AUTOMATIC AMBULANCE RESCUE SYSTEM WITH HEALTH MONITORING AND TRAFFIC CONTROL

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ABSTRACT:

Road accidents and traffic are one of the major problems in cities.To overcome this situation our project describes a solution that is '**Automatic ambulance rescue system with health monitoring and traffic control'**. The main theme behind this scheme is to send the accident location to the emergency center through GPS and GSM. When the accident happens,the emergency center receive the message with the accident location through GSM transmitter in the vehicle. The Emergency center sends the accident location and the nearby hospital location to the ambulance to rescue the people. In health monitoring system, the patient's vital health parameters such as heart rate and body temperature are monitored.In Traffic control unit, an RF transmitter in the ambulance communicate with the RF receiver mounted on the signal post to give way for the ambulance.

Keywords:

API (Application Program Interface), GSM,GPS,Thinkspeak,pcloud,Virtuino.

I. INTRODUCTION

Wireless Sensor Networks (WSN) can be used in various areas like military, home automation, health care monitoring, security and safety etc[5]. This system automatically detects location of the vehicle accident with the help of various sensors. Sensor detects the accident location of the vehicle and then transforms the message to the main server using GPS/GSM module. This system is used when person needs medical treatment not for the accident case but for other emergencies [2[[4]. Such a system is helpful for providing very fast medical treatment to victim of vehicle.

Health parameters such as Heart rate, body temperatures are calculated by hardware. Further using serial communication, the information are stored in Cloud through which they are transferred to hospital.There may be traffic jam occur on main way in special seasons and rush hours. The Emergency vehicles may be locked in traffic jams. Sometimes even if there is no traffic, people have to wait because of the time limit of traffic signal. Recently most of deaths are caused due to the traffic congestion and ambulance may not reach the accident place or hospital. For traffic controlling purpose, RF communication is used. Utilization of time after an accident is golden hours. So that the recovery action should be taken immediately. Also we have to minimize the delay that is caused by traffic congestion[1][3].

II. METHODOLOGY

Under the proposed work, full automation is required to provide a smooth flow for the emergency vehicles like ambulance to reach the accident spot in time for rescue the people.

In proposed work, there are 4 units

- Accident zone unit
- Emergency unit
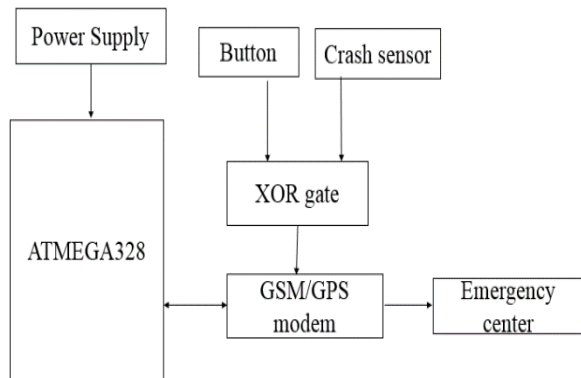- Ambulance unit
- Traffic control unit

Accident zone unit:

Fig.1.Accident Zone unit

The Accident Zone unit is shown in fig.1.This system is installed in every vehicle.If a vehicle has met with an accident, crash sensor gives the electric signal to ATMEGA328 microcontroller. GPS provides latitude and longitude information of the vehicle's location.This information is send to the Emergency Center through GSM[4].If there is no severe accident the information will not send to the Emergency center using XOR gate and button.
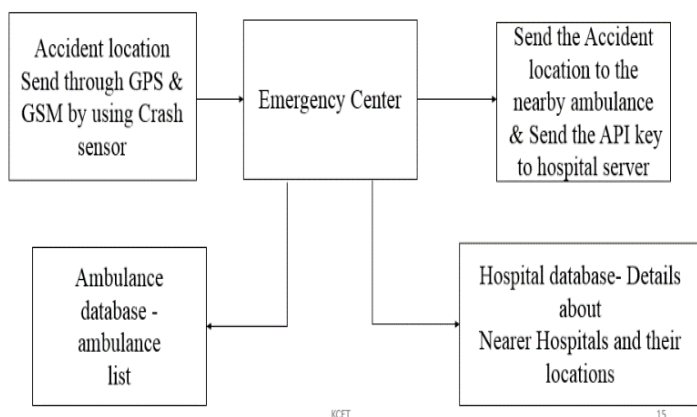
Emergency Center Unit:

Fig.2.Emergency Center Unit

Fig.2 shows the block diagram of the emergency center unit.The Emergency Center must have the list of nearby Ambulances and list of nearby Hospital details and their locations (GPS coordinates).

