

AUTO TRAFFIC SIGNAL TRANSITION FOR AMBULANCE AND FIRE AMBULANCE

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ABSTRACT: *The main aim of the project is to design auto traffic signal transition system using ZIGBEE technology for ambulance and fire ambulance. The main objective of the proposed Method is to prevent the ambulance / fire ambulance from getting stroked in traffic congestion. If the ambulance gets caught up in traffic congestion, there is a risk of patient death. By using this system, the traffic congestion can be prevented. In this project, we have designed an intelligent traffic management system that can clear the traffic congestion using Wireless Communications technology. In this proposed system, the ambulance is fitted with the RFID TAG and RFID READER is placed at signal points. In this signal points RFID reader is used to identify the ambulance vehicle or not and ultrasonic sensor is used to find the vehicle crossing, based on the signal the zigbee transmitter is used to transmit the signal from one signal point to next point, based on signal the green led is ON in that junction.*

Keywords: AT89S51 microcontroller, zigbee module, ultrasonic sensor, RFID reader and RFID tag.

I. INTRODUCTION

1. EXISTING SYSTEM: When an Ambulance approaches the signal junction, the transmitter in the Ambulance sends signal to the receiver which is placed at the traffic signal junction. Whether is Low traffic density, or Medium traffic density, or High traffic density, the Green light will be on for 60 seconds for the Ambulance to pass through the signal junction. With this technique, a new era of traffic signal control is entered.

2. PROPOSED SYSTEM: The proposed method is to prevent the ambulance / fire ambulance from getting stroked in traffic congestion. If the ambulance gets caught up in traffic congestion, there is a risk of patient death. By using this system, the traffic congestion can be prevented. In this project, we have designed an intelligent traffic management system that can clear the traffic congestion this is done by using zigbee transceiver as it transfers the information to receiver that an ambulance is detected then it automatically passes the next two signal indicating green to ambulance as it make the path clear to pass the ambulance easily without any traffic congestion using Wireless Communications technology.

II. COMPONENTS DESCRIPTION

- 8051 microcontroller
- zigbee transmitter
- zigbee receiver
- Ultrasonic sensor
- RFID reader and tag

A. 8051 Microcontroller: The AT89S51 is a low- power, high-performance CMOS 8-bit microcontroller with 4Kbytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pin out.

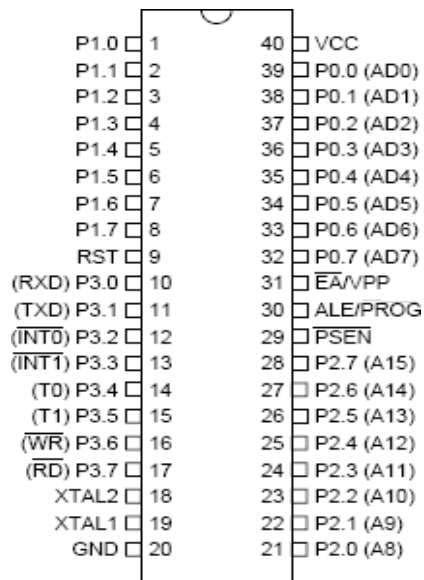


Fig 2.1 pin diagram of 8051 microcontroller

The AT89S51 provides the following standard features: 4K bytes of Flash, 128 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, two 16-bit timer/counters, a five vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry

B. Zigbee Transceiver: Zigbee is an IEEE 802.15.4-based specification for a suite of high-level communication protocols used to create personal area networks with small, low-power digital radios, such as for home automation, medical device data collection, and other low-power low-bandwidth needs, designed for small scale projects which need wireless connection. Hence, zigbee is a low-power, low data rate, and close proximity (i.e., personal area) wireless ad hoc network.

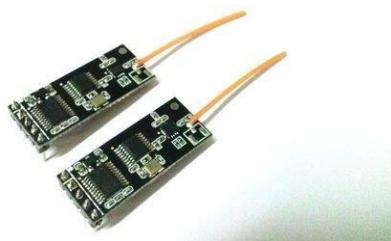


Fig 2.2 Zigbee transceiver

C. Ultrasonic sensors: An Ultrasonic sensor is a device that can measure the distance to an object by using sound waves.

It measures distance by sending out a sound wave at a specific frequency and listening for that sound wave to bounce back. By recording the elapsed time between the sound wave being generated and the sound wave bouncing back, it is possible to calculate the distance between the sonar sensor and the object.

