International Journal of Advances in Engineering and Management (IJAEM)
Volume 2, Issue 4, pp: 710-713 www.ijaem.net ISSN: 2395-5252

Intelligence Traffic Monitoring Using Image Processing

[1]Jagadish D, [2]Karthik R Gowda, [3]Suraj Ratnakar Naik, [4]Veeresh., [5]Dr. Jose Alex Mathew

[1][2][3][4]4th year BE, [5] Assistant Professor
[1][2][3][4][5]Electricals and Electronics Engineering, Srinivas Institute of Technology, Valachil, Mangalore
Corresponding author: Jagadish D

Date of Submission: 02-08-2020 Date of Acceptance: 20-08-2020

ABSTRACT: Traffic is the major problem which every country faces because of the increase in number of vehicles throughout the world, particularly in large urban areas. As the problem of urban traffic congestion spreads & occurrence of road accidents increase, there is a pressing need for the introduction of advanced technology and equipment to improve the traffic control algorithms to better accommodate this increasing demand. The simplest way for controlling a traffic light is using timer for each phase. Another way is to use electronic sensors in order to detect vehicles, and produce signal that cycles. In this paper we propose a system for controlling the traffic light by image processing. The system will detect vehicles through images instead of using electronic sensors embedded in the pavement. A camera will be installed alongside the traffic light. It will capture image sequences. The image sequence will then be analyzed using digital image processing for vehicle detection, and according to traffic conditions on the road, traffic light can be controlled.

Index terms: Traffic light control

I. INTRODUCTION

As the populace of the modern-day cities is growing day with the aid of day due to which vehicular tour is increasing which lead to congestion problem. Traffic congestion has been inflicting many critical troubles and challenges in the important and most populated cities. Due to this site visitors congestion there is greater wastage of time. The consistent enlarge in the quantity of vehicles on the street has amplified the significance of managing site visitors drift efficiently to optimize utilization of current road capacity. High gas value and environmental worries also furnish necessary incentives for minimizing traffic delays. Road accident is any other principal problem in contemporary world. If we have a look at severely the motives of street accidents, we found that slender roads and speedy increase of potential of transport are the major motives at the back of growing variety of road accidents.

Traffic Rules & Laws, Road Signs and Traffic Control Systems are used to solve the previously mentioned traffic problems. Traffic laws are the laws which govern traffic and regulate vehicles, while rules of the road are both the laws and the informal rules that may have developed over time to facilitate the orderly and timely flow of traffic. Traffic signs or road signs are signs erected at the side of roads to provide information to road users.

II. OBJECTIVE

- To develop an integrated traffic light control system based on image processing to calculate the density of vehicle on the road and set the timer
- To select the appropriate image enhancement and edge detection techniques useful for the vehicle detection & density computation
- To implement the image processing techniques & simulate the result
- To integrate the image processing part with the traffic light system & stepper motor

III. REQUIREMENTS

A. Hardware

1) Raspberry Pi 3 2) Webcam 3) IR sensor 4) Laptop

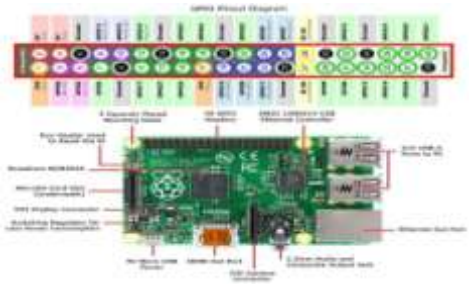
B. Software

1) Python 2) Open CV

C. Hardware Implimentation

1) Raspberry Pi 3:

International Journal of Advances in Engineering and Management (IJAEM)
Volume 2, Issue 4, pp: 710-713 www.ijaem.net ISSN: 2395-5252



The Raspberry Pi is a credit card sized single-board computer with an open-source platform that has a thriving community of its own, similar to that of the audio. It can be used in various types of projects from beginners learning how to code to hobbyists designing home automation systems.There are a few versions of the Raspberry Pi, but the latest version, has improved upon its predecessor in terms of both form and functionality.

