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Smart Traffic Control System Using Time Management

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***Abstract*— An automated Raspberry Pi based traffic control system using sensors along with live web updates can be a helpful step in optimizing the traffic flow pattern in busy intersections. This intuitive design of the transport infrastructure can help alleviate the traffic congestion problem in crowded cities. This system describes a system where photoelectric sensors are integrated with the Raspberry Pi to operate the lanes of an intersection based on the density of traffic. The current condition of the intersection is updated on a user accessible website. In this system, we will use photoelectric sensors to measure the traffic density. We have to mount four photoelectric sensors for each road; the distance between these sensors will depend on nature of traffic on a particular junction. These sensors will sense the traffic on that particular road. As a result, the improvement in traffic system can be incrementally enhanced, which can lead to eventually significant improvement in the overall traffic system.**

Keywords— ***smart traffic control system; Raspberry pi; photoeletric sensor; traffic congestion.***

I. INTRODUCTION

In modern life we have to face with many problems one of which is traffic congestion becoming more serious day after day. It is said that the high volume of vehicles, the inadequate infrastructure and the irrational distribution of the development are main reasons for increasing traffic jam. The major cause leading to traffic congestion is the high number of vehicle which was caused by the population and the development of economy. Traffic congestion is a condition on road networks that occurs as use increases, and is characterized by slower speeds, longer trip times, and increased vehicular queuing. The most common example is the physical use of roads by vehicles. When traffic demand is great enough that the interaction between vehicles slows the speed of the traffic stream, these results in some congestion.

As demand approaches the capacity of a road (or of the intersections along the road), extreme traffic congestion sets in. When vehicles are fully stopped for periods of time, this is colloquially known as a traffic jam or traffic snarl-up. Traffic congestion can lead to drivers becoming frustrated and engaging in road rage. In order to avoid the congestion in the traffic. In traffic environments, Traffic Sign Recognition (TSR) is used to regulate traffic signs, warn the driver, and command or prohibit certain actions. A fast real-time and robust automatic traffic sign detection and recognition can support and disburden the driver, and thus, significantly increase driving safety and comfort.

Generally, traffic signs provide the driver various information for safe and efficient navigation Automatic recognition of traffic signs is, therefore, important for automated intelligent driving vehicle or driver assistance systems. However, identification of traffic signs with respect to various natural background viewing conditions still remains challenging tasks. Real time automatic vision based traffic light control has been recently the interest of many researchers, due to the frequent traffic jams at major junctions and its resulting wastage of time. Instead of depending on information generated by costly sensors, economic situation calls for using available video cameras in an efficient way for effective traffic congestion estimation. Researchers may focus on one or more of these tasks, and they may also choose different measures for traffic structure or add measures.

For more comprehensive review on vision based traffic light control Due to the massive growth in urbanization and traffic congestion, intelligent vision based traffic light controller is needed to reduce the traffic delay and travel time especially in developing countries as the current automatic time based control is not realistic while sensor based traffic light controller is not reliable in developing countries. Traffic congestion is now considered to be one of the biggest problems in the urban environments. Traffic problems will be also much more widely increasing as an expected result of the growing number of transportation means and current low-quality infrastructure of the roads. In addition, many studies and statistics were generated in developing countries that proved that most of the road accidents are because of the very narrow roads and because of the destructive increase in the transportation means.

A Raspberry Pi microcomputer and multiple ultrasonic sensors are used in each lane to calculate the density of traffic and operate the lane based on that calculation. This idea of controlling the traffic light efficiently in real time has attracted many researchers to work in this field with the goal of creating automatic tool that can estimate the traffic congestion and based on this Variable, the traffic sign time interval is forecasted.

II. WORKING

In this proposed system supply given to the step-down transformer. The output of the transformer is connected to the input to the full wave bridge rectifier. The output of bridge rectifier is given to the Regulator. The output of regulator gives +5 positive supply which is given to the whole electronic component of the system. The Raspberry Pi uses this information to set the signal timer according to the level of traffic.

