Implementing Intelligent Traffic Control System for Congestion Control Ambulance Clearance andStolen vehicle detection

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ABSTRACT: In this advance traffic light system we are using Arduino mega in the receiver to control traffic lights based on IR sensors, this system is used to resolved density problem at traffic signals. In addition to that we are controlling traffic signals with respect to the presence of ambulance by using zigbee communication. In transmitter we are using arduino nano, zigbee TXand switches for controlling traffic lights. We can find theft vehicle with the help of RFID reader and tags. This information sends as SMS using GSM module.

Index Terms— Arduino mega, Arduino Nano, IR sensors, switches, zigbee TX, Rx, RFID reader and cards

1. INTRODUCTION:

Traffic congestion problem is a major problem in transportation system in country. This leads many problems especially when there are emergency vehicles at traffic light junctions those are always busy with many vehicles. A traffic light control system is designed to solve these problems. Vehicles on roads spread on traffic control system

to avoid accidents and travel safely to their. The high ways have of signs, signal lights, pavement marking to prevent the accidents. The signal light is one probably the most easily recognized traffic control device. At a busy junctions in a large city, a traffic signal may control the activities of more than 100,000 vehicles per day

2. LITERATURE SURVEY

Traffic congestion is important problem in towns of growing nations like china and India. In Indian website traffic needs a website site visitors manipulate solutions, which might be one in every of a type from the alternative global places. Smart management of traffic flows can decrease the poor effect of congestion. In modern decade wireless era are broadly used inside the excessive manner transport as they provide extra price powerful alternatives. Generation like ZigBee, GSM and RFID can be utilized in traffic manage to provide better answers.

In this project we are using density based traffic light control system which just resolves density problem but we have several other issues like emergency situation traffic control, stolen vehicles detection.

3. PROPOSED SYSTEM:

We are controlling two modes of operation with switch 1. To operate traffic light based on density of vehicles and 2. To operate traffic based on emergency situation with the help of

ZigBee communication. Fig 10 & 11 shows the arrangement of the transmitter and receiver sections.
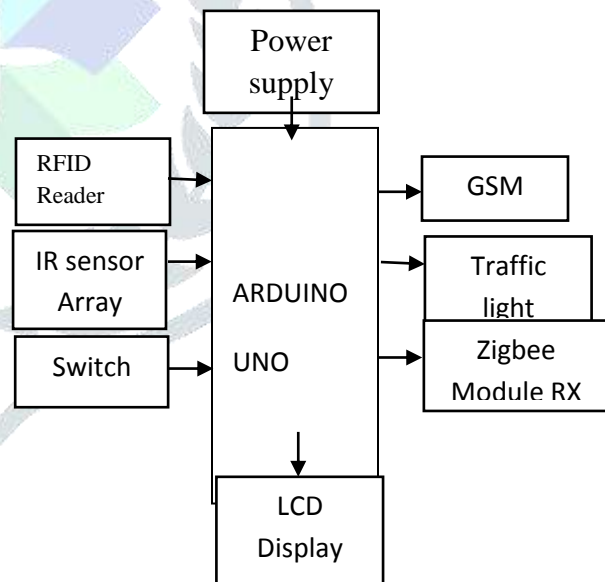
BLOCK DIAGRAM:

Receiver:

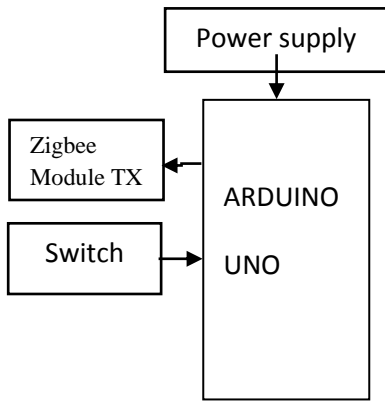Fig 1: Traffic control unit

Transmitter:

Fig 2: Implementation for ambulance.

A. ARDUINO:

The Arduino Micro Controller is a open source platform which has 6 analog pins, 14 digital pins, one serial port, one power jack and one USB jack for code dumping. Fig 3 shows the microcontroller.
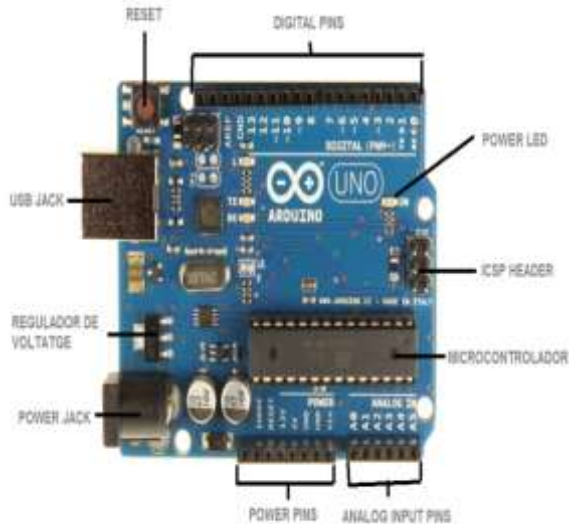

Fig 3: Arduino microcontroller.

B. LCD:

Here we are using LCD(liquid crystal display) with size 16*2 which means 16 columns and 2 rows. We can use LCD in two modes: 1. 4-bit mode and 2. 8- Bit mode.Fig 4 shows the LCD display.
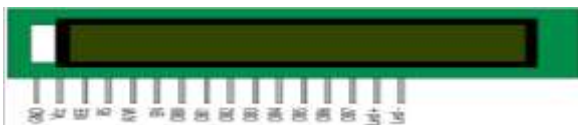
PinDiagram:

Fig 4: LCD Display unit.

