

E-AMBULANCE Intelligent Ambulance System with Automatic Traffic Control

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Abstract— In this fast and reckless world, human beings are being ruled by digital gadgets and we have no time for waiting. Hence the technology should replace the word “wait”. The traffic conditions are getting worse day by day, which results in traffic jams. No human being has the patience to wait for all these signals and especially ambulance. Thus this is time of the hour to find a solution for the victims starving for life inside the ambulance. This research is being typically oriented on the solution of the above described problem. There is a radio frequency transmitter attached inside the ambulance and the ambulance will be fixed with the RF transmitter and the RF receiver will be fixed at the traffic signals. This transmitter transmits a unique code continuously into air. When the ambulance is near to the traffic signals, the unique code, transmitted by the transmitter from the ambulance, will be received by the RF receiver at the traffic signals. Here we are tracking the patient’s health conditions. The health parameters such as Heart rate, body temperature, Blood pressure and Blood level are sent to the hospital using the on board GSM unit. All these parameters are displayed in the hospital unit on a pc with the help of visual basic s/w.

Key words: GSM, RF, Traffic Signal

I. INTRODUCTION

Traffic management on road has become a severe problem on today’s society because of urbanisation, industrialisation and population growth. With growth in traffic there is occurrence of many problems too. Traffic jams is one of the major problem which cause the ambulance restrictions to move along the traffic. So to make the ambulance run freely during emergency conditions we have implemented a technique in this paper which will be discussed further. This traffic light system was first implemented in 1868 in London and today this system has been installed in almost all parts of the world. Most of the traffic light work within a predominantly timing circuit. Sometimes the vehicle on the Red side have to wait for Green signal even though there is a little traffic because of the automated system. Most of them use the sensor to calculate current volume of traffic but this approach has the limitation that these techniques based on counting of the vehicles and treats a emergency vehicles as the ordinary vehicles means no priority to ambulance, fire brigade or V.I.P vehicles. As a result, emergency vehicles stuck in traffic signal and waste their valuable time. The problem of traffic light control can be solved by RFID based system. With this system, we can consider the priority of different type of vehicles and also consider the density of traffic on the roads by installing RF reader on the road intersections. Radio frequency identification is a technique that uses the radio waves to identify the object uniquely. RFID is a technique that is widely used in various application areas like medical science, electronic toll collection system etc.

The RFID transmitter is been placed in the ambulance vehicle and the receiver end is placed on each signal systems. When the ambulance reaches a range of 500 metres from the signal the transmitter starts transmitting the RFID which is been received by the receiver on the other end which is placed at a signal system. When the RFID which is sent matches the signals gets automatically switched so as to provide a free path for the ambulance to travel. This in turn saves time for the ambulance to reach the hospitals and also saves the life’s of those whose travelling. GSM cell phone interface is also provided for users those who wish to obtain the latest position of traffic on congested roads.

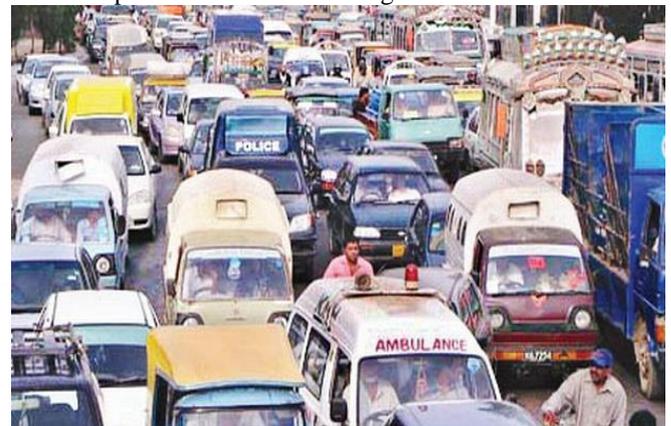


Fig. 1:

II. METHODOLOGY

A. Traffic Light Controller on Detection of Ambulance Using RF Sensors and Control Circuitry

Ambulances should be given the highest priority of uninterrupted transportation on roadways as it saves the lives of the people. As of today ambulances are permitted to break the rules of traffic signal, but the cumulating of vehicles at the traffic signals make it difficult to arrive at hospitals at the right time for the emergency treatment of the person inside the ambulance. To provide the uninterrupted services to the ambulances, a RF transmitter is mounted on the top of the ambulance and a receiver is attached to the traffic signal pole. The control circuitry at the pole receives the radiation from the RF transmitter at the ambulances via RF receiver and changes the status of the colour of the light to GREEN at the lane where ambulance is present whereas the vehicles at the other lane is been restricted to travel by posting a RED colour in the display. This helps the ambulance to cover more distance and reach the destination quicker.

