

Intelligent Traffic Control System

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Abstract: Intelligent Traffic control system using Xigbee and gsm to develop system which is useful to control traffic effectively. The system monitors the live traffic and according to density of traffic the signals are controlled. Each vehicle is considered to be having its own unique rf id tag which is placed on position where it cannot able to remove. If the tag is of black listed vehicle detected on signal system send message to police control room. Xig bee placed on emergency vehicle used to send signal to system clear traffic on route before vehicle reach to the traffic signal point.

Keywords: Intelligent Traffic Control System, Xigbee, RF id tag, ZigBee, traffic signal point.

I. INTRODUCTION

Traffic on the roads of Indian cities is one of the serious problems [1]. Numbers of vehicle on city road is going to be increasing day by day but roads and infrastructure in the city is not increasing as expected [2]. Controlling traffic signal plays major roll to avoid congestion on the roads. This is controlling system also reduces efforts of police persons which are doing duties on signals. System is designed to monitor density of traffic on the road. If any emergency vehicle like ambulance or fire bridged or any VIP person's vehicle having xig bee will tell the system to clear traffic in critical conditions by turning on green on the path emergency vehicle is travelling. All other signals are turned to red. After passing this vehicle normal signaling is carried on as it is . The system also useful to detect theft vehicle used rf id tag which is placed on vehicle, tag is placed such as it can't be removed from vehicle. if rf id reader on signal is detected the theft vehicles tag it will send signal to the police control room. The system fully automatic no need of human to monitor, control, clear the vehicles. Less maintenance is needed. provides 24x7 monitoring and controlling of signal is available. We consider the system is self smart by sensing density with I- r sensors

II. LITERATURE SURVEY

In [4], green wave system was discussed, which was used to provide clearance to any emergency vehicle by turning all the red lights to green on the path of the emergency vehicle, hence providing a complete green wave to the desired vehicle. A 'green wave' is the synchronization of the green phase of traffic signals. With a 'green wave' setup, a vehicle passing through a green signal will continue to receive green signals as it travels down the road. In addition to the green wave path, the system will track a stolen vehicle when it passes through a traffic light. Advantage of the system is that GPS inside vehicle does not require additional power. The biggest disadvantage of green waves is that, when the wave is disturbed, the disturbance can cause traffic Problems that can be exacerbated by the synchronization. In such cases, the queue of vehicles in a green wave grows in size until it becomes too large and some of the vehicles cannot reach the green lights in time and must stop.

This is called over-saturation [5]. In [6], the use of RFID traffic control to avoid problems that usually arise with standard traffic control systems, especially those related to image processing and beam interruption techniques are discussed. This RFID technique deals with multivehicle, multilane, multi road junction areas. In [7], it proposed a RFID and GPS based automatic lane clearance system for ambulance. The focus of this work is to reduce the delay in arrival of the ambulance to the hospital by automatically clearing the lane, in which, ambulance is travelling, before it reaches the traffic signal. This can be achieved by turning the traffic signal, in the path of the ambulance, to green when the ambulance is at a certain distance from the traffic junction.

III. PROPOSED MODEL

Current system is not sufficient to control the main problem on traffic. They don't design to handle density based traffic, emergency clearance and theft vehicle detection. Our system works on three different problems. First is automatic signal control system. These passing vehicles having tags pass the reader then reader count each vehicle on road. Counting is done before every signal and compared with vehicles on all other sides. According to density signal time is adjusted. Second part is clear traffic for emergency vehicle. Emergency vehicle consist of zig bee module. This xig bee send signal to the system that emergency vehicle on route. For this vehicle signal for this route is converted to green and other all are red. Third is stolen vehicle detection. The RFID reader reads the RFID tag; it compares it to the list of stolen RFIDs. If it matches then system send message to the police control room.

A. ZigBee Module CC2500

It is rf module having transreceiver which provides two way communication. This module working on frequency of 2.4 GHz. the most important features is serial communication without any extra hardware and no extra coding. The microcontroller and CC2500 communicate with the serial communication mode. It is used to transmit and receive the data at 9600 baud rate. It has transmission range of 20 meters. ZigBee one of the wireless devices used for communication. This has wireless Low current

consumption (13.3 mA in RX, 250 kBaud, input well above sensitivity limit), Excellent receiver selectivity and blocking, Programmable data rate from 1.2 to 500 kBaud. It is Suitable for frequency hopping and multichannel systems due to a fast settling frequency synthesizer with 90 us settling time.

