

An Advanced Ambulance Rescue System Using Prioritized Traffic Switching

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Abstract:

There is loss of life as a result of the delay within the arrival of ambulance to the hospital within the golden hour. This delay is especially caused by the waiting of the ambulance within the traffic signals. The most themes behind this theme is to produce a sleek flow for the emergency vehicles like ambulance to succeed in the hospitals in time and therefore minimizing the delay caused by traffic jam. The thought behind this theme is to implement ARSPTS which might management automatically the traffic lights within the path of the ambulance. The ambulance is controlled by the control unit that furnishes adequate route to the ambulance and conjointly controls the stoplight in step with the ambulance location and therefore reaching the hospital safely. The controller identifies the situation of the accident spot through the measuring system within the vehicle and therefore the controller walks through the ambulance to the spot. This theme is totally ambulance -controlled, therefore it finds the accident spot, controls the traffic lights, serving to to succeed in the hospital in time.

Keywords: ARM 7, Wi-Fi, GPRS

Introduction

In today's world, traffic jams during many hours in roads due to many issues. Due to the traffic in many hours present in the roads which may cause the emergency vehicles like Ambulances, Police cars and Fire Brigade trucks were unable to survive the people with in the time. Due to the delay in the time emergency vehicles

are not able to reach their particular given address in time and causes loss to human lives. So to reduce this issue we have developed a system called green bay to the desired vehicle. The synchronization of the green bay system from the green phase of traffic signals is given to a setup of a vehicle which is passing through a green signal. It will continue the signal to receive data code as it travels down from the road from one part to other. The system used to implement the concept of the green bay reduces the time. It also provides the patient monitoring condition to the hospitals also.

Due to the delay in the time of arrival of the ambulance the human life is going to be experienced due to the ambulance stuck in the traffic. It will be the great use if a system is designed to reach the accident spot with in fractions of time and reach the hospital by monitoring the traffic signal and by checking the human health condition and update it to the nearest possible hospital center to save the life. The accident detection systems which is very delay and of less intelligence. It shows the discipline actions in the monitoring of the people health condition by manually and works more efficiently to reduce the loss of human life.

The powerful portable devices which are used for the human life are described for the many applications. The safety of the road services are automated by the mobile system. To make the service faster a support has established called emergency vehicle service (EVS) which is very essential and reliable. By the EVS services the system has become more flexible by implementing by

the new intelligence techniques called zig-bee and Wi-Fi module using the mesh technologies which makes the network circuits very low cost. By implementing the new technologies the system became error free by fulfilling the needs of others and reduces the time of the emergency cases. This system finds the ambulance which is nearer to spot by automatically and reduces the errors by reaching fast and improves the human life within a period of limited time. This reduces human errors and saves the human life in partial time

By implementing the advanced technology the traffic congestion is limited by using the car navigation system that shows the shortest path with the predefined time saving efficient route which is of short distance and nearer to destination. These systems find the shortest path by finding the route in the different ways and select the path by shortest path first serve. The process of making the different paths from one source to destinations called routing. In this project it provided a new version called dijkstra by improving the memory of the previous system and making the nodes and edges limited. By increase of the number of vehicles in the road it increases the traffic and causes traffic congestion which can be reduced by the traffic signal control model.

The traffic signals are controlled by the technique by which the traffic signal can be monitored by the RF module in the particular vehicles. The intelligence ambulances will arrive the destination of the accident spot and reaches the hospital location within the limited period of time. As the patient present in the ambulance after his arrival within that ambulance the patient conditions of the health will be taken and it will be updated to the hospital and the services are to be started to the person in ambulance only. The planning of this technique is done in mainly 3 ways accident detection, monitoring signals, equipment usage to patient. The estimation of the person accident location and serving of the person is discussed based upon the time of reaching spot and mathematical model of travelling time. This model is designed to detect the spot of the accident by location of the area of horizontal and vertical locations. The ambulance technology is designed to

maintain the level of self-balancing state which works on the principle of gyroscope.

System architecture

There is no technology for the detection of the accident where it causes the loss to the human life within the limited time due to the manual loss of time in traffic. When ever the accident causes the victim is dependent in the huge rush and reaches the hospital within the late time of reaching hospital and the other reason is of unnoticed accidents are occurred by the people to which they are not safely treated to hospital. In other condition the delay in reaching of hospital also reduces the human life. Due to the high rate of accident occurrence and delay in the time of reaching hospital due to the traffic congestion between the accident location and hospital. In addition there is a delay in reaching the hospital due to the traffic congestion between accident location and hospital which caused the death to the victim. To overcome the existing problem a new system implemented called automatic detection of accident. In this new system a GSM and GPRS is fitted to the vehicle unit near to accelerometer unit. When the vehicle is meet with the accident the accelerometer unit detects the accident and sends the location of the spot by gprs and GSM unit to the ambulance. After reaching the information the ambulance starts travelling to the spot and carries the patient to the hospital from the accident spot by controlling the traffic signals in the path where the ambulance is moving will provide the clearance of path. By this it will reduce the reaching time of the hospital.

