



# TRAFFIC MONITORING SYSTEM

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**Abstract:** Now a days roads are getting over crowded, especially in cities. The main goal of our project is to build a traffic regulation system which is able to detect the vehicles in traffic. Based on the count of the vehicles the signal shifts to the next traffic signal. A webcam is used in each stage of the traffic light in order to take pictures of the roads. Count of vehicles in these images are calculated by using opencv with python and shifts the signal by using arduino based micro controller.

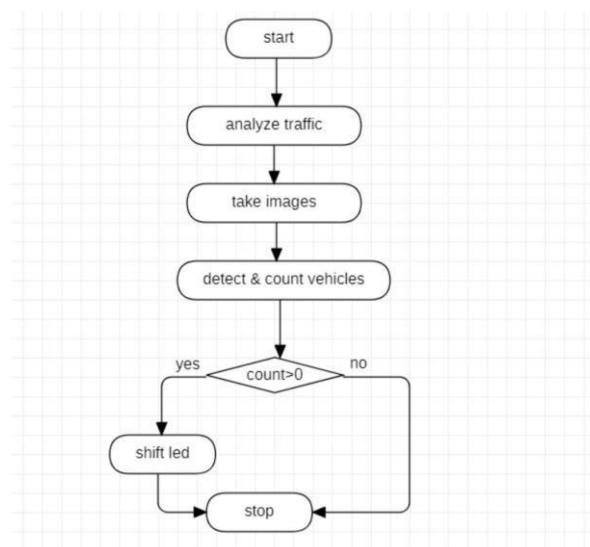
**Keywords:** Open CV, Image Processing, Arduino, Micro controller.

## I. INTRODUCTION

Now a days roads are getting over crowded, especially in big cities the traffic is increased. This project is to handle the real time situations and to handle the delays at traffic signals. Due to traffic issues in and around metro cities in India, people face a tremendous hardship during regular commuting resulting in wastage of time, fuel, and energy. The system consists of camera, it will capture the images and counts the vehicles in the images. Based on the count of the images the signal shifts to the maximum count side using microcontroller.

## II. LITERATURE SURVEY

In this paper, a method for estimating the traffic using OpenCV is presented. This is done by using the camera images captured from the road lanes. Each image is processed separately and the number of cars has been counted. This system guarantees that the average waiting time of the vehicle in front of traffic signal will be lesser than present traffic control systems, also the techniques and algorithms used in this project promises to be more effective as compared to the previous system. The advantages of this new method include such benefits as use of OpenCV over sensors, low cost, easy setup and relatively good accuracy and speed. Because this method has been implemented using OpenCV software, production costs are low while achieving high speed and accuracy. The implementation of this system is not possible in rural areas since there are less number of vehicles present due to which there are no traffic issues encountered.



## EXISTING SYSTEM

This system was first developed using sensors, but since sensors have a complicated hardware and implementation, the project was developed using OpenCV and Matlab, which made the project comparatively easy to implement and understand, also there were changes in the hardware such as the microcontroller used was Raspberry Pi. The techniques



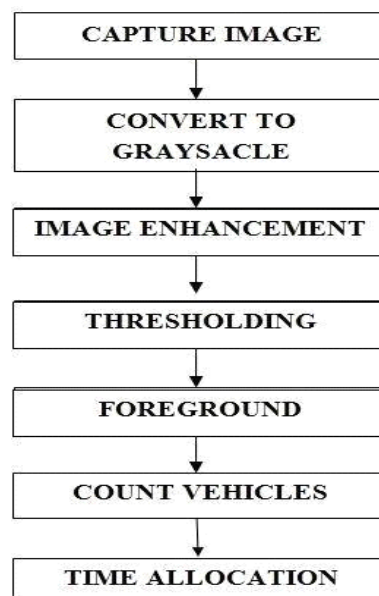
used were blob detection, blob analysis, vehicle counting, colour thresholding and background subtraction. Various algorithms used were Haar Cascade, blob detection. The previous project was implemented using videoprocessing.

