HYBRID DRIVER SAFETY, THEFT INTIMATION AND TRACKING USING MODERN WIRELESS TECHNOLOGY AND CLOUD COMPUTING.

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Abstract- **The main cause of the accident is due to driver's careless where he might be intoxicated due to alcohol or due to a medical condition which causes an abnormal heart rate and even if the accident occurs due to the above factors the impact on the car can be reduced where too much pressure on the car is detected and immediately the car gets stopped and by the use GSM and GPS technology the location of the car where accident occurs is sent to the emergency contact. In order to make the diagnosis easy for the consulting doctors the heart rate, alcohol intensity gets stored in the cloud dynamically and can be accessed by the doctors for a better diagnosis of the accident victim. In addition, the care is made secure, where the finger print of the persons who access the car is stored and for the respective finger print the One Time Password (OTP) is sent for verification to the user through SMS and also intimating the owner that the car is in access by the fingerprint registered user and if the wrong finger print crosses the threshold the car will be locked and a notification will be sent to the owner mobile.**
Keywords – MQ3 gas and alchohol sensor, Ultra sonic sensor, Heart rate control system, Pressure sensor, Password authentication and auto reply SMS GSM, Location finder using GPS, Cloud Computing.

1. INTRODUCTION

In many urban areas Accidents and theft of the car is a common problem and the deaths caused due to accidents is mainly due to the carelessness of the driver, driving under the influence of alcohol and it also might be due to cardiac arrest, when the person is driving the car or also due to the abnormal heart rate due to the medical condition or anxiety. So these deaths can be reduced using various techniques and even if, the prevention of accident is not successful, the impact of damage on the car can be reduced and in turn the damage on the person inside the car is also reduced. The various techniques are the heart rate control monitor system, Alcohol detector, pressure detection system, usage of the ultra sonic sensor which estimates the distance of the obstacle before hand and stops the car. These are some of the techniques for accident prevention and with respect to security there is a usage of a finger print module where the authorized persons finger prints are stored and after the finger print authorization is matched a notification including the One Time Password (OTP), this OTP must be entered in order for the car to get into ignition. The notification is sent to the owner mobile in case of theft and in case of the accident the notification is sent to the driver emergency contact using GSM and GPS technology.

This is a hybrid system where the safety of the car, the driver's conscience and status of the driver during driving is an important concern. First, the safety of the car is made more sophisticated and the car is made more secure. The car consists of a finger print module where the person who wants to access the car, their finger print is stored and whenever the person wants to access entry into the car, finger print should be matched by the module and to the respective finger print an One Time Password(OTP) is sent to the users phone and another notification is sent to the owners phone stating that the car is in usage and only if the OTP is matched, the person can have access into the car and the OTP is different for different users. For each finger print stored in the module there will be different and unique OTP and the OTP is sent to the individual's mobile number whose finger print is stored. If the number of matching of the finger print crosses the threshold a notification is sent to the driver stating that an attempt to steal the car has been made.

Secondly, It is mainly concentrated on the driver safety, there are various causes for accidents it might be due to carelessness of the driver, the drive might get into a stage of cardiac arrest or abnormal heart beat due to anxiety and the driver might be driving under the influence of the alcohol. Notification is sent to the driver if he is intoxicated with alcohol stating that the driver is under influence and not to drive the vehicle and even if the accident occurs the damage on the car is reduced by the usage of the pressure sensor, when the pressure reaches threshold the car stops immediately and a notification is sent to the driver's emergency contact stating that the driver was in an accident and is in danger and also the location of the car is also sent using the GPS module, so it would easier to locate the accident victim and help the victim faster. The prevention is also done using the ultra sonic sensor where the sensor calculates the distance, if the distance of the car is too close to the obstacle

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and the driver is distracted and cannot stop the car the ultra sonic sensor calculating the distance stops the car immediately goes back a little distance so that the car is not too close to the obstacle. If the accident occurs due to the cardiac arrest or abnormal heart beat due to anxiety, the heart rate including the alcohol intensity, pressure intensity is stored in the cloud where the consulting doctors can easily diagnose the problem and can start the treatment early and using this technology the cloud computing also comes into picture.