The emergency center send the accident location to the nearby ambulance and API key of Thingspeak cloud tothe nearby hospital's server using pcloud.
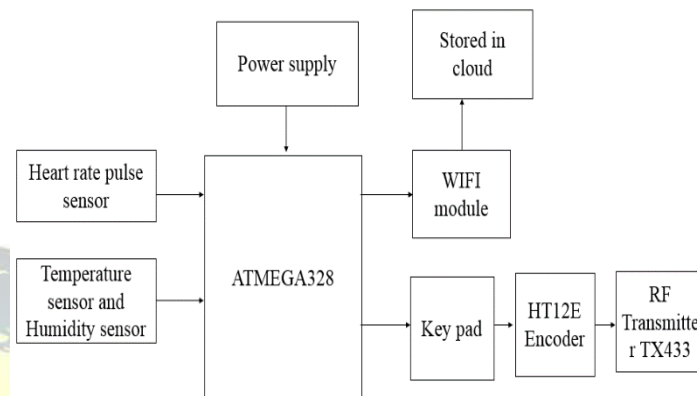
Ambulance Control Unit:

Fig.3.Ambulance Control Unit

virtuino mobile application the doctor can monitor the patient's information through mobile.Further information about patient's information send through plcoud. Using pcloud we can send audio, video, text information. RF transmitter RF433 placed on emergency vehicle transmits control signal to receiver which is fixed on traffic light post in emergency mode.
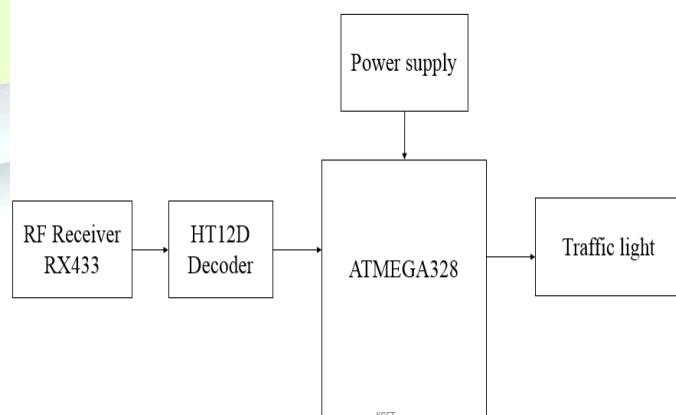
Traffic Control Unit:

Fig.4.Traffic control Unit

The control signal is received in the RF receiver RX433 and it is decoded by HT12D decoder.[1] The ATMEGA328 microcontroller controls the traffic light pattern through RF transmitter and receiver[6][7].The RF receiver placed in traffic post receives the control signal from the ambulance to change the signal to green for certain time duration for the ambulance to pass through without waiting. After certain time period the signal pattern changes to the previous pattern.

