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HUMAN TRACING USING LOCATION BASED SYSTEM

Sumit Gahire[1],Rameshwar Mane[2], Abhay Sharma[3]
Ravikiran Waghmare[4], Gitanjali Mate[5]

[1,2,3,4]Department of IT, SavitribaiPhule Pune University, Pune (India)

[5]Assistant Professor, Department of IT, SavitribaiPhule Pune University, Pune (India)

ABSTRACT

Crimes are getting worse in today's era, nobody feels safe while travelling or specially to be in abandoned area. Women facing separation, particularly where there is violence and abuse. We hope this information will help humans specially women to negotiate safety for themselves and their children. However, we acknowledge that there needs to be important changes in how domestic violence, child protection and family law issues are dealt with to improve the safety of women and children. Currently, women face many problems when escaping domestic violence and child abuse. The research indicates that survivors of violence and abuse begin recovery when their exposure to danger has stopped and they are able to re-establish safety. However, since the criminal justice, child protection and family law systems leave women exposed to this violence and abuse, they are placed in the difficult position of being unable to focus on recovery and safety. In fact, when mothers are trying to negotiate their own and their children's safety they are put at more risk as these systems fail to provide a safe environment for this to take place.The project is designed for the human security especially for the women protection purpose. Usually while travelling, women are facing many issue related with the safety. So, in order to protect them from the other the smart safety device is created. Switch is connected to the controller so that whenever a person feels that it is not safe place or the person behind her disturbing continuously, and then he/she can press the button if they wants so that the message goes to the nearby police station as well as to the relatives. Hence he/she will find the needed help. GPS is used to detect the location of person which is he/she carrying and GSM isused to send the location.

Keywords: GPS, GSM, Location, Latitude, Longitude.

I. INTRODUCTION

Day by day the people's security is becoming the common issue, registering theft, robbery, murders and house breach every year. With the App revolution of smart phones, many security apps are developed every day but even the other side that is fraudulent or adversary knows that such apps do exist, and they are equally smart to confiscate the victim's phone. Hence the strategy to switch to an independent hardware is focused in our project. The system includes GPS,GSM, Arduino micro-controller and a web portal. The GPS is use to get the location of the user whereas the GSM is use to send the location of the user to the server. The Arduino-microcontroller is use to invoke the GPS and GSM module. The web portal is provided by the

admin. Admin can add and update Police Station details and Person's details. After Logging in, Admin can see list of all Requests sent from Device. Every request is assigned to nearest Police Station by using the haversine algorithm.

II. EXISTING WORK

In paper [1] the author proposed ABHAYA an android application for android users to track using many applications. It make use of global positioning system to track precise location of the victim seeking for help. Present android applications does not have the real time location tracking system. The issue of the above problem is solved by these system. This system sends the message comprising the URL of the location of the user to the pre-programmed contacts. When user click on the application it see if the required system Settings are accessible if not then it will enable all the system settings. It takes the actual location of user with help of global positioning system module and send the message comprising coordinates in the form of URL to the pre-programmed contact numbers for support. The received URL tracks the precise location of the person. The track location is sent to pre-programmed contacts after every 5 minutes. To terminate it we need to stop the system or application. The main objective of paper [2] is to track the location of vehicle using ARM7. There are various system develop to track the location of moving object(vehicle) but they are application specific, region specific which send the location of the vehicle. Location is sent in the form of longitude and latitude so it require third party application to get the precise location over the map. This application is divided into 2 part first is transmitter and second is receive. GPS receives location data from satellite and convert the data into data string of NMEA 0183 format. It contains longitude, latitude, altitude, speed and other satellite information. The system uses ARM7 microcontroller which receives NMEA string from GPS and take only latitude and longitude. Now this latitude and longitude readings are sent to receiver with the help of GSM module. The receiver receives the message which contains the longitude and latitude in the form of NMEA 0183 format. The data is entered into GUI application made in MATLAB. This GUI application convert the readings from NMEA 0183 format to degree format which is appropriate for Google earth. After that Google earth is called by an algorithm which placed these reading on it. Then lastly Google earth display the location of vehicle on map. The author in paper[3] proposed a system for LSB to overcome the tracking system using Wi-Fi because the system requires Wi-Fi to communicate all the time. This system make use of sim card for the communication purpose through radio channel and also uses GPS transceiver for getting the 2D/3D location information from satellite. It needs 3 satellite for getting the 2D location whereas for 3D location it need 4 satellite. GPS make use of programmed UART (Universal Asynchronous Receiver/Transmitter) microcontroller to send the location information into the link parameters and into the emergency button. GPS traces the location and it is send by using the GPS module. The format of the data is in the form of link(http://maps.google.com/?t=k&q=LATITUDE,LONGITUDE) which is send to the contacts. The receiver must have google map app for getting the exact location on the map. In paper [4] the author has projected a real time algorithm to acquire the performance of differential GPS using SMS services of GSM network. The author uses the Differential Global Positioning System (DGPS) technique to advance the precision of position. The system is divided into 2 parts - the Reference Station (RS) and Mobile Station (MS). RS includes a computer and a GPS receiver with a program to perform the execution and them sends the data to the MS using GSM. The MS could be anywhere within 50km radius of the circle. The MS