B. Monitoring Of Patient Health Condition

Inside the ambulance we are tracking patient health condition by monitoring blood pressure, Heart beat rate, Body temperature and other health parameters by suitable medical equipment’s and sending the information to the

hospitals by means of ZigBee modules as it covers around 2 kms and has a frequency range of 2.4Ghz . So the doctors in the hospital is used to diagnose the current health status of the patient and room service providers to make necessary arrangements of equipments and precautions to treat the patient as soon as he arrives the hospital. All these desired operations are being done through 8051 microcontroller. This project is about interfacing RF (Radio Frequency) module with the 8051 microcontroller. These RF modules help us in sending and receiving the data wirelessly up to certain distance. This provides us the ease of wireless data transferring. There are many forms of wireless technologies which can transfer the data such as Bluetooth modules, ZigBee modules, and Wi-Fi modules. RF is one of them. It's a lot cheaper and works quite well for small scale projects. These modules are really easy to deal with. They just require the data to be transferred serially and VCC+GND supply of course. This technology can be used to make wireless control systems like door locks, operating home appliances wirelessly and many more.

III. FLOWCHART

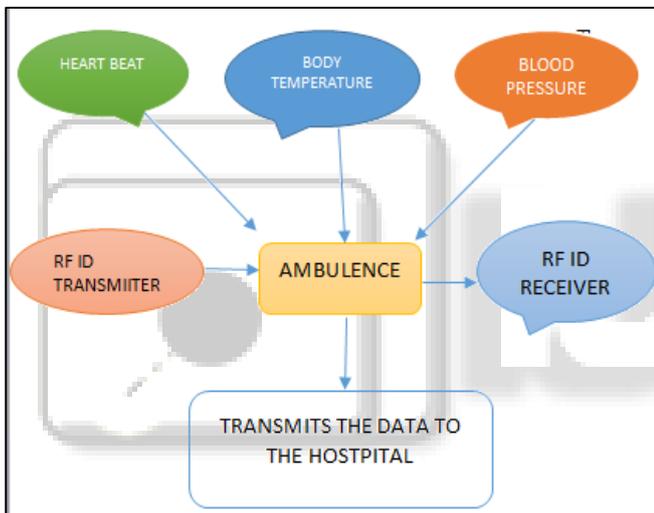


Fig. 2:

IV. PIN DIAGRAM

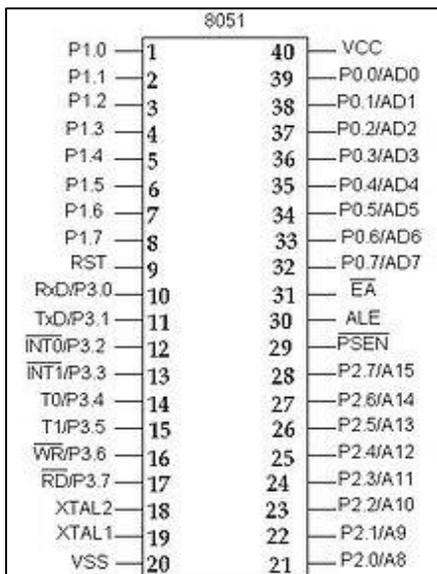


Fig. 3:

