International Journal of Applied Engineering and Technology ISSN: 2277-212X (Online)
An Open Access Online International Journal Available at http://www.cibtech.org/jet.htm
2020 Vol. 10, pp.41-47/Aakash et al.
Research Article

SPEED CONTROL IN AUTOMOBILE'S USING LAB VIEW

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ABSTRACT
The speed control is the major technique used to reduce accidents. This paper represents control strategy for controlling the vehicles maximum speed in traffic lanes by calculating the traffic density in that particular area by using google maps. The traffic density is taken through Image processing. In google maps, density is shown on the basis of color. Based upon that traffic density, the maximum speed of the vehicle will be limited and the message will be shown in the display connected in the vehicle. This helps to reduce accidents due to rash driving in medium traffic lanes. By implementing this system in real time speed of the automobiles can be regulated in the defined range.

Keywords: *Google Maps, Traffic Density, Image processing, Speed control*

INTRODUCTION
For the past several decades' automobile industry have grown up to its peak for its ease and convenient services given to its customers and its demand will keep on increasing. But the part where this industry fails to its customer is safety to life. So we intend to provide a solution for this problem by constructing (Vehicle Speed Control Module) which has the capability of receiving the live speed limit data from GPS/GSM connected server and alter the maximum permissible speed allowed for a driver to drive, though this speed limit varies upon traffic and discipline of road. A webcam is used in order to take pictures of the roads where traffic is bound to occur. Number of vehicles in these images is calculated using image processing tools in Matlab and different timings are allocated according to the count along with a green signal for vehicles to go (Alessandri, *et al*., 1999). This paper was designed to develop a density based dynamic traffic signal control. The signal timing changes automatically by sensing the traffic density at the junction. The microcontroller used in the project is ARDUINO. This system contains IR sensors (transmitter and receiver) which will be mounted on either side of the road on poles. It gets activated and receives the signal by the vehicles passes close by its (Bhaskar and Yong, 2014) .The purpose of the research work is to design and apply LabVIEW in the area of traffic maintenance and, by introducing improvements in the smart city. The objective is to introduce the automated human–machine interface a computer-based graphical user interface for measuring the traffic flow and detecting faults in pole (Chen *et al*., 2017*)*. From this article, we explore the possibility of using only the built-in sensors of off-the-shelf smartphones for traffic density estimation (Aqeel and Wadee, 2017). This paper develops the brushless dc motor (BLDCM) sensor less control strategy for a high-speed blower. The nonlinear offline compensator is used to compensate for the phase delay of the back electromotive force due to a low-pass filter; the phase voltage comparator is used to compensate for variations of the phase due to changes in the load, calculation error and unbalance of three-phase motor stator. The commutation mode based on the transition between by detecting the total delay angle, the process of start-up and the anti-disturbance capability are described in detail (Gomes and Horowitz, 2006). In this paper, we discuss and address the issue of detecting vehicle / traffic data from video frames and various researches have been done in this area and many methods have been implemented, still this area has space for improvements. It is proposed to develop a unique algorithm for vehicle data recognition and tracking using Gaussian mixture model and blob detection methods. We differentiate the foreground from background in frames by learning the background. Here, foreground detector detects the object and a binary computation is done to define rectangular regions around every detected object. To detect the moving object correctly and to remove the noise some morphological operations have been applied. Then the final counting is done by tracking the

detected objects and their regions. The results are encouraging and we got more than 91% of average accuracy in detection and tracking using the Gaussian Mixture Model and Blob Detection methods (Hegyi *et al*., 2002).

METHODOLOGY

To get the live traffic density, the system takes the density value in the form of image. For the process to be carried the system undergoes the image process algorithm in LabVIEW. The colour of the image is acquired based upon that maximum speed of the vehicle is adjusted. Digital Image Processing is the processing of digital image by means of a digital computer. It uses computer algorithms, to get enhanced image to extract few useful information. This algorithm consists of the following steps:

- Image acquisition
- Analysing and manipulating the image;
- The result in the output can be altered image or a report which is based on that image.

