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Intelligent Traffic Management System

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Abstract:- Traffic signals play a major role in everyone's day –to- day life. Due to improper functioning of traffic signals, 14% of the total people who struggle for their lives are dead. About 34,000 minor accidents occur in a day in India. Every 4 minutes a person is dead due to flaws in traffic signal control system in India. In a day about 50 people die due to improper functioning of traffic signals in Tamil Nadu. The death tolls due to road accidents have increased by 10% in the year 2016 when compared to 2015. We propose a system in which the traffic signals are controlled from control centres. The traffic data of a particular signal is transferred from a computer to that signal through GSM (Global System for Mobile).With that data, the traffic is controlled automatically using a controller. The controller is programmed in such a way that the timing of each path is varied based on vehicle density with the help of traffic datum.

Keywords:- *LCD, Wi-Fi, GSM, ATMEGA162, Relay.*

I. INTRODUCTION

Traffic congestion is a severe problem in many major cities across the world and it has become a nightmare for the commuters in these cities. The Traffic congestion can also be caused by large Red light delays, etc. The delay of respective light is hard coded in the traffic light and it is not dependent on traffic. Therefore for simulating and optimizing traffic control to better accommodate this increasing demand is arises .One of the major problems faced by heavy traffic is by Ambulances. As we all know that Ambulances are the most important medical means of transport in any country as they carry patients to the nearby hospitals. But due to heavy traffic, one can often see the Ambulances stuck in traffic for long durations thus causing danger to patient's life. So, our project aims to solve this problem of Ambulances. When an Ambulance arrives, its corresponding lane traffic light becomes green and all the others become red, thus paving traffic less way for the Ambulance and thus helping it to reach the hospital swiftly.Finally,using the concept of ATMEGA we are providing passage to vehicles of extreme priority (VIP and Police cars), here we have installed Wi-Fi transmitter in one such vehicles, the moment it comes within the line of sight of the corresponding Wi-Fi receiver installed at a distance from the traffic light, it will send a signal to microcontroller and the respective lane's light goes green.

II. LITERATURE SURVEY

A. From "Intelligent Traffic Signal Control Using Wireless Sensor Networks", Vignesh. Viswanathan and Vigneshwar. Santhanam. It is observed that the use of wireless sensor networks to sense presence of traffic near junctions and hence route the traffic based on traffic density in the desired direction. This system does not require any system in vehicles so can be implemented in any traffic system easily. This system uses wireless sensor networks technology to sense vehicles and a microcontroller based routing algorithm for traffic management.

B. From "Intelligent Traffic Signal Control System Using Embedded System"

Dinesh Rotake, Prof. Swapnili Karmore, Nagpur.The ITSC system consist of high-performance, low power AVR_32 microcontroller with 32kbytes of in-system programmable flash memory and in-built 8-channel, 10-bitADC which is required to process the IR input from sensor network. The ITSC system will able to deal two basic problem of traditional traffic light system: i) Detection of traffic volume by using genetic algorithm. ii) Emergence vehicle detection such as ambulance, police etc by using wireless sensor network (IR) embedded at the signal intersection.

C. From "Intelligent Traffic Light Controller" J R Latha, U Suman Asst Professor, Gitam University, Hyderabad Campus. This makes the use of Sensor Networks along with Embedded Technology. The timings of Red, Green lights at each crossing of road will be intelligently decided based on the total traffic on all adjacent roads. Thus, optimization of traffic light switching increases road capacity and traffic flow, and can prevent traffic congestions. GSM cell phone interface is also provided for users those who wish to obtain the latest position of traffic on congested roads. This is a unique feature of this research which is very useful to car drivers to take an alternate route in case of congestion. The various performance evaluation criteria are average waiting time, average distance traveled by vehicles, switching frequency of green light at a junction, efficient emergency mode operation and satisfactory operation of SMS using GSM Mobile.

III. BLOCK DIAGRAM OF THE PROPOSED MODEL

A. LCD Display

A liquid crystal display (LCD) is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals (LCs). Ls do not emit light directly.

Liquid crystal displays (LCDs) have materials which combine the properties of both liquids and crystals. Rather than having a melting point, they have a temperature range within which the molecules are almost as mobile as they would be in a liquid, but are grouped together in an ordered form similar to a crystal.

