INTELLIGENT TRAFFIC CONTROL SYSTEM USING ARDUINO

L. David William Raj[1], N. Ranjani Priya Bai[2], C. Pooja[3], M. Padmini Bai[4], D. Nandika[5]

[1]*Assistant Professor, Department of Electronics and Communication Engineering, Adhiyamaan College of Engineering, Krishnagiri district, Tamilnadu, India*
[2-5]*UG Scholars, Department of Electronics and Communication Engineering, Adhiyamaan College of Engineering, Krishnagiri district, Tamilnadu, India*

[1]*davidraj1311@gmail.com, [2]ranjanipriya9337@gmail.com, 3poojachenneer174@gmail.com, [4]padhudeva18@gmail.com, [5]dnandika0@gmail.com*

---***---

Abstract--Traffic obstruction is one of the major problem in the present-day world. The present-day traffic signal control only works on a slotted time delay basis irrespective of the vehicle density. With the quick expand in vehicle usage, a system can demonstrate to be inefficient causing a lot of dropping. This advanced system includes a density based traffic control system which uses Arduino UNO, IR sensors and LEDs for the constructive signal hold and vehicle density control at the intersection.

Keywords--**Traffic control system, Arduino UNO, IR sensors, LED**

I   INTRODUCTION

In the present-day world, with emerging technologies and unfavourable development in the metropolitan cities, traffic management has become one of the most mandatory fields to be dealt with. The main role of a traffic management is
To continually improve the traffic control system and effectively synchronize the same. With the number of vehicle users constantly increasing, the solution provided by the current system is limited and feeble with respect to the energy and time consumed. A survey shows that an average person spends about four to six months of his/her entire life just waiting for the green light to be turned ON at a signal. It is also been identified that this inadequate facility and irrational distribution of signal control is leading to such traffic issues. This inefficient traffic control system is also contributing to various traffic violation where in the people don't possess the patience to wait for that interim of the signal which does not have much vehicle density than the other existing densities. Avoiding circumstances of extreme traffic congestion is highly important in the current situation. Hence, in this advanced system of traffic control, we focus on the traffic density rather than just giving control to the signals on a slotted time basis. This proposed is based on vehicle detection by IR sensors, analyzation and figuring of the scenarios by the Arduino UNO and the same gives the control depending on the control time in the code to the LED's. On a whole, this system senses the existence of the vehicle in that given place.

A) Project Scope

Traffic congestion is increasing on the road day- by- day. As a result of which, two main issues arises. The troubles are no traffic, but still need to hold back massive traffic congestion. These problems occur due to slotted authority on traffic. This research will aim to control the traffic according to the density, but in manner of programming which is already fixed in the system.

II   LITERATURE SURVEY

Saiba P A et al. advanced density based traffic control system using PIC microcontroller were three IR sensors are engaged in each road for the detection of the presence of the automobile and the density is identified in different levels such as low, medium and high. Based on the mass recorded, the duration of the green light is decided by the microcontroller. Pramod Sharma et al. advanced mass based intelligent traffic control system using IR sensors by ATMEL 89C51 Microcontroller were IR sensors are used for the vehicle detection and the control of the signals are taken over by the microcontroller. Sakshi Pandey et al. advanced mass based traffic control system using ATmega8 microcontroller where IR sensors are used to identify the level of vehicle density presenting each road at an intersection and in case of emergency vehicles, their approach was identified by proving a unique RFID card for the same. Bilal Ghazal et al. advanced smart traffic light control system using PIC microcontroller and IR sensors but alienated the data from the IR sensors to the microcontroller using XBee Tran receiver based on ZigBee firmware. K. Vidhya et al. proposed a density based traffic control system using Raspberry Pi and concept of image converting. Under this, they examined the ways to obtain the vehicle count by acquiring the real time images of the vehicle densities and further reefing it into a series of grayscale, threshold, canny, erode and contour images. D. D. Pukale et al. proposed a density based traffic authority

system using video processing. With the help of Arduino, the implementation is carried out by analysing the video recordings and removing the frames using which the vehicle densities is found. Corresponding the density present, the time span for the specific control of the signal is decided.

