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# Automatic ambulance rescue system using shortest path finding Algorithm

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***Abstract:~****Traffic congestion and tidal flow management were recognized as major problems in modern City areas, which have caused much uncomfortable for the ambulance. Moreover accidents in the city have been nonstop and to bar the loss of life due to the accidents is even more Complexly . To implement this scheme called AARS (Automatic ambulance rescue system). The main Function behind this scheme is to provide a smooth flow for the ambulance to Enter the hospitals in time and thus minifying the Practical Implementation. The idea behind this scheme is to implement a ITS which would control mechanically the traffic lights in the path of the ambulance. The ambulance is controlled by the MCU which furnishes the most scant route to the ambulance and also controls the traffic light according to the ambulance location and thus reaching the hospital. The server also determines the location of the accident Place through the sensor systems in the vehicle which encountered the accident and thus the server walks through the ambulance to the Exact Place. This scheme is automated, thus it finds the accident Place, controls the traffic Signals, helping to reach the hospital in time.*

***Keywords : MEMS,PIC,ARM,ACP,PTMS***

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## I. INTRODUCTION

There is loss of life due to the delay in the arrival of ambulance to the hospital in the golden hour. The ambulance in the traffic signals. It would be of great use to the ambulance if the traffic signals in the path of the hospital are ON., Post Accident Detection Systems, Lack of Intelligence in the detection systems., Fails to track the collision and pre-damage status, Way of monitoring people to be manual, Time delay (first aid).

A new design for automatically controlling the traffic signals and achieving the above mentioned task so that the ambulance would be able to cross all the traffic junctions without waiting., For easy access the server maintains a database for each node, and hence each node will have a unique id for addressing it., The ambulance is guided to the hospital by the server through the shortest route. The vehicle unit installed in the vehicle senses the accident and sends the location of the accident to the main server. The main server finds the nearest ambulance to the accident spot and also the shortest path between the ambulance, accident spot and the nearest hospital., Wireless technologies used for information transferring.

## II. FUNCTION FLOW

The MCU controls the entire operation of this section.ARM (Automatic RISC Machine) is the controller that we are using in this ambulance section. The sensors fixed vehicle collects the vibration to the amplifying circuit. The amplifying circuit will amplify the obtaining vibrations and given to the MEMS. MEMS are able to store the factors such as vibration, speed, humidity, temperature etc. It is connected with the accelerometer hence if the speed of the vehicle is at a high rate it will give a warning alarm (indicator) to the driver. If the driver continues the driving with the same speed and accident occurs, the MEMS can detect weather it is a linear (only x axis) or nonlinear (x, y, z directions). Also it can store all the data of the vehicle with the cause of accident.

The GPS and GSM are connected to this system. The communication for the GPS and GSM can be done through serial communication. The serial communication creates an interface through which it covert CMOS to TTL logic. The GPS is used to locate the position (longitude and latitude) of the vehicle.

The GSM in the black box can sent a message to the ambulance section and GSM of the family member. The message includes the location, time and other details regarding the accident.

## III. METHODOLOGY

### *A. Existing Method*

- There is loss of life due to the delay in the arrival of ambulance to the hospital in the golden hour. The ambulance in the traffic signals. It would be of great use to the ambulance if the traffic signals in the path of the hospital are ON.

- Post Accident Detection Systems
- Lack of Intelligence in the detection systems.
- Fails to track the collision and pre-damage status
- Way of monitoring people to be manual
- Time delay (first aid).

### *B. Proposed Method*

- A new design for automatically controlling the traffic signals and achieving the above mentioned task so that the ambulance would be able to cross all the traffic junctions without waiting.
- For easy access the server maintains a database for each node, and hence each node will have a unique id for addressing it.
- The ambulance is guided to the hospital by the server through the shortest route. The vehicle unit installed in the vehicle senses the accident and sends the location of the accident to the main server. The main server finds the nearest ambulance to the accident spot and also the shortest path between the ambulance, accident spot and the nearest hospital.
- Wireless technologies used for information transferring.

### *C. Vehicle Section*

Vehicle section is the most important section of this entire project. The vehicle section includes

- Microcontroller unit
- MEMS
- GPS
- GSM/GPRS
- Serial communication
- Indicator
- Amplifying circuit

The MCU controls the entire operation of this section.ARM (Automatic RISC Machine) is the controller that we are using in this ambulance section. The sensors fixed vehicle collects the vibration to the amplifying circuit. The amplifying circuit will amplify the obtaining vibrations and given to the MEMS. MEMS are able to store the factors such as vibration, speed, humidity, temperature etc. It is connected with the accelerometer hence if the speed of the vehicle is at a high rate it will give a warning alarm (indicator) to the driver. If the driver continues the driving with the same speed and accident occurs, the MEMS can detect weather it is a linear (only x axis) or nonlinear (x, y, z directions). Also it can store all the data of the vehicle with the cause of accident.