contains 2 receiver, the 1 receiver is GPS receiver which takes and signifies the position co-ordinate of MS and the 2 receiver is received by GSM modem as SMS and it shows the Differential data (DD). The system can operate with n numbers of mobile station .The system can be more handy if we implement it on a smart-phone rather than using a PC. In paper [5] the author aim to advance the positional accuracy of network based positioning system in severe non-line-of-sight (NLOS) and multipath environments. The operation is done by using a two-step position determination method and a one-step method. The two-step position determination method is split into two step which includes optimization with NLOS mitigation and geometry and motion based adjustment. After this process one-step position determination method is executed in which it offer a position determination scheme which equally handles the two processes in one step. Well ahead conducting the two method it was detected that it is best suited in the conditions where severe NLOS and multipath propagations exist Later it was proved that projected algorithm can improve the positioning accuracy compared to the current algorithms.

III. PROBLEM STATEMENT

This System is developed for human safety to reduce the crime in the today's era. As crimes are getting increase,this device help the person to get the help easily and fast. The nearby police station gets the request of user who is in trouble and accordingly the help is provided to the user.In this system we will include 2 roles namely Admin(Server) and Police Station. Server has the ability to add the police station and users detail as well as Server can modify the details. Each request is then assigned to nearest police station using the haversine algorithm,these request is also send to the server.

IV. HARDWARE

The system uses GPS, GSM and Arduino to track the location of the users.

4.1 Arduino

Arduinois an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as amicrocontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board – you can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package.

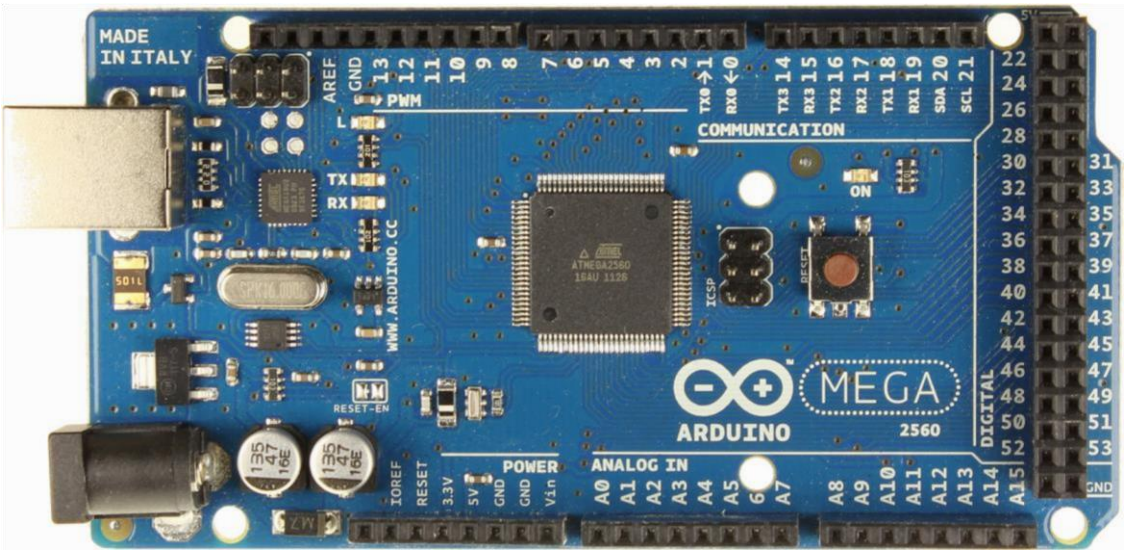

Fig 1. Arduino Device

V. GSM Module

GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system. Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS232, USB, etc.) for computer. GSM/GPRS MODEM is a class of wireless MODEM devices that are designed for communication of a computer with the GSM and GPRS network. It requires SIM (Subscriber Identity Module) card just like mobile phones to activate communication with the network. Also they have IMEI (International Mobile Equipment Identity) number similar to mobile phones for their identification.