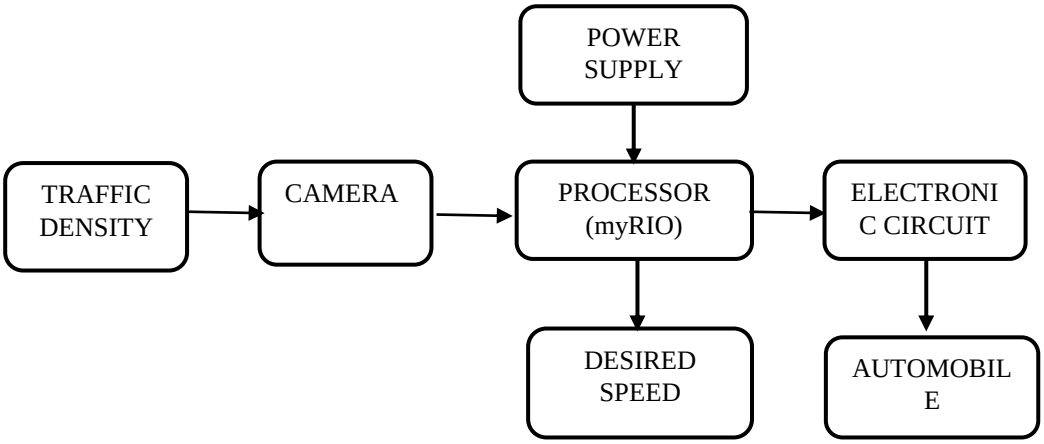


Figure1: BLOCK DIAGRAM

Traffic density is taken from google maps. Google Maps, web mapping service developed by Google. This offers satellite image, aerial photos, street maps, Street View, real-time traffic conditions, and route planning for traveling by foot, car, bicycle and air, or public transportation. The satellite view available via Google Maps is created through collaboration with Google Earth, depending on images from third-party satellites to be stitched into the mainframe to provide high-resolution photographs of the world taken from above. Google Maps asks for the location data on your phone.

Working of Google Mapsuses combination of location and service. Location method to identify a user was actually developed by Google maps, to know what service area you are in and to notify the traffic conditions of that place. GPS and GSM are used. GSM is used to identify a user, it was actually developed by cell carriers to know what service area you are in, so that they can charge you for Roaming services. The SIM nearest to the tower will have high reception comparing to the farthest.

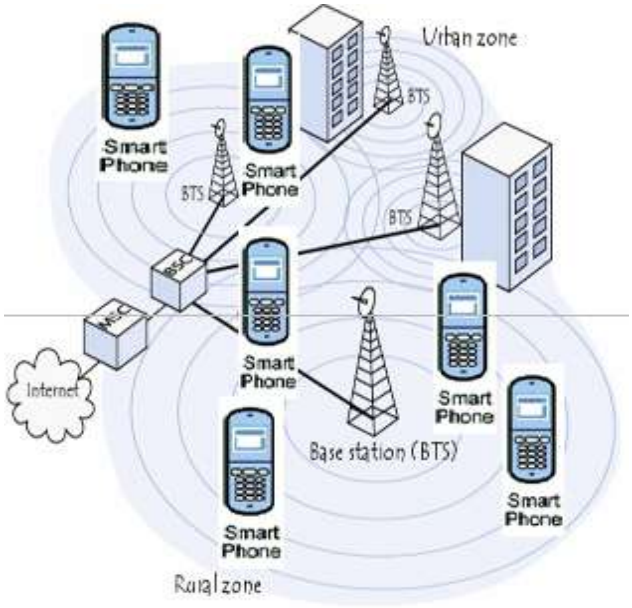


Figure 2: GSM in Google Maps

It shows traffic density in the form of different colours. Colours like Red, Orange and Blue for various traffic densities.

