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IR Based Traffic Density Detection and Signal Controller

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ABSTRACT: The project is aimed at designing a density based dynamic traffic signal system where the timing of signal will change automatically on sensing the traffic density at any junction. Traffic congestion is a severe problem in most cities across the world and therefore it is time to shift more manual mode or fixed timer mode to an automated system with decision making capabilities.

Present day traffic signalling system is fixed time based which may render inefficient if one lane is operational than the others. To optimize this problem we have made a framework for an intelligent traffic control system. Sometimes higher traffic density at one side of the junction demands longer green time as compared to standard allotted time We, therefore propose here a mechanism in which the time period of green light and red light is assigned on the basis of the density of the traffic present at that time. This is achieved by using PIR (proximity Infrared sensors). Once the density is calculated, the glowing time of green light is assigned by the help of the microcontroller (Arduino). The sensors which are present on sides of the road will detect the presence of the vehicles and sends the information to the microcontroller(Arduino) where it will decide how long a flank will be open or when to change over the signal lights. In subsequent sections, we have elaborated the procedure of this framework.

I. INTRODUCTION

With the difficulties of modern life, transportation has become an increasingly significant part of daily existence for humans. The growing quantity of automobiles on the road is indicative of any nation's economic expansion. But this has also made it harder to handle traffic congestion and accidents on the roads. Aside from traffic lights, which may not be effective enough to manage traffic, there is currently no technology that has demonstrated the ability to regulate circumstances like the number of cars in one lane relative to another, which may eventually cause that lane to become congested.

Major accidents worldwide are caused by maintenance failure and breaking traffic laws, according to a survey. In London, traffic lights were initially introduced in 1868, and since then, numerous current strategies have been used to implement them. Three common colored lights make up a traffic signal. It is made up of three lights: one red light that stops all traffic, one yellow light that alerts drivers to impending stops, and one green light that permits traffic to move forward in the designated direction. A lot of issues have arisen with the traditional traffic signal controller. One of them has extremely congested traffic, and no one has figured out how to gauge how bad the jam is.

II. METHODOLOGY

Block Diagram of Density Based Traffic Control System Using IR Sensor. The integrated system of this density based traffic control consists of an IR sensor for input, an Arduino UNO microcontroller for data interpretation, a red, yellow and green LED for traffic light lighting and an LED Dot Matrix Module for output of this project.

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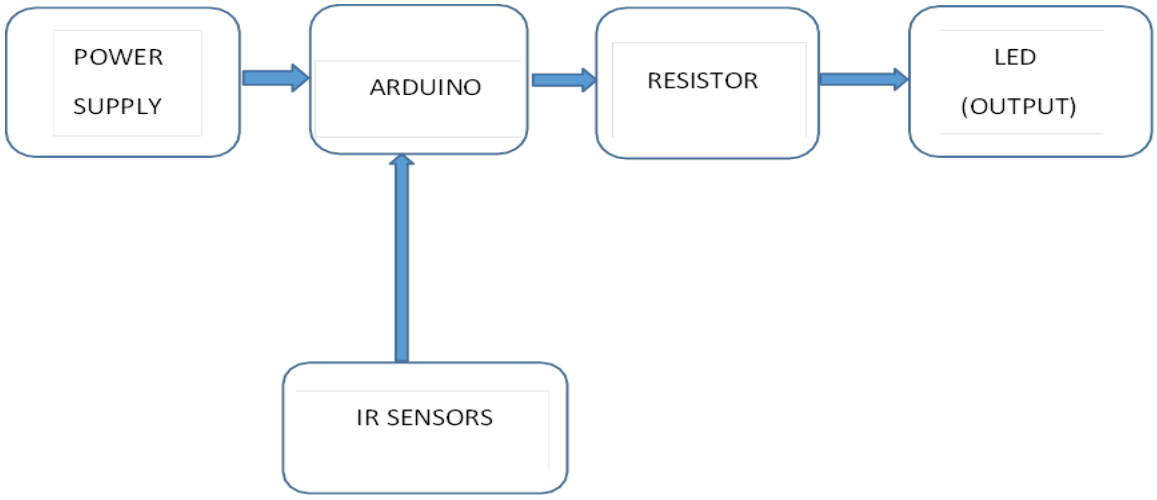

Figure 1: Block diagram of this density based traffic control system using IR sensor

Hardware and software design and development are the two main components of this project. A prototype is produced as an intersection in the hardware design. It was made up of four traffic lights placed at the intersection, each with an IR sensor affixed. Every traffic signal is roughly 100 meters away from these infrared sensors. There is just one traffic light where the LED display is installed.