VI. ALGORITHM

6.1 Haversine Algorithm

The haversine formula determines the great-circle distancebetween two points on a spheregiven theirlongitudesandlatitudes. Important innavigation.

6.2 Haversine formula

For any two points on a sphere, the haversine of thecentral anglebetween them is given by

$$\operatorname{hav}\left(\frac{d}{r}\right) = \operatorname{hav}(\varphi_2 - \varphi_1) + \cos(\varphi_1)\cos(\varphi_2)\operatorname{hav}(\lambda_2 - \lambda_1)$$

Where

hav is thehaversinefunction:

$$\operatorname{hav}(\theta) = \sin^2\left(\frac{\theta}{2}\right) = \frac{1-\cos(\theta)}{2}$$

- *d* is the distance between the two points.

- r is the radius of the sphere,
- φ_1, φ_2: latitude of point 1 and latitude of point 2, in radians
- λ_1, λ_2: longitude of point 1 and longitude of point 2, in radians

On the left side of the equals sign d/r is the central angle, assuming angles are measured inradians.

Solve for d by applying the inverse haversine (if available) or by using the arcsine (inverse sine) function:

$$d = r\,\mathrm{hav}^{-1}(h) = 2r\arcsin\left(\sqrt{h}\right)$$

where h is hav(d/r), or more explicitly:

$$d = 2r\arcsin\left(\sqrt{\mathrm{hav}(\varphi_2-\varphi_1)+\cos(\varphi_1)\cos(\varphi_2)\,\mathrm{hav}(\lambda_2-\lambda_1)}\right)$$
$$= 2r\arcsin\left(\sqrt{\sin^2\left(\frac{\varphi_2-\varphi_1}{2}\right)+\cos(\varphi_1)\cos(\varphi_2)\sin^2\left(\frac{\lambda_2-\lambda_1}{2}\right)}\right)$$

When using these formulae, one must ensure that h does not exceed 1 due to a floatingpoin t error.

VII. PROPOSED SYSTEM

This system is developed for human safety, Day by day the people's security is becoming the common issue, registering theft, robbery, murders and house breach every year. With the App revolution of smart phones, many security apps are developed every day but even the other side that is fraudulent or adversary knows that such apps do exist, and they are equally smart to confiscate the victim's phone. In this project System we will include two roles namely Admin (Web Portal) and Police Station (App). Admin can add and update Police Station details and Person's details. Every request is assigned to nearest Police Station through SMS. List of nearby Requests are sent from Person's device. Police can see current location from where the request has been made.

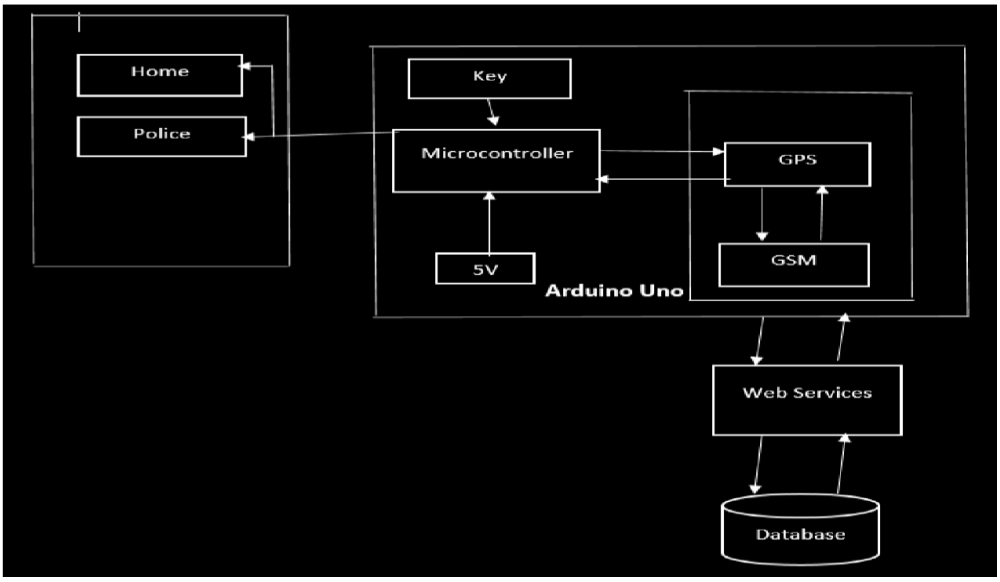

Fig 2.Block Diagram

VIII. SYSTEM PHASES

7.1 Registration phase

Admin needs to add all the police station details to the server which includes the name of the police station, location, mobile number, police station in charge, username and password. After successfully registration the credential of the police station is provided to the respected police station incharge through SMS or email. Login credential are the soul of the system. The police station in-charge has to login to portal through the web browser.