C. GSM MODULE:

GSM module is used for sending and receiving messages by using AT commands.

AT Commands:

- AT commands are used for to control GSM module.

- AT refers to Attention.

- "AT+CMGF = 1" – To Set GSM mode.

- "AT + CMGS"– To send SMS message.

- "CTRL + Z" – Sending option.

Fig 5: GSM module.

D. RFID:

RFID refers to Radio Frequency Identification which is used to read 12 digits of alphanumeric data from RFID cards or tags.
This module can be used in many applications for identification, Internally RFID reader consists of inductive coil which transfer power by mutual induction to RFID cards or tags. RFID card consists of IC with unique ID of 12 digits ,Fig 6 shows the RFID reader.

Fig 6: RFID reader module.

E. IR SENSORS:

IR(infrared sensor) is like a proximity sensor which has two LEDS (i.e., one black led and one white led), one comparator (LM325) and potentiometer. Here white led transmits IR rays forward direction upto some extent if there is any obstacle in between some part rays will be reflected back. The black led

observes reflected part. The comparator observes frequency variation between incident and reflected waves. By this it will generate digital output.Fig 7 shows the IR sensor circuit.

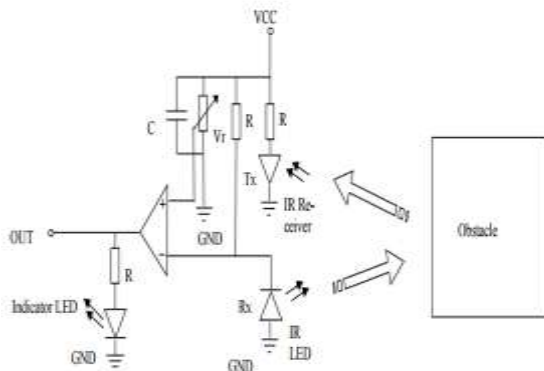| Pin No.	Connection	Description
1	Output	Digital Output (High or Low)
2	VCC	Connected to circuit supply
3	Ground	Connected to circuit ground

Fig 7: IR Sensor circuit

Working of the project:

Here we are controlling two modes of operation with switch 1. To operate traffic light based on density of vehicles and 2. To operate traffic based on emergency situation.

A. BASED ON DENSITY OF VEHICLES:
In this system there are four IR sensors on four sides It is used to observe density of traffic and gives inputs to Arduino for controlling traffic light. If none of the IR sensor is activated at junction microcontroller does provide the green signal for 5 Sec to the every way of the junction. If any IR sensor is activated microcontroller display that direction on the LCD display and provide the green signal 10Sec. fig 8 shows the density at west mode.

Fig 8: Density at West mode

B. BASED ON EMERGENCY SITUATION:
In this system we are using zigbee technology to control traffic lights with the inputs given from the switches in emergency vehicle through wireless communication.Microcontrollers display this information in the LCD display.Fig 9: display the emergency mode south.

Fig 9: Emergency south mode

c. DETECTION OF STOLEN VEHICLE:
In this system we are using RFID reader and card. Each card is assigned each vehicle if any unknown stolen vehicle is at the junction RFID reader read the vehicle tag and it will give message through GSM for the police control room with location.Fig 10 shows to message alert to police station.

Fig 10: Message alert to police station

4. RESULTS:

A. Transmission section:
Here the ambulance module is nothing but the transmitter section and it consists of Arduino, ZigBee and switches.
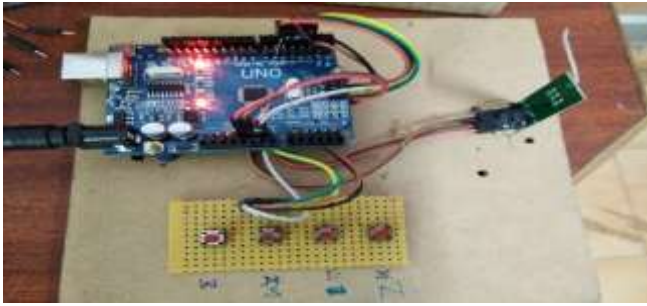
Fig 11: Ambulance section

B. Receiver section:

Here the receiver section is nothing but the traffic control unit which is shown in below figure.

Fig 12: Traffic controlling unit

Fig 13: Monitoring section

5. CONCLUSION:

We have designed a system to control traffic light for congestion control ambulance clearance and detection of stolen vehicle for four ways of the junction.

6.REFERENCES:

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Ch. Nagaraju(guide) he is currently working as Assistant professor in. Annamacharya institute of technology and science Affiliated to JNT University, Anantapur. He had done his M.Tech Specialization in ECE, and have 13 years of teaching experience. Her areas of control, power s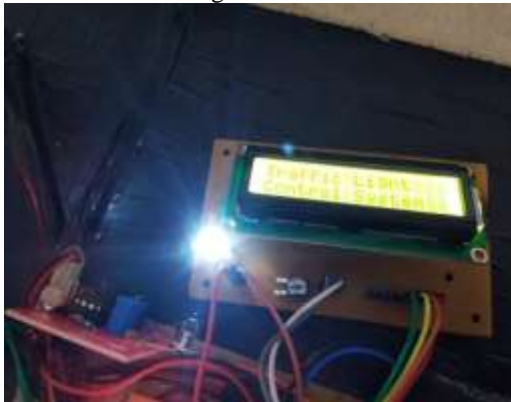ystems stability and protection.