Int. J. Chem. Sci.: 14(4), 2016, 3107-3112
ISSN 0972-768X
www.sadgurupublications.com

ADVANCED TRAFFIC CLEARANCE SYSTEM FOR AMBULANCE CLEARANCE USING RF-434 MODULE

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ABSTRACT

The existing time based traffic management system is the one which is not suitable and not flexible for the present day traffic. Owing to this reason many emergency service vehicles like ambulance, fire service were prevented from doing their duty at the right time. The growing Vehicle population demands a major change in the existing Traffic management systems. There are systems which uses image processing technology for efficient traffic management in urban areas. But these technologies are implementable only in developing countries as they are more complex and expensive.

This paper describes the use of wireless communications for relieving ambulance from traffic congestion in urban areas. This advanced traffic clearance system can be implemented in any Urban areas quite easily with less time and low cost. In this system the Ambulance is fitted with a RF transmitter and controlled by a microcontroller. The Traffic Light is fitted with a RF receiver and Traffic signals are controlled by a microcontroller based on the receiver data. Whenever the ambulance switches ON the siren, the RF transmitter transmits the RF signal. Whenever the ambulance approaches the traffic signal stand, the RF receiver in the stand receives the RF signal and automatically switches the traffic signal to green thus making the ambulance to pass through the road intersections.

Key words: Traffic Management, Wireless Communication, Ambulance, GSM.

INTRODUCTION

Cities became the identity for heavy traffic congestion. Cities have appreciable economic development when compared to the development in rural areas. People in rural regions migrate towards urban areas for improving their standard of living. Cities have higher population density and the people living in urban areas enjoy more facilities than those living in rural areas. Time is the most crucial element in today's life. People like to

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spend more time in their work place rather than wasting time by commuting on road. City people mainly prefer their own transport for travel rather than using public transport resulting in greater vehicle Population. Everyone needs to reach their destination within a short duration of time. But most of them actually don't start early to reach their destination earlier. In hurry, the commuters do not follow the Traffic rules and regulations. This is the major reason for death in ambulance. The emergency vehicle needs to pass through several traffic signals in the city. If the vehicle population in a particular area is at peak for longer duration then the ambulance needs to spend a longer time in traffic for reaching the hospital. The existing timer based traffic management system does not detect the presence of ambulance in a particular traffic lane. The local traffic authorities in that area will identify the presence of ambulance and correspondingly make changes in the traffic signal for allowing the ambulance to pass through the road intersections. This system is not efficient.

EXPERIMENTAL

Proposed model

The main objective of the proposed Model is to prevent the ambulance from getting stucked 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 paper, we have designed an intelligent traffic management system that can clear the traffic congestion using Wireless Communications technology.

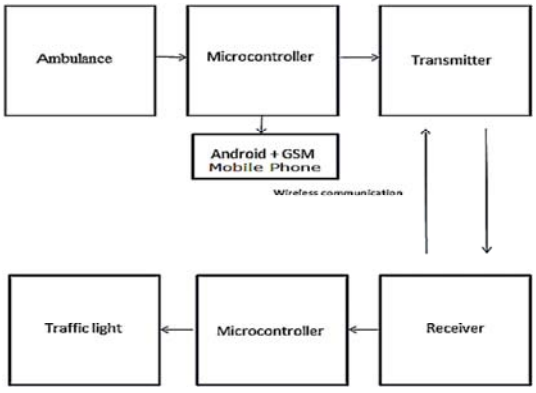

Fig. 1: Block digram of the proposed model

The proposed system consists of Arduino module, Android GSM mobile, lcd, transmitter and receiver module. Whenever an Ambulance comes near the road intersections automatically the traffic signal changes and gives way for the ambulance to pass through the road intersection without any difficulty. The existing system simply suggests an alternative

route at huge traffic situations. This system can immediately stop vehicles in all other lanes and allow the ambulance to pass through safely and quickly.

