MOVABLE SMART ROAD DIVIDER USING EMBEDDED TECHNOLOGY

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Abstract - This paper presents smart movable road divider for controlling the traffic congestion. Road divider is generally used for dividing the road. The problem with static road divider is that the number of lanes on either side of the road is fixed. Since the resources are limited and population as well as number of vehicles are increasing there is significant increase in the number of vehicles on road. This calls for better utilization of existing resources. This paper aim is to build a smart road divider in terms of automated road divider which moves or shifts the lane. It provides a better solution for traffic problem. A prototype is developed by using Arduino board, embedded technology (IOT) which will provides a better solution for traffic congestion. An automated movable road divider can provide a solution very effectively.

Keywords – congestion, static, lanes, IOT, automated, resources

I. INTRODUCTION

Nations around the globe are confronting issue of traffic problem due to the number of automobiles increasing day by day. Though the number of vehicles increased, the road infrastructure is nearly the same which cannot be able to cope up with the changes like unpredictable traffic jams, travel delays, congestion. Hence it has become necessary to find an effective solution for traffic control. There are many different situations where different strategies are applied to solve them, here in this project article the main focus is to take the traffic controlling to a new era by avoiding traffic congestion, and to control high density traffic and to reduce the time of journey in peak hours for a better and smarter solution for the above said problems. In this proposed work, a module has been developed which is used for measuring the density of the traffic. The density of the traffic is measured using IR

sensors by deploying it on either side of the lane. If the density is high the divider is moved. The density of the traffic is stored in cloud and is updated every time. The stored information is represented in graphical form. It is stored in an open source IoT application called Thing speak. By this, the traffic congestion is reduced and time consumed is less compared to static road divider.

II.   LITERATURE SURVEY

Sonal Agarwal, Prakhar Maheshwari proposed a paper on "Controlling of Smart Movable Road Divider and Clearance Ambulance Path Using IOT Cloud" [1]. This system works where traffic on one side is more than the other side then the divider is able to shift. Deep learning is used acquiring the current situation of traffic and these data will store in clouds using cloud computing and big data handling over IOT. Cloud database sends the message to embedded system over IOT protocols to shift the divider left or right. Complicated technology is the limitation.

B Durga Sri, K Nirosha, Sheik Gouse proposed a paper on "Design and Implementation of Sensible Movable Road Divider through IOT [2]. They have used IOT primarily based to investigate the traffic density during an explicit time. The photographs are captured through the camera and traffic density are analyzed from the IOT platform. The model was enforced optimization of raspberry pi and servo motors but the usefulness of this approach may be a serious concern because of the price of its implementation.

Roopa Ravish, Varun R, Gupta, Nagesh K J, Amruth Karnam proposed a paper on "Software Implementation of an Automatic Movable Road Barrier" [3]. In this proposed model by using computer vision the traffic density on both sides can

be visualized. This is implemented using a camera installed video recording. Python 3 script is mainly used in this project. More Expensive.

III.   METHODOLOGY

In this proposed system, ATMEGA 328P Microcontroller is used. By using efficient features of microcontroller programming is done for analyzing the traffic density. In this project sensors plays an very effective role. By using IR sensors traffic density is known. This project uses three IR sensors if the one IR sensor is HIGH traffic density is treated as NORMAL, if the two IR sensors are HIGH traffic density is treated as MEDIUM finally when all the three IR sensors are HIGH traffic density is treated as HIGH and there by DIVIDER is initiated to move. All the scenarios of traffic density is recorded in the software platform called Thing Speak. By using this data we can estimate the traffic density and we can divert the coming vehicles into that way which are moving towards the same destiny in other alternative ways there by smart traffic system is realized. This proposed system also consists of relay, motor, power supply, ultrasonic sensors and LEDs for traffic signals.

IV.   COMPONENTS REQUIRED

MICRO CONTROLLER (ATmega328P)

It has 14 digital input/output pins,6 analog inputs, a 16 MHZ quartz crystal, a USB connection, a power jack, an ICSP header and a reset button.
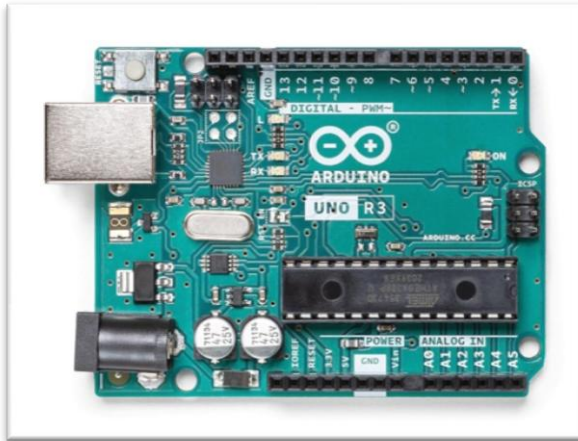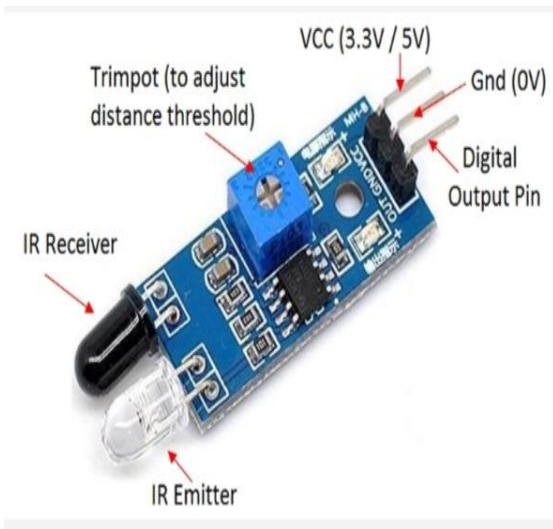
LIQUID CRYSTAL DISPLAY (LCD)

It is 16*2 Liquid Crystal Display. It is used for displaying traffic density

INFRARED SENSOR (IR SENSOR)

It is used for motion detection and indicates the traffic density.