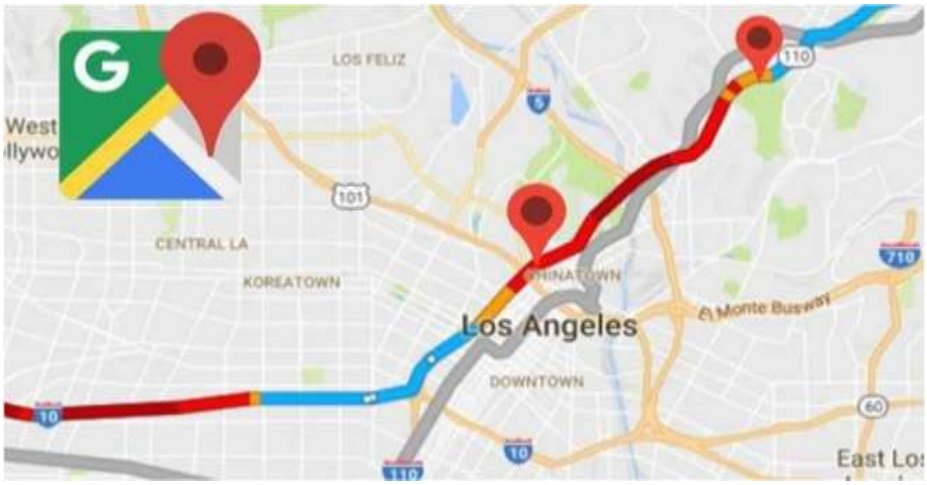


Figure 3: Pictorial Representation of Traffic Density

Figure 4: Color in Google Maps

S.NO	COLOR	TRAFFIC DENSITY
1	BLUE	LOW
2	ORANGE	MODERATE
3	RED	HIGH

The image is taken through camera from the google maps and the values is given to myRIO. The myRIO acts as the interfacing device. The software used is LabVIEW. It controls the maximum speed of the vehicle according to the color coding. myRIO acts as the microcontroller for controlling the speed of the vehicle. Image is taken through image processing.Image processing is done through LabVIEW. Laboratory Virtual Instrument Engineering Workbench is a system program design platform and development environment for a visual programming.

The graphical programming language is named "G"; not to be confused with. It is released for the Apple Macintosh in 1986,commonly used for acquisition, instrument, and industrial automation on a variety of operating systems (OSs),like Microsoft Windows, various versions of Unix, Linux, and macOS.

Image processing in LabVIEW is done through the following steps. Image type, File path, Image and Color Spectrum are taken for image processing. There are different kind of images such as Greyscale, RGB, HSL and Complex in that the image type needs to be chosen according to the image which gets processed. In the image block the live image was taken by the camera. Based upon the color spectrum value which is stored in the array the respective Boolean glows. In the rectangle block the value are specified to get the particular image.

As the Boolean glows the values are given to the case structure where the maximum speeds are given based on density. The speed is controlled with the help of pulse width modulation. Generally the output from my RIO is 3.3v for a duty cycle. In programming the PWM value is reduced that is duty cycle is reduced. The voltage decreases as duty cycle reduces. The speed will be reduced as it is directly proportional to voltage.

Pulse width modulation or pulse-duration modulation , is a method of reducing the average power delivered by an electrical signal, by effectively chopping it up into discrete parts. The Boolean indicator is changed into local variable, depending upon the color of the Boolean the Pulse width modulation is changed and then it will give to the myRIO according to that speed of the vehicle is adjusted.

