

INTELLIGENT TRAFFIC CONTROL SYSTEM FOR EMERGENCY VEHICLE

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Abstract : This paper presents the Intelligent Traffic Control for Congestion, Ambulance clearance, and Stolen Vehicle Detection. This system was implemented based on the present criteria that tracking three conditions, in those one is heavy traffic control and another one is create a path for emergency vehicle like ambulance and VIP vehicle. In this paper we are going to implement a sensor network work which is used to detect the traffic density and also RFID reader and tags. We use ARM7 system-on-chip to read the RFID tags attached to the vehicle. It counts number of vehicles that passes on the way at specified duration. If the RFID tag read belongs to the stolen vehicle. GSMSIM300 used for sending the message to the police control room. Also when an ambulance approaching to the junction, it will communicating with the traffic controller in the junction in order to turn on the green light. This module uses the Zigbee module on CC2500.

IndexTerms - Zigbee CC2500, ARM-9, ambulance vehicle and stolen vehicle, congestion control, traffic junction.

I. INTRODUCTION

The goal of this project is to control the traffic congestion and detect the stolen vehicle. INDIA is the most populous country in the world and it is a fast-growing financial prudence. Now a days INDIA facing that the terrible road congestion problems in cities. When compared to that infrastructure and vehicle growth, thus the vehicle growing up by the very fast manner based upon the space and effective cost. Also, Indian traffic is non-lane based, so It need a traffic congestion control solution, but which is different from other countries? In the recent years, wireless networks are widely used in the road transport as they provide more cost-effective option. Technologies like XBee, GSM and RFID can be used in traffic control to provide optimal solution. RFID system is a wireless technology that uses radio frequency electromagnetic energy to carry information between RFID tags and RFID reader. Some RFID system will be passing the information within the range it may and RFID reader. Some RFID system will only work within the inches or centimeters, while others may pass the information for 100meters or more. A GSM-(Global System Mobile communication) is a special type of modem, which accepts the SIM card and operates over a subscription to a mobile operators, just like a mobile phone. The XBee operates at low-power and can be used at all the levels of work configurations to perform predefined task. It operates in ISM bands (868MHz) in Eroupe, (915MHz) in USA and Australia, (2.4GHz) in rest of the world. The entire project is grouped into 5 parts. Section-2 talks about the literature survey. Section-3 is discussing about the current problems that exist in making way to an ambulance and other vehicle and how the proposed model will overcome the problems faced in developing countries and developed countries. Section-iv gives the implementation of the proposed model. Section-5 talks about the enhancement of this work.

II.BLOCK DIAGRAM

The implementation of the proposed system mainly involves three steps, in that the first one is congestion control, then the second is ambulance clearance and the last is to detect the stolen vehicle. The block diagram of the proposed system is given below.