2. LITERATURE SURVEY
A valuable amount of research has been done on accident detection, precaution and safety of the car, etc.Some of the closely related work has been discussed in this section.

2.1 Usage of the GPS and GSM and accident detection using IR sensor–
The paper proposed by Sangita N.Gujar1 , Jagruti R.Panchal2 , Lalita K.Wani3 with title"Improving safety with Obstacle detection and Track following Car using sensor and GPS covers the security aspect but seems a bit complicated if the owner calls the user for first time the ar should lock and if again called for the second time it should open and in case accident detection it is usinng IR sensor to find out the prescence of obstacle and it uses GPS and GSM in order to track the car in case of an accident this is better action taken regarding an accident but the chances of it working when a patient is critical is less, when the patient is taken to the doctor he has to asses the patient and give him the right treatment, but if the assesment is done beforehand it would save a huge chunk of time and the chances of patient living is also increased

2.2 Usage of the Pre-crash detection with usage of PIR sensor–
The paper proposed by Md.Khaled Hossain* , Sayed Samial Haq** with title" Detection of Car Pre-Crash with Human, Avoidance System & Localizing through GSM" is stating that the precautions regarding the pre-crash is taken, but it is prioritizing humans over animals as an obstacle and it shows that they have the usage of the PIR sensor in order to priortoze humans and dogs and in case, this system fails and accident occurs they are using GSM to pin point the location where the accident has taken place. The paper is just mainly concentrating on the precautions and does not take necessary actions in case of an accident and the usage of the PIR sensor is not the most efficient way to detect the oncoming obstacle.

3. DESIGN OF PROPOSED SYSTEM
Figure 1 shows the designed system Hybrid driver safety, theft intimation and tracking using modern wireless technology and cloud computing. The driver safety system contains a gas sensor, a heart rate control system , and two ultrasonic sensor one in the front and the other in the back for measuring the distance between the obstacle and the theft intimation and tracking contains a finger print module, a GPS and a GSM modem and keypad for entering the OTP send to the user and an LCD display for displaying the entered and OTP and showing the status of the car after and before entering the OTP.
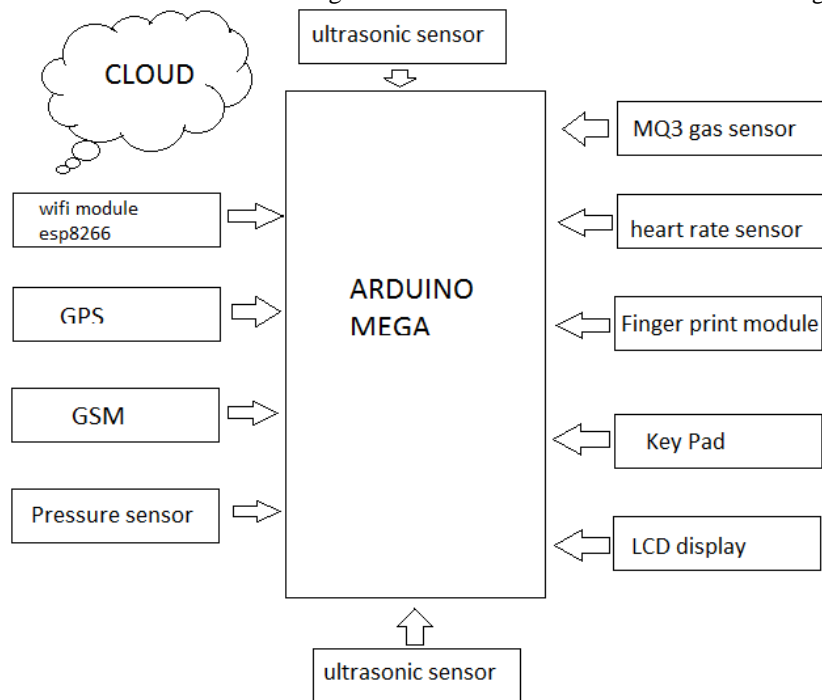

Figure1. Proposed system for the Hybrid driver safety, theft intimation and tracking using modern wireless technology and cloud computing