III. BLOCK DIAGRAM

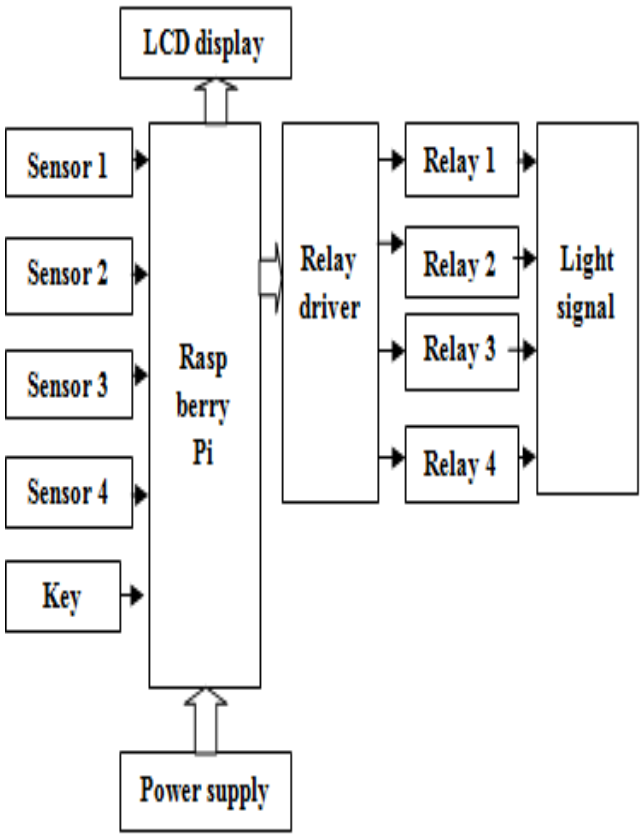


Fig. 1 Block Diagram

16*2 alpha-numeric LCD display is used which shows the real time information about Traffic signal. Here use to four sensor when any sensor sense then this signal go to the Raspberry pi and Raspberry pi output go the relay driver and relay is ON at that time LED is ON and also LCD display the time.

IV. SYSTEM DESIGN

Fig. shows the overall design of the system. In this intersection, each outgoing lane has four photoelectric sensors that calculate and report the traffic conditions of each lane to the Raspberry Pi. The Raspberry Pi uses this information to set the signal timer according to the level of traffic.

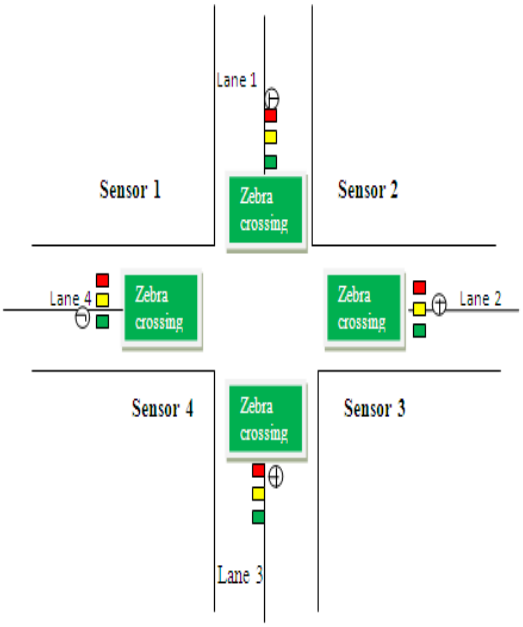


Fig. 2 The model of the system

V. COMPONENT

The components used in this system are listed below:

A. Photoelectric sensor

It used to discover the distance, absence, or presence of an object by using a light transmitter, often infrared, and a photoelectric receiver.

Component Name	No. Of Component Used	No of I/O pins required for each unit of component.	Total no. of I/O pins required	No of I/O pins used
Photo Electric Sensor	4	3	12	
LED	8	2	16	
16×2 Display	1	14	14	
Driver ULN 2003	1	16	16	
Relay	4	5	20	

B. Raspberry Pi 3

Raspberry pi is a miniature computer with an operating system that can be used as a development tool for different software and hardware based projects. In this project, the Raspberry Pi 3rd generation was used for its superior processing power compared to other available Microcontrollers.

C. Display

This display used to show the traffic timers.

D. Relay

Relay electrically operated switch.