Basic Pins: PIN 9: PIN 9 is the reset pin which is used to reset the microcontroller's internal registers and ports upon starting up. (Pin should be held high for 2 machine cycles.) PINS 18 & 19: The 8051 has a built-in oscillator amplifier hence we need to only connect a crystal at these pins to provide clock pulses to the circuit. PIN 40 and 20: Pins 40 and 20 are VCC and ground respectively. The 8051 chip needs +5V 500mA to function properly, although there are lower powered versions like the Atmel 2051 which is a scaled down version of the 8051 which runs on +3V. PINS 29, 30 & 31: As described in the features of the 8051, this chip contains a built-in flash memory. In order to program this we need to supply a voltage of +12V at pin 31. If external memory is connected then PIN 31, also called EA/VPP, should be connected to ground to indicate the presence of external memory. PIN 30 is called ALE (address latch enable), which is used when multiple memory chips are connected to the controller and only one of them needs to be selected. We will deal with this in depth in the later chapters. PIN 29 is called PSEN. This is "program store enable". In order to use the external memory it is required to provide the low voltage (0) on both PSEN and EA pins. There are 4 8-bit ports: P0, P1, P2 and P3. Port P1 (Pins 1 to 8): The port P1 is which can be used for a variety of interfacing tasks. The other ports P0, P2 and P3 have dual roles or additional functions associated with them based upon the context of their usage. The port 1 output buffers can sink/source four TTL inputs. When 1s are written to port1 pins are pulled high by the internal pull-ups and can be used as inputs. Port P3 (Pins 10 to 17): PORT P3 acts as a normal IO port, but Port P3 has additional functions such as, serial transmit and receive pins, 2 external interrupt pins, 2 external counter inputs, read and write pins for memory access. PORT P2 (pins 21 to 28): PORT P2 can also be used as a general purpose 8 bit port when no external memory is present, but if external memory access is required then PORT P2 will act as an address bus in conjunction with PORT P0 to access external memory. PORT P2 acts as A8-A15. PORT P0 (pins 32 to 39) PORT P0 can be used as a general purpose 8 bit port when no external memory is present, but if external memory access is required then PORT P0 acts as a multiplexed address and data bus that can be used to access external memory in conjunction with PORT P2. P0 acts as AD0-AD7, as can be asynchronous communication input or Serial synchronous communication output

V. SMARTNESS OF E-AMBULANCE SYSTEM

8051 microcontroller works under 5v supply. Crystal oscillator helps to generate a resonant Frequency. The microcontroller controls the switching of light in the pole after receiving the signal from ZigBee transmitter at the ambulances as it approaches nearby .In case of deadlock condition, the controller will be reset by activating the timer circuit in the microprocessor. The signal transmitted from the ZigBee transmitter is decoded at the receiver to measure the nearest distance between the traffic pole and the ambulance. When traffic lights are to be controlled by manual operations by traffic officers an external peripheral devices are connected which acts as a interrupt to the normal operation of microcontroller. Interrupts may be hardware or software interrupts. Non-Maskable interrupts are those

whose functions are to be performed immediately whatever may be current operation of microcontroller. Example in case of failure of lighting arrangement at the poles these interrupts are activated to turn off the microcontroller.

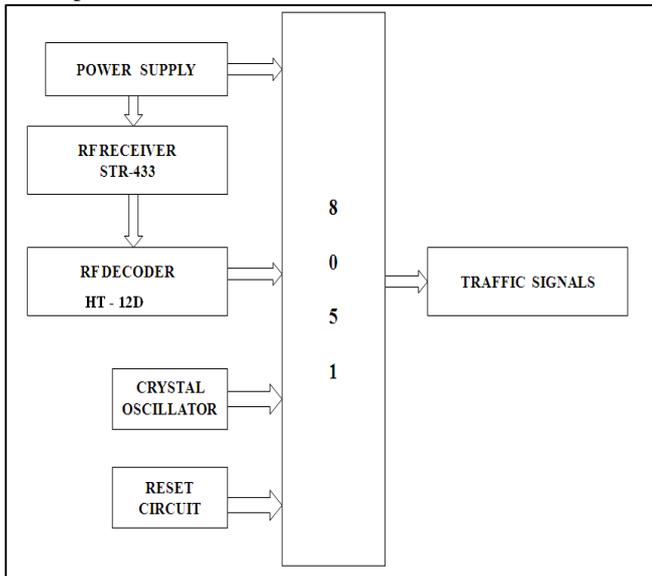


Fig. 4:

VI. CONCLUSION

The proposed system mainly designed in order to provide a enhance the treatment to the patients in the ambulance and to alert the traffic system. An effective solution is provided to develop the intelligent ambulance which will operates on traffic zones zones and monitor various parameters of the patient inside the ambulance. Controlling the traffic signals automatically in real time is very difficult.. Thus the contribution from the part of a engineering community is being required in a enormous scale to reduce the accident counts. Implementation of advanced technologies is the most preferable logistic to reduce the counts of accidents.

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