A REVIEW - AN INTELLIGENT TRAFFIC LIGHT CONTROLLING SYSTEM

Dhruv A. Trivedi[1], Sugam P. Thakkar[2], Yash G. Patel[3], Arpan A. Patel[4]

[1] *Research Scholar, Department of Civil Engineering, L.D.C.E, Ahmedabad.*
[2] *Research Scholar, Department of Civil Engineering, L.D.C.E, Ahmedabad.*
[3] *Research Scholar, Department of Civil Engineering, LJIET, Ahmedabad.*
[4] *Research Scholar, Department of Civil Engineering, Aditya Silver Oak, Ahmedabad.*

ABSTRACT

Traffic control is a big problem today. Traffic management in India is also a tough job, and manual operations alone can not prevent this kind of problem, so machines are needed. We need a system that can handle such situations effectively. Today, traffic control systems can handle such situations, but they are not very effective because they are actually static. Because we need an essentially dynamic system, we can handle traffic smoothly and require systems such as the Intelligent Traffic Control System. In this project, we are creating the same dynamic traffic control system with the ability to avoid traffic congestion and traffic control. This project handles traffic through image processing. Some traffic control approaches solve the problem of reducing traffic congestion. Adjust the traffic lights so you can change the direction of your car. This project consists of a webcam, processor and LCD display installed at each intersection. Here, each intersection and traffic light acts like a social insect. Today's traffic control systems are based on microcontrollers and microprocessors. This has a number of predefined structures that can not be handled by real-time situations. The fuzzy logic control traffic system is described in 1995. The fuzzy logic controller follows the same schedule pattern. Vehicle detection systems can be used to manage traffic control performance. Different types of image processing algorithms can be used to detect vehicles based on the ability to switch traffic lights.

Keyword - *Intelligent Traffic Light Controller, (TLC).*

1. INTRODUCTION

A Road transport in India is the nation's most widely used means of transport, with a growing number of vehicles and an increasing number of road users. Metro cities such as Delhi and Mumbai are facing problems such as road jams, and problems such as congestion require sorting and it is not possible to work with predefined programs instead of real-time data. Unfortunately, such traffic is present and can not handle the number of cars on the road as a result, and it also causes congestion in most parts of our city.

However, there are many other ways to improve existing systems. As the number of road users increases rapidly, we are introducing automated and intelligent methods to control road vehicles and infrastructures. Resources provided by current infrastructures are limited to introducing intelligent traffic signal control systems and will be critical in the near future. A key aspect of this white paper is the design of intelligent systems that use image processing to control traffic lights. This prevents traffic from flowing and congestion. The system first measures the traffic density on different signals, and therefore changes the time delay for traffic lights on the side of many traffic, resulting in a green light signal. Finally, it also communicates with neighboring intersections. Traffic is important in today's times. These transportation methods require a traffic management system that can understand the traffic situation in order to increase traffic volume and reduce traffic volume. You can change the control method according to the situation. These systems reduce traffic without affecting the transportation system. In this paper, we will create a system that can make dynamic decisions such as giving a new perspective to the traffic control system and changing the times such as red, green and amber.

2. LITERATURE REVIEW

Collisions at traffic lights or at intersections are important road problems. There are millions of traffic light signals in India to control traffic in India. However, congestion can not be handled sufficiently. The International Road Federation (IRF) has estimated that a $ 2 billion (INR / trillion) annual traffic disruption request in India was installed in London in 1868. Major minor changes have been made since 1868. However, static behavior can not handle the demands of the situation. Since traffic control plays an important role in our lives, many articles and research are published to solve traffic problems. Some of these articles say: Robert A. Sowah designed and implemented a suitable microcontroller-based traffic light control system. Developed systems can handle whether an officer has traffic control. Yong Cao, Zaiqing Nie has published a paper on designing an intelligent traffic light controller using an embedded system. In this article, the predefined time schedules have been removed to reduce the static behavior of the system. They also provide a GSM mobile phone interface that allows people to easily get information about traffic. This paper uses sensor networks and embedded systems.

