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# Automated Traffic Control System for Ambulance

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**Abstract**: The proposed system is the Automated Traffic Control System for Ambulance which deals with traffic congestion during high-density traffic at the specific time. Traffic density can be identified by Vehicle Counter placed at a certain default position on the lane. Here we are considering the main scenario at a time when the traffic congestion is less, the green signal activates for less number of time. As the traffic congestion increases green signal activates until it matches the default number. If there are no vehicles on the lane, then that particular lane signal is skipped. This framework additionally controls the movement of traffic congestion by enabling an ambulance to arrive at a specific area without having it to stop anyplace until the hospital is reached. This system includes RF transmitter and RF receiver. A unique RF transmitter which is present on ambulance transmits signals. The RF receiver placed few meters away from traffic signal receives signals and hence the ambulance on road is detected. Our system show result under light medium & heavy traffic. The designed system has a simple architecture, fast response time, ease of understanding the working module, user-friendliness and scope for further expansion.

**Keywords**: Ambulance, Traffic System, RF TX and RF RX.

## I. INTRODUCTION

Fastest mode of transportation is the nerves of economic development for any country. Fail to manage traffic congestion results in long waiting times, loss of fuel and money. It is necessary to have a fast, economical and efficient traffic management system for country's development. The major problem nowadays for highly populated countries is traffic management. With the increasing number of vehicles on the road, the Traffic Monitoring Authority has to find new methods for avoiding such a problem. By applying automation techniques and smart control methods traffic flow can be controlled. To manage traffic congestion many techniques are available. But none of the technique is found to be perfect as the live situations are generally continuously changing and the system has to adapt to the continuously changing circumstances. An attempt is taken to provide some traffic management strategy which is self-changing in nature that has to fit into endlessly changing real-time traffic conditions. In this system, time is assigned to traffic signal of particular lane according to the traffic density on the road with priority given to ambulance. The traffic density can be measured by a counter device which will be placed at a certain position on the lane. When the vehicle passes the counter device the traffic density can be calculated. If traffic crosses the counter device, then it is considered as heavy traffic and the signal light is turned green for the default value till the traffic density decreases. If there are no vehicles on the lane, then the traffic signal of that particular lane is skipped and preference is given to next lane. If there is an obstacle LCD is used to display the message of obstacle detection to avoid inconvenience.

## II. RELATED WORK

Traffic management on the road has become a severe problem in present society because of growth of the urbanization. The main reason behind present traffic problem is the techniques that are used for traffic management. Present traffic management system has no strength in live traffic scenario, which results in inefficient traffic management systems. Here are few lists of literature survey papers which have adopted different methods to overcome traffic congestion.

Anchal Rawat et.at. [1] provide a Smart Traffic Light System, which would enable the ambulance to reach the goal in the least possible time by providing an acceptable route of passage. Along with this, a controller is to be fit on vehicles, which would help in completely automatic recognition of the occurrence of the accident and locate the vehicle as well.

Prashant Jadhav et.at. [2] aims to prevent heavy traffic congestion. Initially, a live video of a road is recorded by a camera. A web camera is placed in a traffic road that will click images of the road on which we want to control traffic. Then these images are effectively processed to know the traffic density. According to the processed data from mat lab, the controller will send the command to the traffic LEDs to show particular time on the signal to manage traffic.

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From the above survey, techniques have been used to control traffic congestion. As in the reference [1], concentrates on ambulance reaching the destination without interruption. But proposed system controls traffic congestion and gives preference to an ambulance with the shortest path to the destination.

## III.PROPOSED SYSTEM

The Proposed System contains Renesas Microcontroller, GSM Module, RF TX RX, GPS Module, Android Application, LCD Display, Traffic Signals as shown in fig 1. The System is controlled with the Renesas Microcontroller. Initially, Microcontroller manages the traffic congestion by turning the signal light to green according to a number of vehicles on road. If Ambulance is on the road which can be identified by RF TX and RF RX, the signal light is automatically turned to green allowing all the vehicles on road to pass without interrupting ambulance and it is provided with the shortest path to the nearest hospital by the android application.