B. WIFI

A Wi-Fi-enabled device, such as a pc, video game console, smartphone or digital audio player, can connect to the Internet when within range of a wireless_network connected to the

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Internet. The coverage of one or more (interconnected) access points called hotspots comprises an area as small as a few rooms or as large as many square miles. Coverage in the larger area may depend on a group of access points with overlapping coverage. Wi-Fi technology has been used successfully in wireless mesh networks in London, UK, for Wi-Fi provides service in private homes and offices as well as in public spaces at Wi-Fi hotspots set up either free-of-charge or commercially. Organizations and businesses, such a airports, hotels, and restaurants, often provide free-use hotspots to attract or assist clients. Enthusiasts or authorities who wish to provide services or even to promote business in selected areas sometimes provide free Wi-Fi access. As of 2008 more than 300 city-wide Wi-Fi (Muni-Fi) projects had been created. As of 2010 the Czech Republic had 1150 Wi-Fi based wireless Internet service providers.

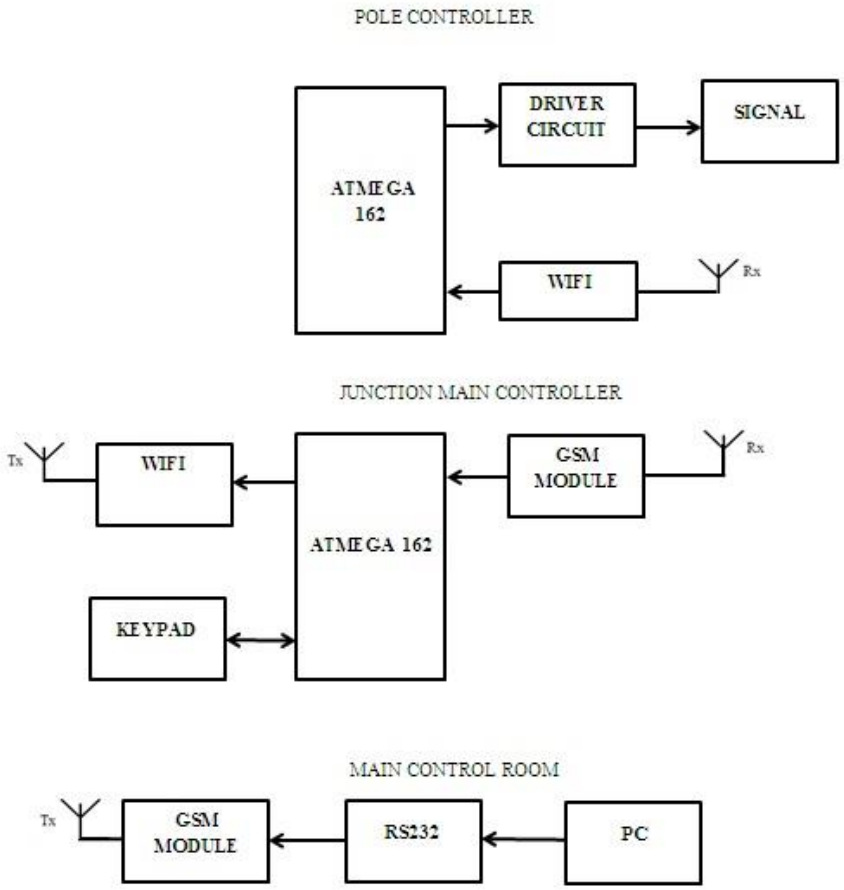

Fig. 1:- Block Diagram

C. GSM Module

SIM 800 is an electronic device which is used to connect the device for the communication purpose through data transferring networking. GSM Module assembles a GSM modem with standard communication interfaces like RS232 (Serial MI system. The power supply circuit is also built in the module that can be activated by using suitable adaptor. The GSM modem is a class of wireless MODEM devices that are designed for communication of a computer with GSM and GPRS network. It requires a SIM (SUBSCIBER IDENTITY MODULE) card just like mobile phones to activate communication the network .also they have IMEI number similar to mobile phones for their identification. The MODEM needs AT command, for inter facing with controller communicated through serial communication. This commends are send by the controller. The MODEM sends back a result after it receives a commend.

D. ATMEG162

AVR is a family of microcontrollers developed by Atmel beginning in 1996. These are modified Harvard architecture 8-bit RISC single-chip microcontrollers. AVR was one of the first microcontroller families to use on-chip flash memory for program storage, as opposed to one-time programmable ROM, EPROM, or EEPROM used by other microcontrollers at the time.

E. Relay

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits; the link is magnetic and mechanical.