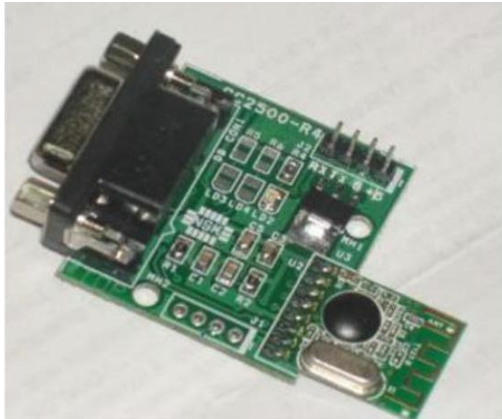


Fig 1. zig bee module

B. Microcontroller (PIC16F877A)

Peripheral Interface Control (PIC) type of controller IC. It executes each instruction in less than 200 nanoseconds. It has 40 pins and has 8K program memory and 368 byte data memory. it is easy to store large number of emergency vehicles. Interrupt option gives the advantage like jump from one loop to another loop. Less power and operates by vehicle battery itself.

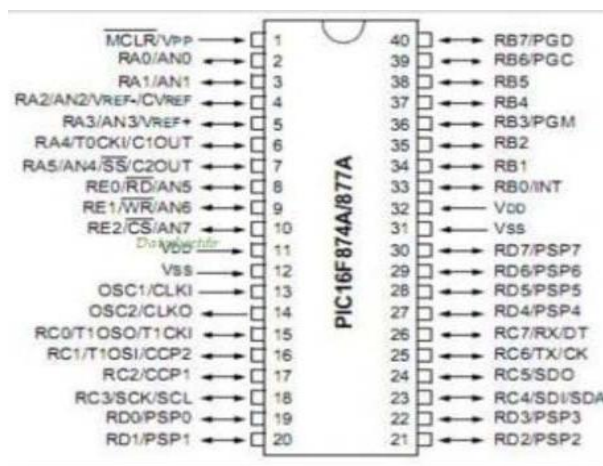


Fig2 PIC16F877A

C. GSM Module

These GSM modems are most frequently used to provide mobile Internet connectivity, many of them can also be used for sending and receiving SMS. GSM modem must support an “extended AT command set” for sending/receiving SMS messages. It works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz. Designed for global market, SIM300 is a Tri-band GSM/GPRS engine that works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS1900 MHz. SIM300 provides GPRS multi-slot class 10 capability and support the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4.



Fig4. GSM Module

D. RFID Tag and RFID Reader

RFID finds large scope in industries, shopping malls, institutions and departmental stores. RFID is the latest trend used to automate the systems providing long term benefits and eliminate the respective drawbacks. RFID is abbreviation of Radio Frequency Identification that uses Radio waves for communication and is rapidly gaining importance to boost the existing systems. The RFID tags can be programmed unique code. This code gets read when passing through the RFID reader. When a tag crosses the reader, the reader recognizes the unique code and updates the account of user. Modern readers have the capability of reading up to 15 tags at a time.

RFID Tag

It is made up of carbonic structure which contains magnetic strip or coil layer inside the tag which helps in sensing the tag. When radio waves from the reader are encountered by a passive RFID tag, the coiled antenna within the tag forms a magnetic field. The tag draws power from it, energizing the circuits in the tag. The tag then sends the information encoded in the tag's memory. The tag is typically much less expensive to manufacture.



Fig4. RFID Tag

There are two types of RFID tags: Active tags and Passive tags. Passive tags need to energize through a power source in order to improve their range for reading through the reader. They can be read up to a small distance of 10-15 cm, so the system is static. A passive tag is an RFID tag that does not contain a battery.