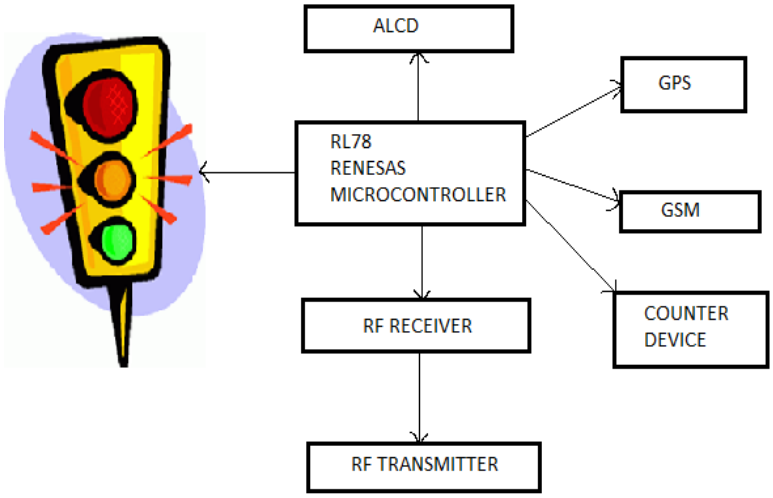


Fig 1: Block Diagram of the system

### *A. RENESAS MICROCONTROLLER*

The Renesas Microcontroller is a general purpose register with 8 bit 32 registers. It has a capacity of 512 KB ROM, 32KB RAM and 8KB data flash memory. Renesas Microcontroller has on-chip single power supply flash memory with the prohibition of block erasing or writing function. It has on-chip high speed as well as a low-speed oscillator. Most of the pins of Renesas microcontroller have multitasking feature and comparatively has low cost. It operates with 5v power supply and has a rigid body which makes it less prone to damages. The fig 2 below shows the Renesas microcontroller board.

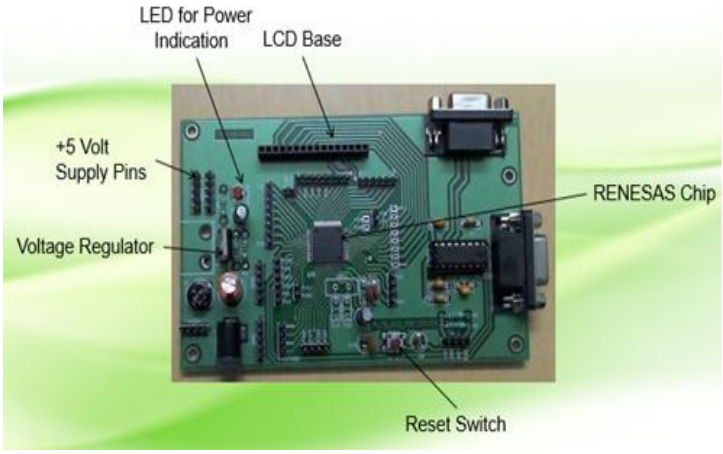


Fig 2: 64 Pin Renesas Microcontroller Board

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*B. GSM*

GSM stands for global system for mobile communications, GSM uses SIM card which is a detachable smart card containing the user's subscription information. The GSM standard has been an advantage to both consumers and also to network operators. GSM likewise spearheaded a minimal effort, to the system bearer, contrasting option to voice calls, the Short message benefit, which is currently supported on other mobile standards also. The "AT" or "at" prefix must be set at the beginning of each command line. To terminate a command line enter <CR>. SIM300 is a Tri-band GSM/GPRS motor from SIMCOM Ltd, that chips away at frequencies EGSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz. The physical interface between SIM300 and the mobile application is through a 60 pins board-to-board connector, which provides all hardware interfaces from mobile to customer's boards except the RF antenna interface. Fig 3 shows the GSM SIM300 board.

Fig 3: GSM Board

*C. RF TRANSMITTER AND RF RECEIVER*

RF transmitter and receiver are utilized both in the control unit and also in the mechanical module. The RF transmitter and receiver in the transmitter and receiver module individually work at the frequency of 433MHz. The RF receiver in the transmitter module gets the distance related data transmitted by the automated module. The microcontroller is utilized to show the distance on the LCD module. The receiver in the mechanical module gets the control signals transmitted by the control unit which are utilized to control different elements of the robot.