Features of Raspberry Pi Model 3 B:

2) Webcam: A webcam is a video camera that feeds or streams its image in real time to or through a computer to a computer network. When "captured" by the computer, the video stream may be saved, viewed or sent on to other networks via systems such as the internet, and emailed as an attachment. When sent to a remote location, the video stream may be saved, viewed or on sent there. Unlike an IP camera (which connects using Ethernet or Wi-Fi), a webcam is generally connected by a USB cable, or similar cable, or built into computer hardware, such as laptops.

IR Sensor: The ambulance carries an IR transmitter and IR receiver will be there some few meter before the signal. The receiver will receive the signal and the module will send the command turn on green through the RF and every traffic post will have an RF receiver. So whenever the ambulance comes near the traffic, the ambulance will transmit a code say emergency the receiver will receive this signal .Then it immediately switch off the other signals that is it make all the signals red and later make this particular direction signal green. IR Sensors LM358 is used.

D. Software Implementation

1)Python: Python is a powerful modern computer programming language. It bears some similarities to Fortran, one of the earliest programming languages, but it is much more powerful than Fortran. Python allows you to use variables without declaring them (i.e., it determines types implicitly), and it relies on indentation as a control structure. You are not forced to define classes in Python (unlike Java) but you are free to do so when convenient. Python was developed by Guido van Rossum, and it is free software. Free as in "free beer," in that you can obtain Python without spending any money. But Python is also free in other important ways, for example you are free to copy it as many times as you like, and free to study the source code, and make changes to it. There is a worldwide movement behind the idea of free software, initiated in 1983 by Richard Stallman. Like shell scripts, Python can automate tasks like batch renaming and moving large amounts of files. It can be used just like a command line with IDLE, Python's REPL (read, eval, print, loop) function. However, there are more useful things you can do with Python. For example, you can use Python to program things like:

a)Web applications

b) Desktop applications and utilities
c) Special GUIs
d) Small databases
e) 2D games

Python also has a large collection of libraries, which speeds up the development process. There are libraries for everything you can think of – game programming, rendering graphics, GUI interfaces, web frameworks, and scientific computing. Many (but not all) of the things you can do in C can be done in Python. Python is generally slower at computations than C, but its ease of use makes Python an ideal language for prototyping programs and designing applications that aren't computationally intensive.

2)Open CV:Open CV Stands for Open computer vision it is source library of functions. is released under a BSD license and hence it's free for both academic and commercial use. It has C++, Python and Java interfaces and supports Windows, Linux, Mac OS, iOS and Android. OpenCV was designed for computational efficiency and with a strong focus on real-time applications. Written in optimized C/C++, the library can take advantage of multi-core processing. Enabled with OpenCL, it can take advantage of the hardware acceleration of the underlying heterogeneous compute platform. Adopted all around the world, OpenCV has more than 47 thousand people of user community and estimated number of downloads exceeding 14 million. Usage ranges from interactive art, to

International Journal of Advances in Engineering and Management (IJAEM)
Volume 2, Issue 4, pp: 710-713 www.ijaem.net ISSN: 2395-5252

mines inspection, stitching maps on the web or through advanced robotics.

IV. METHODOLOGY

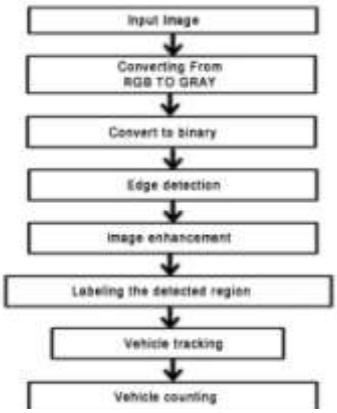


Image Processing

The Block diagram below gives an overview of how traffic will be controlled using image processing. Various boxes in Block diagram are explained below:

1) Image Acquisition: Generally an image is a two-dimensional function f(x,y) (here x and y are plane coordinates).The amplitude of image at any point say f is called intensity of the image. It is also called the gray level of image at that point. We need to convert these x and y values to finite discrete values to form a digital image. Each digital image composed of a finite elements and each finite element is called a pixel.

