International Journal of Advances in Engineering and Management (IJAEM)
Volume 2, Issue 4, pp: 38-40 www.ijaem.net ISSN: 2395-5252

Density Based Automatic Traffic Control System Using Ultrasonic Sensor and Air Pollution Indicator

S M Patil[1] Akshata mali[2] Akshata Channavar[3] Guruprasad Salahalli[3] Laxmi Patil[4]

[1]*Asst. Professor,EEED,BEC(A),Bagalkot, India*
[2-5]*UG students, EEE department,Basaveshwar Engineering College(A), Bagalkot, India*
Corresponding author: S M Patil

Date of Submission: 30-07-2020 Date of Acceptance: 09-08-2020

ABSTRACT-The project is designed to develop a density based traffic signal system with an additional improvement of air pollution indicator. Traffic congestion has become nightmare for the citizens. Conventional traffic light system is based on fixed time concept allotted to each side of the junction which cannot be varied as per varying traffic density.

Some times higher traffic density at one lane of the junction demands longer green time as compared to standard allotted time. Using ultrasonic sensor the signal is processed in such a way that higher vehicle density lane gets more time of the green signal.

We, therefore propose here a smart traffic control system in which the signal time is based on vehicle density. The signal timing changes automatically on sensing the traffic density at junction. It also consists of air pollution indicator to give awareness about the global warming and used solar power supply as it is renewable energy resource.

Key words- Traffic junction, ultrasonic sensors, air pollution indicator.

I. INTRODUCTION

As the number of vehicles are increasing day by day this causing the problem of traffic congestion. So smart traffic control system is required to handle the traffic efficiently depending on the density of vehicles. This problem can be overcome by the intelligent traffic system using ultrasonic sensors at lane and detecting the vehicle density**.**

II. DESCRIPTION OF COMPONENTS

Battery : Battery stores electricity for future use. It develops voltage from the chemical reaction produced when two unlike materials, such as the positive and negative plates, are immersed in the electrolyte, a solution of sulfuric acid and water. In a typical lead-acid battery, the voltage is approximately 2 volts per cell, for a total of 12 volts. Electricity flows from the battery as soon as there is a circuit between the positive and negative terminals. This happens when any load that needs electricity.

Solar working : A typical silicon PV cell is composed of a thin wafer consisting of an ultra-thin layer of phosphorus-doped (N-type) silicon on top of a thicker layer of boron-doped (P-type) silicon. An electrical field is created near the top surface of the cell where these two materials are in contact, called the P-N junction. When sunlight strikes the surface of a PV cell, this electrical field provides momentum and direction to light-stimulated electrons, resulting in a flow of current when the solar cell is connected to an electrical load.

Ultrasonic Sensor: An Ultrasonic sensor is a device that can measure the distance to an object by using sound waves. It measures distance by sending out a sound wave at a specific frequency and listening for that sound wave to bounce back. By recording the elapsed time between the sound wave being generated and the sound wave bouncing back, it is possible to calculate the distance between the sonar sensor and the object.

Relay : Relays are switching devices operated by currents and employed to control large power or to perform switching operations.

Microcontroller : The microcontroller is interfaced to the buffers as shown in the figure. Any port can be used as input or output port as per the project requirement. The buffers can be used as bidirectional way.

The crystal is connected to the microcontroller pin no 18, 19 to provide the oscillation at the frequency 11.059Mz .The pin no 9 of the

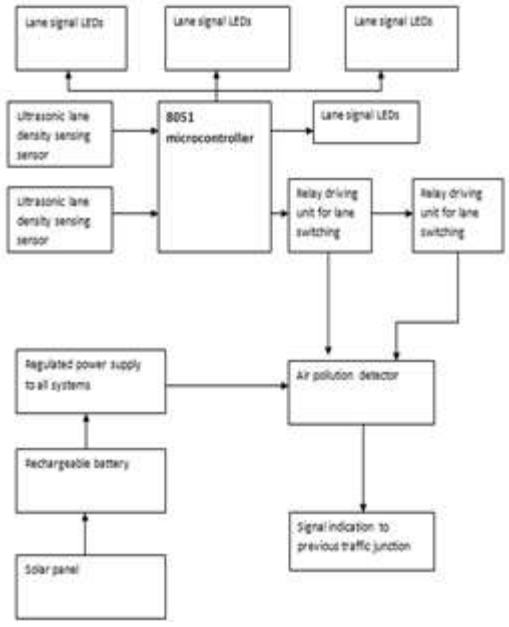
International Journal of Advances in Engineering and Management (IJAEM)
Volume 2, Issue 4, pp: 38-40 www.ijaem.net ISSN: 2395-5252

microcontroller is used for reset. When the power is switched on for the microcontroller the microcontroller gets reset. And external switch is also used for manual reset of the microcontroller.