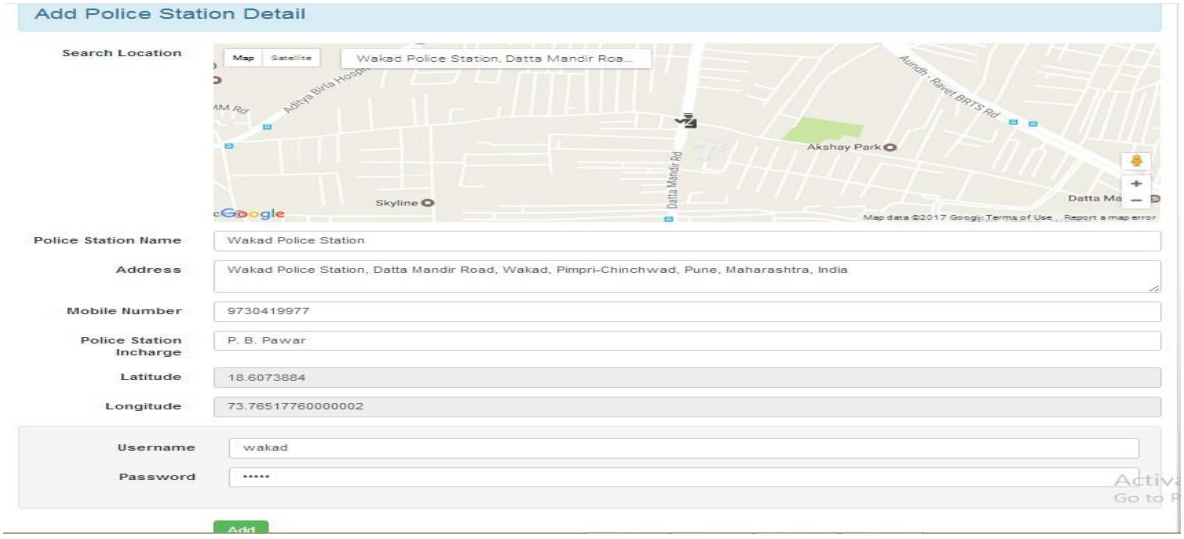

Fig 3.1 Add Police Station Details

User who has purchased the device gets registered by the admin with the unique id. The user details includes , address , mobile number ,relatives mobile number , email-id. If the user wants to change the relative contact number he/she has to contact the admin to change the mobile number details.

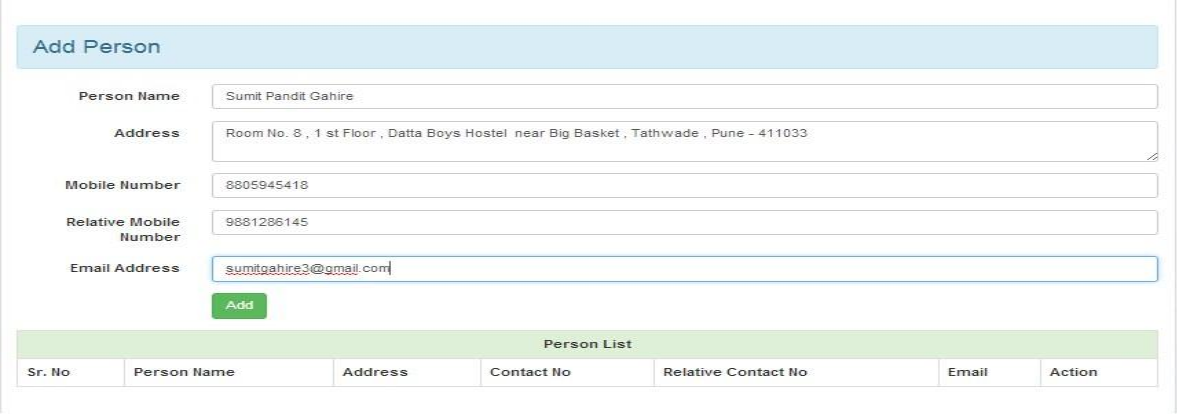

Fig 3.2 User Details

7.2 Processing phase

- Whenever the user feels unsafe or in danger he/she press the button to get the help and while pressing the button a beep will be generated.
- After pressing the button the micro-controller gets executed and the GPS attached to the microcontroller gets the location of the user.
- After getting the location details the micro-controller invoke the GSM to send the location to the server.

