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# Traffic Control System Based on Density of Vehicles Using Python and Image Processing

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**Abstract** - *Now-a-days, Traffic management is becoming one of the most important issue. Due to the rapidly growing of urban population, the number of vehicles on the road is increasing. So there is a need for controlling streets, highways and roads. Due to this problem of proper traffic management, there is a need for advanced technology and equipment to improve the state of the art of traffic control. The solution we provide for traffic management by having a special intelligence which the images of road feed from the cameras at traffic junctions for real time traffic density calculation using image processing and python. The traffic lights are controlled according to the vehicle density on the road.*

***Key Words***: Image capture, Winpython, Opencv, Image processing (RGB to Gray conversion, Thresholding, Edge Detection), Vehicle counting, Time Allocation.

## 1.INTRODUCTION

Traffic-jam is a very big problem in developing cities, In fact it's ever increasing day-by-day nature makes it difficult to find where the traffic density is more in real time, so that to schedule a better traffic signal control and effective traffic routing. It is necessary to build technology system for transportation management which is used for control of the traffic phenomenon. Traffic control systems have direct influence on traffic problems which is help to improve traffic flow and reduce traffic congestion. Usually, traffic jams are caused by many reasons such as incidents, works in roads, insufficient Road width, Road conditions due to weather, unrestrained demand, large delay of Red Light etc. Technology in the recent past using image processing for surveillance and safety, which is widely used in vehicle and traffic management for traveller information. The traffic density estimation can also be achieved using Image Processing.

The aim of this paper is to discuss the solution to reduce traffic congestion and road incidents by using timer model. This model can be implemented using opencv and image processing techniques.

## 2. PRESENT TRAFFIC CONTROL SYSTEM

Under present scenario, traffic control is achieved by the use of a system of hand signs by traffic police person, traffic signals and markings. Standard use of colors and shape aids in this identification and in deciding on the appropriate course of action. Under current circumstances, traffic lights are set on in the different directions with fixed time delay, following a particular cycle while switching from one signal to other creating unwanted and wasteful congestion on one lane while the other lanes remain vacant. The system we propose identify the density of traffic on individual lanes and thereby regulate the timing of the signal's timing.

## 3. PROPOSED TRAFFIC CONTROL SYSTEM

The proposed system can be implemented by using the method as shown below.

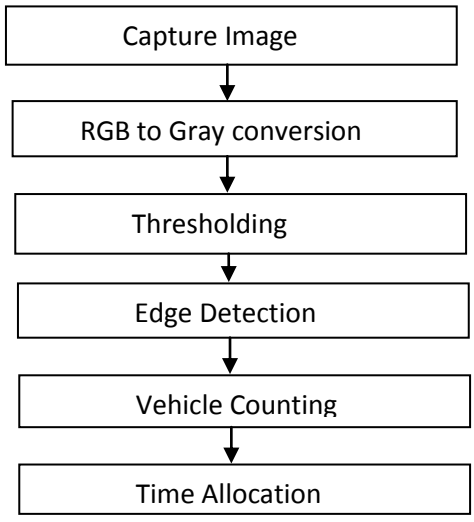


**Fig 1.0 Flow chart**

**3.1 Capture Image:** In this system the input is the RGB image. A camera is used for capturing video and frames are extracted from video to obtain images.


**Fig 1.1 Capture Image**

**3.2 RGB to Gray Scale Conversion:** The gray scale image can be used to display the objects in the format of black and white. In this system the output will be display the gray scale image after getting the source image only, because source image only converted into the gray scale image.


**Fig 1.2 Gray Scale Image**

**3.3 Thresholding:** The threshold image brightness or contrast of the gray scale image. In this system we can convert the gray scale image to threshold image.


**Fig 1.3 Threshold Image**

**3.4 Edge Detection:** Edge detection can be used to outline the edges of the objects. It can be help full for find out the objects. Here we have convert the threshold image to canny image or Erode image.

Before showing the vehicles count and output screen the Erode Image converted into the contour image. This image is the final step to find the vehicle counts and output screen.

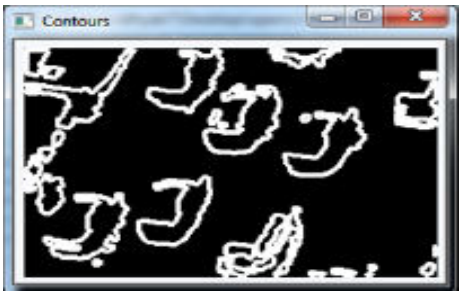


**Fig 1.4 Erode Image**

**3.5 Vehicle Counting**: Image processing techniques are used to count the number of vehicles on road and hence estimate the density. By using this count, we can control the traffic signal. Vehicle counting can be observed in the below output image.