The various design components are explained as follows:

3.1 Arduino mega 2560–
This board consists of variety of microprocessor and controllers. Also this board consists of analog and digital input/output pins which are used to interface with other circuits; also arduino mega is featured with serial communication interface which also includes universal serial bus (USB) which is used for loading programs for computers. Usually these microcontrollers are programmed using the features of programming languages like C, C++. Also it consists of 16Mhz crystal oscillator, a power jack, an icsp header and reset button, showing that it contains everything that is required to support the microcontroller. Arduino is user friendly and most of the components are compatible with Arduino mega and it can be easily programmed.

3.2 GSM SIM 808A–
SIM808A module consist of both GSM and GPS. Actually it is constructed based on gsm/gps module SIM808 from SIMCOM also it support quad-band network and importantly it adds GPS technology for satellite navigation. It is also featured with ultra low power consumption in sleep mode and integrated with charging circuit for Li-Lon batteris which make it work for a long time and it is convenient for projects that needs its use for long time. It also consist of high GPS receive sensitivity with 22 tracking and 66 receiver channel. Also it supports A-GPS. Actually this entire module is controlled by AT commands using UART and also supports 3.3v and 5v logic level. Importantly this module(board) uses the 2G GSM networks. The main features it consist like support real time clock, GPRS mobile station class B. the GPS module takes the co ordinates of the location from the satellite and sends it to the GSM, the GSM sends the location to the mobile phone of the owner through SMS and this process is performed dynamically so that the car can be tracked in case of theft.

3.3 Ultrasonic sensor–
Ultrasonic sensor is a component that is used to measure the distance of an object or a thing by making use of sound waves. Means by sending a sound wave at some particular frequency say at human audible range of 40khz towards the object or a thing and waiting for the sound signal to get reflected back from the object. Now recording the time between the generation of the wave, sending of sound waves to object, and obtaining the reflected wave from object, we can find the distance between the sensor and the object or a thing. Here it is to notice that the working of ultrasonic sensor can be affected by temperature and humidity of the atmosphere. Also the point to be noted is that some few object cannot be found by ultrasonic sensor this is because some few objects are positioned or they have shape in such a way that the sound signal gets deflected away from ultrasonic sensor also sometimes few objects are able to absorb the transmitted sound wave which makes the ultrasonic sensor unable to find the object or a thing to which the sound wave is transmitted. This ultrasonic sensor is not only used to measure distance object but also it is used in measurement of dynamically changing diameter, heights, depths and counting number of units. There are two ultrasonic sensor that is being used, both for front and back, which calculates the distance between the car and the obstacle and in case the distance is less than the threshold the car backs up a little bit and keeps a safe distance from the obstacle.

3.4 Pressue sensor–
The pressure sensor is a device which is used to measure the pressure that is being applied on the system, in case an accident occurs the pressure is applied on the sensor and if the pressure is above the threshold the car is immediately stopped and put into reverse, where the car is bought to some distance and stopped keeping a safe distance from the obstacle and the vehicle and usage of the pressure sensor reduces the impact on the car.

3.5 Finger Print Module(R305)
This is a finger print sensor module that consists of TTL UART interface for the direct connection to microcontroller UART or to the pc through MAX232/USB serial adaptor. Here the user can store the finger print data and can also configure it in 1:1 or in 1:N mode for identifying the person .This finger print module can also directly interface with 3v3 or 5v microcontroller and for interfacing with PC serial port we need a converter (like MAX232) . This finger print module can be embedded into a variety of products like access control, attendance, safety deposit box, car door locks. Its includes feature like low power consumption ,low cost, small size, excellent performance, good image processing capabilities.

3.6 Keypad–
A keypad is a pad which consists of a set of buttons and the buttons is a combination of alphanumeric symbols and it is an input device where the information is typed on the keypad and is displayed on the output device like LCD. In the proposed system the keypad is used for security purpose when the person with the registerd finger print is using the car, as soon as he keeps his finger on the finger print module the OTP is sent to the user and he should use this OTP and enter it on the keypad in order to get entry into the car.

3.7 LCD display–
LCD display is an output device which light modulating properties to display the information given on the input device like key pad and the LCD display is used to check the status of the system, when the user with registered fingerprint gets the OTP and he enters it on the keypad and the entered OTP is shown on the LCD display and it also shows the status after keeping the finger on the fingerprint module stating that whether it is matched or not.

3.8 MQ3 Gas Sensor–
The Mq3 gas sensor is actually a alcohol sensor which is used especially to detect the alcohol amount on a human breath and also detects the amount of harmful gases. This gas sensor provides an analog resistive output based on alcohol concentration or amount in human breath. That is when the alcohol gas is present, the sensors conductivity gets higher along with the gas amount or concentration rising. Its application includes like detecting alcohol at different concentration, also it is widely used in domestic alcohol gas alarm, industrial alcohol gas alarm and also in potable alcohol detector. Its specifications will be like 5v supply voltage, detecting concentration from 0.05 to 10mg/l, analog and digital output . if a person driving the car is intoxicated with alcohol the message is sent to the owner that the driver is intoxicated and is under the influence of the alcohol suggesting the driver not to drive .

3.9 Wi-fi module(ESP8266)
The Esp8266 wifi module contains SOC with integrated TCP/IP protocol stack which can provide any microcontroller to get your wifi network8. this ESP8266 is capable to host either an application or offloading all WI-FI networking functions from another application processor. Also this module has powerful on-board processing and also consist storage capability which allows it to be integrated with sensor and other devices during run time. They also support APSD for Voip application and for Bluetooth co-existence interfaces, it also contains self-calibrated RF which allows it to work under all operating conditions and importantly they do not require external RF part. Its application includes smart power plugs, home automation, WI-FI , location-aware devices, industrial wireless control and security ID tags. The wifi module is an important module which is essential in order to connect it to the cloud.

3.10 Cloud computing–
cloud computing is a paradigm that provides access to configurable system resources and a large level services . the main services provided by the cloud is the storage but only the storage does not constitute the cloud, it also includes the global access to the information stored in the cloud in order to provide the services. In the proposed system we store the rate of the following parameters; gas, heart rate, pressure and the front and the back distance between the car and obstacle computed by the ultrasonic sensor and these parameters are required in order to analyze the cause of the accidents and can be used by the consulting doctors to asses the problem and start the treatment faster.

4. IMPLEMENTATION
The components used in the proposed system are interfaced together on the arduino board according to pin configuration and the the system with all the components inter connected to each other is placed inside the car and the components provide services to both the car and the driver of the car in both security and safety aspects and the figure 2 below shows the implemented prototype.
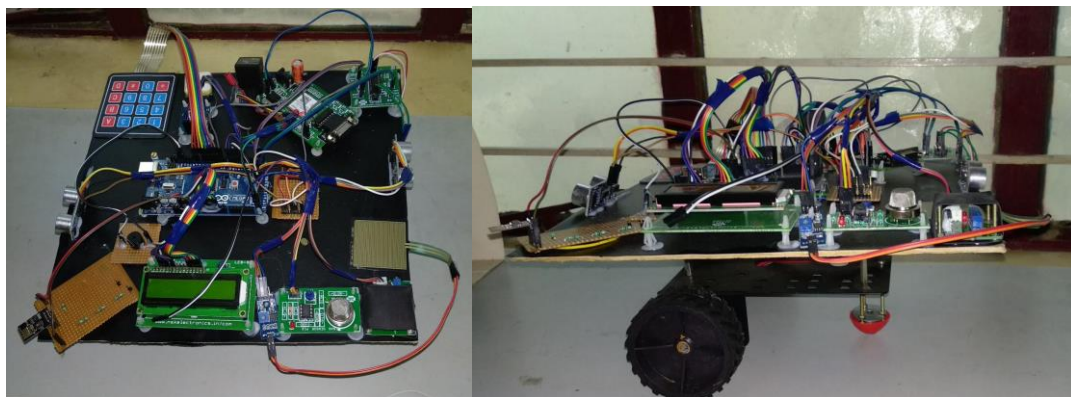

Figure 2.Implemented prototype.

