IJAREEIE

e-ISSN: 2278-8875
p-ISSN: 2320-3765

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

Volume 11, Issue 6, June 2022

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.18

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (IJAREEIE)

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 8.18|

||Volume 11, Issue 6, June 2022||

|DOI:10.15662/IJAREEIE.2022.1106047 |

Implementation of a Density -Based Traffic Light Control with Innovative Clearance for Ambulance

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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 signaling 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 frame work 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. 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 e detect the presence of the vehicles and sends the information to the microcontroller 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.

KEYWORDS: PIR sensor, Arduino, optimize, LCD, Framework, PIC Microcontroller

I.INTRODUCTION

Traffic congestion is a severe problem in many major cities across the world and it has become a major issue for the commuters in all the cities. The delay of respective light is hardcoded in the traffic light and it is not dependent on traffic. This creates unnecessary waiting for drivers, which could not be endurable in every case, as being in time, is important to everyone. Density, speed, and flow are the three critical parameters for road traffic analysis. As the number of road Users constantly increases, and resources provided by current infrastructures are limited, the control of traffic has become a very important issue in the present. Also, one of the major problems faced by heavy traffic is by Ambulances. The aim of this project is to solve traffic congestion which is a severe problem in many modern cities all over the world. The traffic density is controlled using a microcontroller. This system contains IR transmitter and IR receiver which are mounted on either side of roads respectively. The IR system gets activated whenever any vehicle passes on the road between IR transmitter and IR receiver. The objective for usage of IR sensor is to detect obstacles. The microcontroller controls the IR system and counts a number of vehicles passing on the road. The microcontroller also stores vehicles count in its memory. Based on different vehicles count, the microcontroller takes a decision and updates the traffic light delays as a result. By measuring the traffic lined up on a particular road the signal timings are adjusted to let that particular way clear out and then the next populated one. It also consists of an emergency override that allows traffic authorities to remotely let go a particular signal in case an ambulance or important vehicle arrives on that way.

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The origin of cultivation starts with kingdom eras. Later, he started using tools to prepare the land and he termed the animals in cultivation. This leads the man tostart his agriculture technique in crop development. Initially it was done with the help of plough and basic tools. As the population increased, man started thinking of advanced technologies to improve agriculture. Some scientist like Dr. M. S. Swami Nathan brought green revolution in our country. There are different types of revolution such as blue revolution, white revolution and sliver revolution. These are eminent turning point in Indian agriculture system by the continuous increase in population. It becomes population explosionand increasing of industrialization, urbanization and colonization leads to shortage and shrinking of cultivable lands. So that population, flood, famine and starvation are widely spread which are not avoidable. To control and bring back the normal saturated conditions by supplying adequate amount of food to each and every citizen in our country. We have to adopt modern digital methods in agronomy. Introducing this type of intervention of IOTand digital sensors in agriculture practices will enhance the yield of pure line breads.

II.PROPOSED SYSTEM

The limitations of current traffic system are eliminated in the proposed system. In this system, an PIC microcontroller that is interfaced with IR sensors to change the timing of traffic signal automatically to ensure that there is free movement of vehicles on road. The problem caused due to fixed time delay is eliminated. The proposed system is observed to be more efficient than the existing traffic controller in terms of reducing delay and emergency override feature. No need of extra traffic person. The paper uses the IR interruption concept for generation logic gates to the input of microcontroller. To achieve the same a number of IR diodes are used facings photodiodes. While the IR light falls on the photodiode the resistance of the photodiode falls increasing the bias voltage. The voltage at the non inverting terminal will be greater than that of inverting terminal and the led connected to the comparator glows continuously.

Whenever there is an obstacle between the IR led and photodiode the resistance of the photodiode increases to a high value and the voltage at the non inverting will be less than that of inverting and the output obtained is of negative logic. The led connected to the comparator turns of indicating that there is a vehicle passing the road Depending on the number of vehicle passing the time required to turn the green signal also increases. Whenever an emergency occurs a direct interrupt signal is send to the RFID receiver through the RF technology for emergency vehicle and theses causes to clear the way to the emergency vehicle. Logic high sensed by the microcontroller input changes the green ON time to a higher value for allowing more vehicles to pass through. After sometime in case any other way gets more logic high, the sequential gets automatically increased for that way Based on the IR interruption the green ON time increases thus more the vehicle longer will be green signal time. This dynamic time control is achieved based on the traffic density. Reduce the problem of traffic congestion caused by traffic signals by using IR sensors to detect the density of traffic in each lane. Provide priority to an arriving emergency vehicle before it gets trapped in traffic.