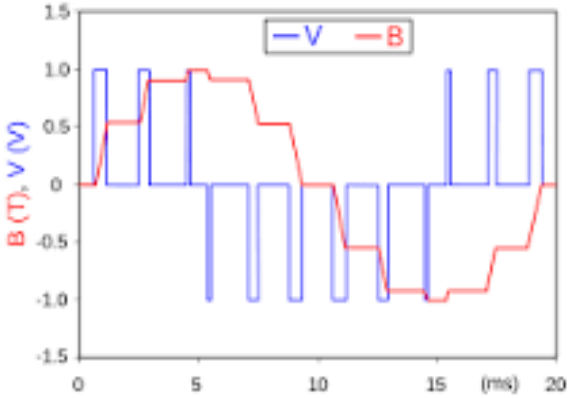


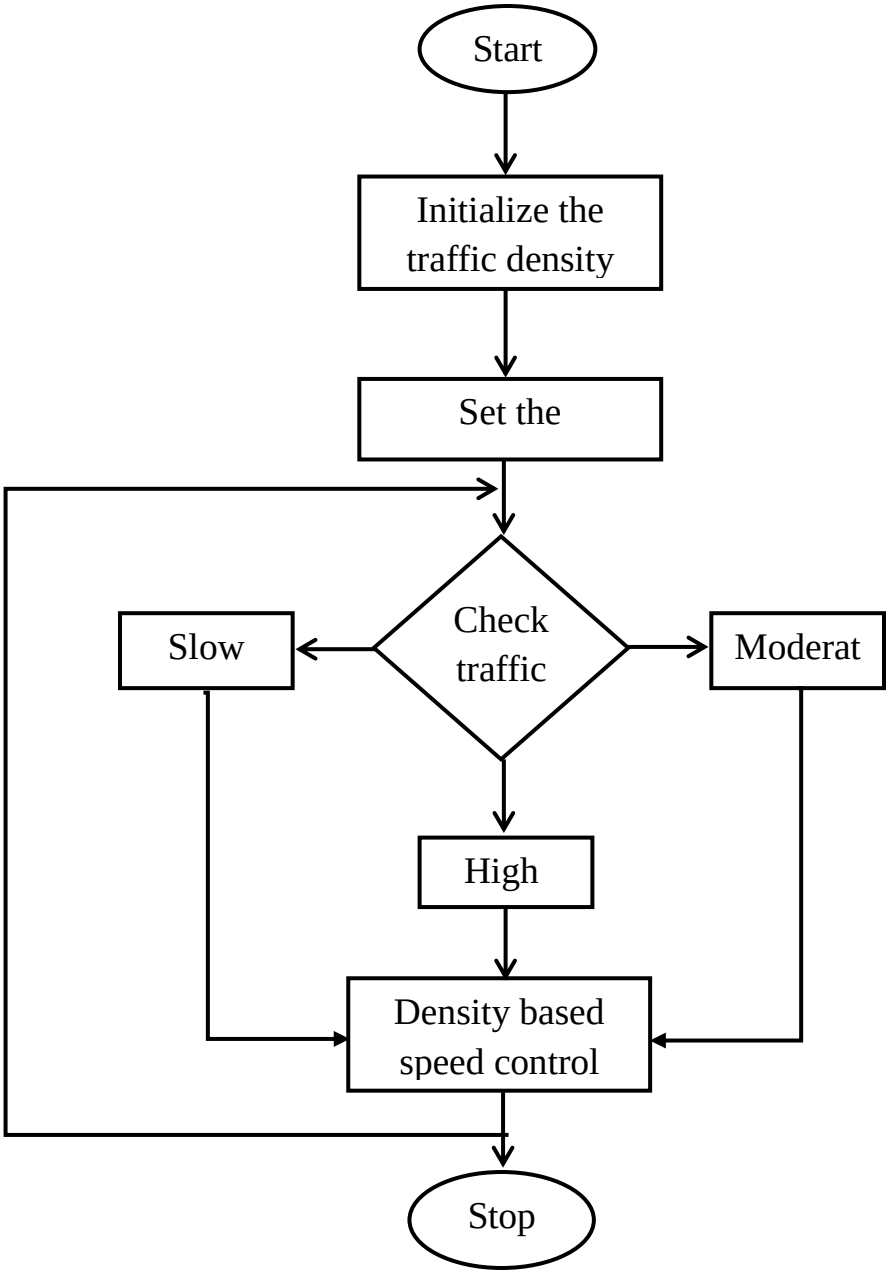
Figure 5: PWM Diagram

MyRIO can generate the voltage only up to 3.3 to 5V. But that voltage is not enough for the working prototype so the amplification process is taken for better efficiency. Here the MOSFET TIP120G is used for the amplification process.

SYSTEM IMPLEMENTATION

As the system gets started it initializes the traffic density in terms of colors from starting point to destination. The system checks the traffic based on the low, moderate, high levels. The economy speed is adjusted for medium traffic, 30kmph for high traffic and 70kmph for low traffic. These speed are for the application of the system in practical. For prototype the speed is adjusted based upon the PWM duty cycle. One duty cycle for high traffic, 0.75 for medium traffic and 0.5 for low traffic.