5. EXPERIMENTATION AND RESULTS
For experimentation we mainly use cloud computing, the main devices which are connected in the aspect of safety, dynamically transfers the data for every certain intervals of time and these data are used by consulting physicians in case of an accident and these data helps the doctors to easily asses the cause of the accident and start the treatment early, because the life of the victim would be on the watch and every second counts, sometimes assessment takes a huge amount of time, by the

time of providing the correct treatment, the patient would have lost his life, our prposed system not only provides the safety measures for the driver but also helps to take the right and appropriate actions in case of the accident

The figure 3 shows the pressure rate that is being put on the car,which allows us to know at what intensity the accident has been occurred.
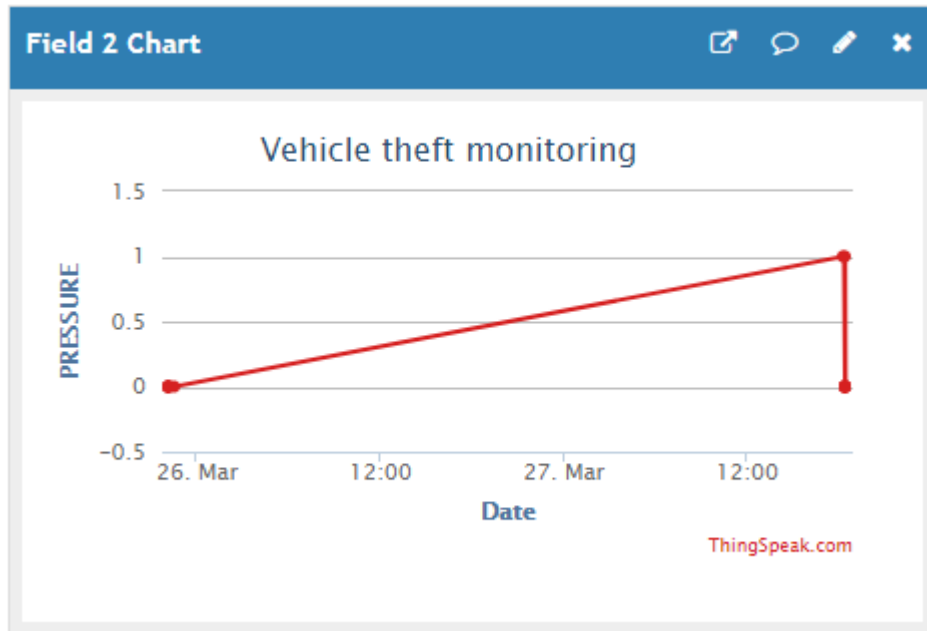

Figure 3.the cloud showing the pressure values from cloud.

The figure 4 shows the values of the heart rate sensor, this is very useful for the consulting doctor to deduce the reason of the heart attack or if the accident is caused due to anxiety.
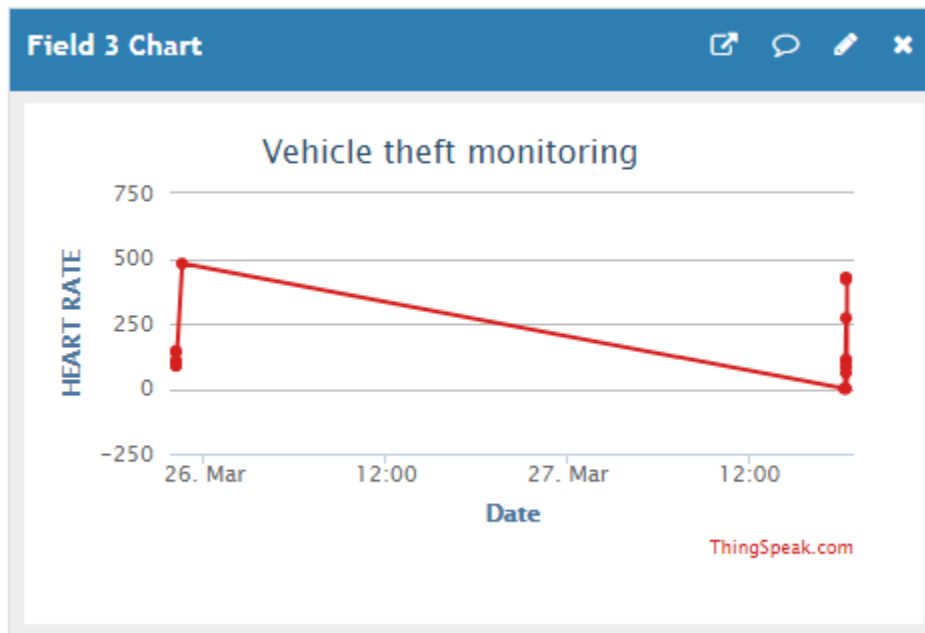

