

GPS Overview and Innovative Ideas

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Abstract

In this paper, overview of GPS and some new ideas of GPS are described. GPS or Global Positioning System is a network of orbiting satellites that send precise details of their position in space back to earth. The signals are obtained by GPS receivers, such as navigation devices and are used to calculate the exact position, speed and time at the vehicles location. We are proposing in this paper, a GPS based Android Application called Treasure Shield can be work against the home/shop thief cases. Another proposed android application is App for Blind and Visually Impaired people walking, it helps to detect hazards on the visual impaired person pathway, and make it easier for the person to avoid different obstacles. Another android application as Remind Me GPS! This will help people to remind stored note at certain location.

Keywords: Altitude, GPS, Latitude, Longitude

I. INTRODUCTION

Now a day's lots of stealing cases are reported to police station. High Tech Security Solutions are very expensive and cannot affordable by the poor people; the proposed application will have very low costing. Global Positioning System Treasure shield as the name suggests, it will use GPS to track any door's position. Our area of concentration in this project is on tracking door position if changes are occurs then acknowledge to owners.

Another application idea of GPS is App for Blind Impaired people, We haven't see any app for people with needs like visual or blind impaired where could make it easier to walk in different environments like cities where everything is in constant change, it helps to detect hazards on the visual impaired person pathway, and make it easier for the person to avoid different obstacles. By using latitude, longitude and altitude co-ordinates App will find height difference and convert it to audio; audio will play by using headphones or earphones.

Another idea of GPS is Remind Me GPS! , Many times we stored address of person in phone contacts, this contacts will sync with the proposed application, when the person go nearby place of contact person's address. Application notifies the person it. Many thing which need to remind at certain place will also be stored app and app will notify the things at that place.

II. HOW GPS IS WORK?

The fast-moving nature of technological developments in the GPS market is a different application: GPS receiver, GPS logger and GPS tracker.

- A GPS receiver is linked to Personal Computer (PC) or a pocket PC. These units can archive spatial data and/or send the data to location requesting device for location information.
- A GPS logger is the same equipment as a receiver, but also includes memory within the unit. Records are generated from a process signal, with recordings occurring every second in comma-delimited format. The data fields can include latitude, longitude, altitudes and speed.
- GPS trackers are similar to the logger however they also include a telecommunications component using a SIM card to transmit information in real time through a phone line.

The Global Positioning System (GPS) is a network of about 30 satellites orbiting the Earth at an altitude of 20,000 km.

Each of the satellites is in an orbit that allows a receiver to detect at least four of the operational satellites. [6]

Each one of satellites transmits information about its position and the current time at regular intervals.

These signals, travelling at the speed of light, are intercepted by your GPS receiver, which calculates how far away each satellite is based on how long it took for the messages to arrive.

Once it has information on how far away at least three satellites are GPS receiver can find your location using a process called trilateration.

In fact, signals from just three satellites are needed to carry out this trilateration process; the calculation of position on earth based on distance from three satellites.

The signal from the fourth satellite is redundant and is used to confirm the results of the initial calculation.

If the position calculated from distances to satellites "A-B-C" do not match the calculation based on "A-B-D" then other combinations are tested until a consistent result is obtained. [6]

The process of measuring the distance from satellite to GPS receiver is based on timed signals.

The time lag is easily converted into distance to each satellite. The slight difference between signals from each satellite is then used to calculate the receiver's position.

The total process is defined in figure 3.1 (GPS – A) figure 3.1 (GPS – B) figure 3.1 (GPS – C) figure 3.1 (GPS – D) figure 3.1 (GPS – E) figure 3.1 (GPS – F).

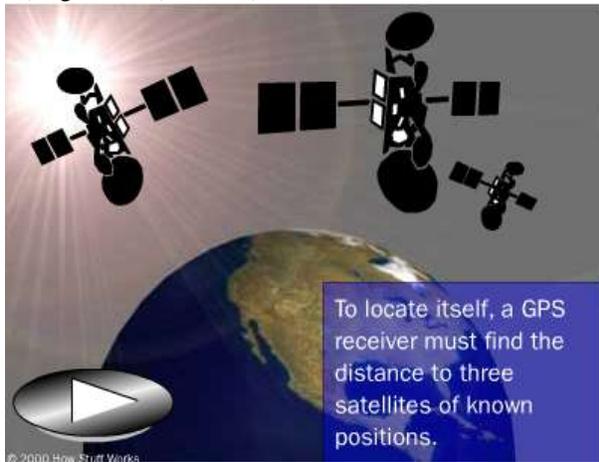


Fig. 3.1: (GPS – A)