- Detection range (10-400)centimeters
- Accuracy of +/- 1 cm
- Resolution 1 cm
- 5V DC Supply voltage
- Serial data of 9600 bps TTL level output for easy interface with any microcontroller



Fig 2.3 Ultrasonic sensor

D. RFID Reader and tag: Radio Frequency Identification (RFID) Card Readers provide a low-cost solution to read passive RFID transponder tags up to 7 cm away. The RFID card reader read the RFID tag in range and outputs unique identification code of the tag at baud rate of 9600. The data from RFID reader can be interfaced to be read by microcontroller or PC.

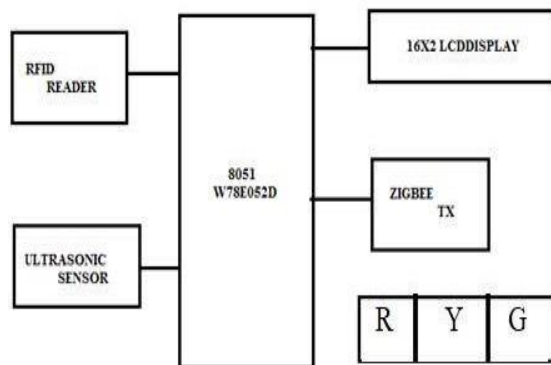
E. RFID Tag: The EM4102 has several metal options which are used to define the code type and data rate. Data rates of 64, 32 and 16 periods of carrier frequency per data bit are available.



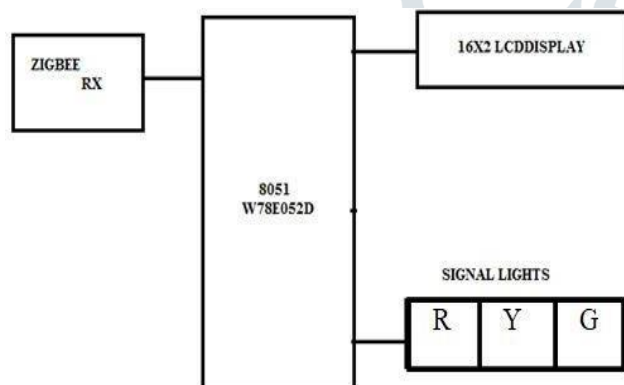
Fig 2.4 RFID Reader

III. BLOCK DIAGRAM

TRANSMITTER:



RECEIVER:



Here we use Ultrasonic sensors, zigbee communication, and RFID reader as sensors. LCD's and LED's at transmitter and receivers act as actuators. As we are working on the wireless transmission the main role is played by zigbee transceiver. The LED's at junction works in polling method. When the ambulance is detected by RFID reader then it transmit's the data to microcontroller. LCD displays it as ambulance. Then the signal automatically shows green signal with some delay.

When the ultrasonic sensor is high (logic-1) at any side of the receiver section it detects and it display's as "AMBULANCE". This is done by using zigbee transceiver as it transfers the

Information to receiver that an ambulance is detected then it automatically passes the next two signal indicating green to ambulance as it make the path clear to pass the ambulance easily without any traffic congestion.

IV. CIRCUIT DIAGRAM

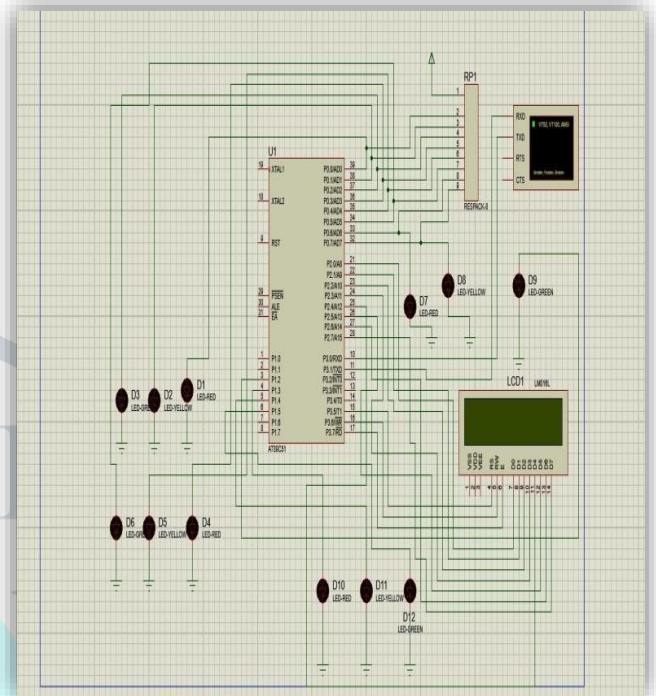


Fig 4.1 Schematic of transmitter

All the peripherals are interfaced with microcontroller AT89C51. Zigbee module is an open global standards for wireless technology designed to use low power digital radio signals for personal area networks. It is connected to port-3 (P3⁰ and P3¹) the zigbee transmitter pin is connected to microcontroller receiver pin P3⁰ and zigbee receiver pin is connected to microcontroller transmitter pin P3¹.