III. WORKING PRINCIPLE

The potential transformer will step down the Power supply voltage (0-230V) to (0-6V) level. Then the secondary of the potential transformer will be connected to the precision rectifier, which is constructed with the help of op amp. The advantages of using precision rectifier are it will give peak voltage output as Dc, rest of the circuits will give only RMS output. When four diodes are connected as shown in figure, the circuit is called as bridge rectifier. The input to the circuit is applied to the diagonally opposite corners of the network, and the output is taken from the remaining two corners. Let us assume that the transformer is working properly and there is a positive potential, at point A and a negative potential at point B. the positive potential at point A will forward bias D3 and reverse bias D4. The negative potential at point B will forward bias D1 and reverse D2. At this time D3 and D1 are forward biased and will allow current flow to pass through them; D4 and D2 are reverse biased and will block current flow. The path for current flow is from point B through D1, up through RL, through D3, through the secondary of the transformer back to point B. this path is indicated by the solid arrows. Waveforms (1) and (2) can be observed across D1 and D3. One-half cycle later the polarity across the secondary of the transformer reverse, forward biasing D2 and D4 and reverse biasing D1 and D3. Current flow will now be from point A through D4, up through RL, through D2, through the secondary of T1, and back to point A. This path is indicated by the broken arrows. Waveforms (3) and (4) can be observed across D2 and D4. The current flow through RL is always in the same direction. In flowing through RL this current develops a voltage

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corresponding to that shown waveform (5). Since current flows through the load (RL) during both half cycles of the applied voltage, this bridge rectifier is a full-wave rectifier. One advantage of a bridge rectifier over a conventional full-wave rectifier is that with a given transformer the bridge rectifier produces a voltage output that is nearly twice that of the conventional full-wave circuit. This may be shown by assigning values to some of the components shown in views A and B. assume that the same transformer is used in both circuits. The peak voltage developed between points X and y is 1000 volts in both circuits. In the conventional full-wave circuit shown—in view A, the peak voltage from the center tap to either X or Y is 500 volts. Since only one diode can conduct at any instant, the maximum voltage that can be rectified at any instant is 500 volts.

The maximum voltage that appears across the load resistor is nearly-but never exceeds-500 v0lts, as result of the small voltage drop across the diode. In the bridge rectifier shown in view B, the maximum voltage that can be rectified is the full secondary voltage, which is 1000 volts. Therefore, the peak output voltage across the load resistor is nearly 1000 volts. With both circuits using the same transformer, the bridge rectifier circuit produces a higher output voltage than the conventional full-wave rectifier circuit.

IV. RESULT AND DISCUSSION

With the µVision Project Manager and Run-Time Environment you create software application using pre-build software components and device support from Software Packs. The software components contain libraries, source modules, configuration files, source code templates, and documentation. Software components can be generic to support a wide range of devices and applications.

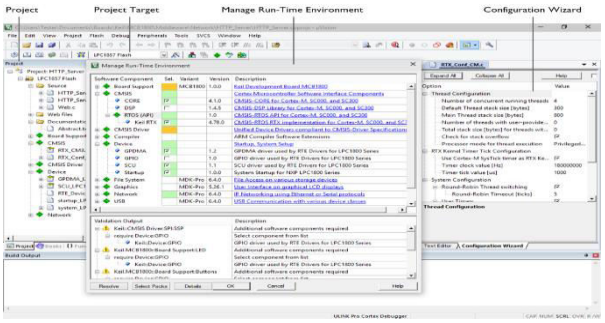

Figure 1: Simulation Window

V.HARDWARE IMPLEMENTATION

It is a device that can be operated either manually or automatically. This kind of dual mode can enhance the productivity of crop and continuity functioning of the device. Due to this type of special arrangement the device can be operated without any interruption. Malfunctioning of the device can be rectified immediately by any one of the alternate methods. The hardware prototype shows the entire working process of the Traffic Light Control in innovative methods.

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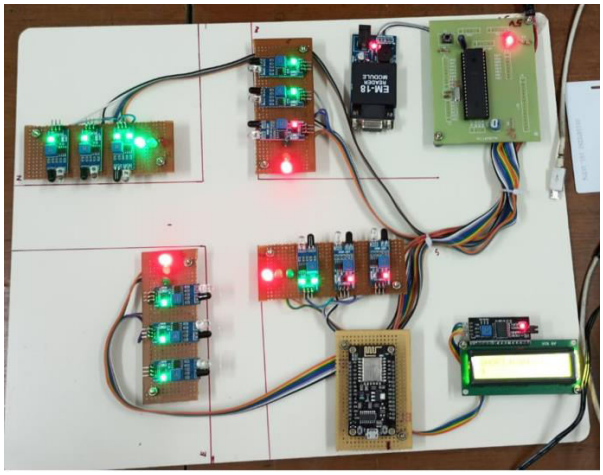

Figure 2: Hardware prototype

When the device is working automatically with the help of PIC Microcontroller, theLCD will display the mode in which it is operating. So that the whole process willbe automated and the required side based on traffic density the Signal will be switched over here.