RFID Reader

Readers come in many forms, operate on different frequencies, and may offer a wide range of functionality. Readers may have their own processing power and internal storage and may offer network connectivity. RFID readers are used to interrogate data stored in tags. It contains radio frequency module, control unit and an antenna to interrogate electronics tags via radio signals. The antenna inside the reader generates electromagnetic field. When a tag passes through the field, the information stored on the chip in the tag is interpreted by the reader and sent to the server, which, in turn, stores or retrieves information about the book's issue or return. RFID readers can be in any form either fixed or handheld. In this project both are in use. RFID readers are placed both at entry and exit of the library.



Fig 5. RFID Reader

IV. BLOCK DIAGRAM

Before you begin to format your paper, first write and save the content as a separate text file. Keep your text and graphic files separate until after the text has been formatted and styled. Do not use hard tabs, and limit use of hard returns to only one return at the end of a paragraph. Do not add any kind of pagination anywhere in the paper. Do not number text heads-the template will do that for you.

As discussed earlier we are going to create system that works 24x7, monitor current density of traffic, provides ambulance clear path, detect theft vehicles. It compares traffic on each road and provides green signal more delay time for vehicle to pass on. After that if any emergency vehicle arriving at signal is detected by central controller to detect signal system through vehicle Zigbee. This Zigbee alert system before vehicle came to signal that instant green light turn on at that particular path. Traffic released and provided clear path for the vehicle. Every vehicle having RF ID tag which has special identity for each vehicle.

If any vehicle is stolen then its RF ID tag is fixed in system controller memory. Each vehicle on signal is compared with system RF ID tag signal. If match is found then that vehicle is stolen vehicle. This message is sent to the signal that vehicle is detected on particular vehicle path. This signal monitors all vehicles passing on signals.

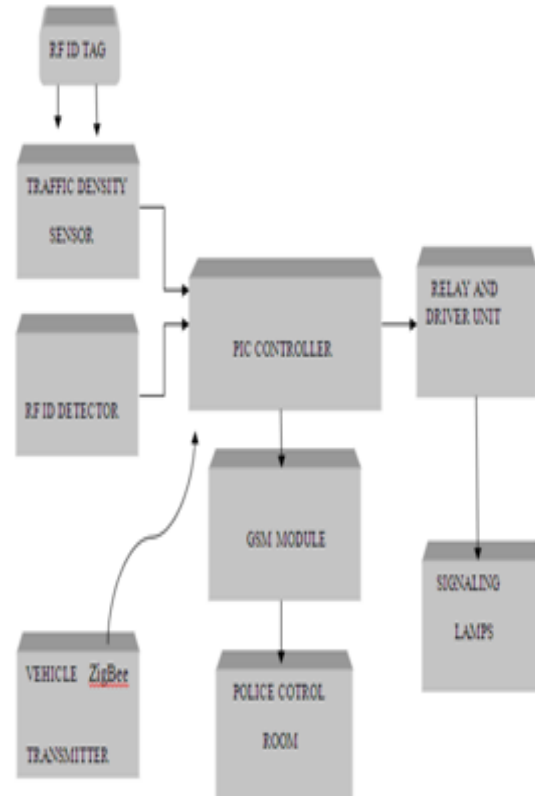


Fig 3 Block Diagram of System

V. ADVANTAGES AND DISADVANTAGES

Advantages:

- i. wireless controlling is possible by Zigbee and GSM systems.
- ii. Density monitoring is possible is automatically takes place and controlling is also possible.
- iii. Save time of the vehicles waiting on signal.
- iv. Reduce the workload traffic police and RTO Officers.
- v. 24x7 monitoring and controlling is possible.

Disadvantages:

- i. Zigbee range is limited so may cause some problems.
- ii. Tag detection and Tag recognition is very complicated so limits on system.
- iii. Density calculation has also add few limit to system.

VI. COCLUSION

From this system we able to control the traffic in the cities. We are able to calculate densities of vehicles. System intelligently changes its ON/OFF time according to traffic density. Automatically clear the road for emergency vehicles. If any theft vehicle is detected from its RFID tag then system will send the message to the police control vehicle.

VII. FUTURE SCOPE

In many countries traffic controlling is biggest problem. So many different ideas involves in this field. New research and technology is adoption in this work. This system we can use for servile of vehicles. We can add the video camera to take images and using image processing accurate density calculation can be made. We can use many idea related rf id tag s can given to vehicle special unique number. In this system range of Zigbee is limited to 100m. More new techniques can be increase to the range of the system.

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