Figure 4. heart rate values recorded from sensor stored in cloud.

The figure 5 shows the intensity of the gas or tells intensity of alcohol in the driver, if the driver is intoxicated with alcohol and provides a precaution through SMS stating that the person is intoxicated.
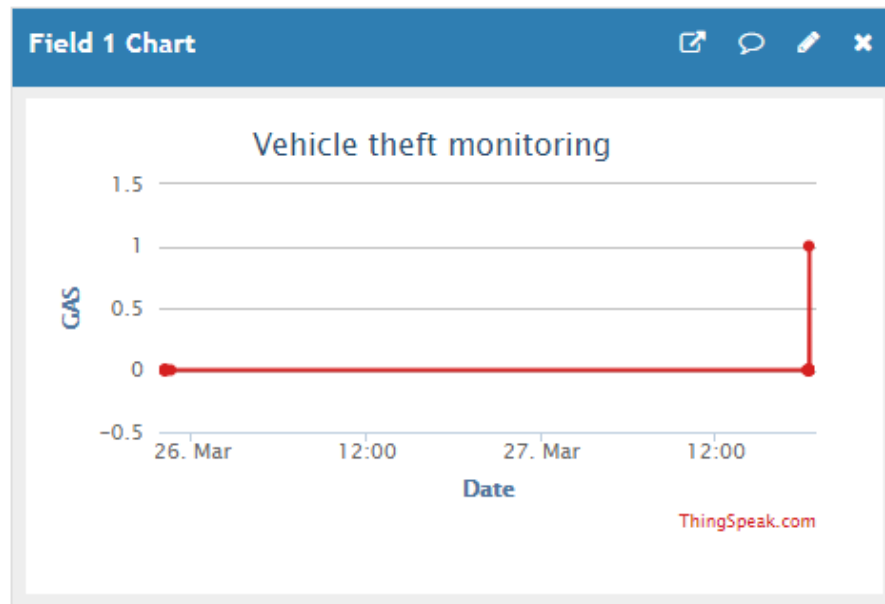
Figure 5.gas intensity recorded from the sensor stored in the cloud.

The figure 6 and figure 7 shows the distance between the car and the obstacle both in front and back of the car ,these values are taken from the ultrasonic sensor and if the distance is less than the threshold the car immediately stops and takes it reverse and then stops ensuring that it is in the safe distance between the obstacle and car.
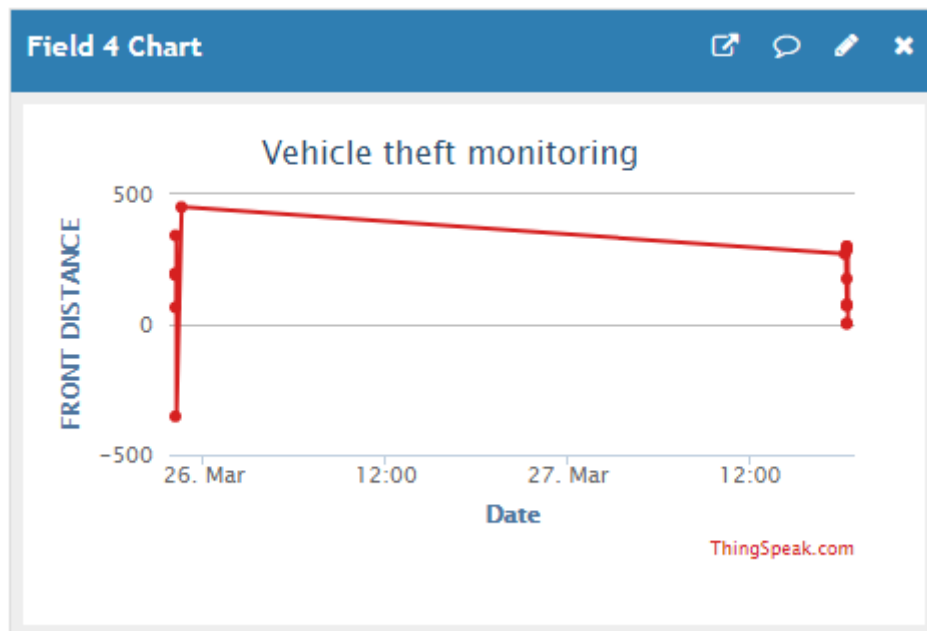

