Real Time Traffic Signal Time Operating and Ambulance Preference

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Abstract- *Traffic congestion is one of the major problem in today's world, which is need to be solved to improve traffic control and management. Vehicle flow detection appears to be an important part in today's traffic management system. The traffic flow shows the traffic state in fixed time interval and helps to manage and control the traffic especially when there is a traffic jam. In this project, we propose an automatic traffic management system for vehicle detection, counting and automatic signal scheduling. The population of the developing countries is increasing gradually due to which the traffic density is increasing at a high rate which requires the need of automatic traffic management system to replace the conventional, manual and time based traffic signal system. The increased traffic has lead to long waiting time, fuel wastages, slower speed, and increased vehicular queuing. Current traffic signals have fixed amount of time. It does not check any conditions which is vehicles are available or not and if not then signal wait up to its time over. So we need to change such type of system like if vehicle are not available in current green signal road then signal control automatically transferred to next signal. So in this way we minimize waiting time and provide some fast process. Another problem with signal, there is no any indication for ambulance where patient is in emergency condition, for that we are providing such system which gives preference to emergency vehicle like Ambulance.*

Keywords-RFID, IR Sensor , Arduino Board, Bluetooth Module HC-05.

I. INTRODUCTION

The commonly used Traffic Signal System in developing countries is the time based system. This system involves a preset time interval setting for each road junction. The system is based on one minute time interval, the vehicles are allowed to move at the junction where the traffic light is green for a certain interval of time, but after one minute it comes to a stop when the traffic light turns red. Sometimes there are no vehicles on a particular lane but still it is given green signal because the traffic signals change depending upon time interval. Urban areas are facing severe traffic congestion problems which need to be solved and this is not possible by existing traffic systems which works on predefined technique instead of real time data. An automatic

traffic management system can solve these problems by continuously sensing traffic density at different signals and accordingly adjusting the timer for traffic lights on the side at which there is more vehicular density. It will also communicate and synchronize with neighboring traffic signals. This traffic management system will additionally provide us useful information such as traffic flow density, the length of vehicular queue, average traffic speed and the total vehicle count in a fixed time interval.

II. RELATED WORK

A.D.Jadhav, :proposed an "Intelligent Traffic Light Control System" which aims at reducing the delay on roads by reducing the amount of traffic. This paper includes analyzing the traffic flow of each road along with the signals and assigns time period to glow the respective light The proposed system tries to minimize the possibilities of traffic jams, to some extent by clearing the road with higher density of vehicles The road which is recorded with more traffic density then other roads will be assigned with a green signal and all other roads will be assigned with red. This paper focuses to reduce traffic congestion on roads which results in long waiting times, loss of fuel and money.

Sivakumar.R, Vignesh.G, Vishal Narayanan, Prakash.S, Sivakumar.V: proposed an "Automated Traffic Light Control System and Stolen Vehicle Detection" proposes a machine controlled Aggregation of vehicles (traffic) power to direct system that smartly used to avoid crowding of vehicles, ambulance headway and detection of stolen vehicle. Each transport vehicle is furnished with (RFID'S) Radio Frequency Identification tag to ascertain in Aggregation of vehicles (traffic) signal.

Ruthvik Gautham,: proposed an Automated Traffic Signal which provides a smooth flow to Ambulance vehicles by introducing a dynamic traffic signal. This paper focuses on providing a smooth flow to ambulance using non pre-scheduling where the sole resource is time. The traffic density on each road will be measured by using Radio Identification Readers to count the number of vehicles.

Gajanan P. Dhok, Sarika B : exploit the emergence of new technology called as Intelligent traffic light controller, This makes the use of sensor n/w along with embedded technology. Where traffic light will be intelligently decided based on the total traffic on all adjacent roads. Thus optimization of traffic light switching increases road. Capacity, traffic flow and can prevent traffic congestions.