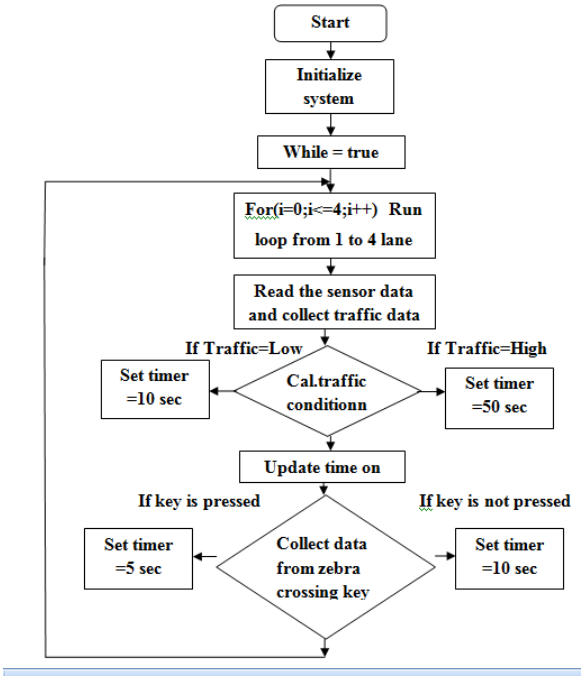
E. Driver ULN2003

The IC ULN2003A is a Darlington transistor array which deals with high-voltage and high-current.

VI. ASSEMBLY

The methods used to assemble all the components are discussed in this section. Table I shows the number of I/O pins used in the design and also how they are distributed among each component. It is also used to represent how the number of I/O pins was reduced to increase the efficiency of the system.

VII. FLOW CHART



VIII. ADVANTAGES

1. Eliminate paper based process.
2. It helpful to the authority.
3. User friendly and save time.
4. Customization and flexibility.

IX. ACKNOWLEDGMENT

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X. FUTURE WORK

More sensors can be used in each lane to make the system more accurate and sensitive to small changes in traffic density. Driverless cars can access the website to view the intensity of traffic at an intersection and choose the fastest route accordingly. Data mining techniques such as classification can be applied on traffic data collected over a long term to study the patterns of traffic in each lane at different times of the day. Using this information, different timing algorithms can be used at different points of the day according to the traffic pattern.

XI. CONCLUSION

Nowadays, traffic congestion is a main problem in major cities since the traffic signal lights are programmed for particular time intervals. However, sometimes the demand for longer green light comes in at the one side of the junction due to huge traffic density. Thus, the traffic signal lights system is enhanced to generate traffic-light signals based on the traffic on roads at that particular instant. The advanced technologies and sensors have given the capability to build smart and intelligent embedded systems to solve human problems and facilitate the life style. Our system is capable of estimating traffic density using IR sensors placed on either side of the roads. Based on it, the time delay for the green light can be increased and we can reduce unnecessary waiting time. The whole system is controlled by Raspberry Pi. The designed system is implemented, tested to ensure its performance and other design factors.

XII. REFERENCES

[1] R. Dhakad and M. Jain, "GPS based road traffic congestion reporting system," 2014 IEEE International Conference on Computational Intelligence and Computing Research, Coimbatore, 2014, pp. 1-6.doi: 10.1109/ICCIC.2014.7238547

[2] Q. Xinyun and X. Xiao, "The design and simulation of traffic monitoring system based on RFID," The 26th Chinese Control and Decision Conference (2014 CCDC), Changsha, 2014, pp. 4319-4322. doi: 10.1109/CCDC.2014.6852939

[3] M. F. Rachmadi et al., "Adaptive traffic signal control system using camera sensor and embedded system," TENCON 2011 - 2011 IEEE Region 10 Conference, Bali, 2011,pp.12611265.doi:10.1109/TENCON.2011.6129009

[4] X. Jiang and D. H. C. Du, "BUS-VANET: A BUS Vehicular Network Integrated with Traffic Infrastructure," in IEEE Intelligent Transportation Systems Magazine, vol. 7, no. 2, pp. 47-57, Summer 2015.doi:10.1109/MITS.2015.2408137

[5] I. Septiana, Y. Setiowati and A. Fariza, "Road condition monitoring application based on social media with text mining system: Case Study: