IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319 5940

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 5, Issue 4, April 2016

Emergency Service using GPS Tracking

Pavan Wadhe[1], Rutuja Pandharkar[2], Rohan Raut[3], Devansh Modi[4]

Bachelors in Engineering, Computer Engg., Padmabhooshan Vasantdada Patil Institute of Technology, Pune, India[1,2,3,4]

Abstract: About 33,000 people die because the ambulance cannot reach them in time. It is not necessary that when you call an ambulance, the nearest ambulance will reach you. The paper describe a model to track the nearest free ambulance in the area using global positioning system and bring it to the person in distress. The GPS device continuously move with the ambulance and will calculate the the co-ordinate of each position and can be obtained whenever required by the server. Hence it can track the nearest ambulance and bring it to the person in distress.

Keywords: GPS, ambulance, mobile application, tracking.

I. INTRODUCTION

As population increases so does the importance of emergency services. The need of emergency services is increasing day by day. One such service is ambulance. Today there are a hundred ambulance services running yet unknown to people. Every hospital has its own contact number for the ambulance. Ever private and government Service has its own contact number for ambulance. It becomes really hectic for a person to call all these numbers and ask for an ambulance.

So we took this opportunity and thought of bringing these Ambulances under one roof. The application we are going to bring forth will bring all ambulance available in the city under one roof. On a click of a button the patient Will get the nearest ambulance to his service. Even a person in distress can call an ambulance without anyone's help. As android is one of the most booming platform, we are building our application on that.

II. RELATED WORK

Himmat [1] is an application made by the Delhi police. User needs to register at Delhi Police website. After successful registration, user gets registration key (OTP) which needs to be entered to complete application configuration. As soon as the user of Himmat app raises the SOS alert from the Himmat App, the location information and audio-video is transmitted to Delhi Police control room. Delhi Police can then immediately send the nearest Police help to the victim.

ICE[2](In Case of Emergency) is an application that is made by the Mumbai police which give the basic tips on personal security and cyber threats and uses GPS for locating person in distress.

The work by Pooja Sathe [3] shows that moving vehicals can be tracked using GPS tracking system and thieves can be caught using these.

In Al-Suwaidi and Zemerl work [4], the problem was Solved by proposing an application "Locating Friends and Family Using Mobile Phones with Global Positioning System (GPS)". The architecture of the system is based on client-server approach. The client phone registers and login into the server. Then, the client periodically sends his coordinate location updates to the server which stores it in a database. Thus, any client wishes to learn the location of another client will have to register and login to the server to request the location. This application was developed to helps locate family member and friends. The mobile application was implemented using J2ME. As for the server, it uses MySQL Database along with PHP to guarantees that the server would not be overloaded. This proposed solution makes each client has same control and command privileges as the other which is not convenient for use in child tracking application where only the parent should have the control and command privileges. A limitation of this solution is that in order for the system to work there must be internet connectivity in both client and server side.

III.SYSTEM ARCHITECTURE

The architecture of the system proposed; illustrated in the Fig.1, consist of two sides. First is the user's side which is basically a smart phone owned by the person in distress or any user. The user's side uses internet connection to request for an ambulance. Thus, it requires telephony and internet services to be enabled in the user's phone for the system to function.

The second is the ambulance side. The ambulance side is a dedicated device or an android smartphone owned by the driver or fixed in the ambulance. It uses internet and maps. Maps are used to locate the person in distress.

When a user request for an ambulance the request is first send to the server. The server starts to search ambulance in the area around the user's location. As soon as it finds a vacant ambulance it sends a request to the ambulance. If the request is accepted then the ambulance is send the location of the person in distress and user's name and phone number. The driver can see the exact location of the

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319 5940

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 5, Issue 4, April 2016

person who requested the ambulance. If the ambulance rejects the request next free and nearest ambulance is searched and sent a request. Meanwhile the user can see the numbers of all the nearest hospitals and their addresses.

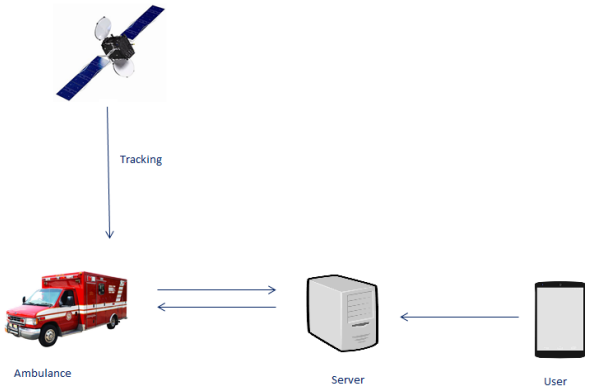


Fig.1 System Architecture

Typically the work done by geo-location sensors is: They report your location to other user, and they associate real-world location to your location. You get a richer experience of geo-location sensor when used with mobile devices than desktops because the relevant data you send and receive changes as your location changes.

There is a GPS chip inside in every smartphone, which uses the satellite data to get its exact location which services such as Google maps can map. When GPS signal is not available, then the smartphone use the cell tower information to triangulate your location. The accuracy of this location is lower than GPS, but it has greatly improved in recent years. Some geo-location systems use GPS and cell site triangulation (and in some instances, local Wi-Fi networks) in combination to zero in on the location of a device.

In relative positioning, difference between GPS measurements taken by two receivers, is formed to remove or considerably reduce the effect of errors which are common to the measurements, atmospheric being the major one. Hence if the location of reference receiver is known then the absolute position can be computed. In relative positioning, the rover position is determined with respect to a known point usually called a *reference*, *base* or *master* station. The code or phase range can be used to find the relative position of the rover. Phase range are much more accurate the code measurements. Although they have an additional unknown called integer ambiguity which needs to be solved before we can obtain the accurate position is determined.

To calculate the distance to the satellite, the amount of delay caused by receiver can be used. Simple triangulation determines the position on the Earth surface. This takes a look at the time of course because the GPS system you have in your hand or in your car is not going to have a strengthen signal one clock, which is a type of clock provided by the satellite. So synchronization is necessary with the clocks on the satellite before current position can actually be detected on the surface of the earth.

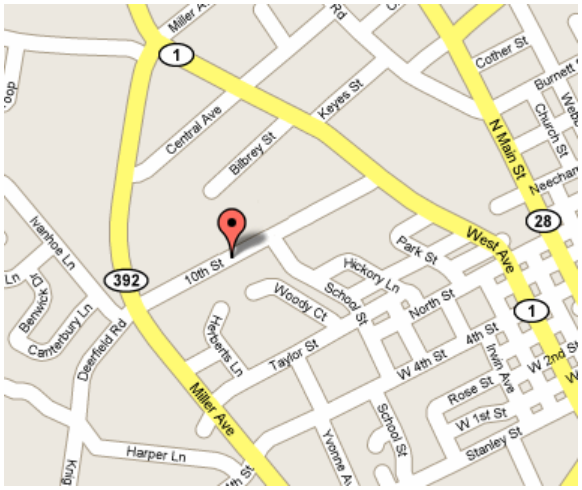


Fig.2 obtaining patient's Location

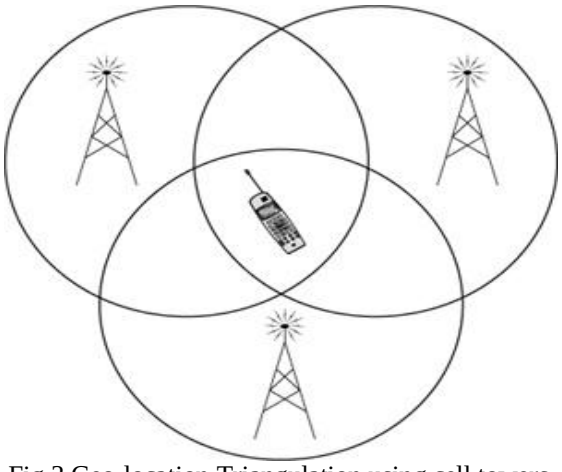


Fig.3 Geo-location Triangulation using cell towers

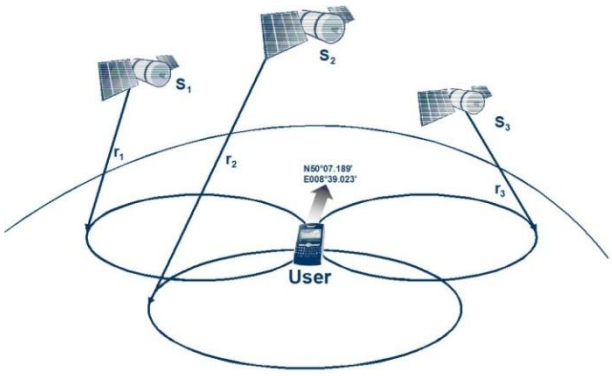


Fig.4 Geo-location Triangulation using Satellite

IV. RESULT

There are two sides of this application namely:

1. User Side
2. Ambulance Side

The user side gps is used just to get the location of the user when he/she presses the help button.

DOI 10.17148/IJARCCE.2016.54133

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319 5940

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 5, Issue 4, April 2016

The ambulance device is tracked by the server. Using the Google Matrix API and Google maps API the nearest distance from the user's location where the ambulance is located is found and sent the information of the user.

Trilateration and Haversine formula are used by Google to triangulate the location of a particular object or person on ground or in air.

Haversine formula

The haversine formula is an equation important in navigation, giving great-circle distances between two points on a sphere from their longitudes and latitudes. It is a special case of a more general formula in spherical trigonometry, the law of haversines, relating the sides and angles of spherical triangles.

For any two points on a sphere, the haversine of the central angle between them is given by

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

hav is the haversine function:

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

- d is the distance between the two points (along a great circle of the sphere; see spherical distance),
- 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

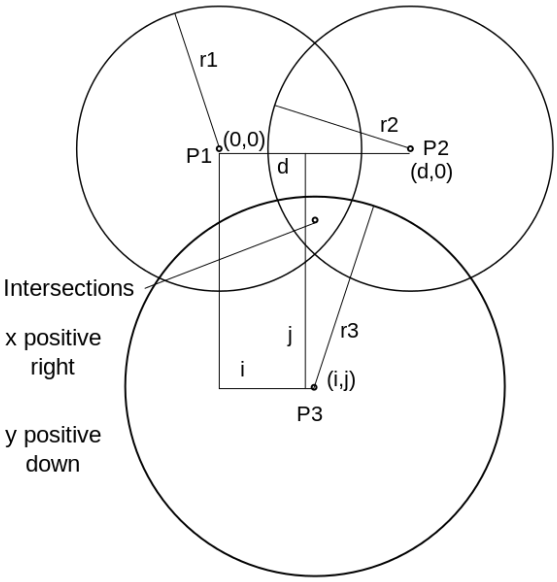
Trilateration

In geometry, trilateration is the process of determining absolute or relative locations of points by measurement of distances, using the geometry of circles, spheres or triangles.

In addition to its interest as a geometric problem, trilateration does have practical applications in surveying and navigation, including global positioning systems (GPS). In contrast to triangulation, it does not involve the measurement of angles.

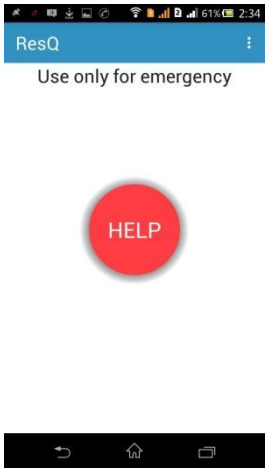
In two-dimensional geometry, it is known that if a point lies on two circles, then the circle centers and the two radii provide sufficient information to narrow the possible locations down to two. Additional information may narrow the possibilities down to one unique location.

In three-dimensional geometry, when it is known that a point lies on the surfaces of three spheres, then the centers of the three spheres along with their radii provide sufficient information to narrow the possible locations down to no more than two (unless the centers lie on a straight line)

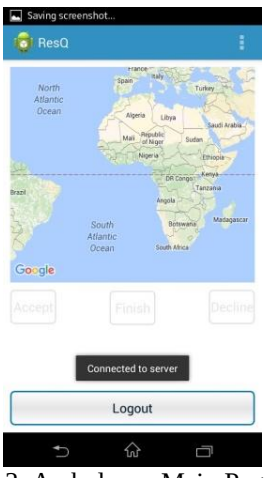


The plane $z = 0$, showing the three sphere canters, $P1$, $P2$, and $P3$; their x,y-coordinates; and the three sphere radii, $r1$, $r2$, and $r3$. The two intersections of the three sphere surfaces are directly in front and directly behind the point designated intersections in the $z = 0$ plane.

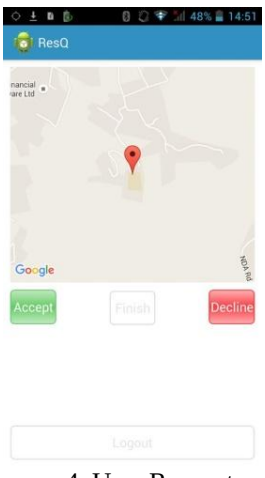
1. Ambulance Login



2.User Main Page



3. Ambulance Main Page



4. User Request

DOI 10.17148/IJARCCE.2016.54133

V. FUTURE SCOPE

Currently this application is working only on android. But if the response is good this can be developed for all possible platforms.

The user would be able to track his requested ambulance. He would be able to know the exact location of the ambulance as the ambulance knows his.

As the accuracy of the geo-location increases, the more accurate position of the patient can be obtained.

In future a priority can be added according to the emergency occurred or the need of the ambulance. Multiple requests from one position can be eliminated by setting a no request zone around any user who requested.

VI. CONCLUSION

In conclusion we can say that if this application works as expected then it can do wonder. It is a necessity for modern India and smart city project going on in India. The overhead of calling is eliminated. Even if the route is not known to the driver, still he can reach the patients location. Hence by eliminating these things the service is faster than ever.

REFERENCES

1. https://en.wikipedia.org/wiki/Himmat_(app)
2. https://play.google.com/store/apps/details?id=com.kpmg.emag.app&hl=en
3. International Journal of Science and Research (IJSR), India Online ISSN: 2319-7064 ,Volume 2 Issue 9, September 2013, www.ijsr.net ,'Vehicle Tracking System Using GPS' Sathe Pooja, Disha Institute of Management & Technology, Raipur, Chhattisgarh, India
4. Ghaith Bader Al-Suwaidi, Mohamed Jamal Zemerly, "Locating friends and family using mobile phones with global positioning system(GPS)," IEEE/ACS International conference on Computer Systems and Applications, 2009
5. Almomani, I.M., Alkhalil, N.Y., Ahmad, E.M., Jodeh, R.M., "Ubiquitous GPS vehicle tracking and management system," 2011 IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies(AEEECT), pp.1-6, 6-8 Dec.2011.
6. Anson Alexander, "Smartphone Usage Statistics 2012,", available 2012 infographic/
7. P.Misra and P. Enge, Global Positioning System: Signals, Measurements and Performance. Lincoln, MA, USA: Ganga-JamunaPress, 2001.
8. Nadesh, R.K., Jayashree, K.Nirupama, lVijayashree, K.Anish Fatima (2011): "Mobile Tracking Application for Locating Friends using LBS ". International Journal of Engineering Science and Technology (IJEST).

DOI 10.17148/IJARCCE.2016.54133