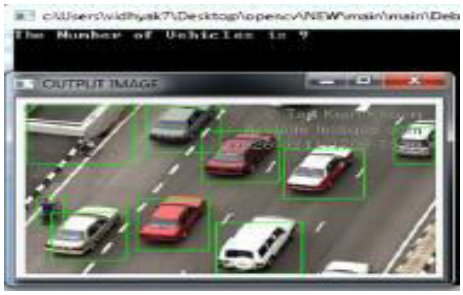


**Fig 1.5 Output Image**

**3.6 Time Allocation:** Time allocation is indicated by numbers. Time allocation can be depend on the count of cars.

## 4. Result:

The time allocation for each side of the road depends upon the count of vehicles. This allocation of time for four sides of road can be observed in the following images.

The two types of output screens are displayed in this system. They are,

1) First output screen display the output image. In this image will display the original RGB Image and in this screen the vehicles are boxed for the find the count.

2) Another output screen is the command prompt. In this command prompt will be open when the user run this system, in final stage after getting the output image the command prompt will display the images.

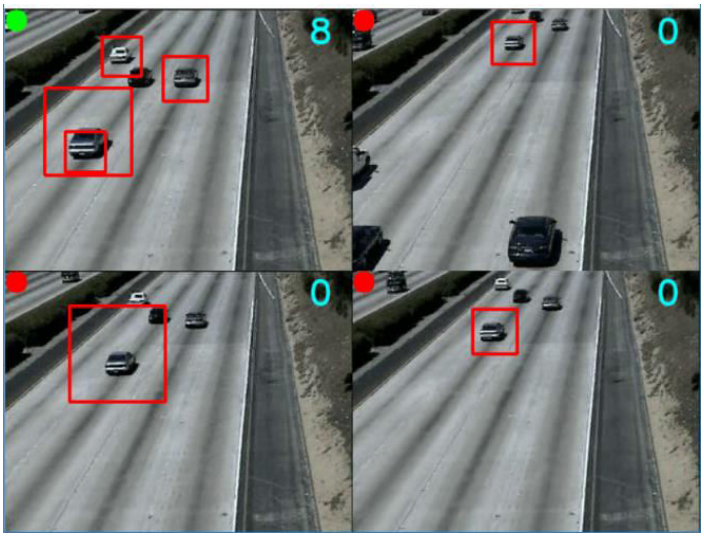


**Fig 1.6 Time allocation for 1st side**

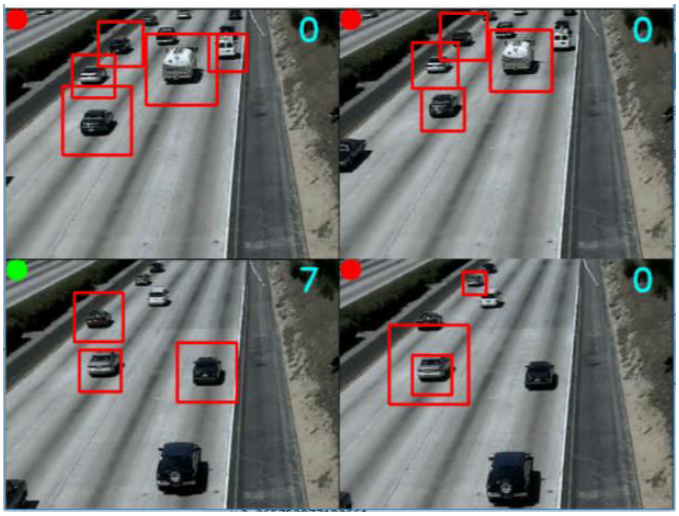


**Fig 1.7 Time Allocation for 2nd side**

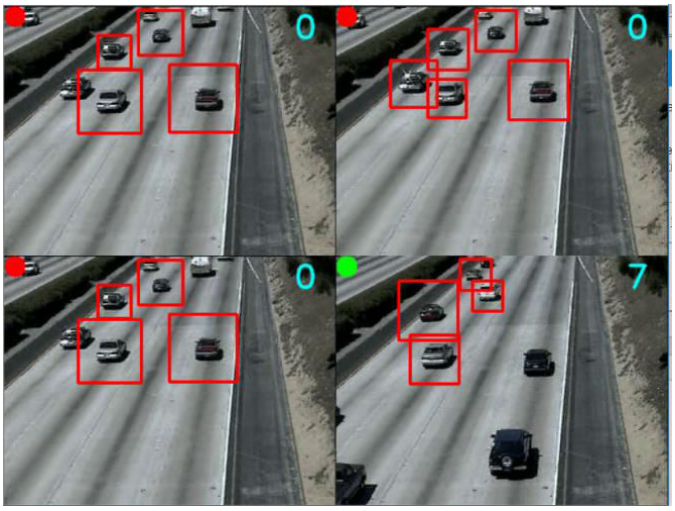


**Fig 1.8 Time allocation for 3rd side**

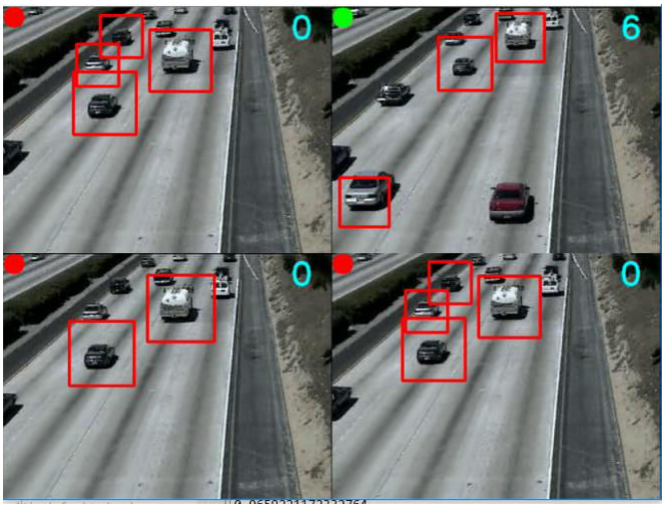


**Fig 1.9 Time Allocation for 4th side**

## 5. Advantages:

- Image processing techniques overcome the limitations of the all the traditional methods of traffic control.
- It eliminates the need for extra hardware and sensors.
- The use of multiple cameras will help to analyse and control traffic in a particular region.
- The proposed system outperforms the existing system in terms of accuracy and simplicity.
- Reducing travel times and efficiency.
- Save people time and Reduce injuries.

## 6. Future Scope:.

- This technique allows the operator to gather the recorded data from a far end to his home computer without going there.
- Based on the technology studied it is possible to develop cost effective, weather resistant products that have the potential for more sophisticated applications, including vehicle speed measurement and length classification.