VI. CONCLUSION

By using this system we were able to successfully build a system to control and manage traffic signals to avoid traffic congestion caused due to traffic signals. The number of IR sensors blocked decides the density range of traffic and on this basis traffic lights are prioritized to lanes with highest number of IR sensors blocked. We were also able to build a system so as to clear a lane when an emergency vehicle is detected in that particular lane. During the process we learnt about the various hassles faced in the interfacing of various hardware and the methodologies to overcome them.

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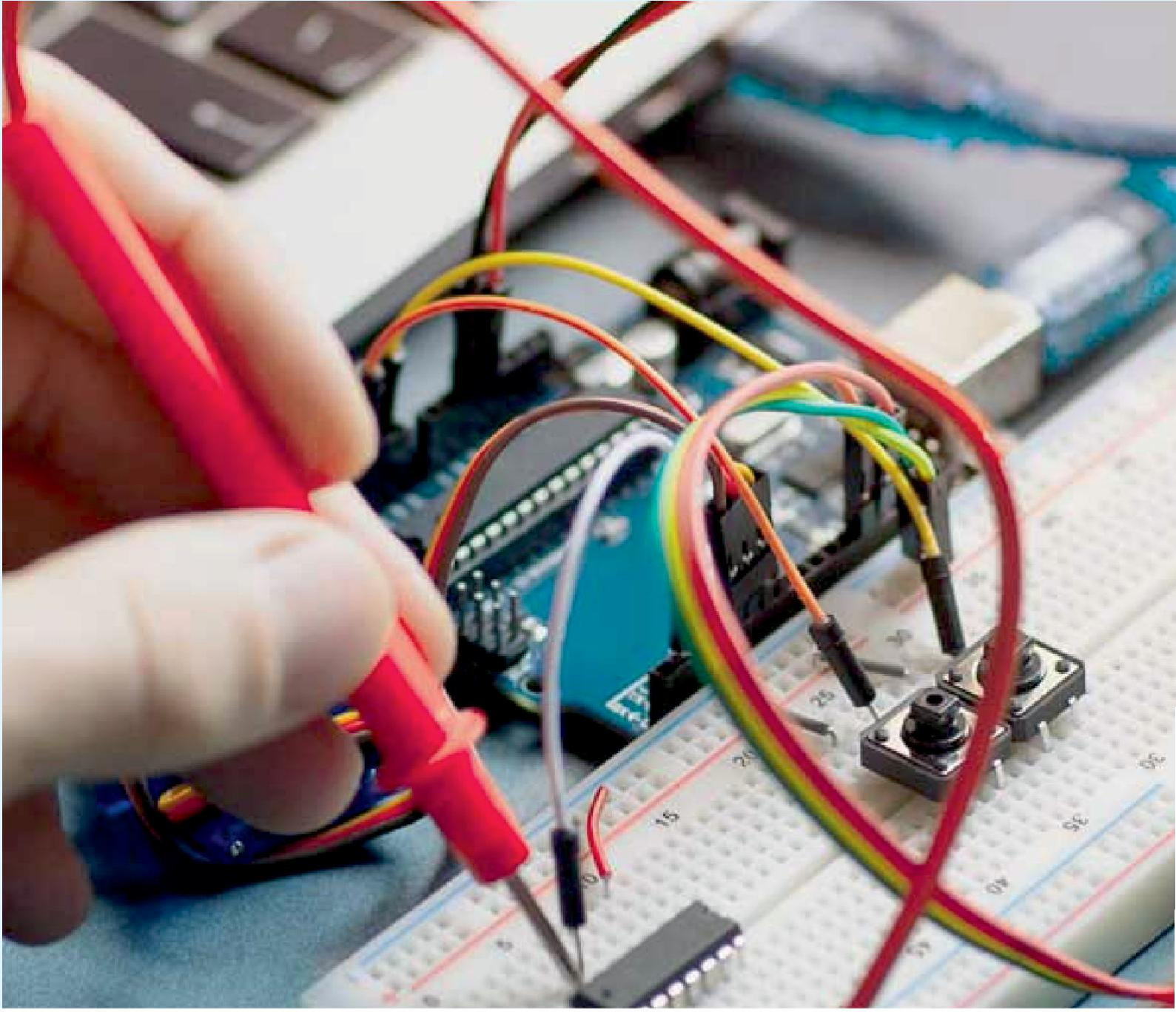

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