III   EXISTING SYSTEM

Avoiding conditions of extreme traffic jams is highly important in the current situation. Hence, in this advanced system of traffic control, we focus on the traffic density rather than just giving control to the signals on a stable time basis. This advanced is based on vehicle detection by IR sensors, examine and calculation of the outline by the Arduino UNO and the same gives the control depending on the control time in the code to the LED's. On a whole, this system senses the presence of the vehicle in that given. The main purpose of introducing this smart traffic system is that for every minute the vehicles at the junction will be dense and the traffic lights shall be changed to each side for some fixed time. Although there are no vehicles at certain side, the traffic signals will radiance for a given slotted time. Due to that there is time squander & vehicles on the other side have to hold back for the time to complete the process. So to reduce the wastage of time, we can implement the system that controls the traffic based on the heavy flow of vehicles at any particular side. With this system, we shall count the number of vehicles at each side at the junction and give path to the particular side which has denser traffic and keeping the other side's stopped.

IV   PROPOSED SYSTEM

The main aim of the proposed system is to constantly monitor the vehicle density present in all parts of the road at the junction. The elemental proceeding of operation is as follows: collection of vehicle density data from the roads; next is to send the same data to the device which compares the same and arrives at a particular characteristic output pattern; then the execution of the output design which is reflected in the signal design. In this model, the IR sensors are used to find the presence of any vehicle in that part of the road, when detected it sends a triggered output to Arduino UNO which is the heart of the project. Then Arduino analyses the number of such provoked outcome from the set of sensors placed in the different roads at the junction and correspondingly triggers the different

LED lights in the signals in order to felicitate the vehicle movement.

V   EXPERIMENTAL RESULT

The results of the proposed model can be analysed in three different scenarios. When there is vehicle density present in all the four roads of the junction, then the signal functionalises normally, similar to the existing system.
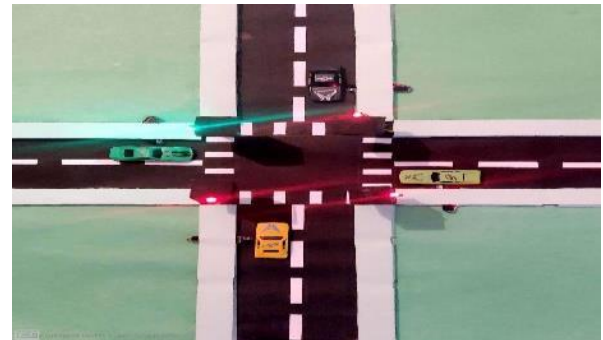

Fig 5.1: Vehicle density present in all roads

When there an absence of vehicle density in one or more roads but present in at least one road, then the signal for green light skips that particular road with no vehicle density and moves ahead with the ones with density present.

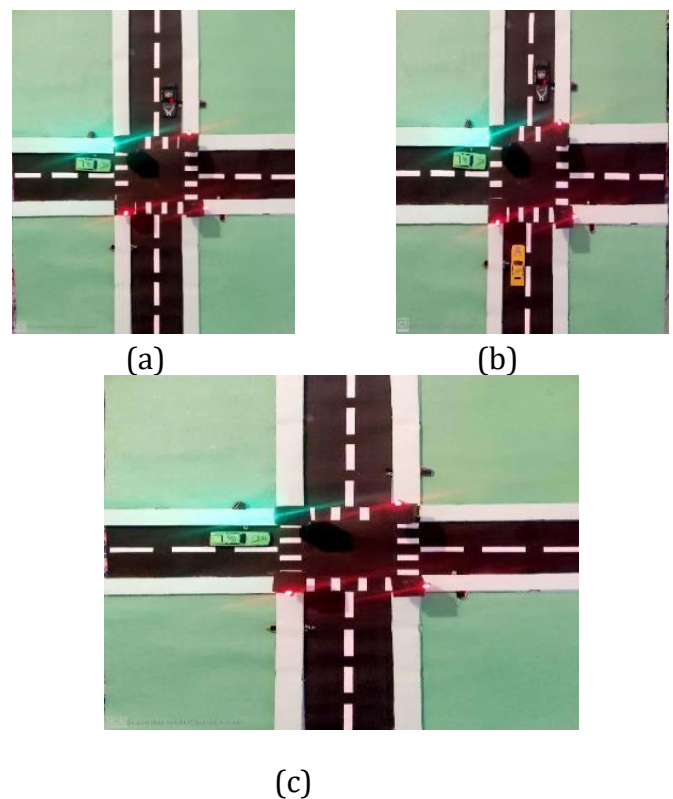(a)   (b)

(c)

Fig 5.2 a, b, c: Vehicle Density Absent in at Least one road.