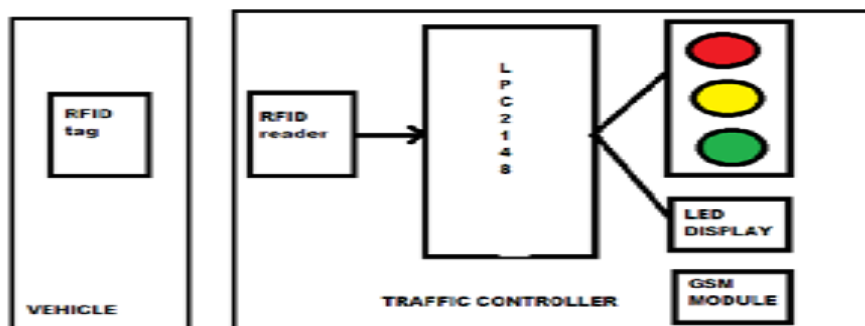


Fig1-block diagram

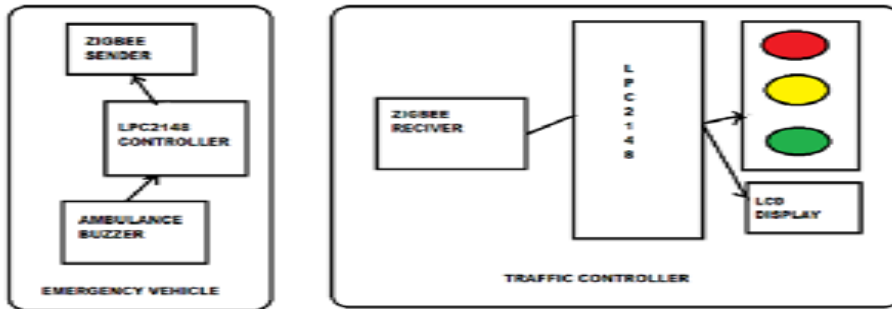


Fig2-block diagram

III. DIAGRAM IMPLEMENTATION

When working with electronic, we need one basic thing that is power. In every electronic circuit power supply is required. So the proper working of each and every circuit, we have to give the exact amount of voltage and current. In case the power exceeds its limit, then the circuit may be burst (or) it may be fatal effect. We can give the +5V power supply, it's based on the commercial 7805 voltage regulator IC. This type of IC will produce a steady +5V output, accurate to within 5% (0.25 volt). It's also contains power limiting circuitry and thermal overload protection, so that the IC won't be damaged in case of excessive load current, suddenly It's reduce the output voltage.

a). The initial part contains automatic signal control system. Each vehicle equipped with an RFID tag. When it comes in the range of RFID reader, it will send the signal to the RFID reader. Then the work of RFID reader will track the how many vehicles have passed through for a specific period and determine the congestion volume. Based upon the prediction it will set the green light duration for the path.

b). The second part contains the emergency vehicle clearance. Here each vehicle contains Zigbee transmitter and Zigbee receiver will be implemented at the traffic junction. The buzzer will be switched ON when the vehicle used for emergency purpose. The following components are used in the experiment are CC2500RF module, Microchip ARM-7, RFID Reader-125KHz-TTL and SIM300 GSM module.

c). If a match is found, it sends SMS to the police control room and changes the traffic light to red, so that he vehicle is made to stop vehicle is made to stop in the traffic junction and local police can take appropriate action. List of components we used for this experiment are CC2500RF module, Microchip ARM-7, RFID Reader-125KHz-TTL and SIM300 GSM module.

IV ZIGBEE MODEL

The CC2500 is a RF module and has trans receiver, which provides an easy way to use RF communication at 2.4 GHz. Every CC2500 is equipped with the ARM-7, which contains Unique Identification Number (UIN). This UIN is based on the registration number of the vehicle. One of the most important features is serial communication without any extra hardware and no extra coding. Hence, it is a trans receiver as it provides communication in both directions, but only one direction. The ARM-7 and CC2500 always communicate with ARM-7 via serial communication. Rx pin of CC2500 is connected to Tx (RC6) of microcontroller and Tx pin of CXC2500 is connected to Rx pin of microcontroller (RC7). Other two pins are used to energize trans receiver. It is used to transmit and receive the data at 9600 baud rate. Figure 4.1.a shows the image of trans receiver. Here, we uses CC2500 Zigbee module and it has transmission range of 20 meters.

Features of zigbee

1. Operating frequency-2.4GHz.
2. Supply Voltage-2.8 to 3.4 V.
3. Urban range-100 ft.
4. RF data rate -250000bps



Fig-Hardware for ZIGBEE model

V. GSM model

GSM modem connected with the ARM-7 microcontroller. This allows the computer to use the GSM modem to communicate over the mobile network. These GSM modems are most frequently used to provide mobile Internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages. GSM modem must support an “extended AT command set” for sending/receiving SMS messages. GSM modems are a cost-effective solution for receiving SMS messages, because the sender is paying for the message delivery. SIM 300 is designed for global market and it is a tri-band GSM engine. It works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz. SIM900 features GPRS multi-slot class 10/ class 8 (optional) and supports the GPRS coding schemes. This GSM modem is a highly flexible plug and play quad band GSM modem, interface to RS232, it supports features like voice, data, SMS, GPRS.