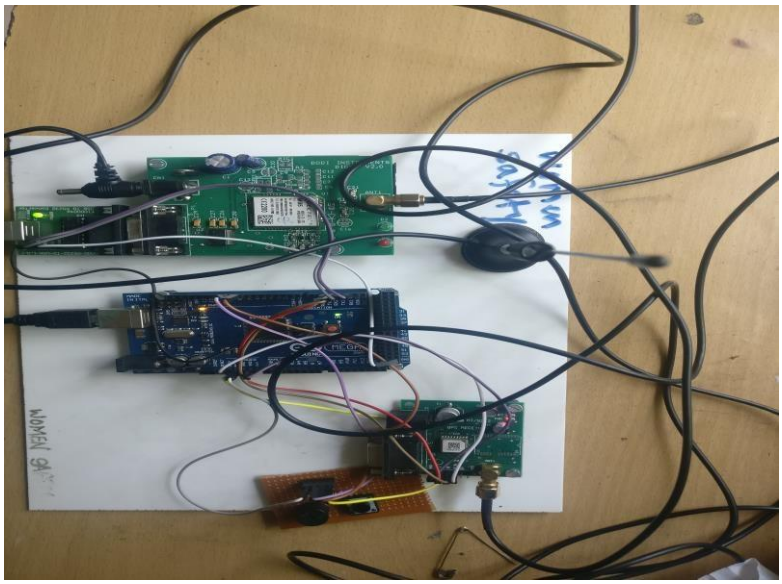

Fig 3.3. Device

- After receiving the request from the user the system will execute haversine algorithm which will calculate the nearest police station and then sends the request to the nearby police station, admin as well as to the registered relative contact with the link of the location through SMS.