- Raspberry pi microcontroller can be used which will directly integrate the opencv software there is no need to install the opencv in the system. With the help of raspberry pi we can provide the view of the traffic to the traffic controller room so that the green signal will be provided for the longer time in the required area during the signal in order to avoid the unnecessary waiting time during the signal.

## 7. Conclusion:

We conclude the Density measurement of the vehicles by using opencv tool as software for image processing by just displaying the various conversion of images in the screen and finally surrounding the box on the vehicle in the given image, the number of vehicle is calculated. We can calculate the density of the vehicle by using mat lab tool by comparing the four sides of the image which is given as a input to the opencv tool. we can simulate the result of the four given input images but this cannot be used in real time applications as it is very slow and the software is not free of cost like opencv to overcome this disadvantage of mat lab, opencv software is used which is very easy to install and is open source software and can be used in real time application in a quick manner. In this paper we have shown the density measurement of the vehicles in the signal by using opencv in the System which is portable in any system.

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**REFERENCES:**

[1] K. Vindhya (postgraduate student), A. Bazila Banu(Assistant Professor) , "Density Based Traffic Signal System", Volume 3, Special Issue 3, march 2014, ISSN(online): 2319-8753, ISSN (print): 2347-6710, Published in IJIRSET.

[2] Sayan Ghosh, Shaurya Kumar and Gautam Ghosh-Assistant professor (Institute of Engineering and Management), "Density Based Traffic Light System", Volume 6, Issue 6, June 2017, ISSN: 2278-909X, Published in IJARECE.

[3] Ashwini Basavaraju, Senhalata Doddigarla, Navitha Naidu, Shruti Malgatti, "Vehicle Density sensor System to Manage Traffic", eISSN: 2319-1163, pISSN: 2321-7308, Published in IJRET.

[4] Prof.D.D.Pukale, Palak Chauhan, Adhikari Siddhi Satish, Preeti Nawal & Neha Kumari, "Density Based Traffic Control System Using Video Processing", Vol-2, Issue-6, 2016 ISSN: 2454-1362 published in Imperial Journal of Interdisciplinary Research.