When no vehicle density is registered in any of the roads at the intersection, the yellow light is provoked in all the Signals with time delay of 800ms which gives a blinking effect in the signals.

VI   CONCLUSION

The proposed traffic control system is the very basic step approaching accomplish mechanization in the area of traffic control system. With various advancements taking place in today's world, people are in search for automated systems which not only saves their time but also a lot of energy in different forms. The saving of fuel (petrol, diesel, natural gas), reduction in time of the operation of automobile engines, reduction in the emission of the harmful gases in the atmosphere. Thus, this system helps in depleting the number of accidents that happens just because of this incorrect traffic control system and surface way to a greater traffic control system. The proposed system aims to save the number of man-hours withered at the signals and hence making effective utilization of time. Further a lot of work and development can be made on these lines by giving priority to emergency tag vehicles. Also, a mass of work can be done on the usage of solar energy of the operation of such systems which can also make them highly energy systematic. It is also possible to make use of gas sensors to control the timing of the timers in the traffic nodes. Using GPRS (General packet radio service) map as besides step for development in this area, the best route can be resolved for emergency.

REFERENCES

[1]   M. Naveen, S. Raghavendra, D. Imran Basha,   & P. Kiran Kumar. "Density based Traffic Signals ControllingUsing ARDUINO and IR Sensors".International Journal of Electronics Engineering (IJEE). ISSN: 0973-7383, 2019.

[2]   Saranya J, Jayashwanth J.S, Kiran J, Harish S, & Linga Kumar T. "Automated Density Based Traffic Light Control System Using Arduino Platform". International Journal of Engineering and Advanced Technology (IJEAT). ISSN: 2249 – 8958,2019.

[3]   Usikalu, M. R., Okere, A., Ayanbisi, O., Adagunodo, T. A., & Babarimisa, I. O. "Design and Construction of Density Based Traffic Control System". IOP Conference Series: Earth and Environmental Science, 331, 012047,2019.

[4]   K. Bagya Lakshmi1, M. Suresh Kumar, S. Sindhuja, R.Padmavathy, & P. Jayabharathi. "Density Based Traffic Control System". Asian Journal of Science and Applied Technology ISSN: 2249-0698 Vol. 7 No. 2, 2018,

[5]   Devi, R. B., Reddy, D. K., Sravani, E., Srujan, G., Shankar, S., & Chakrabartty, S. "Density based traffic signal system using Arduino Uno". International Conference on Inventive Computing and Informatics (ICICI),2017.

[6]   Saiba P A, Afeefa M U, Aruna T S, Clincy Jose, & Radhika V M. "Density Based Traffic Signal System using PIC Microcontroller". International Journal of Computer Trends and Technology (IJCTT). ISSN: 2231-2803,2017.

[7]   Sakshi Pandey, Mittal Jethva, Sailee Jangam, & Yash Panwar. "Density based Traffic Control System". International Journal for Scientific Research & Development (IJSRD),2017.

[8]   Ghazal, B., ElKhatib, K., Chahine, K., & Kherfan, M.. "Smart traffic light control system". Third International Conference on Electrical, Electronics, Computer Engineering and Their Applications (EECEA),2016.

[9]   K.Vidhya,& A.Bazila Banu . "Density Based Traffic Signal System". International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET). ISSN: 2319 – 8753,2014.

[10]   D. D. Pukale1, Palak Chauhan, Adhikari Siddhi Satish, Preeti Nawal, & Neha Kumari. "Density Based Traffic Control System Using Video Processing". Imperial Journal of Interdisciplinary Research (IJIR). Vol-2. Issue-6, 2012..