An Analytical Approach for Intellectual Traffic Control System

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Abstract -

According to Figure by word Automobile Industry, upto 2020 India will be Biggest Automobile sector market in world.It is very difficult to manage traffic on roadway and give bypass to important vehicle like ambulance or VVIP vehicle.So we have propose a system based on traffic control system using ultrasonic sensors and accomplishes dynamic timing slots with different levels.There is no facilities get provided for ambulance to cross the road rapidly. Due to which Ambulance has to wait on the signal until the traffic gets clear.So, in order to rectify this problem, we are going to make adaptive traffic control system. This system senses the density of traffic on a particular road and sets its own time according to the density on that road. After that according to the density the signal turns green for a particular time. The system provides an option to the controllers to override any signal and make it green in case of any ambulance or important vehicles to pass through while keeping other signals red. We can use this system to make our city a smart city.

*Key Words***:** Traffic Density,Aurdino, Rfid, Ultrasonic Sensor,

1.INTRODUCTION

Vehicular traffic control at road crossings has always been a matter of concern for administrations in many modern cities around the world. Several attempts have been made to design efficient automated systems to solve this problem. Most of the present day systems use pre-determined timing circuits to operate traffic signals which are not very efficient because they do not operate according to the current volume of traffic at the crossing. It is often seen in today's automated traffic control systems that vehicles have to wait at a road crossing even though there is little or no traffic in the other direction. There are other problems as well, like ambulances getting caught up by a red traffic signal and wasting valuable time. Congestion is often translated into lost time, missed opportunities, lost worker productivity, delivery delay and, in general, increased cost. Actually the traffic congestion is not only recurring (caused by recurring demand that exists virtually every day) but also non-recurring (caused by traffic incidents like damaged vehicles, crashes, work zones, weather and special events) in nature. To manage non-recurring congestion some sensor based systems were suggested for improvement over fixed timing controlled ones. However the performance was not satisfactory due to the 2 necessity of a direct line-of-sight (LOS) path between sensor and vehicles. Further, simultaneous multiple detections were difficult to handle with a sensor-based system. To solve these problems and to add further enhancements to the complex problem of vehicular traffic control at road crossings an Intelligent Traffic Control Systems (ITCS) is proposed using radio frequency identification (RFID). The key idea is based on the principle of RFID tracking of vehicles, a topic on which many organizations are doing extensive research. For example, a couple of months back Transcore released eZGoTM Anywhere onboard unit, a high speed RFID tag operating in 902-928 MHz frequency band designed for nationwide road toll collection in USA. Also it is worth mentioning the AeroScout tag, specifically designed for fast moving objects (upto 180 km/hr) which are being tested for possible implementation in vehicle tracking in Malaysia. Currently available hardware can be used to monitor vehicles at a read distance of 80-100m.

2. SYSTEM ARCHITECTURE

In the present system every traffic control signal is allotted fixed duration for opening of that particular signal whereas other is closed. Due to this reason many times we observe that the line having very less crowd are allotted for that fixed time whereas having huge crowd are stopped for that time which waste their time.When they are waiting they don't put off their vehicle cause in waste of fuel and increase in pollution. Due to heavy vehicle traffic on road the polluted gases passes through the breathing air, which is cause the normal human life. Our new traffic control system based on traffic density will definitely provide relief to a normal human being from the environmental pollution and traffic. They propose a system based on traffic control system using ultrasonic sensors and accomplishes dynamic timing slots with different levels.

There is no facilities get provided for ambulance to cross the road rapidly. Due to which Ambulance has to wait on the signal until the traffic gets clear. So, in order to rectify this problem, we are going to make adaptive traffic control system. This system senses the density of traffic on a particular road and sets its own time according to the density on that road. After that according to the density the

signal turns green for a particular time. The system provides an option to the controllers to override any signal and make it green in case of any ambulance or important vehicles to pass through while keeping other signals red. We can use this system to make our city a smart city.
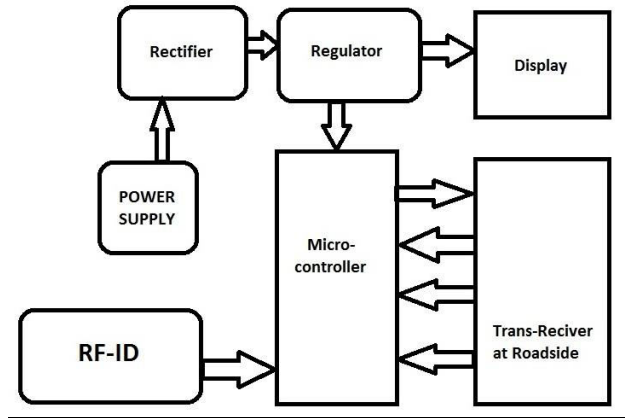