Automatic Ambulance Rescue System consists of major four units which interlinks the communication between one unit to other unit without any delay of the time which is of very automatic system design. This system has developed and divided into four units namely Vehicle Unit, host main Server, Ambulance Unit, Signal controller unit. In this unit the vehicle unit consists of a in built server which senses the accident by producing the greater motor frequency. By sensing the accident the vehicle unit sent the location data in the form of latitude and longitude to the host server. The main host server

finds the ambulance which is nearer to the accident spot and the ambulance of the hospital. After finding the ambulance nearest to the spot it sends the information and location of spot to the ambulance. The ambulance then takes the information by controlling the nodes of the signal making it enable by reaching the hospital within the time without any delay. The system architecture of the vehicle unit is shown in figure 1.

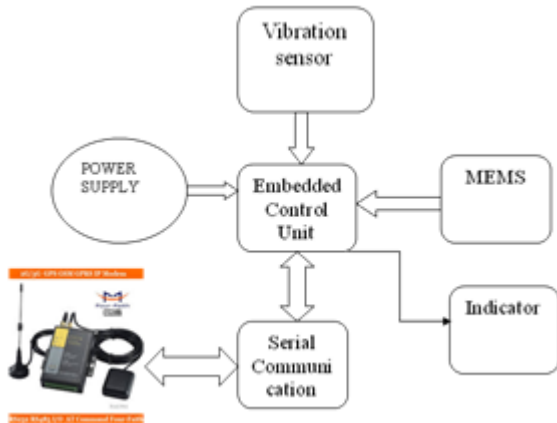


Figure 1: vehicle unit

By this new phenomenon every vehicle should have a sensing vehicle unit which consists of accelerometer, controller, a user interface, GPRS system and a GSM module. The information about the accident is sent to the host server which has the data of location where the accident occurred and is detected by GPRS module which is present in the vehicle. The GPRS system finds the position of vehicle (latitude & longitude) the accident spot and sends the data to the GSM module in the form of the message. The main host server gets information by GSM by using accelerometer. Accelerometer alerts the driver and public by turning on the buzzer in place of accident spot. The GPRS SYSTEM finds out the current location of the vehicle and transfers the data to the WI-FI module. This module sends the sms to the server to the number which is already registered in the module and emergency number.

When the ambulance unit receives the information it controls the traffic signals by making the spot position of way to be in ON state where in search the ambulance must reach the recommended spot and must safely take

the patient to the hospital. The ambulance can alternate and controls the signals of traffic in an at the distance of 100mts. The signal structure of traffic unit monitoring is shown in figure 2

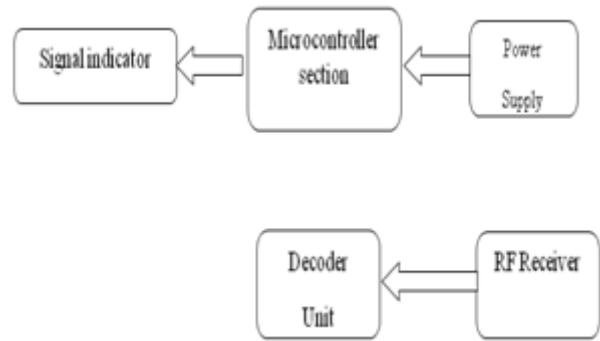


Figure 2: Traffic unit

The ambulance unit has a GPRS SYSTEM and a GSM MODEM for transmitting data in the form of the sms. The server gets the data from the ambulance within the fractions of seconds of time interval. The host will make the path coordination between the ambulance and all units of the system. The host will give the spot of accident to the ambulance.

The ambulance unit receives latitude and longitude location on to a map where the accident is occurred. The ambulance unit is shown in figure 3.

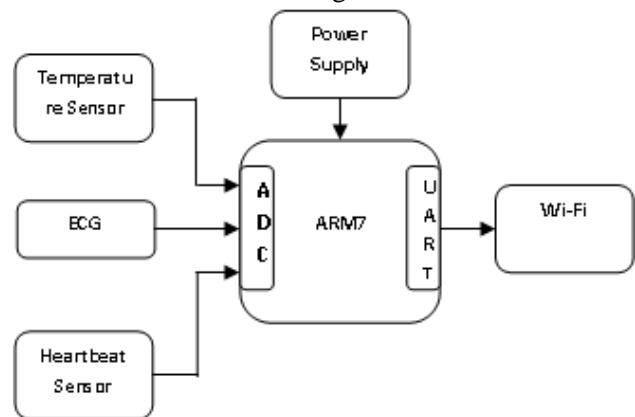


Figure 3: hospital Section

The ambulance unit on receiving the spot takes the patient into the ambulance and checks the heartbeat, B.P, ECG and updates the results of the patient to the hospital. If the patient condition is critical it shows the buzzer sound.

