

A Review Paper on Traffic Light Controller Techniques

Akshay Chauhan¹, Harshal Gupta², Rohan Sawant³, Bhushan Save⁴

^{1,2,3,4} Dept of Electrical Engineering
^{1,2,3,4} VIVA Institute of Technology, Virar.

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 based on the density of the traffic present at that time. This is achieved by using IR (proximity Infrared sensors).

Keywords- Traffic, Signal Lights, Arduino, IR Sensor.

I. INTRODUCTION

In today's high-speed life, tie up becomes a significant issue in our day to day activities. It brings down the productivity of individual and thereby the society as variant work hour is wasted at the signals. High volume of vehicles, the inadequate infrastructure and also the irrational distribution of the signalling system square measure main reasons for these chaotic congestions. It indirectly additionally adds to the rise in pollution level as engines stay on in most cases, a large volume of natural resources in varieties of gas and diesel is consumed without any fruitful outcome. Therefore, to eliminate these issues or a minimum of cut back them to important level, newer schemes must be compelled to be enforced by conveyance in detector-based automation technique during this field of traffic signalling system.

II. BLOCK DIAGRAM

The basic block diagram of the density-based traffic control system is as shown in figure 1. It consists of four roads, IR Sensors, crystal oscillator and signal lights (LED's).

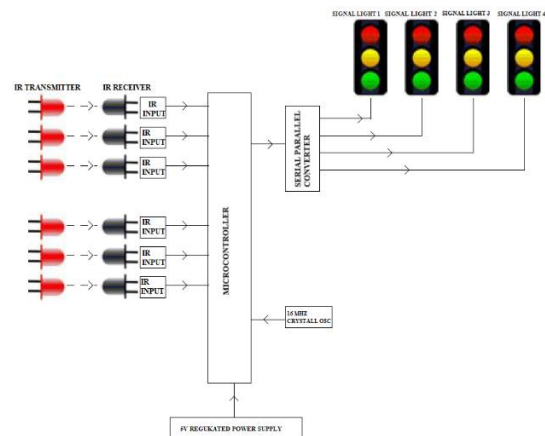


Fig No. 1: Block Diagram of density based traffic controller.

The components required are as follows:

1. IR Sensor: - An infrared (IR) sensor is an electronic device that measures and detects infrared radiation in its surrounding environment.
2. Light emitting diode: - A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it.
3. Arduino Atmega 328: - ATmega-328 is basically an Advanced Virtual RISC (AVR) micro-controller. It supports the data up to eight (8) bits. ATmega-328 has 32KB internal built-in memory. This micro-controller has a lot of other characteristics.
4. crystal oscillator: - A crystal oscillator is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to create an electrical signal with a constant frequency
5. Serial Parallel Converter: - The task of a serial to parallel converter is to take a stream of data in serial format and for N-bit parallel converter, give N-bits as parallel output.

Density-based traffic light control is an automated way of controlling signals in accordance with the density of traffic in the roads. IR sensors are placed in the entire intersecting road at fixed distances from the signal placed in the junction. The time delay in the traffic signal is set based on the density of vehicles on the roads. The IR sensors are used to

sense the number of vehicles on the road. According to the IR count, ATMEGA takes appropriate decisions as to which road is to be given the highest priority and the longest time delay for the corresponding traffic light.

III. CIRCUIT DIAGRAM

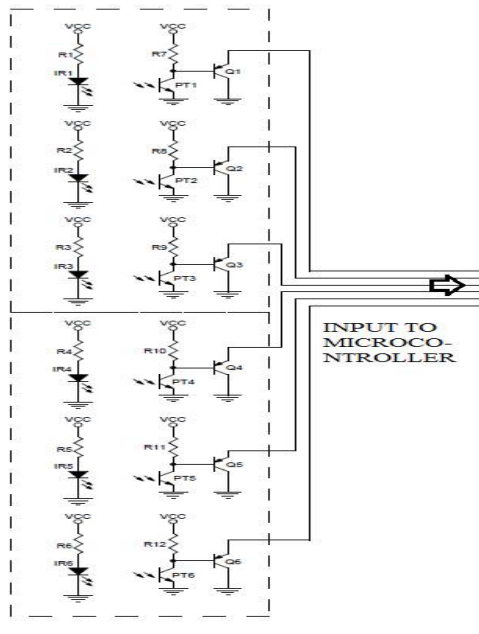


Fig No. 2.A:Circuit Diagram of IR input section.