III. RESULTS AND DISCUSSION

a. Accident Zone Unit

If accident occurs, crash sensor send the signal to the XOR gate. At the same time, GPS finds the accident location.Another input of the XOR gate is through the push button. If the button is pressed within the time duration, GSM will not transmit the accident location information to the Emergency center. If the button is not pressed GSM will transmit the information to the Emergency center[2][4].Fig. 5 demonstrates the complete accident zone unit. The latitude and longitude information is displayed in the serial monitor as in fig. 6.
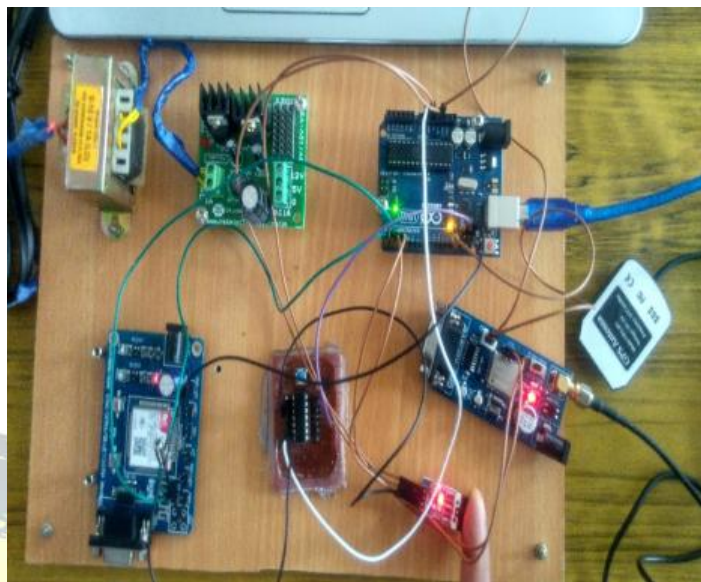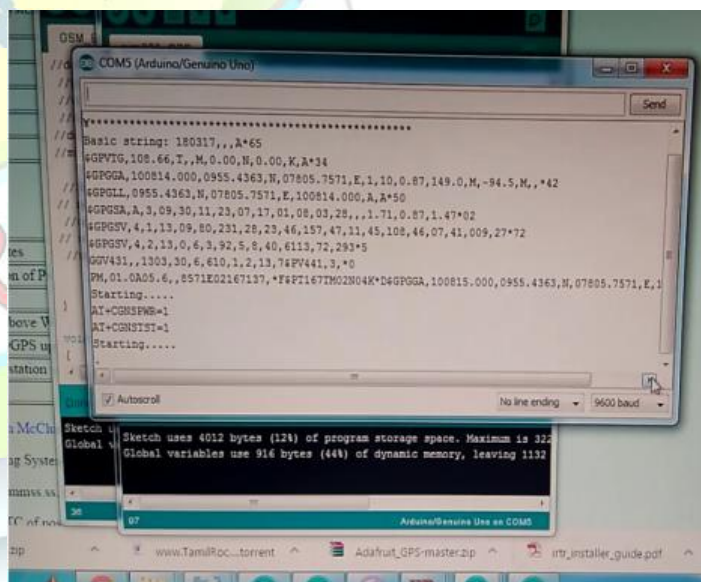

Fig. 5.Accident Spot detection

Fig.6.GPS location

b. Emergency Unit

The latitude and longitude information is received at the emergency center. Emergency center transfers the information about patient's health to the doctor through cloud.