IV. ADVANTAGES

A. Advantages of Smart Ambulance System:

- Ambulance service will no longer be affected by traffic jams.
- Use of radio frequency signal (not blocked by objects, fast).
- Over a wide range applicability.
- One time investment cost.
- Life of people can be saved.

B. Advantages of Traffic Density Control System:

- A modernized way of controlling traffic.
- Number of road accidents can be reduced to a large extent. Easy traffic regulation in busy cities such as Delhi, Mumbai etc.
- Help the traffic police in easy control of traffic

V. EXPERIMENTAL RESULTS AND SETUP

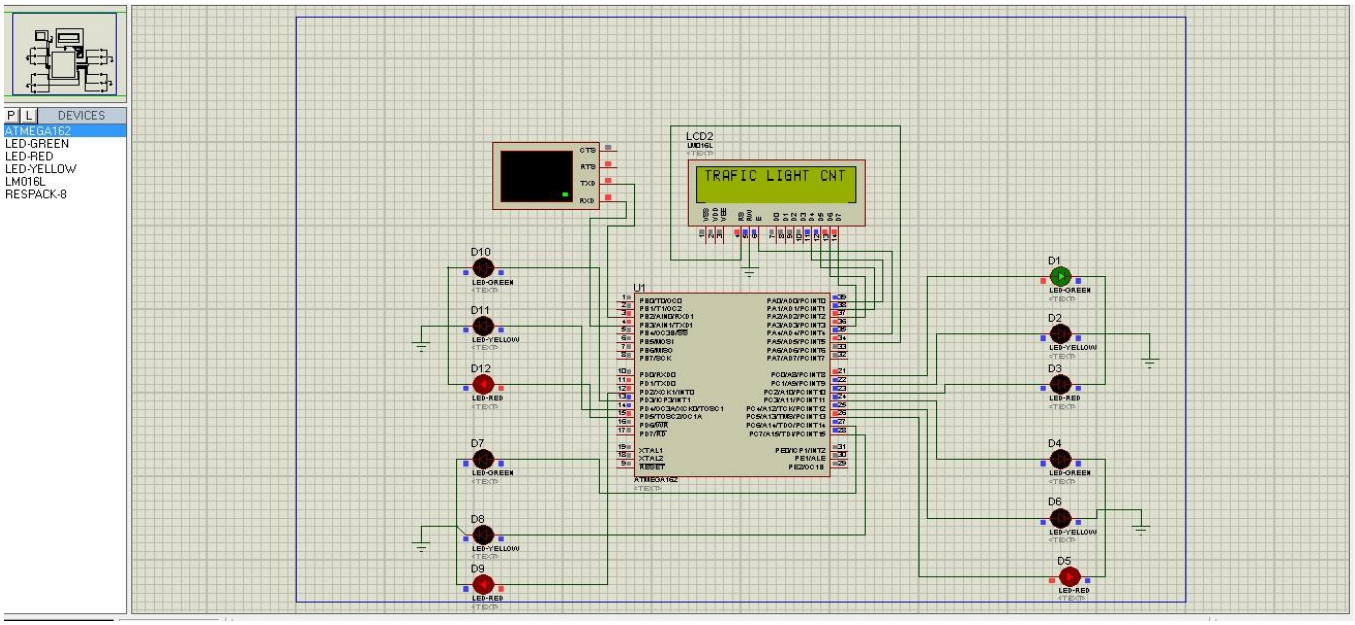

Fig. 2 :- Circuit Design

VI. THEORY OF OPERATION

We propose a system in which the traffic signal operates based on vehicle density data. The vehicle density data is obtained by continuous monitoring and updation of traffic at regular intervals. The vehicle density data obtained is stored in the server of control room. Then this data is transferred to signals through GSM module. Each signal will have a main controller (ATMEGA) and pole controllers. The main control selects the pole to be operated based on the data and sends command to the pole controller. The pole controller adjusts the timing based on the vehicle density which is pre-estimated by surveying. This system automates the traffic control system and wires are eliminated. Intelligent traffic management system holds good even in emergency situations or during unusual traffic as a control is provided at control room which can be used to modify or configure the unusual traffic. We also provide a Wi-Fi operated keypad to system at junction which is used to control the unusual traffic.

VII. CONCLUSION

The existing system which does not respond to density of vehicles can be replaced by intelligent traffic management system. This system uses a GSM Module and controls and adjusts the timing based density (survey). This system replace the wired system and automates the traffic control. It also provides complete control of traffic management of a particular city.

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