ULTRASONIC SENSOR

It is used for measuring the distance to an object using ultrasonic sound waves.

RELAY MODULE

It is used for driving heavy loads like 12V DC Motor.

Wi-Fi MODULE

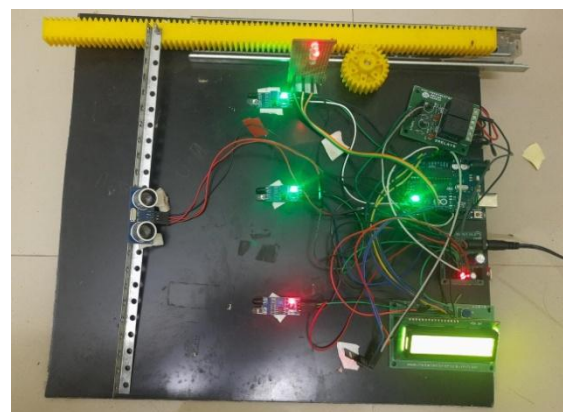It is used for giving Wi-Fi access to microcontroller.

PINION SET & GEAR PULLEY RACK

It is used for moving divider.

SOFTWARE REQUIREMENT:

Arduino IDE: It is used for implementing code required for project.

ThingSpeak IOT server: It used for graphical representation of traffic density.

V. IMPLEMENTATION

The steps for the proposed system are as mentioned below:

Step 1:

Initialize the microcontroller and other components by providing power supply.

Step 2:

Getting status from the IR Sensors.

Step 3:

If the IR 1 sensor is HIGH, then it displays NORMAL traffic on the LCD screen.

Step 4:

If the IR 2 sensor is HIGH, then it displays MEDIUM traffic on the LCD screen.

Step 5:

If the IR 3 sensor is HIGH, then it displays HIGH traffic on the LCD screen.

Step 6:

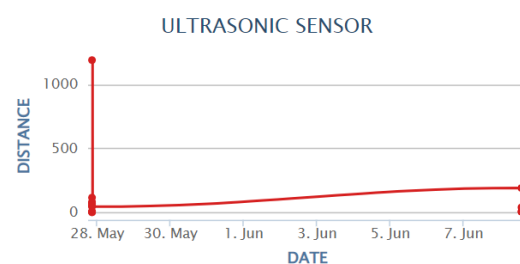If all the three sensors are HIGH and the distance of the vehicles is very near to ULTRASONIC sensor.
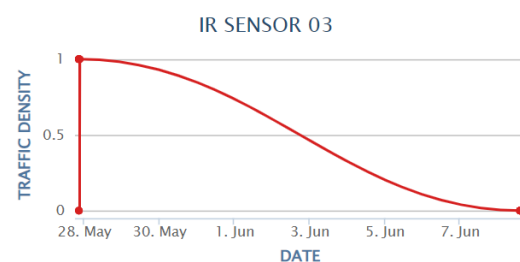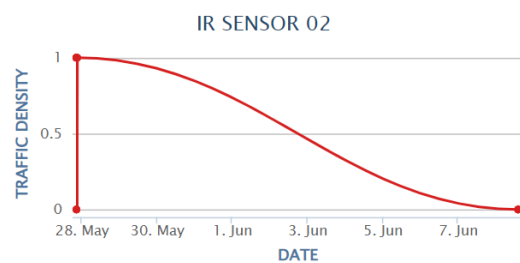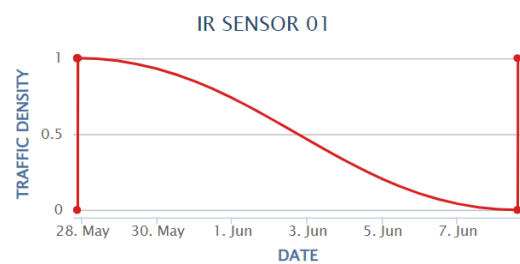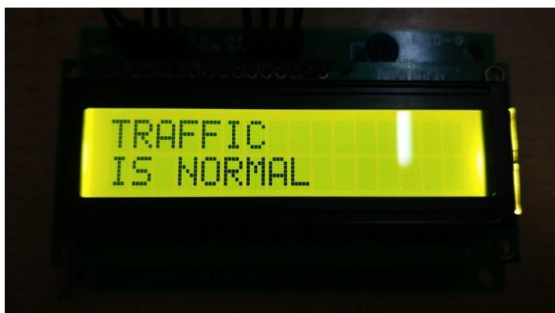
Step 7:

If step 6 is satisfied motor moves the divider.

Step 8:

Entire traffic density is uploaded to the cloud by WI-FI and traffic density analysis is represented in the form of graphs.

VI.   RESULT

VII. CONCLUSION

A prototype model of a Smart Movable Road Divider using Embedded Technology have been proposed for reducing traffic congestion and making traffic management smarter. By this proposed model we can provide the smarter routes for vehicles reducing delays in traffic.

VIII. FUTURE SCOPE OF THE PROJECT

If we can share the traffic density at one traffic spot with the other traffic stations, we can block the roads of the heavier traffic and direct the vehicles in alternative ways if the destiny of the vehicles are towards the same place having multiple routes.

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