Hardware Implementation:

Rfid [Radio Frequency Identification]: This technology provides an object tagged recognition which will support the dynamic traffic signal . It is a technique that uses the radio waves to identify the object uniquely. RFID system consists of a Reader and one or more Tags. The RFID tags consist of 12 digit unique code is used to identify the objects uniquely. The tags can be classified as active or passive; in our system we use passive tags because of its long life and ease of maintenance. The reading range of tag depends on various parameters like environmental condition, frequency of operation and antenna size.

Fig:RFID tag

IR Sensor [Infrared sensor]

An IR sensor is an electronic device which is used to sense object of its surroundings by either emitting and/or detecting infrared radiation. IR sensors are also capable of measuring the heat being emitted by an object and detectingmotion.
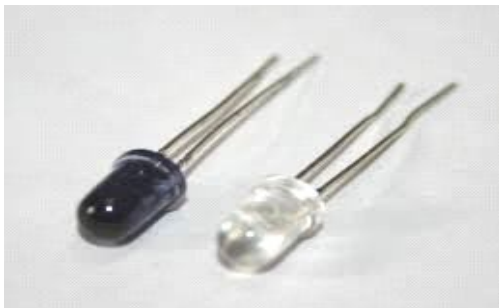
Arduino Board:

Arduino is a computer hardware ,software company, project, and user community that manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. Arduino boards are accessible commercially in preassembled. The Arduino project provides an IDE (integrated development environment) based on the Processing language project.

Bluetooth module:

Bluetooth is a wireless technology for exchanging data over short distances from fixed and mobile devices, and building PANs (personal area networks). Range is approximately 10 Meters.
- HC-05 is more capable module that can be set to be either Master or Slave.
- HC-06 is Slave only device. It looks physically like the HC-05.

They have no pins and usually solder to a larger board.


Software Implementation

Android App :

We are developing an Android Application, which will be entitled to see the system work. The Android App and System communication done with help of Bluetooth.

There is one way communication (from system to Android App).The send and receive pins IX and TX respectively. We are creating different panals for different system stages.

III. PROPOSED SYSTEM

In the proposed system, we aim at providing an efficient traffic management scheme which provides priority to Ambulance & helps to control heavy traffic .The operation of Automated Traffic Controller is as shown in the Figure .
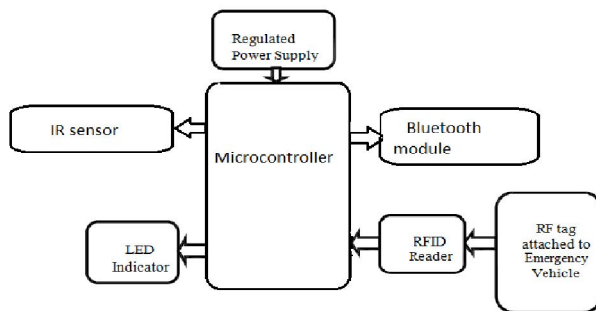
The proposed system is implemented for a multilane traffic junction and the operations are carried out using Microcontroller which is the Heart of the system. The whole setup consists of Arduino board, RFID , IR sensors , Bluetooth module and Android mobile application for identifying the ambulance and providing automatic traffic management. Initially, the traffic light signals are programmed in all the areas in order to vary from red to yellow, yellow to green and green to red within particular time interval. When one face is green, all the signals in other faces are in red.

Using the RFID system the traffic problems that usually arise with standard traffic control systems can be avoided. We placed IR sensors beside a road. This sensors sense the vehicles and send signal message to the arduino board. Then aurduino board takes smart decision about traffic signal and sends current system status on Android Mobile Application via Bluetooth module. The traffic signal indication continuously glows to green as long as the Ambulance vehicle does not cross the traffic junction. Once the Ambulance vehicle, crosses the junction automatically the traffic signals continue their idle 2operation.

IV. WORKING PROCEDURE

A.   Automatic Traffic Signal Time Operating

IR sensors calculate the time according number of vehicle on each road. This sensors sense the vehicles and send signal message to the arduino board. Then aurduino board takes smart decision about traffic signal on the basis of Any Ambulance is detected?? If Ambulance is not detected then Calculate the time for lanes & clear traffic according to that.