LCD (LM016) it means it is an 16x2 LCD display. The control pins are connected to port-3 (RS-P3⁵, RW-P3⁶, EN-P3⁷) and data pins are connected to port-2 (D0(P2⁰)-D7(P2⁷)). These data are used to send the address commands and data commands. Ultrasonic sensor is connected to port-1 i.e., (P1⁰ and P1¹). Here ultrasonic sensor detects the ambulance and displays "ambulance" on LCD i.e., it indicates that ambulance is coming. RFID reader is a device used to gather the information from an RFID tag

Which is used to track the individual objects. RFID tag transmits the data about ambulance through radio waves to the reader combination when the tag receives information from the reader, and it allows the ambulance to pass by indicating at the LCD.

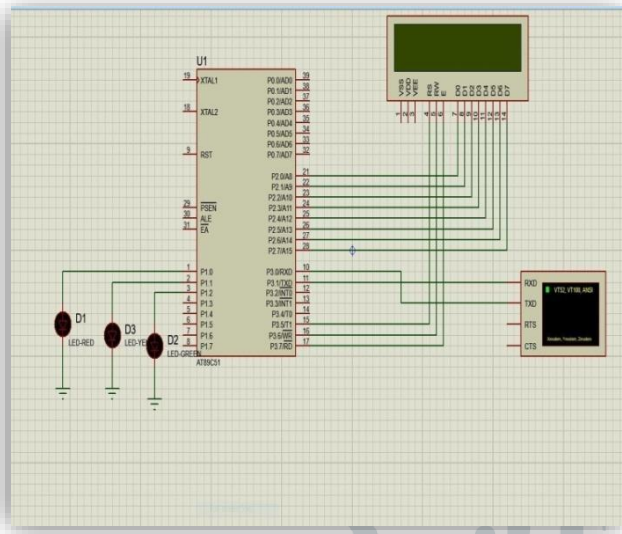
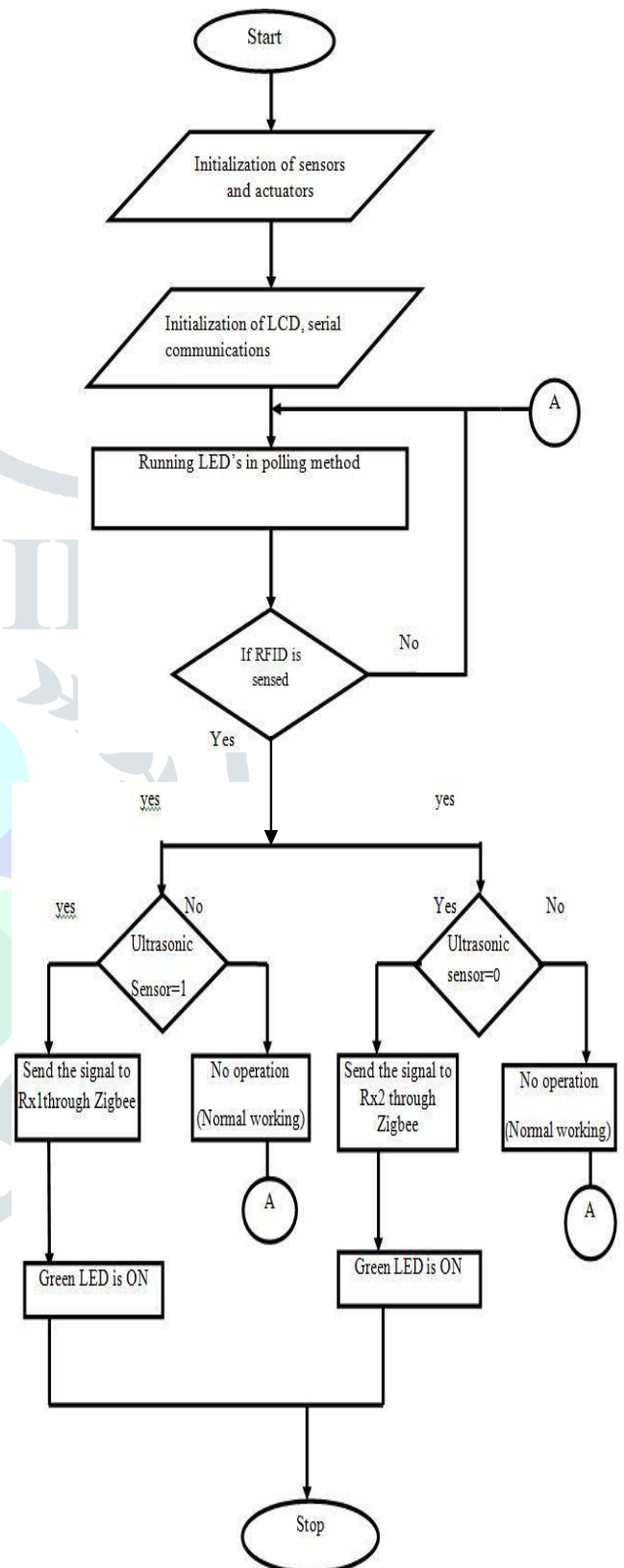


