACMAC-PID compound control are studied in detail. Thirdly, road density controllers based on CACMAC-PID compound control are designed by combining the highway traffic model and a nonlinear feedback technology

A simulation study of traffic agent to identify traffic flow density using modified traffic cellular automaton model

Steven Ray Sentinuwo ; KoheiArai

Published in: 2015 1st International Conference on Wireless and Telematics (ICWT)

This paper presents the evaluation of traffic agent utilization to identify road traffic flow density. This research also proposes the concept of traffic agent as the new method for traffic monitoring and surveillance. Smart autonomous traffic light switching by traffic density measurement through sensors

Y M Jagadeesh ; G. Merlin Suba ; S Karthik ; K Yokesh

Published in: 2015 International Conference on Computers, Communications, and Systems (ICCCS)

This paper is concerned with the development and implementation of Sensor based Traffic Light System with Dynamic Control which in turn reduces the Average Trip Waiting Time (ATWT). It consists of IR sensors, Low Power embedded controllers, comparators and storage device. Comprehensive traffic management system: Real-time traffic data analysis using RFID

B S Meghana ; Santoshi Kumari ; T P Pushphavathi

Published in: 2017 International conference of Electronics, Communication and Aerospace

Technology (ICECA) Comprehensive Traffic Management System (CTMS) using Radio Frequency Identification (RFID) and analytics for real time

implementation has been proposed Traffic Light Controller Using Sound Sensors and Density Sensors

R. R. Jegan ; E. Sree Devi ; M. Sindhuja ; S. Pushna ; D. Sudhaa

Published in: 2018 Second International Conference on Inventive Communication and Computational

Technologies (ICICCT) we are using density sensor for measuring density of the vehicles and sound sensors to detect the sound signals of such vehicles. All these sensors are interfaced to the PIC micro controller to collect the data and provide priority to the congested lane.

III PROPOSED SYSTEM:

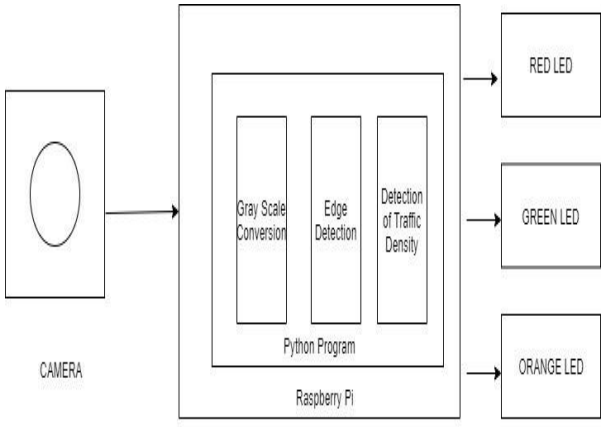

Figure 1: Traffic Density Detection

Steps:

a) Images are rescaled to fixed resolution.
b) Then the above rescaled images are converted from RGB to gray.
c) Edge detection of pre-processed images is carried out using canny edge detection technique.
d) The output images of previous step are matched using pixel to pixel matching technique.
a. After matching the timing allocation is done depending on the count of the vehicles that are calculated.
b. First the signal is set to red
c. Then it is changed to yellow for 6 seconds

If the traffic density is higher than signal will immediately turn into green

If the number of vehicles counted is less than threshold value, then red signal will get on. And soon.

IV RESULT:

a) Outcome: Real time detection of phishing sites.

b) Screenshots

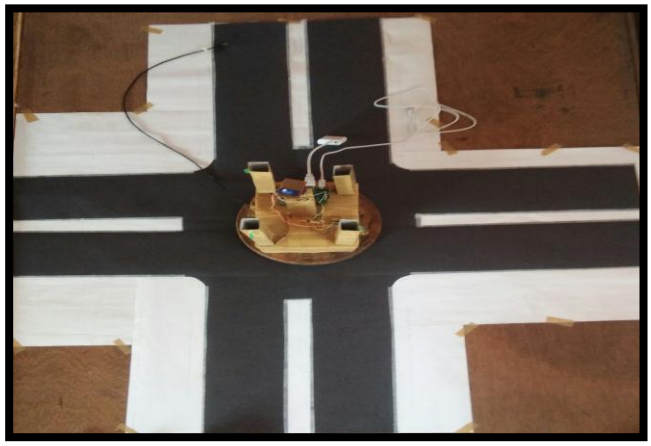

Figure 2: Hardware Implementation

1. Hardware implementation = The camera and signal module is kept in the middle of roads to capture image and allocate signal as per density of vehicle.