Circuit diagram

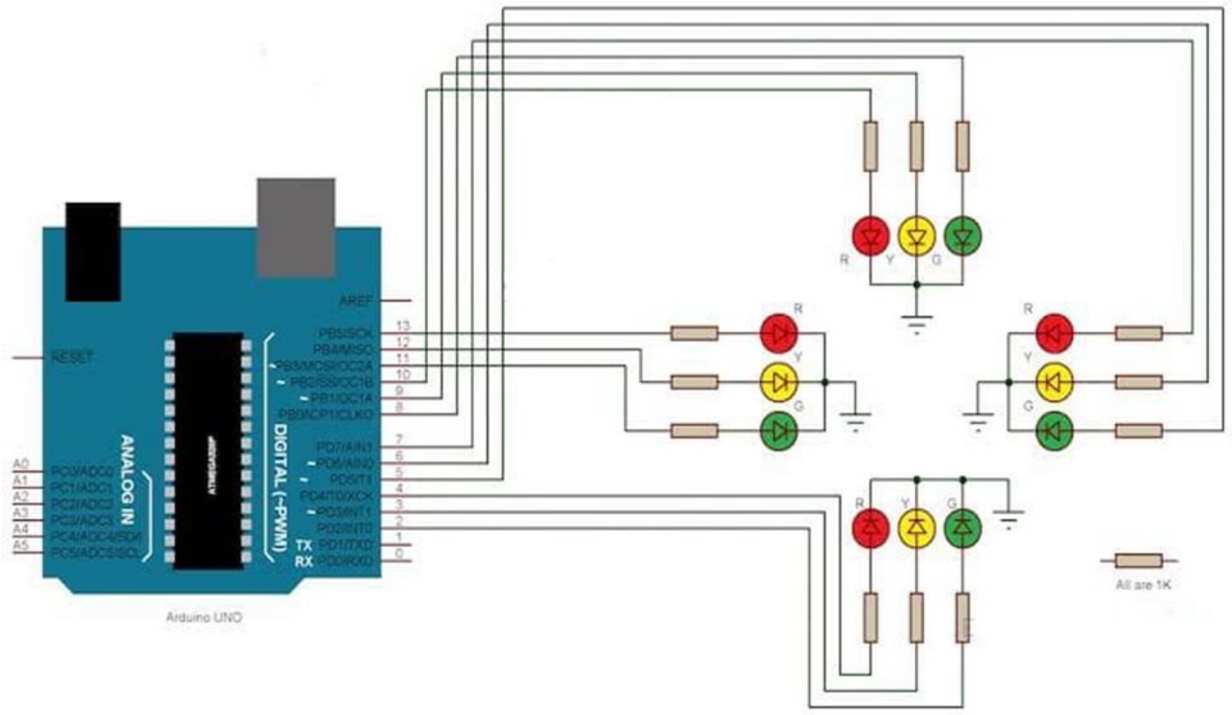

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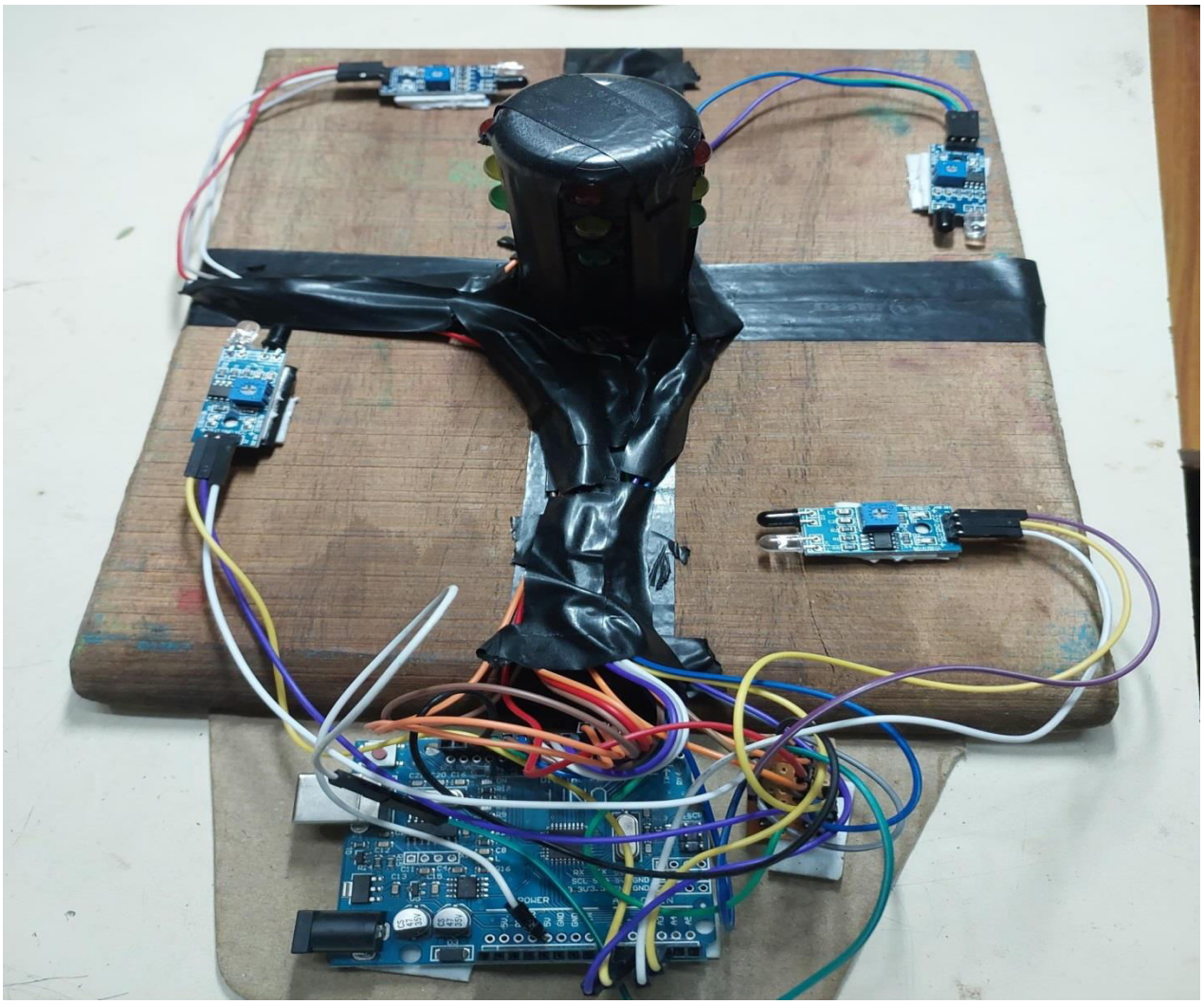
TABLE SUMMERISING THE INTERVAL OF LEDS

Traffic Light	Initial State	Duration (ms)	Next State	Duration (ms)