Fig 4.2 Schematic of Receiver

In receiver section zigbee communication plays a major role in receiving the data from the transmitter section as our project is based on wireless communication. Zigbee is connected to port-3 (P3⁰ and P3¹). The zigbee transmitter pin is connected to microcontroller receiver pin P3⁰ and zigbee receiver pin is connected to microcontroller transmitter pin P3¹. Ultrasonic sensor is connected to port-1 (P1⁰ and P1¹). When ultrasonic sensor sense the ambulance it automatically transmits the data from transmitter to receiver through zigbee module.

LCD is a device used to display the data that is received by transmitter. The control pins are connected to port-3 (RS-P3⁵, R/W-P3⁶, EN-P3⁷). Data pins are connected to port-2 (D0 (P2⁰) - D7 (P2⁷)). When ambulance is detected by ultrasonic sensor then it displays that ambulance is in receiver-1 direction or at receiver-2 direction. As ambulance is detected automatically signal to next two pole and indicates green signal to ambulance. So there will be no traffic congestion.

FLOW CHART:



RESULTS: This gives the details about the project after testing. The results after testing shows if the requirements are met in the project and if the requirements are not satisfied a thought for future developments is done after study of results.

- The following results are obtained when experiment was conducted:
- The ambulance passes the RFID reader senses the code on the RFID tag whether it is an ambulance or a normal vehicle and displays it on LCD



Fig:1 It shows the LCD that it is checking the data base

- Once the data is checked it detects it as an ambulance and when it passes through ultrasonic sensor it displays it as an "AMBULANCE".



Fig:2 When ambulance passes it displays as "AMBULANCE"



Fig:3 when RFID TAG is detected by RFID reader



Fig:4 when RFID TAG is detected then at junction it shows green signal

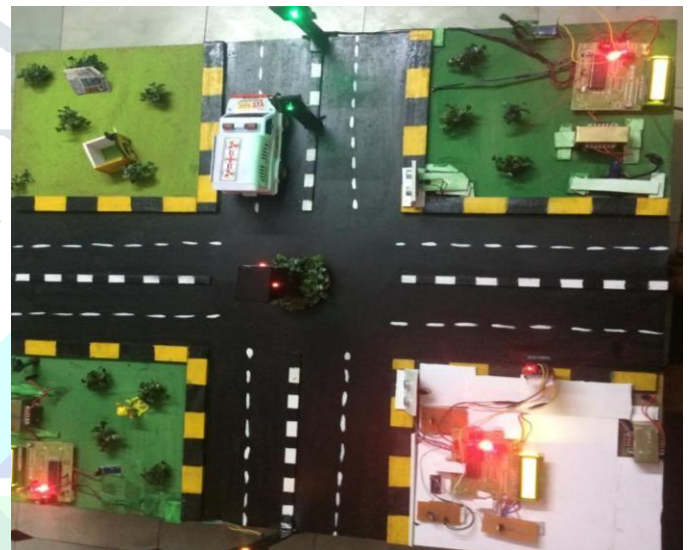


Fig:5 when ambulance takes it direction towards right side then ultrasonic sensor detects the ambulance and gives green signal to next two signals



Fig: 6 when unauthorized vehicle moves towards RFID reader it remains same as normal polling method

ADVANTAGES:

- Allows the ambulance to reach the destination promptly.
- Increases the efficiency of existing transport infrastructure.
- It will be ease for the traffic police to clear the congestion for the ambulance.

CONCLUSION:

The project “**Auto traffic signal transition for ambulance and fire ambulance**” has been successfully designed and tested. To smoothen the ambulance movement to reach the hospitals quickly we have designed this When an ambulance approaches the signal junction the transmitter in the ambulance sends the signal to the receiver then it passes through the ultrasonic sensor and the LED turns into green colour and allows the ambulance to pass. With this technique, a new era of traffic signal control is entered.

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