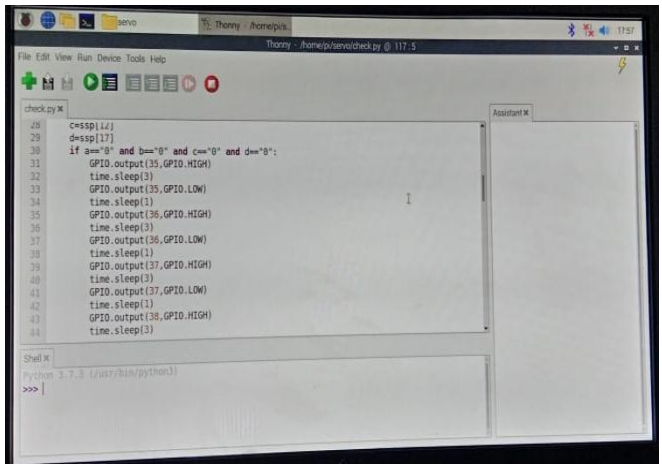

Figure 3: Software Implementation

1. Software implementation = consist code related to control the overall processing of system to give proper output as per requirements.

Figure 4: Result 1 - Capture image of each road in Chowk to detect/count vehicle's present on the road by rotating camera in 90degrees with the help of servo motor.

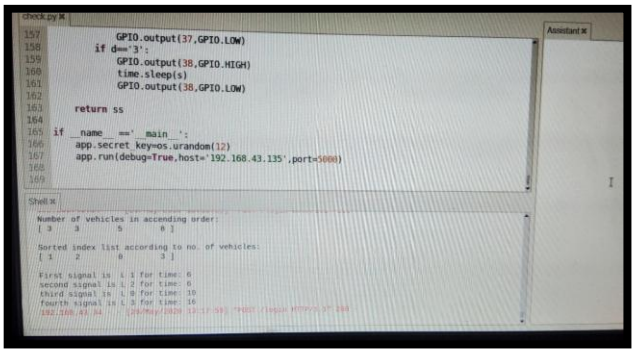

Figure 5: Result 2

Result 2 –Number of vehicles present in captured image is get detected by using image processing technique and required dynamic time is get calculated (2s for 1 vehicle as shown in fig 5).

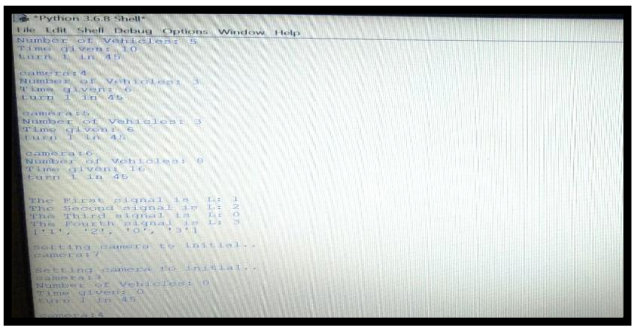

Figure 6: Result 3

1. Result 3-as per input from processing system controlling system controls signal allocation by allocating signal with dynamic time by using no. of vehicles and sorted index list.

V CONCLUSION:

This project presents an Image Processing Based Intelligent Traffic Control System by using Raspberry pi which we are going to implement using PYTHON Programming Language. "Image Processing Based Intelligent Traffic control using Raspberry Pi" technique that we propose overcomes all the limitations of the earlier (in use) techniques used for controlling the traffic. Earlier in automatic traffic control use of timer had a drawback that the time is being wasted by green light on the empty. This technique will avoid all this problem.

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