Intelligent traffic light control systems also use traditional optical signals of red, amber, and green. The vehicle stops using a red signal. The amber traffic light indicates the green signal used to indicate that the vehicle can advance and the ready status for additional stops.

The system processes the data in image format based on the signal light being finally controlled. As part of the investigation, all intersections of the karvenagar Area are selected for the case study. At this junction, the essence of a road is like having four major roads and some roads. This property intersects the intersection in four directions. When you visit the intersection, there appear to be four scenarios where traffic lights control. This traffic signal system is the same at many intersections and is used to control traffic at most intersections in the Carbaghara region. You cannot change the status of a fixed traffic light, but you can dynamically control it using background differentiation techniques. In this way, we can assign more priorities to road segments with higher queue lengths. Our base paper uses the 16F877 microcontroller because it has a high clock speed, but we avoid the use of microcontrollers throughout the system. The headache that needs to be maintained in the hardware part is easily extracted.

2.1 HOW INTERFACING IS DONE BETWEEN IMAGE PROCESSING ANALYSIS AND TRAFFIC CONTROL SYSTEM

The camera stays at the top of the traffic light to capture video. In our video, all of our processing algorithms require image frames as input, so images are extracted. This image is then sent to the processing unit. This processing unit is on the server. Information about the processing sent over the Internet as shown in the diagram. The information that the server receives as an image then flows through all the algorithms. Frame grabbing, gray scaling, blurring, image subtraction, thresholding, BLOB detection, BLOB tracking, and last logging are stored in the database. Based on this information, the signal is updated with a change in the time clock.

3 SYSTEM IMPLEMENTATION

Gray Scaling: When an image comes to the server for processing, it is 24 bits. Grayscaling converts these images to 8-bit images. For example, an image came in for processing, and RGB should be separated into red, green, and blue. Each pixel in the image is scanned and each pixel contains an RGB value. When blurred, the value is extracted and a grayscale image appears. After extracting the values of red, green and blue, divide by 3 and the result is the position for each processed pixel. Likewise, all pixels are processed. The following snapshot shows the grayscale effect. For the case study, we think that all images are images with penguins instead of traffic images.

Fig 1: Before Grey Scaling

Fig 2: After Grey Scaling

Blurring: The results of Gray Scaling appear blurry. When blurred, the image is blurred. It uses very basic matrix logic. While processing the image, it takes the blue value and the red and green values of each pixel. Then divide this value by 25 if the considered matrix is 5 x 5. This will result in the same calculated value for all pixels.

Fig 3: After Blurring

Thresholding: Thresholding converts an 8-bit image into a 1-bit image. It is a perfect black and white image. A pixel with a value less than 128 is converted to a black logical 0, and a pixel with a value greater than 128 is converted to a white logical 1. Likewise, all pixels for the image are processed..

Fig 4: After Thresholding

Drop detection: After running a threshold, you can easily detect the vehicle in the image. Blob detection uses vector logic to find a continuous vehicle as a blob. It scans pixel by pixel and if two pixel coordinates match somewhere, these two pixels are added to the same vector or array using coordinates to detect the blob. Each vector represents a complete blot in the image. Direction detection: If the stain is easily detected, you must track it to detect the direction. It was used to track which direction the car is heading.

Travel Records: It is also important to keep track of your traffic after you have tracked your vehicle. Therefore, the traffic log calculates the number of vehicle activities. Signal time update: Finally the data or information came from the signal processing, given the time to burn each light. If there is a lot of traffic, if there is a lane, a long green light is on to avoid congestion.