The GPS and GSM are connected to this system. The communication for the GPS and GSM can be done through serial communication. The serial communication creates an interface through which it covert CMOS to TTL logic. The GPS is used to locate the position (longitude and latitude) of the vehicle.

The GSM in the black box can sent a message to the ambulance section and GSM of the family member. The message includes the location, time and other details regarding the accident. This message helps the ambulance section and the family member about the accident and ambulance section can collect the patient from the accident spot to the hospital.

The indicator for warning alarm can be done with the help of buzzer. This section has a direct power supply for entire unit will get from battery fixed in the vehicle. The power supply can be given directly to the microcontroller unit since it controls the entire unit.

### *D. Ambulance Section*

The ambulance section includes the following

- Microcontroller Unit(PIC)
- RF Transmitter

Main responsibility of the ambulance section is to take the victim to the hospital from the accident scene. Also in the ambulance section heartbeat and temperature of the victim is taken. PIC (PERPHERIAL INTERFACE COMPUTER) is the microcontroller using in this section. Also it consists with the RF transmitter

The RF transmitter is for passing the information to the traffic section for controlling traffic hence the ambulance can reach the hospital as soon as possible. So the probability for keeping the victim safe is very high.

### *E. Traffic Section*

The traffic section includes the following

- RF Receiver
- Microcontroller unit
- Traffic light section

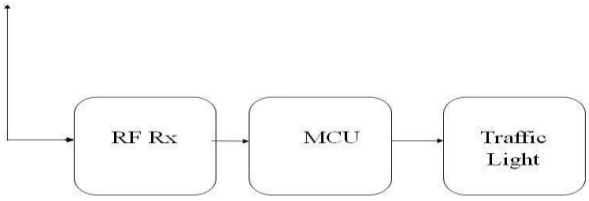


Fig Traffic block diagram

Traffic is an important problem facing by the ambulance section during the time of taking a patient to the hospital. In many cases several victims lost their life due to heavy traffic. So it is very is very important to keep the traffic section in control and this is he that we are doing in this section. The information about the accident which is send from the ambulance will received by the RF receiver in the traffic light section. The microcontroller unit in the traffic light section controls the traffic by indicating through the traffic lights (red, green, yellow).

For example in a junction the traffic light gives red signal to all vehicles for passing the ambulance without jamming in the traffic. This is not only for one junction every junction in a city or heavy traffic road can be controlled using this method. The microcontroller in the traffic light section controls the traffic lights. So the ambulance can reach the hospital as soon as possible and the victim can be admitting in the hospital for taking the treatment.

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### *F. Snaps For Simulation*

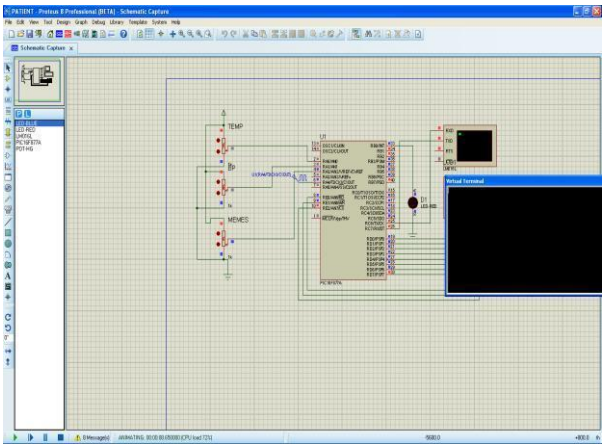

Fig : Circuit Diagram

### *G. Coding Algorithm*

```
PINSEL0 = 0;
        PINSEL1 = 0;
        PINSEL2 &= 0X0000000C;
        PINSEL1 |= 0x01 << 24; //Enable
        ADC0.1
        PINSEL1         |=      0x01 << 26;
        //Enable ADC0.2
        PINSEL1         |=      0x01 << 28;
        //Enable ADC0.3
        VPBDIV          =       0x02;
        //Set the cclk to 30 Mhz
        AD0CR =         0x00250602;
        //ADC configuration bits CLK = 9clks/8Bit |
BURST=1 | CLKDIV = 0x06
        AD0CR |=        0x01000000;
        //start ADC now
        UART0_Init (9600);
                                //Initialize
UART0 to 9600 Baud Rate @ 30MHz
        UART1_Init (9600);
                                //Initialize
UART0 to 9600 Baud Rate @ 30MHz
        UART0_PutC('S');
                UART1_PutC('T');
        U0IER =         0;
        VICIntSelect    = 0<<6;
                        //UART0 ('0' - irq    '1'-fiq)
        VICVectCntl6    = 0x020 | 6;
                //VIC slot enabled
        VICVectAddr6    =               (unsigned
long)UART0_ISR;         //pass address of UART0
        VICIntEnable    = 1 << 6;
                        //Enable          UART0
Interrupt
                ADC_CH          =       1;
        ii=0;
        IODIR0 = 1 << buzzer;
        //Configure P0.16 Output
        IODIR0 |= 1 << Relay2;
        IODIR1 &= ~(1 << crash);
        IOCLR0 = 1 << Relay2;
        IOCLR0 = 1 << buzzer;
        IOCLR1 = 1 << crash;
//      IOCLR1 = 1 << crash;
        while(1)
                {
                while (ADC_CH <4)
                {
                        do
                        {
                                val[ADC_CH]  =
AD0GDR;                 // Read A/D Data Register
                        }
                         while ((val[ADC_CH] &
0x80000000) == 0);              //Wait for the
conversion to complete
{
                        IOSET0 = 1 << Relay2;
delay(500);
                        delay(1000);
                        IOCLR0 = 1 <<
                        Relay2; U0IER = 1;
```

```
                        while(intrpt==0);
                        intrpt=0;
                        ii = 0;
                        m=0;
                        UART1_PutS
("AT+CMGS=\"+919750216721\"\r"); //COVAI
                        delay(10);
                        UART1_PutS ("Vechicle
Crashed @ \n GPS CO-ORDINATE: ");
                        delay(10);
                        delay(10);
                        UART1_PutS
("\nLattitude: ");
                        delay(10);
                        pos = 13;
                                j = 0;
                                while (j<10)
                                {
                                        U1THR
=       Buff[pos];
                                        pos++;
                                        j++;
}
```