Figure 6: MOSFET TIP120G



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SIMULATION AND RESULTS

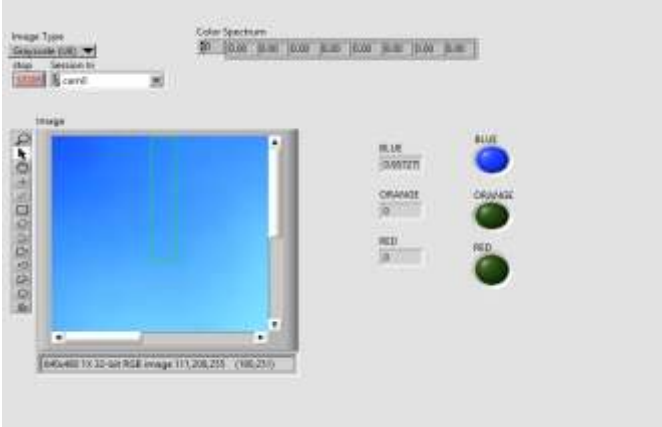


Figure 7: Front Panel for Blue color

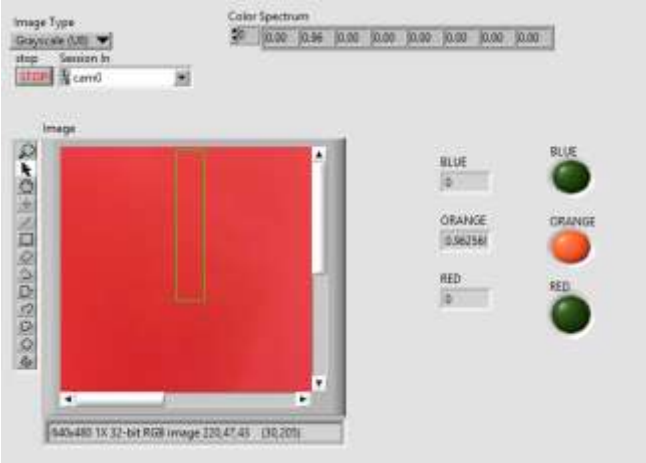


Figure 8 : Front Panel for Orange color

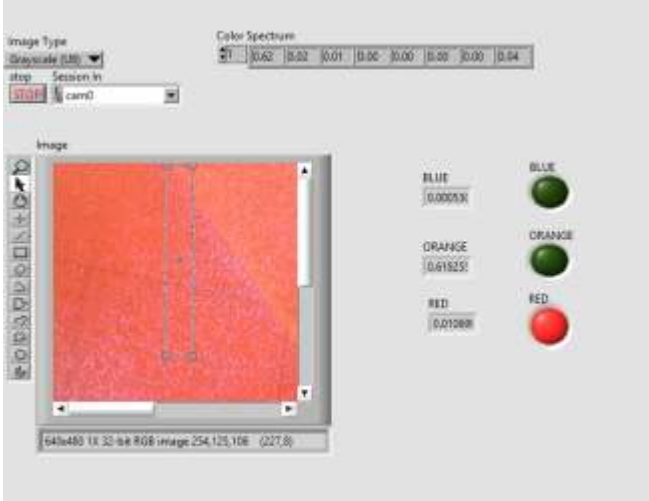
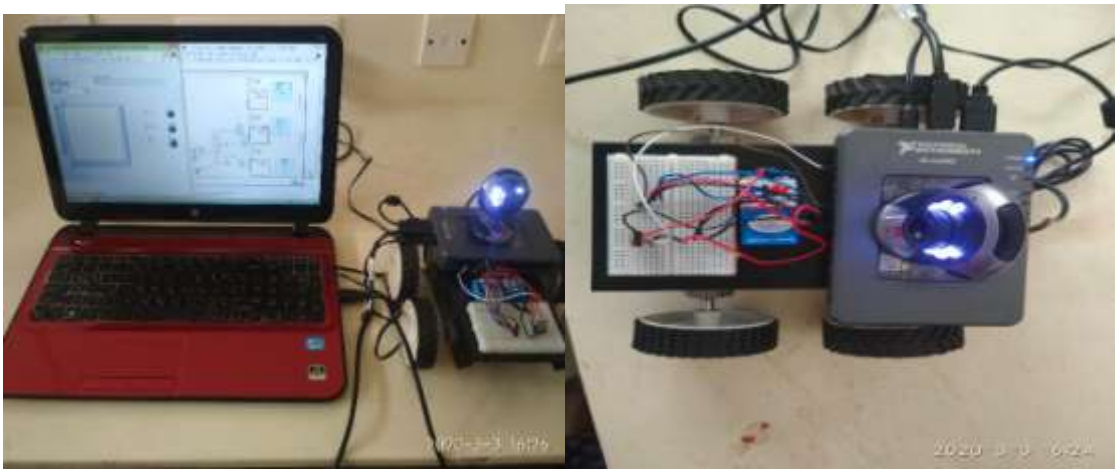


Figure 9: Front Panel for Red color

The above front panel shows the execution of our project. The camera captures the intensity of the current traffic in the desired path. The captured image is processed using image acquisition palette to acquire the spectral values. Depends on the color, the spectral value differs and based on that the program is designed.In this project we have used the three colors such as blue, orange and red, since the traffic density is denoted only by these three colors. The blue indicates the minimal traffic and the speed is set at maximum. If the speed is moderate it denoted as orange color and the speed is limited to the desired level. If the speed is high then it is denoted as red color and the speed is set to minimal to avoid rash driving in heavy traffic lanes.

HARDWARE



CONCLUSION

From this project, the traffic have been controlled by analysing the traffic density in the particular lane using image processing in LabVIEW. The traffic density is taken from the Google Maps. By the real time traffic condition the speed of each vehicle is optimized based on the color, which is from Google Maps. Ultimately, this would prevent the accidents by forbidding the speed over limit.

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