Smoke sensing circuit : A smoke Sensing circuit is designed with smoke sensor MQ2 AND OP_AMP(IC LM358), and Transistor. The alcohol sensor MQ2 converts the smoke contents to difference the resistance. The resistance variation is inversely proportional to smoke. Here the OP_AMP is used as a voltage comparator. The sensor is connected to the non-inverting terminal Pin No 3 of the OP_AMP to provide the potential difference. The inverting terminal Pin No 2 of the OP_AMP get the potential difference & variable resistor (10 KΩ), to adjust the Reference Voltage or a set value of the parameter. The LED connected at the collector gives an indication of sensing parameter when it exceeding the threshold value.

III. PROPOSED SCHEME

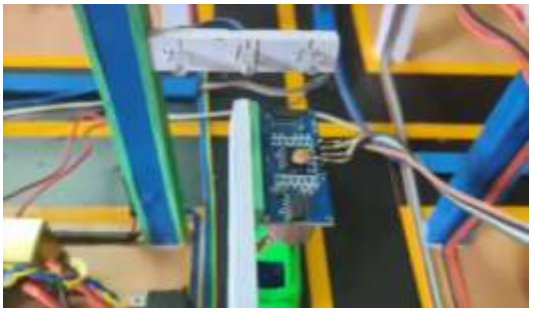
Block diagram

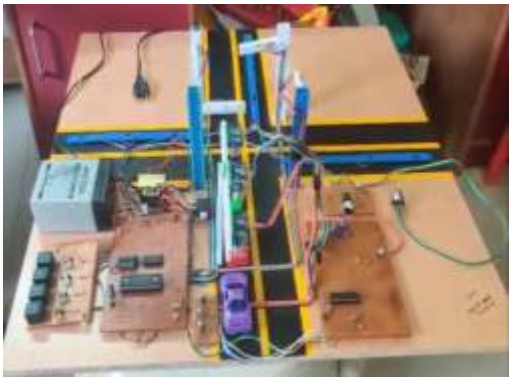


- The main concept is clearing the lanes in junction. The hardware module consist of 8051 controller and is followed by 2 buffer IC's. These IC's provide sufficient current to drive traffic lane LEDs and Relay circuit. 4 relays are used for triggering a particular lane once at a time.
- According to the concept of project will turn on the lane one by one. On the bases of number of vehicles staying in that particular lane, the sensors will detect the density exactly and it will send signal to Microcontroller port 1(acts as input port) and port 0&3 act as output port. While port 2 is connected to relays.
- For the 1st lane 3 ultrasonic sensors are connected to detect vehicle density. For example if lane 1 has 30-40% of density, first sensors will sense that and send this information to Atmega 328 ardiuno controller which uses 16MHz crystal and also a RESET switch.
- All these sensors are interfaced with ardiuno controller so depending on which sensor has been executed output will be provided.(with the help of wire connected to 8051 controller)i.e. after triggering the lane green color will emerge as output for that particular lane about 10seconds for example.
- Similarly assume 40-70% of density is present then about 20seconds the green light will be shown. In case density is heavy all the sensors will send signal and about 30 seconds will be allocated.
- Role of 8051 is to scan the time after completion of every lane there is scan time for 6 seconds. After triggering 1 lane system shifts to next lane to scan. Lane switching is done by relay circuit.
- After complete scanning if 2nd lane has no vehicles then immediately lane shift to next one within 2-3 seconds. Further same process will continue.
- For pollution detection at the junction area CO_2 sensor is used which is connected to Opamp circuit LM318 and is act as comparison circuit.
- As soon as it is exposed to air, it senses and if level of CO_2 exceeds the limit the buzzer starts to generate the sound and public can be alerted. So that as people can take alternative routes.

IV. CONCLUSION

Hardware kit





V. AKNOWLEDGEMENT

The authors wish to thank the local authorities of traffic control department for providing assessment to real time problems analysis.

REFERENCES

[1]. **K.Vidhya, A.BazilaBanu**, " Density based traffic signal system". ICIET press, march 2014.

[2]. **PromilaSinhmar,** "Intelligent traffic light and density control using IR sensor and microcontroller." IJATER, volume-1, Issue 2,March 2013.

[3]. **Mohite J.N. Barote S.S**. "Vehicle pollution control and traffic management"IJRET, Vol-4, Issue 4.April 2015.

[4]. **Rashid hussain**, "WSN Applications: Automated intelligent traffic control system using sensors". International journal of soft computing and engineering, vol-3,Issue-3,july 2013.

International Journal of Advances in Engineering and Management
ISSN: 2395-5252

IJAEM

Volume: 02 Issue: 01 DOI: 10.35629/5252

www.ijaem.net
Email id: ijaem.paper@gmail.com