B.   Priority to Ambulance

Arduino board takes smart decision on the basis of Any High PriorityVehicle is detected?? Then timing of signal is adjusted according to the priority of Ambulance vehicle detected on each road. The RFID tags will be attached to the ambulance, when this ambulance passes through the lane the tag would be read by the reader and ambulance/Ambulance vehicle would be detected if the Tags Unique Identification Code (UID) matches with the preset code. Once the RFID Tag code matches, then the bluetooth Module sends a unique message such as Ambulance to the arduino board placed at the Traffic Junction. Once the unique message is received and verified, the ideal operation is halted and the path where the ambulance is detected turns green.
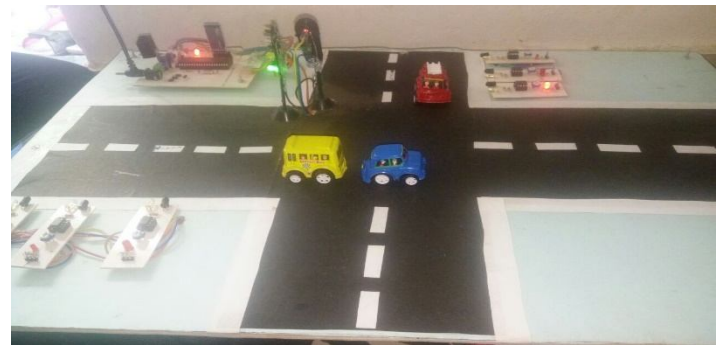
C. Output

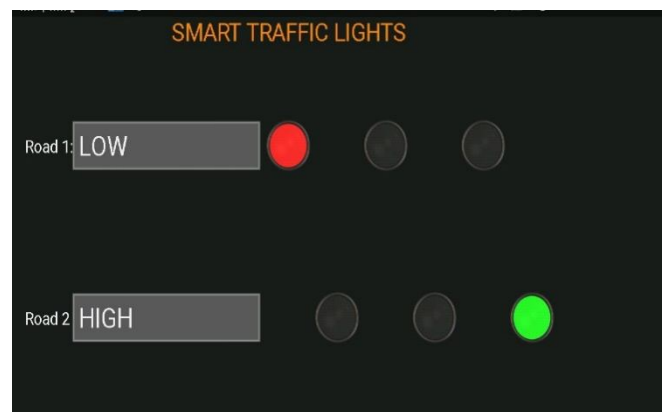
Fig: System shows flow of traffic management.

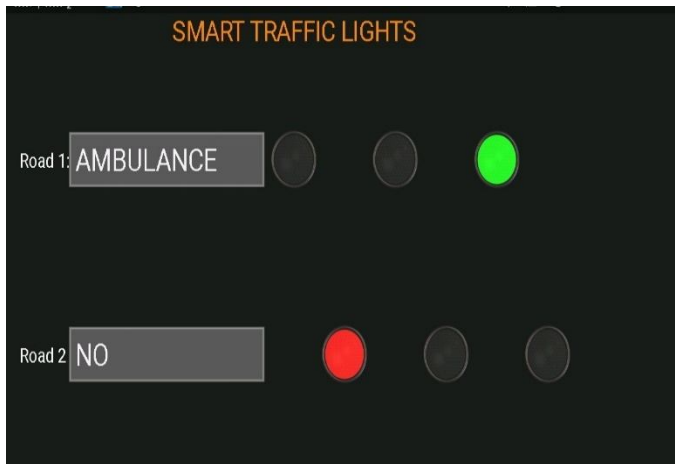Fig: Android App shows result of Traffic Density on Roads

Fig :Android App shows result of Ambulance preference on Road 1.

V. CONCLUSION

This system is a RFID based traffic controlling system which is a real time application. It will manipulate the signal timer according to the density of vehicles and hence manage the traffic flow. It will sense all vehicles in every lane and the system to work fast and efficiently in real time. Also the signal timer scheduling will be done very effectively thus controlling heavy traffic and will consider Emergency vehicle like ambulance giving it priority to go. Thus, this system will be very useful to manage heavy traffic in metropolitan cities.

ACKNOWLEDGEMENT

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