North-South	Green	5000	Yellow	2000
	Yellow	2000	Red	5000
	Red	5000	Yellow	2000
East-West	Green	5000	Yellow	2000
	Yellow	2000	Red	5000
	Red	5000	Yellow	2000



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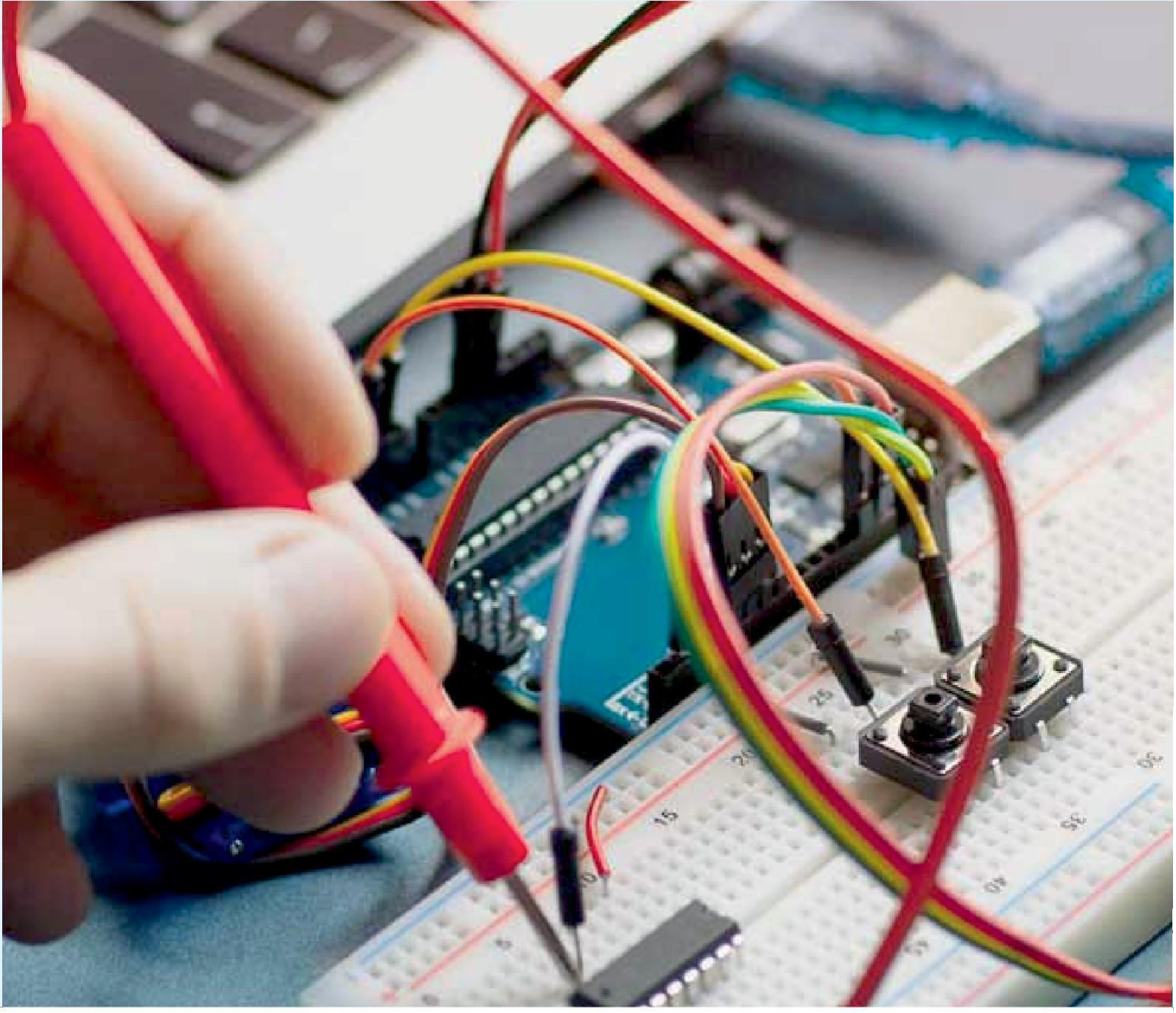
III. CONCLUSION