VI. RFID

Radio Frequency Identification (RFID) is an IT system that transmits signals without the presence of physical gadgets in wireless communication. It is categorized under automatic identification technology, which is well established protocol. The working of an RFID system is very simple. The system utilizes tags that are attached to various components to be tracked. The tags store data and information concerning the details of the product of things to be traced. The reader reads the radio frequency and identifies the tags. The antenna provides the means for the integrated circuit to transmit its information to the reader. There are two types of RFID categories, active and passive tags. The tags that do not utilize power are referred to as passive and they are driven by an antenna that enables the tag to receive electromagnetic waves from a reader. On the contrary, active tags rely on power and they have inbuilt power sources that enable it to send and receive signals from RFID reader. RFID range depends on transmit power; receive sensitivity and efficiency, antenna, frequency, tag orientations, surroundings. Typically, the RFID range is from a few centimeters to over hundred meters. FID reader uses frequency 125 KHz with a range of 10 cm.

FLOWCHART OF SYSTEM MODULE

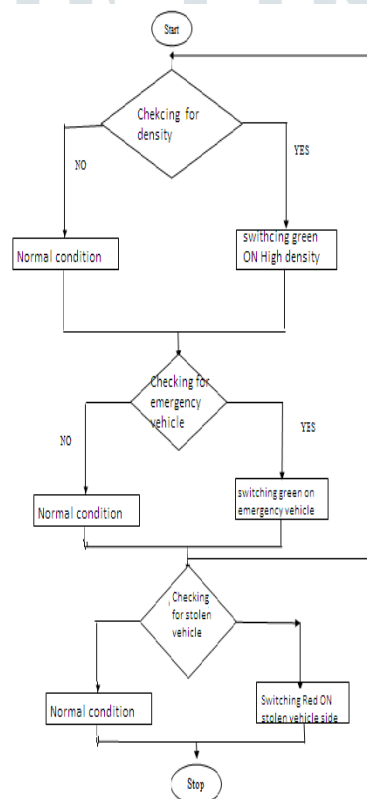


Fig-flow chart of system module

VII. PROPOSED WORK

Under the proposed work, each intersection contains RFID reader. The road is divided into two lanes. Each lane has its RFID to track the vehicles to passing through it. Each intersection point has its own data base to store the information regarding to vehicles that passes from it with timestamp and traffic light. Every vehicle has a RFID enabled device that stores a vehicle identification number (VIN). Every vehicle has its unique VIN number that provides the information that regarding the priority of vehicle and type of vehicle. With the help of VIN we can uniquely identify the vehicle and its owner.

Vehicle Identification Number: - In the proposed work RFID, tag will store vehicle identification number. These numbers is divided in three parts. First part represents the priority of the vehicles. Next part represents the type of vehicle and next, digit represents the vehicle number. In the proposed work, different types of vehicles have different type of priorities. Vehicles are divided into 4 categories. First system category includes Ambulance, Fire brigade vehicles and VIP vehicles. These vehicles have a highest priority. The second category includes the buses school and colleges buses. These buses need to reach their destination on time so these vehicles also need a fast service. Third category includes the car, motorcycle and scooter and forth category includes the heavy

vehicles. Day time priority of 3rd category is high as compare to 4th category but during night hours the priority of heavy vehicles is high.

VIII. CONCLUSTION

As the entire system is automated, it requires very less human intervention. With stolen vehicle detection possible junctions. Emergency vehicles need to reach their destinations at the earliest. If they spend a lot of time in traffic jams. With emergency vehicle clearance, the traffic signal turns to green as long as emergency vehicle is waiting in the traffic junction. The signal turns to red, only after the emergency vehicle passes through. Currently, it is implemented system by considering one road of the traffic junction.

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