## IV. IMPLEMENTATION

In the Proposed System, the ambulance carries an RF transmitter and RF receiver will be there few meters prior to the signal. The RF receiver detects ambulance then automatically the signal turns to green and at every traffic post will have an RF receiver. So whenever the ambulance comes near the traffic signal, the ambulance will transmit the signals and the receiver will receive the signal and it immediately makes the particular lane signal to green.

The new system will provide the following features:

- It allows the ambulance to pass traffic signal without interruption.
- Manages traffic congestion based on traffic density.
- Provides the shortest path to hospital.
- Provides accurate results.

## V. RESULTS

The below fig 4 show the overall experimental results of the system. As shown in fig 4 (a) the model is incorporated with Renesas microcontroller, GSM module. RF receiver which is connected to control unit and RF transmitter which is placed in an ambulance. LCD to display messages, a pair of traffic signals, counter device which tracks the traffic congestion and android application as shown fig 4 (b) shows the shortest path to the hospital by using google maps.

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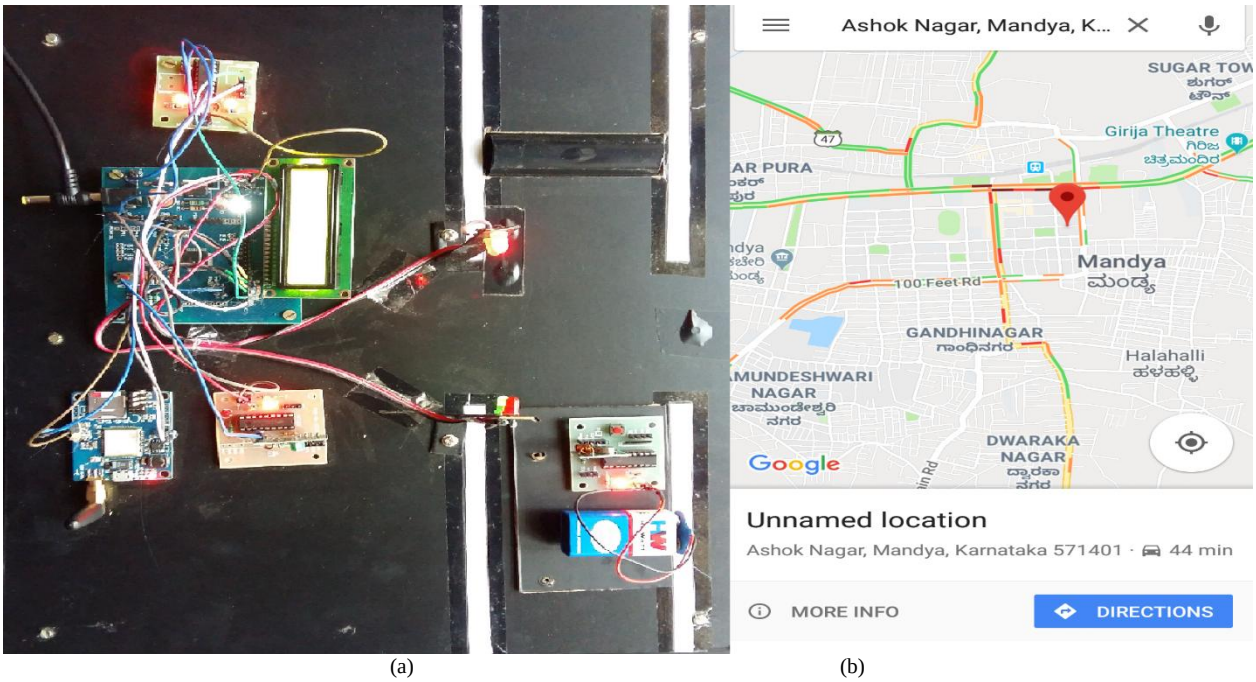


(a) (b)

Fig 4: Experimental results

## VI. CONCLUSION

In this system, the ambulance is identified by RF Transmitter and RF receiver and the android application give the shortest path to the hospital by using maps and Renesas microcontroller controls the signal lights according to the traffic congestion. The advantages of this model are, the ambulance is detected early and traffic is cleared for easy movement of the ambulance without interruption and shortest path is provided for the ambulance to reach hospital early.

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