Working principle

In this proposed system, the ambulance is fitted with the RF Transmitter, which is controlled by a microcontroller. The ATmega 328P microcontroller is programmed and connected with the Arduino UNO board. The RF transmitter transmits the alert signal, when the Ambulance siren is switched ON. When the transmitted RF alert signal comes into contact with the Traffic light stand which is fitted with RF receiver, the microcontroller at the receiver side will process the received commands for switching the traffic light to green signal immediately.

The Bluetooth module HC-05 connected to the Arduino uno board is used for pairing up with the smartphone, which has Android OS. This enables the tracking of ambulance in real time using GPS. The Android application installed in the smartphone gets updated with the gps data for every 5 seconds. This app allows you to share the location data with others using GSM mobile service. Thus the GPS data can be used for remote traffic assistance.

Microcontroller

The high-performanceATmega328P is a 8-bit AVR RISC-based microcontroller combines 32KB ISP flash memory with read-while-write capabilities, 1024 EEPROM, 2KB SRAM, 23 commonl purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with comparitive modes, internal and external interrupts, serial programmable USART, 2-wire serial interface with a byte-oriented, SPI serial port, a 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates from 1.8-5.5 volts.

Role at transmitter side

The microcontroller in the ambulance is programmed to transmit wireless signals to the traffic light at the receiver side

Role at receiver side

The microcontroller in the traffic light module receives the wireless signal from the transmitter fitted inside the ambulance. Upon receiving the signal from the transmitter the traffic light switches to green providing way for the ambulance to pass through the road intersection

RESULTS AND DISCUSSION

We have tested the transmission of the signal from the ambulance. The receiver responds to the transmitted signal from the ambulance with the Green signal. In the absence of ambulance red signal is glown

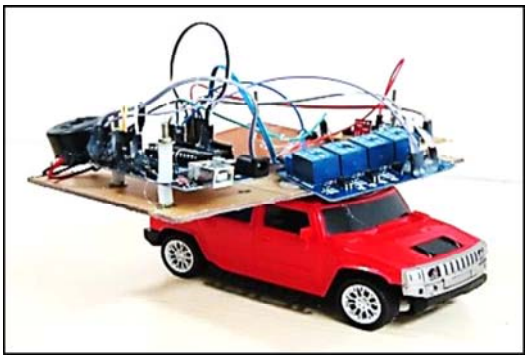

Fig. 2: Ambulance module

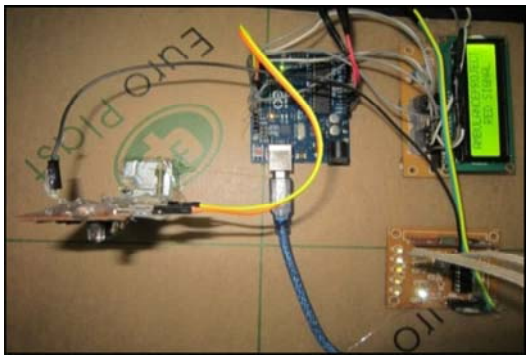

Fig. 3: Traffic light module

Fig. 4: Ambulance detected and green light is glown

Fig. 5: Ambulance not detected and red light is glown

Fig. 6: Android application sharing gps data

Future enhancement

In future the navigation sensor can also be fitted with the existing system, which is useful in finding the ambulance in 360 degree and controlling the 4 way traffic. This ensures no death in ambulance during all traffic conditions. The system will respond much more faster.

CONCLUSION

This method can help the ambulance to reach the hospital with lesser time consumption. At critical situations this concept holds good. The algorithm for implementing this process has been tested extensively .Our approach is simple to execute and uses very less operating power, low cost and more advantageous. During the emergency situation the Traffic signal automatically switches to green and allows the ambulance to pass through the road intersections, and the Android application in the mobile phone shares GPS location via bluetooth, can be shared further by GSM mobile services. Using this data the ambulance can get the remote traffic assistance from the traffic control room reducing the time delay. The result shows the efficiency in clearing traffic congestion for Ambulance. This system is more advantageous when compared to other systems.

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Accepted : 31.10.2016