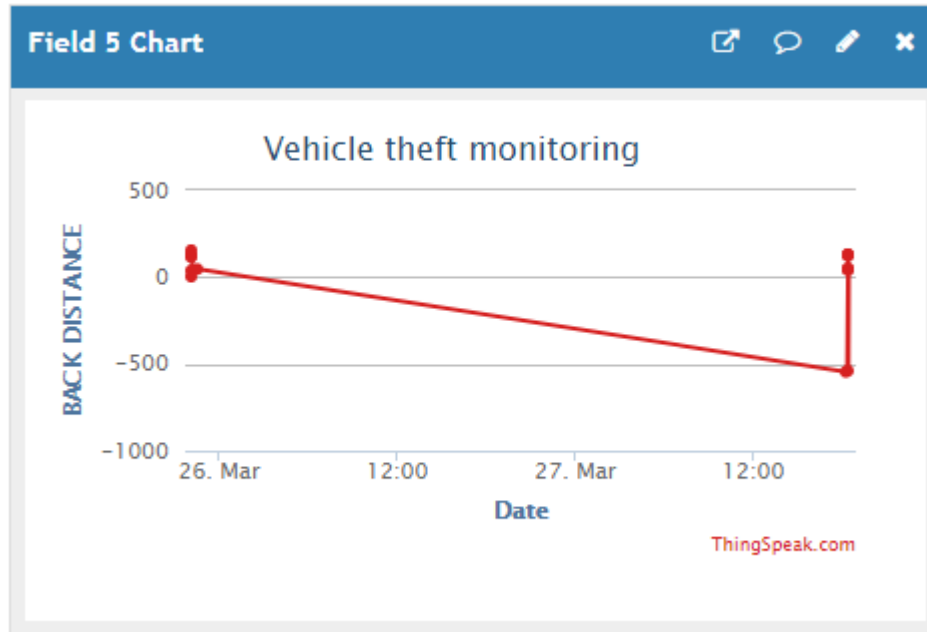Figure 6. The front distance recorded from sensor stored in cloud

Figure7. The back distance recorded from sensor stored in cloud

6. CONCLUSION

There are many research papers stating about the accident detection system, and safety of the car but none of them is concerned about the safety of the driver and none of them are considering the status of the driver before he starts to drive somewhere and if the status of the driver is known the accident can be easily avoided, the accident might occur due to heart attack the driver might be having or he the variation of the heart rate due to anxiety. And the heart rate values are measured and store it in the cloud so that consulting doctors could easily asses cause of the accident and provide correct treatment and the various parameters such as pressure, gas, alcohol and the distance between the car and the obstacle is also stored in the cloud, many papers adopt the usage of the IR and the PIR sensor which is not very much efficient in calculating the distance between the obstacle where as, we use ultrasonic sensor which gives accurate distance and effectively stops the vehicle, in case it is too close to the obstacle and the car backs up a little distance in order to have a safe distance between the obstacle, coming to the security aspect none of them have used the finger print technique and in order to make it more secure the fingerprint registered users gets an OTP through SMS and even the owner of the car gets a message stating that the car in access by another registered person rather than the owner and there is the usage of the GPS and GSM in order to track the location of the car.

7. REFERENCES

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