## IV. CONCLUSION AND FUTURE SCOPE

In a critical situation many vehicles faces accident, due to this lot of person lost their lives. Some people can be saved at that time, but because of lack of information, time and place,it may not be possible. Using the vehicle black box concept the accident happened can be detected with the help of GPS and GSM systems. The victim can be admitted in the hospital by the ambulance section as soon as possible by controlling the traffic signals. Therefore the black box concept can provide for road safety hence it create a safe driving for the driver and give security for the life and property of the public.

The successful implementation of the PTMS can continuously provide field data and valuable experiences to test and evaluate the effectiveness of the ACP approach for solving the management difficulty of real-world complex systems Vehicular ad hoc networks (VANETs) have emerged as an application of mobile ad hoc networks (MANETs), which use dedicated short-range communication (DSRC) to allow vehicles in close proximity to communicate with each other or to communicate with roadside equipment. Applying wireless access technology in vehicular environments has led to the improvement of road safety and a reduction in the number of fatalities caused by road accidents through development of road safety applications and facilitation of information sharing between moving vehicles regarding the road.

## REFERENCES

[1] BergasaL. M, J. Nuevo, M. A. Sotelo, R. Barea, and M. E. Lopez,(Mar. 2006) “Realtime system for monitoring driver vigilance,”IEEE Trans. Intell. Transp.Syst., vol. 7, no. 1, pp. 63–77,

[2] Chung-ChengChiu, Min-YuKu, Hung-Tsung, Chen Nat,(June 2007) "MotorcycleDetection and Tracking System with Occlusion Segmentation," Image Analysis for Multimedia Interactive Services. Santorini, vol. 2, pp. 32-32,

[3] Devi M. S and P. R. Bajaj,(Jul. 2008) “Driver fatigue detection based on eye tracking,” in Proc. IEEE ICETET, Nagpur, Maharashtra, India,pp. 649–652.

[4] GangXiong,SeniorMember,IEEE, XisongDong,Member, IEEE, Dong Fan,FenghuaZhu,Member, IEEE, Kunfeng Wang, and YishengLv, (march 2013)“Parallel Traffic Management System and ItsApplication to the 2010 Asian Games,”IEEE Trans.,vol. 14, no. 1,

[5] Lu .M, W. chen, X. Shen, H.C. Lam and J. Liu,(August 2007) "Positioning andtracking construction vehicle in highly dense urban areas and building construction sites," Automation in Construction, vol. 16, issue5.pp.647-656,

[6] Manuel Fogue,PiedadGarrido,Francisco J. Martinez,Juan-Carlos Cano,Carlos T. Calafate, and Pietro Manzoni,(Sep 2012)”Auttomatic Accident Detection,”IEEE Vehicular Tech. Magazine,

[7] Rigas.G, C. D. Katsis, P. Bougia, and D. I. Fotiadis,(Jun. 2008) “A reasoningbased framework for car driver’s stress prediction,” inProc. Med. Control Autom. Conf., Ajaccio, France, pp. 627–632

[8] Stauffer. and W.E.L. Grimson,(1999) "Adaptive Background Mixture Models for Real-Time Tracking," Proc. IEEE Conf on Computer Vision and Pattern Recognition,.vol.2, pp. 246-252,

[9] Watthanawisuth, T. Lomas and A.Tuantranont,(Jan 2012)“Wireless Black Box Using MEMS Accelerometer and GPS Tracking for Accidental Monitoring of Vehicles,” IEEE-EMBS International Conference on Biomedical and Health Informatics (BHI 2012) Hong Kong and Shenzhen, China, 2-7 .

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