2) Formation of Image: We have some conditions for forming an image f(x, y) as values of image are proportional to energy radiated by a physical source. So f(x, y) must be nonzero and finite. i.e. $0<f(x, y) < \infty$.

3) Image Resizing/Scaling: Image scaling occurs in all digital photos at some stage whether this be in Bayer demosaicing or in photo enlargement. It happens anytime you resize your image from one pixel grid to another. Image resizing is necessary when you need to increase or decrease the total number of pixels. Even if the same image resize is performed, the result can vary significantly depending on the algorithm.

4) RGB to GRAY Conversion: color images are often stored as three separate image matrices; one storing the amount of red (R) in each pixel, one the amount of green (G) and one the amount of blue (B). We call such colour images as stored in an RGB format. In gray scale images, however, we do not differentiate how much we emit of different colours, we emit the same amount in every channel. We will be able to differentiate the total amount of emitted light for each pixel

5) Image Enhancement : Image enhancement is the process of adjusting digital images so that the results are more suitable for display or further analysis. 6) Edge Detection: Edge detection is the name for a set of mathematical methods which aim at identifying points in a digital image at which the image brightness changes sharply or, more technically, has discontinuities or noise. The points at which image brightness alters sharply are typically organized into a set of curved line segments termed edges. 7) Image Matching: We have used a totally different approach for image matching. Comparing a reference image with the real time image pixel by pixel..

V. RESULTS

VI. CONCLUSION

"Traffic control using image processing" technique that we propose overcomes 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. The technique we proposed avoids this problem. Upon comparison of various edge detection algorithms, it was inferred that Canny Edge Detector technique is the most efficient one. The project demonstrates that image processing is a far more efficient method of traffic control as compared to traditional techniques. Also it is more effective than the density based system based on since it is cost effective and less prone to error. The use of our technique removes the need for extra hardware such as sound sensors & magnetic loop

embedded in pavements. The major advantage is the variation in signal time which control appropriate traffic density using Image matching. The accuracy in calculation of time due to single moving camera depends on the registration position while facing road every time.

FUTURE SCOPE

The focus shall be to implement the controller using DSP as it can avoid heavy investment in industrial control computer while obtaining improved computational power and optimized system structure. The hardware implementation would enable the project to be used in real-time practical conditions.

REFERENCE

[1]. N. J. Ferrier, S. M. Rowe, A. Blake, "Real-time traffic monitoring," Proceedings of the Second IEEE Workshop on Applications of Computer Vision, pp.81 -88, 1994.

[2]. V. Kastrinaki, M. Zervakis, and K. Kalaitzakis, "A survey of video processing techniques for traffic applications, "Image and Vision Computing, vol. 21, pp. 359-381, Apr 1 2003.

[3]. Choudekar P, Banerjee S, Muju M.K, "Implementation of image processing in real time traffic light control" International Conference on Electronics Computer Technology, vol.2, pp.94 -98, 2011.

[4]. Digital image processing by Rafael C. Gonzalez and Richard E. Woods.

[5]. Traffic light control system simulation through vehicle detection using image processing By Mac Michael B. Reyes and Dr Eliezer A. Albaccea

[6]. Ms.PromilaSinhmar, "Intelligent Traffic Light and Density Control using IR Sensors and Microcontroller", International Journal of Advanced Technology & Engineering Research (IJATER) ISSN NO: 2250-3536 VOLUME 2, ISSUE 2, March 2012.

[7]. Ahmed S. Salama, Bahaa K. Saleh, Mohamad M. Eassa, "Intelligent Cross Road Traffic Management System (ICRTMS)," 2nd Int. Conf. on Computer Technology and Development, Cairo, Nov 2010, pp. 27-31.