ARM 7 Microcontroller

The ARM7TDMI-S is 32-bit microprocessor general purpose processor. IT offers the high performance rate with very low power consumption. The ARM processor works on the principle of Reduced Instruction Set Computer (RISC). This instruction set decodes the instruction in the simple manner and are very impressive high instructions used for micro processing. The decode mechanism is very simple and uses only less instructions. The real-time interrupt responses are very small and less cost in this core.

In the ARM architecture the pipeline techniques are used where the fetch, decode, execute units can operate the instructions continuously without any time delay. In this when one instruction is in the fetch stage the other previous instruction are being to be in processing in decode and execute stages. So, when one instruction is in one process the other will be in other state which reduces the instruction time. The ARM7 processor consists of the thumb instruction set unit which access the data of high volume applications and reduces the code density. It also other extra activity of zagelly unit which decodes the code in java language



Temperature sensor:

Temperature sensor LM35

The LM35 pin diagram is shown in above figure. As a temperature sensor increases the circuit will sense the reading of temperature in the form of Celsius. The temperature sensor consists of 1 volt power of +5v dc voltage. From above pin diagram one of the pin will give the 5vdc power and the other two pins are used for the power supply and output. The output produced by the analog pin is directly proportional to the temperature in Celsius. The output pin provides an analog voltage output

that is linearly proportional to the Celsius and it gives the output from the range of 1 millivolt per 0.1°C. The output voltage must be divided by 10 to give the result in the degrees of Celsius.

MEMS

MEMS is design tool which is used to get the working tool for researchers, engineers and students. MEMS stands for Micro Electro Mechanical Systems which are a highly specialized for the development of the micro devices. It has the inter-disciplinary field of engineering which engages in the development hardware and in finite elements of the software. This analysis the finite element in the software which acquires the programming skills knowledge of creation of hardware in the successful unit. MEMS is used in the different nations and universities in solving many problems and in the technology maps. MEMS sensors will sense the power rating of the motor.

Vibration sensor

Vibration sensors detect the sounds of the ground in the flow of the signal in decibels. When the sound occurs the vibration sensor will determine the level of the vibrating sound and makes the activation of the sensor to flow. When ever the earthquakes occurs the vibration sensor senses the sound the gives the information. The vibration sensor in this system is used to sense the spot of the accident when the vehicle is skid down.

HEART BEAT SENSOR:

The Heart Beat Sensor is simple way to give the information of the heart beat function. This sensor will grasp the flow of the blood to the blood vessel through the ear lobe. The amount of change in the heart beat is sensed by the force applied to the blood vessel through heart. Within the fraction of the time the heartbeat will change due to the pressure force. It has clip which is also used between the finger tips by which the signal is filtered and blood pumping from heart will be shown in the form of graph. The forcing of blood makes the contraction and relaxation of ventricles and arteries. By this the shutting of the heart valve is taken in the sensors and gives the readings of heart beat.

RF communication:

Radio Frequency are associated with the radio wave propagation. Each frequency is associated with the electromagnetic spectrum. When the RF frequency is supplied to antenna a field of electro magnetic wave is created to propagate different wireless technologies with in the air and produces the field propagation. The RF technology mainly consists of transmitter and receiver sections which are shown below.

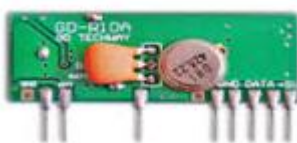
Transmitter: The TWS-434 is very small which transmits the radio frequency signals with the short range of distance. This used for the applications of short-range RF remote controls signals. The transmitter consists of the internal encoding which consists of the simple control and status signals. In the transmitter the IC will take the controlling of the both encoding and decoding units. The output voltage of the transmitter is up to 8mW and it will also go through between walls.



RF Transmitter

Receiver: RWS-434:

The receiver will operates at 433.92MHz. The is a sensitivity which operates DC voltage up to 5.2V. It gives the output data both in analog and digital. The output pin is normally used for the digital decoder to a microprocessor while data is decoding. The output of the data will be presented high when the carrier is present and in the presence of no carrier the data is low. To receive the simple control and status signals also decoders are also present to be set.



RF receive

Results:

By this system we can reach the location the hospital with in the short period of the time and hence secure the human life.



Conclusion:

This system is used to give the information to the ambulance about the accident spot and make the victim to reach the hospital with in short period of the time by monitoring the signals.. The main feature of this operation is to communicate about the location of the accident to their belongs and to hospital. By using the GSM and GPRS technology the location of the vehicle is enhanced. By this system in the ambulance is able to be treated by checking his health conditions and by updating this data to hospital with the help of wi-if. By this method we can able to save the person even in the traffic congestion also.

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