c. Ambulance Unit

The fig.7 shows the connections of the patient health monitoring. Index finger of the patient is placed on the heart rate pulse sensor. The body temperature is also measured using temperature sensor[8]. The heart beat rate and the temperature are transmitted through WiFi module to the cloud. The output is displayed in the serial monitor as shown in the Fig.8.These values are monitored by doctors through cloud. The doctor may also monitor the information through virtuino mobile application as shown in Fig.9. RF transmitter in the ambulance transmits the control signal to control the traffic light.
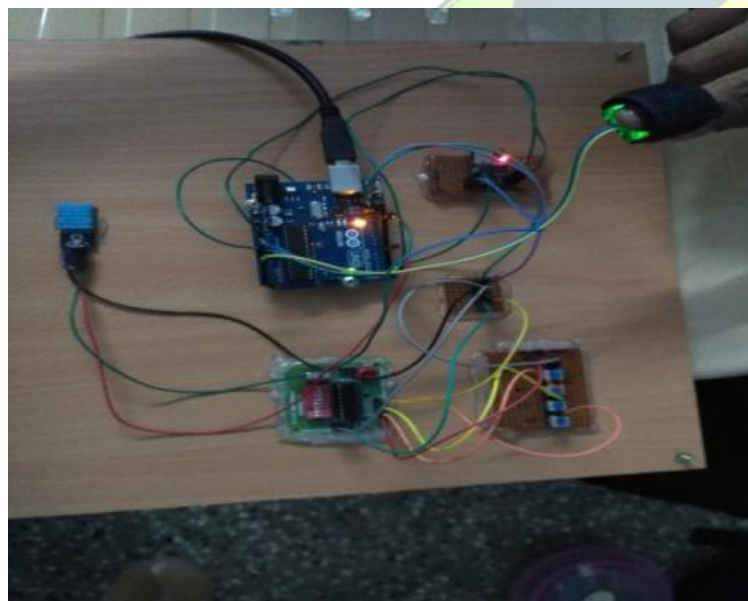
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AT
AT+CWMODE=1
AT+CWJAP="bharu","bharu123"
AT+CIPSTART="TCP","184.106.153.149",80
AT+CIPSEND=70
GET /update?key=EHPIU55RC4DS6UEM&field1=32.00&field2=41.00&field3=58
AT+CIPSTART="TCP","184.106.153.149",80
AT+CIPSEND=70
GET /update?key=EHPIU55RC4DS6UEM&field1=32.00&field2=41.00&field3=19
AT+CIPSTART="TCP","184.106.153.149",80
AT+CIPSEND=71
GET /update?key=EHPIU55RC4DS6UEM&field1=35.00&field2=42.00&field3=100
AT+CIPSTART="TCP","184.106.153.149",80
AT+CIPSEND=69
GET /update?key=EHPIU55RC4DS6UEM&field1=32.00&field2=41.00&field3=2
AT+CIPSTART="TCP","184.106.153.149",80
AT+CIPSEND=70
GET /update?key=EHPIU55RC4DS6UEM&field1=35.00&field2=42.00&field3=55
```

Fig.8.Heart rate and Body Temperature

In fig.8 field1 indicates the body temperature value and field3 indicates the patient's heart rate values.
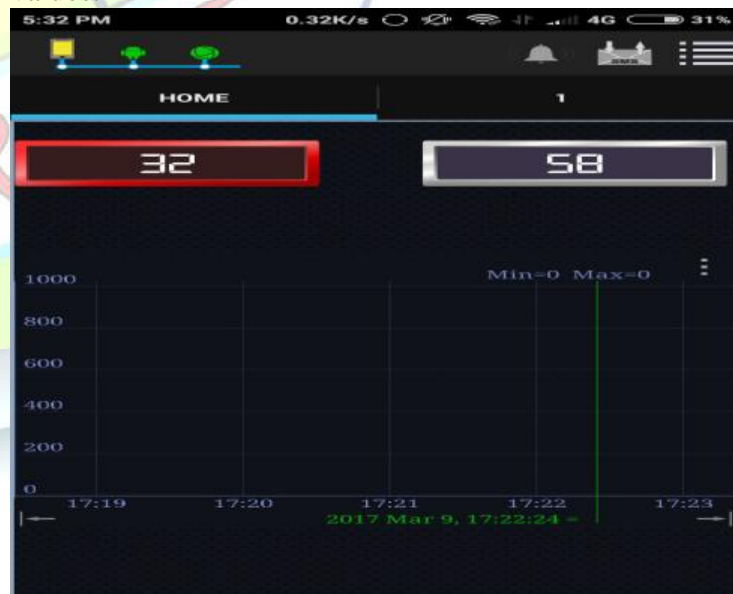

Fig.7.Health Monitoring

Fig.9.Virtuino Mobile Application

d. Traffic Control Unit

RF receiver in the traffic post receives the control signal from the ambulance to change the signal to green as in fig.10.

Fig.10. Traffic light Control

IV. CONCLUSION

In this paper,a system detected the location of accident spot automatically and realizing the automation of information transmission.Also it saves the lives of the victims of accident instead of wasting their time in searching the location of the hospital.This system will continuously monitor the patient's health parameters and simultaneously will control the traffic signal.

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