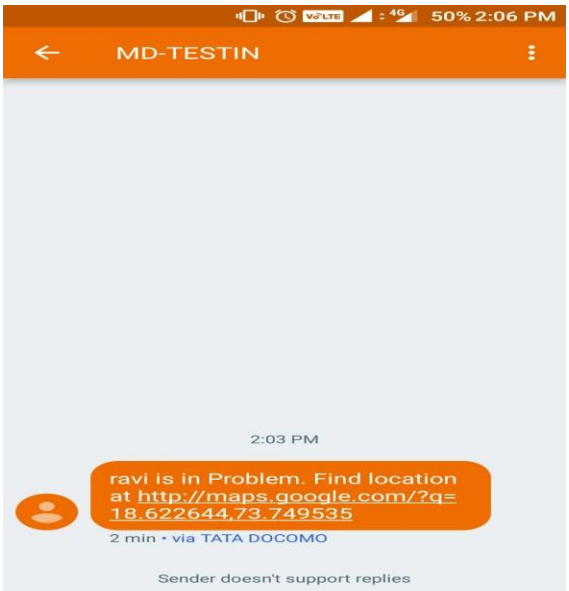

Fig 3.4 Notification Through SMS to Relatives

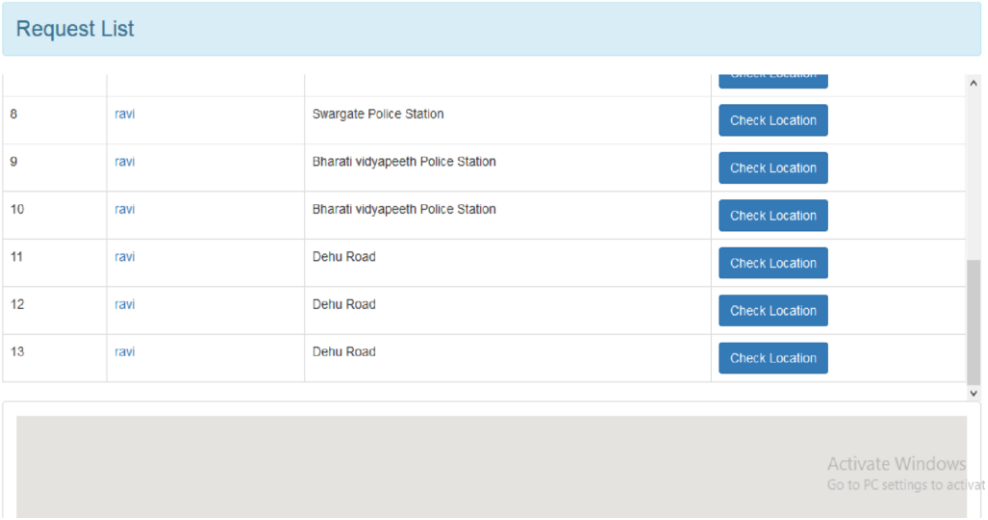

Fig 3.5.Request List at Admin portal

- The Police Station will receive the request in the web browser through a pop-up notification along with a beep

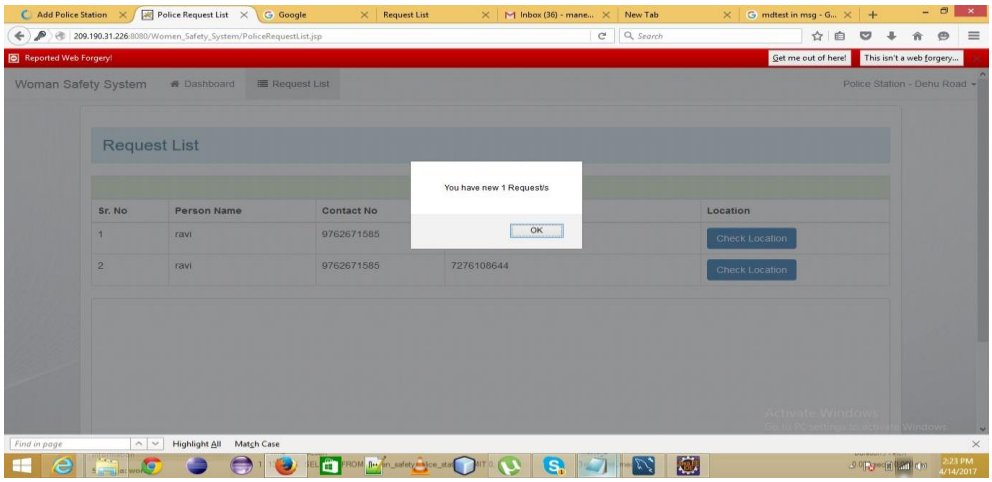

Fig 3.6 Notification to Police Station

- In the browser the police can see the location of the user with the help f google map provided by the admin.

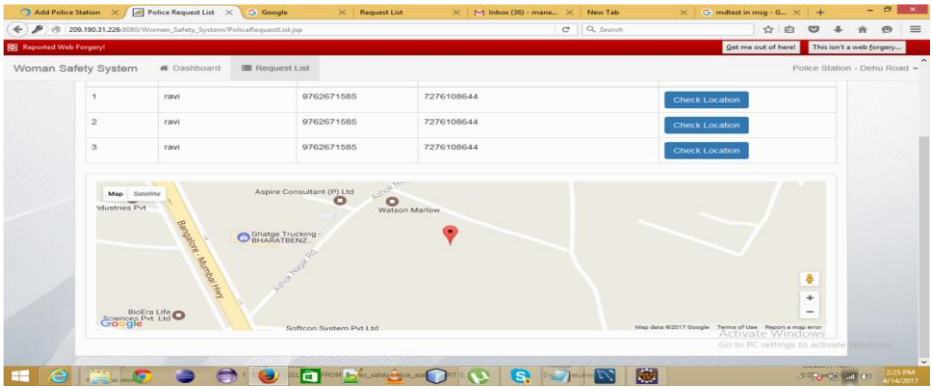

Fig 3.7. Location of Device on Map

IX. CONCLUSION

The proposed system is very useful for the people who are in trouble. This system help reduce the crimes. In our proposed system the request is sent to the nearby police station so the victim can get help as fast as possible .In the near future this system can be more handy , reliable and more accurate than the existing system.

X. FUTURE SCOPE

The main aim of this paper is to provide more safety to the people of this world and reduce the crime as much as possible.

The outlines are given below:

- The size of the device can be reduce by using the Nano-technology.
- Achieve 100% accuracy in tracing the location of the user.
- Include new features such as camera to capture audio or video for evidence.

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