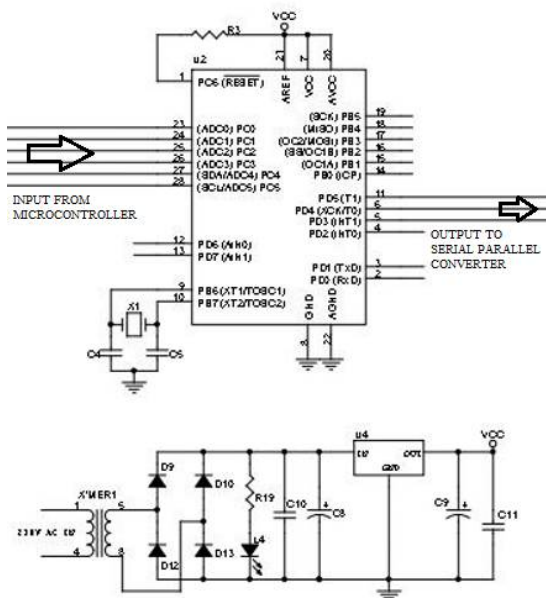


Fig No. 2.B:Circuit Diagram of Microcontroller section.

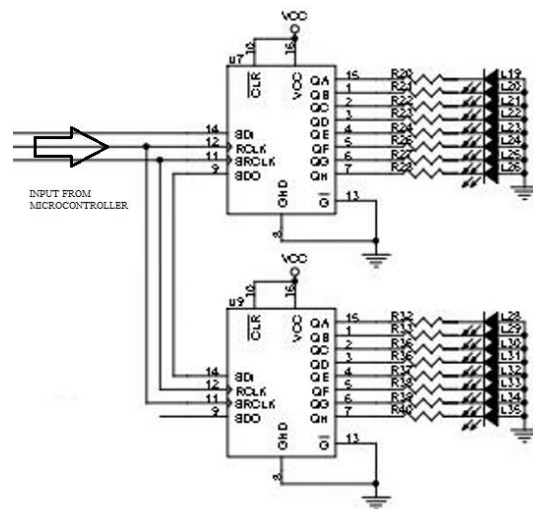


Fig No. 2.C:Circuit Diagram of Serial Parallel Converter Section.

Changing delay of Traffic signals supported the number of vehicles passing through associate allotted section of the road, is that the working rule of the model. At four sides of four-way road four IR sensors square measure placed, that counts the number of vehicles passing by the world lined by the sensors. during this model we have a tendency to square measure exploitation IR sensors substitution control system to style a density-based traffic light system. These IR transmitter and receiver are going to be mounted on same sides of the road at a selected distance. The IR detector can observe the vehicle because the vehicle passes through these IR sensors & can send the readings to the microcontroller. The microcontroller counts the number of vehicles and supply the turn on time to semiconductor diode in keeping with the vehicle's density. Then the semiconductor diode could turn it on for higher time than average or the other way around. The traffic lights square measure at first running at a hard and fast delay of a thousand milliseconds, that successively produces a delay of 1000+1 milliseconds within the entire method. Microcontroller is interfaced with semiconductor diode and IR sensors; this whole embedded system is placed at the junction. The entire range of LED's are 12 and IR sensors needed is four. IR detector module consists of transmitter and receiver thus, this square measure connected to any 2 ports of the Arduino.

IV. CONCLUSION

There is exigent want of economical traffic management system in our country, as India meets with 415 road accidents a day. To scale back this congestion and unwanted time delay in traffic a sophisticated system is meant here during this project. With field application of this

technology, the infuriating chaos of traffic are often effectively channelized by distributing the time slots supported. The advantage of the vehicle load in bound lanes of multi junction crossing. We have with success enforced the paradigm at laboratory scale with outstanding outcome. Succeeding leap forward is to implement this scheme in real world situation for initial hand results, before implementing it on the most important scale.

REFERENCES

- [1] Sai Surya Prakash Moka, Sai ManikantaPilla, “Real Time Density Based Traffic Surveillance System Integrated with Acoustic Based Emergency Vehicle Detection”, IEEE 2020.
- [2] Deemnath K P, Mohammed Waleed, “Density Based Traffic Signal System Using Loadcells and IR Sensors”, IRJMETS 2020.
- [3] P. Pujithsai, O. Gautham, “Density Controlled Traffic Lights System Using Arduino Mega 2560”, IJITEE 2020.
- [4] Prof. Ms. N. C. Band, M.V. Virulkar, “Density Based Traffic Light Control System”, IRJET 2020.
- [5] M. Naveen, S. Raghvendra, “Density based traffic signal control using Arduino and IR Sensors”,IJEE 2019.
- [6] Mohammed Fayaz, Pooja K, “Density Based Light Control System with Ambulance Detection”, IJERT 2019.
- [7] Akshat Shukla, Abhijeet Anand, “Density Based Light Control System Using Microcontroller”, IJARSE 2018.
- [8] D. Prakash, B. Sandhya, “Density Based Traffic Light Control System Using Image Processing”, IJAREEIE 2017.
- [9] V. Ramkumar, M. Sankara, “Density Based Traffic Signal Using Arduino and RFID System” European Journal of Molecular & Clinical Medicine Volume 7.