Fig -1: Block Diagram

As shown in figure 1, it can be seen that the main heart of this traffic system is Arduino. IR (sensors) receivers are connected to the analog pins of the Arduino (i.e.) A0-A8 and traffic lights are connected to digital pins (i.e.) 0-10. If there is traffic on the road, then that particular sensor output becomes low. By receiving these IR sensor outputs, coding is written to control the traffic system. Low output from these sensors will activate the green signal on that particular road side and other road sides are made to be red and yellow depending on the density of the road. The sensors are monitored for specified time interval.

2.1 Procedure

Connect the adaptor to the Arduino board. Switch on the supply.Load the program to the Arduino2560 microcontroller.Connect three IR sensors on each road. Connect LEDs to the digital pins of the Arduino. Arrange all the LED's same as traffic lights.Now if any obstacle(vehicles) is placed in front of any IR sensor, then the system allows the traffic of that particular path by glowing GREEN light. Set some delay time for the next signal to glow based on the sensor output.

3. SYSTEM COMPONENT
3.1. RF-ID Tag Structure

The function of the tag is to respond to a request for the data it carries. Figure 4 shows the bas structure of the RFID transponder, with its analogue front-end, coupled with its back- end digital circuitry. The transponder memory may comprise Read-Only Memory (ROM), Random Access Memory (RAM and non-volatile programmable memory for data storage depending upon the type and complexity of the device.
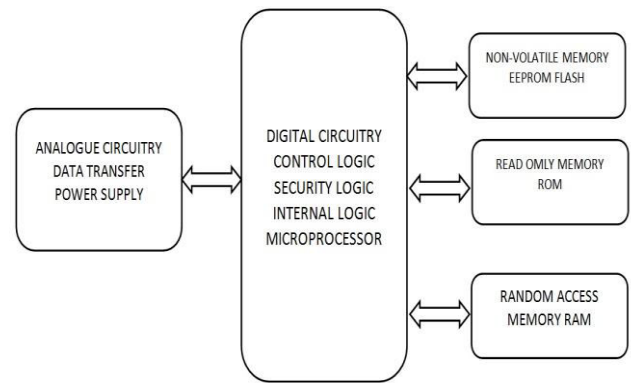

Fig -2: RF-ID Block Diagram

The non-volatile programmable memory is typically Electrically Erasable Programmable Read Only Memory (EEPROM). It is used to store the transponder data and must be non-volatile to ensure that the data is retained when the device is in its quiescent or power-saving "sleep" state.

3.2 Arduino

Arduino Uno is a microcontroller board based on 8-bit Atmega328P microcontroller. Along with Atmega328P, it consists other components such as crystal oscillator, serial communication, voltage regulator, etc. to support the microcontroller. Arduino Uno has 14 digital input/output pins (out of which 6 can be used as PWM outputs), 6 analog input pins, a USB connection, A Power barrel jack, an ICSP header and a reset button.

4. ADVANTAGES

➢ RFID based traffic signal monitoring and controlling have many advantages compared to time based traffic control.
➢ WE can avoid unnecessary occurrence of traffic jams which causes public inconvenience.
➢ We can save considerable amount of time.
➢ Low cost.
➢ Can enhance traffic signal performance.

5. CONCLUSION

This system senses the density of traffic on a particular road and sets its own time according to the density on that road. After that according to the density the signal turns green for a particular time. The system provides an option to the controllers to override any signal and make it green in case of any ambulance or important vehicles to pass through while keeping other signals red. We can use this system to make our city a smart city. This system will prevent accidents.

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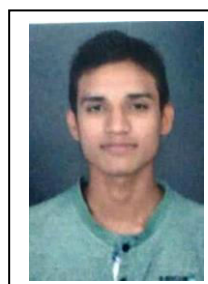

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