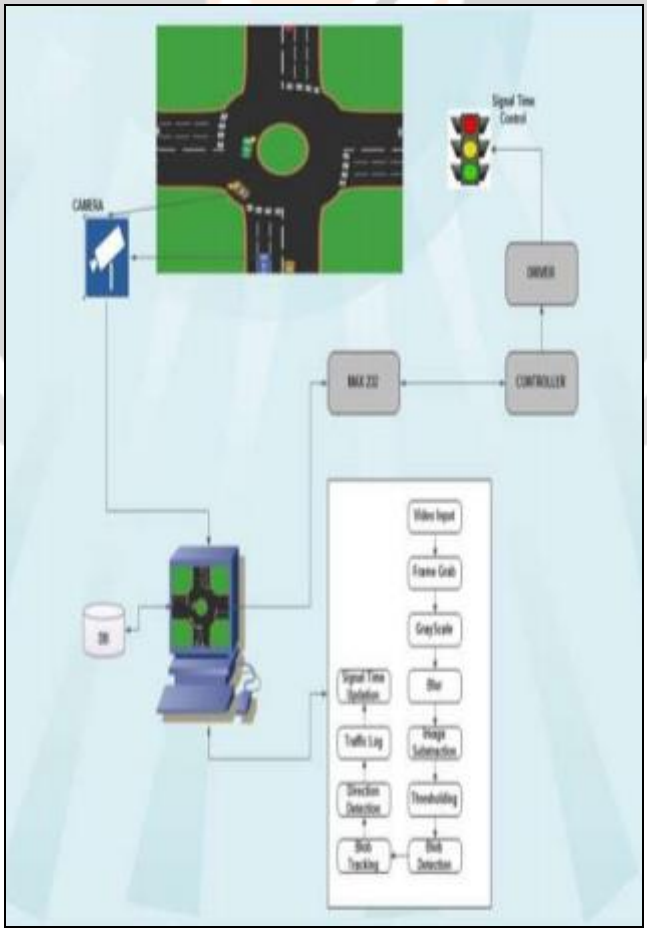

Fig 5: System Architecture

4. CONCLUSIONS

Intelligent traffic light control systems using image processing can handle real-time data and minimize congestion on the road. Images contain real-time data, which is selected by performing image processing techniques. This data is controlled without using a microcontroller as inputs to the system and traffic lights. It provides the best way to control traffic in the rapidly growing countries.

5. REFERENCES

[1]. Sarpong Kwadwo Asare and Robert A. Sowah , "Design and development of a Microcontroller Based Traffic Light Control System Using Image Processing Techniques". 2012 (year should be at the end)IEEE 4th International Conference on Adaptive Science & Technology(ICAST)
[2]. Chunyu Yang, Yong Cao, Zaiqing Nie, Jie Zhou, Ji-Rong Wen, "Design Of Intelligent Traffic Light Controller Using Embedded System" second International Conference on Emerging and Technology, ICETET-2012.
[3]. Jin Zhou, C.L. Philip Chen, Long Chen, "A Small-scale Traffic Monitoring System in Urban Wireless Sensor Networks" 2013 IEEE International Conference in System, Man, and Cybernetics
[4]. Imane L'hadi, Marwa Rifai, Yassine Salih Alj, "An Energy-Efficient WSN-based Traffic Safety System" 2014 5th International Conference on Information and Communication Systems (ICICS).
[5]. Zahra Zamani, Mohammad Hossein Saraee, Mahmoud Pourmand, "Application of Data Mining in Traffic Management: Case of city Isfahan", 2010 2nd International Conference on Electronic Computer Technology (ICECT 2010)
[6] Sri Krisna Endarnoto, Sonny Pradipta, Anto Satriyo Nugroho, James Purnama, "Traffic Condition Information Extraction & Visualization From Social Media Twitter for Android Mobile Application", 2011 International Conference on Electrical Engineering and Informatics 17- 19 july 2011.
[7] Jaywant Kamble, Pratik Kothawade, Abhijeet Kumbhar, prof. Rajani P.K. ,"Traffic Control System Using Image Processing", International Journa of Emerging Trends in Electrical and Electronics
[8] W. Wen, "A dynamic and automatic traffic light control expert system for solving the road congestion problem", Expert System with Application 34(2008) 2370-2381(not necessary to write down)
[9] R. Nithin Goutham, J. Sharon Roza, M.Santosh, "Intelligent Traffic Signal Control System", International Journal of Research in Electrical, Electronics and Instrumentation Engineering, may 2014.
[10] Vishakha S. Thakare, Snehal R. Jadhav, Sananaj G.Sayyed, Poonam V. Pawar, "Design of Smart Traffic Light Controller Using Embedded Systems" ,IOSR Journal of Computer Engineering(IOSR-JCE) Apr.2013