Given that 384 traffic accidents occur in India each day, our nation urgently needs an effective traffic management system. An advanced method is built in this project to lessen traffic congestion and unneeded delays. By allocating the time slots according to the merit of the vehicle load in specific lanes of multi-junction crossings, the frustrating chaos of traffic can be efficiently controlled with the use of this technology in the field. We have successfully tested the prototype in a lab setting, yielding impressive results. Prior to executing this schema on the widest possible scale, the next step forward is to execute it in a real-world setting for firsthand outcomes. This, in our opinion, has the potential to drastically alter the traffic control system on its application in actual field environment.

REFERENCES

[1]Mr.Sujoy Mondal ,7 years as an Assistant Professor in RCCIIT.
[2]Intelligent Traffic Signal Control System Using Embedded System by Dinesh Rotake and Prof.SwapniliKarmore, Innovative Systems Design And Engineering, ISSN 2222-1727 (paper) ISSN 2222-2871 (online), Vol. 3, No. 5, 2012.
[3]Priority Based Traffic Lights Controller Using Wireless Sensor Networks by Shruthi K R andVinodha K, International Journal Of Electronics Signals And Systems (IJESS) ISSN: 2231- 5969, Vol-1 Iss-4, 2012
[4]Road Traffic Congestion Monitoring and Measurement using Active RFID and GSM Technology by Koushik Mandal, Arindam Sen, Abhijnan Chakraborty and Siuli Roy, IEEE | Annual Conference on Intelligent Transportation Systems, 2011.
[5]Image Processing Based Intelligent Traffic Controller by VikramadityaDangi, AmolParab, KshitijPawar and S.S Rathod. Undergraduate Academic Research Journal (UARJ), ISSN: 2278 – 1129, Vol-1, Iss-1, 2012.
[6]B. Prashanth Kumar, B. Karthik — Micro controller based traffic light controller, Department of Electrical Engg.
[7]International Journal of Innovative Research in Science, Engineering and Technology Volume 3, Issue 3, March 2014 Density Based Traffic Signal System by K.Vidhya, A.BazilaBanu.
[8]Shilpa S. Chavan, Dr. R. S. Deshpande & J. G. Rana (2009) "Design of Intelligent Traffic Light Controller Using Embedded System" Second International Conference on Emerging Trends in Engineering and Technology.
[9]Intelligent Cross Road Traffic Mangaement System(ICRTMS) by Ahmed S Salama, Bahaa K Saleh and Mohamad M Eassa submitted at the 2nd International Conference on Computer Technology and Development(ICCTD 2010) in the year 2010.
[10]Intelligent Traffic Light and Density Control using IR Sensors and Microcontroller by First Ms. Promila Sinhmar published in the International Journal of Advanced Technology and Engineering Research (IJATER).
[11]Wikipedia (online), www.wikipedia.org



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