### III. A. FLOW CHART

#### B. Proposed Idea

This system uses OpenCV as a software, and uses the concept of Image Processing. The language that will be used is python. As observed in the previous implementation, since Raspberry Pi is complicated and is difficult to work with, we are using 8051 microcontrollers so that it becomes easy to convert digital language into a binary one. The techniques implemented are blob detection and colour thresholding. The algorithm used here is viola jones algorithm. Additional feature that will be implemented is, our system will be able to detect fire and will take the required actions, also we are implementing this project using the python language. Speaking about the feasibility, since we are using OpenCV as the software, the entire cost of the project is minimised.

#### I. System Design



One of the most serious problems that take lots of attention during last decade is the massive increasing in number of vehicles, which leads to dramatically traffic congestion. Such problem in cities puts huge stress on various systems for decision making and infrastructure planning of many metropolitan areas. Therefore, traffic control becomes the main concern for different systems to overcome this gradual challenge as associated phenomena of the continuous growth of population and vehicles over inadequate road infrastructures. The conventional systems rely on using a static timer for traffic signal, but this solution has multiple limitations, as traffic signal changes its lights even there are no vehicles on the road, which causes fake jamming and waste time and resources. Thus, recent literatures show massive improvements of reducing traffic overcrowding through the usage of In signal node. In this paper, we assume each traffic signal alongside the road has multiple IoT sensors

### II. IMPLEMENTATION

Implementation is an important phase where the development of the proposed system is based on the decisions made previously in the design and system requirement phase.

We have divided our project into 3 modules.

- Web Cam module
- Aurdino based micro controller

#### III. LED indication

##### A.) Web Cam module:

- A webcam is that feeds or streams an image or video in real time. Webcams are typically small cameras that sit on a desk, attach to a user's monitor, or are built into the hardware. Webcams can be used during a video chat session involving two or more people, with conversations that include live audio and video. Here, Cam open in a window it



represents traffic status like occupied or unoccupied. This camera window detects the objects of vehicles and counts them and then when the image is detected the date and time when it was captured is also recorded.

#### B.) Arduino based micro controller:

- This module is used to identify the to simplify electronic design, prototyping and experimenting.
- It's designed to attach all kinds of sensors, LEDs, small motors and speakers, servos, etc. directly to these pins, which can read in or output digital or analog voltages between 0 and 5 volts.
- The Arduino connects to your computer via USB, where you program it in a simple language (C/C++, similar to Java) from inside the free Arduino IDE by uploading your compiled code to the board. Once programmed, the Arduino can run with the USB link back to your computer, or stand-alone

#### C.) LED indicator:

A light-emitting diode (LED) is a semiconductor diode that emits light when an electrical current is applied in the forward direction of the device, as in the simple LED circuit. LEDs are widely used as indicator lights on electronic devices and increasingly in higher power applications such as flashlights and area lighting. An LED is usually a small area light source, often with optics added to the chip to shape its radiation pattern and assist in reflection. The color of the emitted light depends on the composition and condition of the semi-conducting material used, and can be infrared, visible, or ultraviolet. Besides lighting, interesting applications include using UV-LEDs for sterilization of water and disinfection of devices, and as a grow light to enhance photosynthesis in plants.

### V. CONCLUSION:

An efficient density based traffic control system is simulated and implemented which provides a good traffic control mechanism without time wastage. It is also a much better way of detecting the presence of vehicles on the road since it makes use of image data. So it surely operates much better than systems which rely on the metal content of the vehicles to detect their presence. Image processing techniques overcome the limitations of all the traditional methods of traffic control. It eliminates the need for extra hardware and sensors. The use of multiple cameras will help to analyze and control traffic in a particular region. The proposed system outperforms the existing system in terms of accuracy and simplicity.

### VI. FUTURE ENHANCEMENT:

The weather conditions are not taken into account which may affect the image quality when it becomes foggy or in heavy rains. More advancements can be made to the proposed system to check identification of vehicles that pass through the system circle which could help in traffic surveillance. The present system uses a single camera for monitoring traffic at an intersection. By using a separate camera for each road at an intersection can improve the system efficiency further. The vehicle objects can also be categorized into various classes depending upon the geometrical shape of vehicle for blocking the passage of large vehicles e.g. trucks during day time. The emergency mode can be refined further by installing a GPS receiver in ambulance so that the base station will keep track of the ambulance location on a continuous basis and clear the road whenever will be required.

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