Automatic Intelligent Traffic Control System

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ABSTRACT: Traffic congestion is the biggest problem faced by densely populated countries like India, China etc. So, our project focuses on three areas-Ambulance, Priority vehicles (like VIP cars, police jeeps) and Traffic density control. The project is a replica of a four way lane crossing of real time scenario. In the first part, concentrated on problems faced by Ambulances, RFID concept is used to make the Ambulance's lane Green and thus providing a stoppage free way for the Ambulance. In the second part, concentrated on problems faced by Priority vehicles, IR transmitter and receiver are used to make the vehicles' lane Green and thus preventing traffic congestion. In the third part, concentrated on Traffic density control, IR transmitter and receiver are used to provide dynamic traffic control and thus increasing the duration of the Green light of the lane in which traffic density is high and hence, regulating traffic.

KEYWORDS: Traffic density control, RFID, IR transmitter and receiver, dynamic traffic control.

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. This is possible by the use of RF transmitters and Receivers. In the second use of our project, we aim at controlling traffic density using microcontroller. In this the system contains IR transmitter and IR receiver which are mounted on the either sides of roads respectively. The IR system gets activated whenever any vehicle passes on road between IR transmitter and IR receiver. Microcontroller controls the IR system and counts number of vehicles passing on road. Microcontroller also store vehicles count in its memory. Based on different vehicles count, the microcontroller takes decision and updates the traffic light delays as a result. The traffic light is situated at a certain distance from the IR system. Thus based on vehicle count, microcontroller defines different ranges for traffic light delays and updates those accordingly. Finally, using the concept of IR we are providing passage to vehicles of extreme priority (VIP and Police cars), here we have installed IR transmitter in one such vehicles, the moment it comes within the line of sight of the corresponding IR 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

Density, speed, and flow are the three critical parameters for road traffic analysis. High-performance road traffic management and control require real-time estimation of space mean speed and density as input for large spatial and temporal coverage of the roadway network. In Adaptive Traffic Control System which receive information from vehicle such as position and speed and then it utilize to optimize the traffic signal. The system specifies the use of onboard sensors in vehicle and standard wireless communication protocol Specified for vehicular applications. They

implement various traffic Signal control Algorithms [1].Intelligent traffic system for VANET suggest that creation for smart city framework for VANET consisting of Intelligent Traffic Lights which transmit warning messages and traffic statistic. In That System Various Routing Protocol Has Been Discus And Compare. They suggest that AODB is best suited for Intelligent Traffic Light [2]. Author suggest in reference [3] the data forecasting model for transmitting data from one to other. This article studied about the dynamic traffic control system and based on radio propagation model for predicting path loss &link. The author suggests in reference [7] Intelligence road Traffic signaling System. In that system OBUs used. OBUs used destination information for calculating load traffic on road for reducing the conjunction on road. The general belief is that it is more difficult to estimate and predict traffic density than traffic flow .In Intelligent Traffic Light and Density Control using IR Sensors and Microcontroller [4] the author propose that the delay of Signal not depend on traffic density. TheAuthor optimize the traffic using microcontroller this system reduce traffic jams problem cause by traffic light to extent. Thesystem contains IR Transmitter and IR Receiver. IR count the vehicles on the road Microcontroller generates the result. [8]Priority Based Traffic Lights Controller Using Wireless Sensor Network the author implements Adaptive Traffic control System based on (WSN) wireless sensor Network. In that System Time manipulation Used for controlling Traffic Light. This System Control Traffic over Multiple intersections.

III. BLOCK DIAGRAM OF THE PROPOSED MODEL

The block diagram of Detecting vital signs with wearable wireless sensors consists of following blocks:

1. PIC Micro Controller(16F877A)
2. Regulated Power Supply
3. 16x2 LCD Display
4. IR Transmitter & Receiver
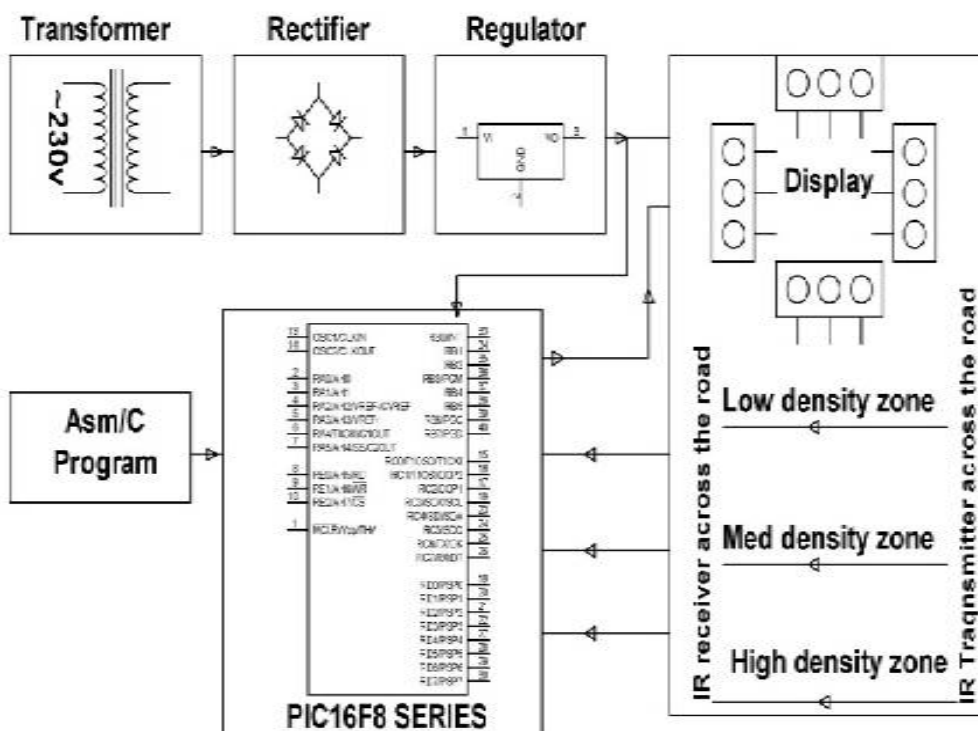5. RF Transmitter & Reciever
6. Smoke sensor
7. LED

Figure 1: Block Diagram the proposed system

The sensors used in this system are listed below:

SMOKE SENSOR

Structure and configuration of MQ-2 gas sensor is sensor composed by micro AL2O3 ceramic tube, Tin Dioxide (SnO2) sensitive layer, measuring electrode and heater are fixed into a crust made by plastic and stainless steel net. The heater provides necessary work conditions for work of sensitive components. The enveloped MQ-2 have 6 pin,4 of them are used to fetch signals, and other 2 are used for providing heating current

INFRARED SENSOR:

In this we have an IR detector and transmitter circuit, the IC 444 timer is working under monostable mode. The pin 4 i.e. reset pin is when grounded via IR receiver the pin 3 output is low. As soon as the IR light beam transmitted is obstructed, a momentary pulse actuates the relay output (or LED). The IR transmitter is simple series connected resistor network from battery. The timing capacitor connected to pin 2 and ground can varied as per requirement.

RADIO FREQUENCY SENSOR:

Radio-frequency identification (RFID) is the use of a wireless non-contact system that uses radiofrequency electromagnetic fields to transfer data from a RF transmitter attached to a vehicle (ambulance), for the purposes of automatic identification and tracking. These devices use a power source (9V) and emit radio waves (electromagnetic radiation at radio frequencies). The transmitter sends signal to the receiver which can receive from several meters (yards) away. Unlike IR devices, the RF transmitter does not need to be within line of sight of the receiver.

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DESCRIPTION OF THE MODEL:

 Traffic light optimization is a complex problem. With multiple junctions, the problem becomes even more complex, as the state of one light influences the flow of traffic towards many other lights Changes, depending on the time of day, the day of the week, and the time of year. Roadwork and accidents further influence complexity and performance. As the number of road Users constantly increases, and resources provided by current infrastructures are limited, intelligent control of traffic will become a very important issue in the future. However, some limitations to the usage of intelligent traffic control exist. Avoiding traffic jams for example is thought to be beneficial to both environment and economy, but improved traffic-flow may also lead to an increase in demand. There are several models for traffic simulation. In our project we focus on optimization of traffic light controller in a city using IR sensor and developed visual monitoring using microcontroller. Traffic light optimization is a complex problem. Even for single junctions there might be no obvious optimal solution. With multiple junctions, the problem becomes even more complex, as the state of one light influences the flow of traffic towards many other lights. In this paper, we propose three approaches, the firstly - to give authority to ambulances to pass the respective lane without delay, secondly – allow smooth passage of vehicles with maximum priority (VIP cars, POLICE cars), and thirdly – control traffic density of cross-roads by increasing the green light time. The project is a replica of a four way lane crossing of real time scenario. In the first part, concentrated on problems faced by Ambulances, RFID concept is used to make the Ambulance's lane Green and thus providing a stoppage free way for the Ambulance. IR transmitter and receiver are used to make the vehicles' lane Green and thus preventing traffic congestion. IR transmitter and receiver are used to provide dynamic traffic control and thus increasing the duration of the Green light of the lane in which traffic density is high and hence, regulating traffic.
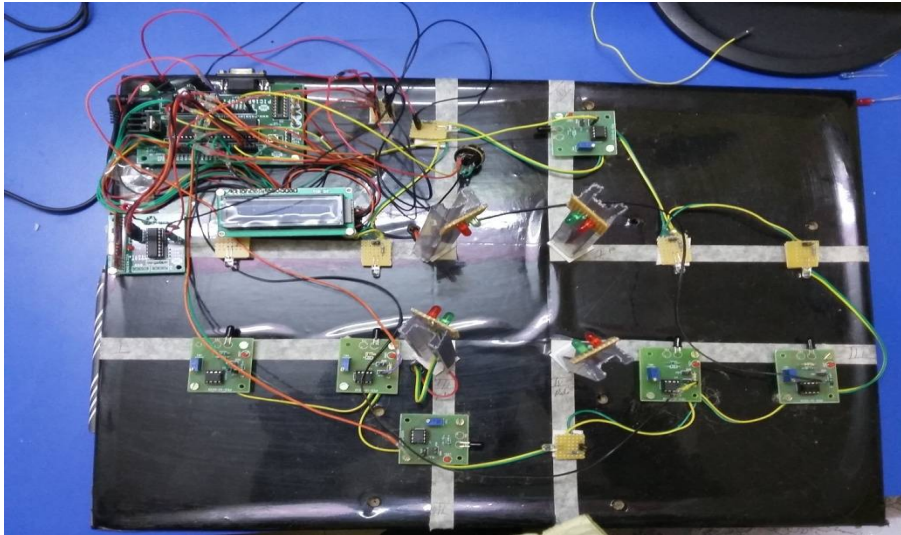
IV.EXPERIMENTAL RESULTS AND SETUP

Fig: 2 Photograph of proposed model

PIC16F877A is used to control traffic density by using IR sensors, way for special vehicles like VIP cars and Ambulance is provided by using RF sensor. Smoke sensor is used tp measure the amount of pollution over that cross section.

V.ADVANTAGES

Advantages of Smart Ambulance System:

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

Advantages of Traffic Density Control System:

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

VI. CONCLUSION

This Project which demonstrates an automated patient monitoring system has its own merits which are discussed above. We have presented some applications of how people could benefit from living in homes that have wireless sensor technologies for improving the quality of life. The first decade of research in the field of wearable technology was marked by an emphasis on the engineering work needed to develop wearable sensors and systems, recent studies have been focused on the application of such technology toward monitoring health and wellness. This consideration was the basis for this project review. This project summarized enabling technologies developed over the past decade and put a great deal of emphasis on surveying studies focused on the deployment of wearable sensors and systems in the context of a concrete clinical applications, with main focus on rehabilitation.This wearable module can transmit the

data continuously over a fiber optic link or through an internet digital radio. The received data can be stored in separate memory and be processed by a microcontroller.

VII. FUTURE SCOPE

- This project can be enhanced in such away as to control automatically the signals depending on the traffic density on the roads using sensors like IR detector/receiver module extended with automatic turn off when no vehicles are running on any side of the road which helps in power consumption saving.
- No. of passing vehicle in the fixed time slot on the road decide the density range of traffics and on the basis of vehicle count microcontroller decide the traffic light delays for next recording interval. In future this system can be used to inform people about different places traffic condition. This can be done through RADIO. Data transfer between the microcontroller and computer can also be done through telephone network, data call activated SIM This technique allows the operator to gather the recorded data from a far end to his home computer without going there
- Traffic lights can be increased to N number and traffic light control can be done for whole city by sitting on a single place.
- In ambulance system, the data of the patient in the ambulance can be sent to the Hospitals via GSM technology. Thus, it can provide early and fast treatment of the patient.

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