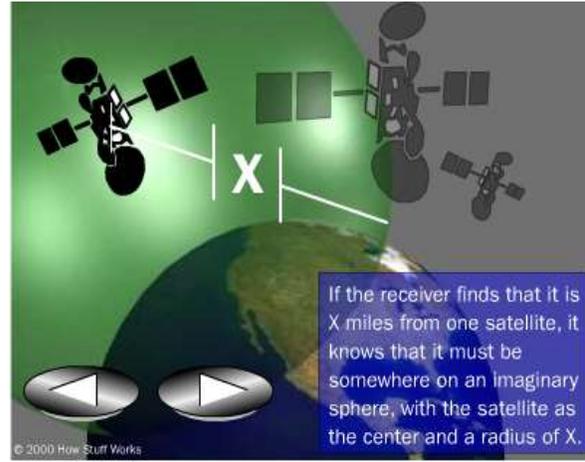


Fig. 3.1: (GPS – B)

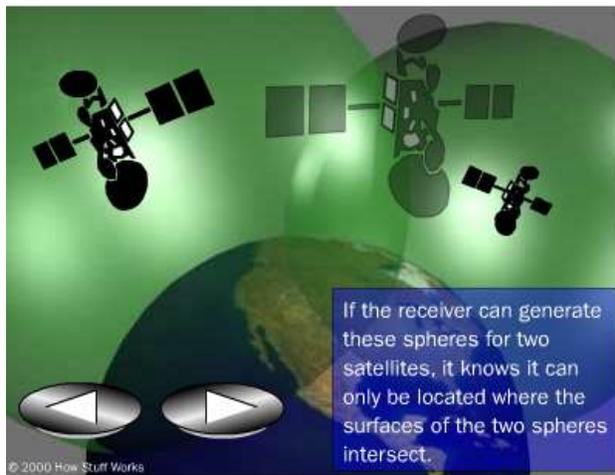


Fig. 3.1 (GPS – C)

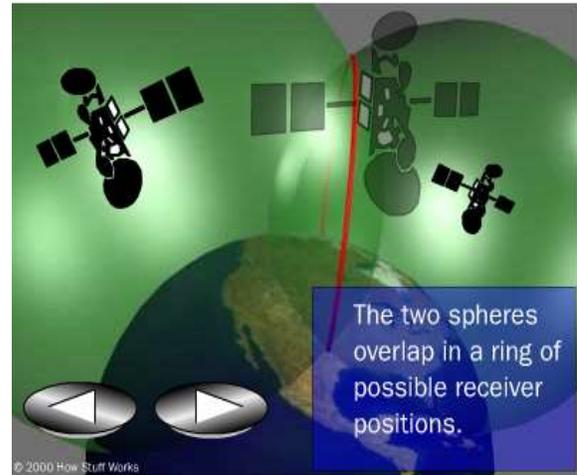


Fig. 3.1 (GPS – D)

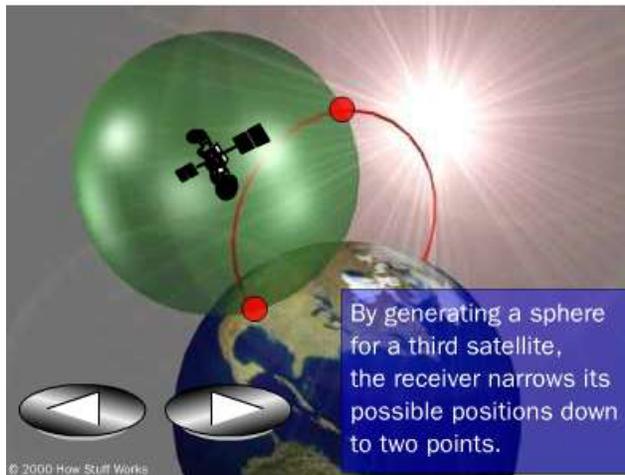


Fig. 3.1: (GPS – E)

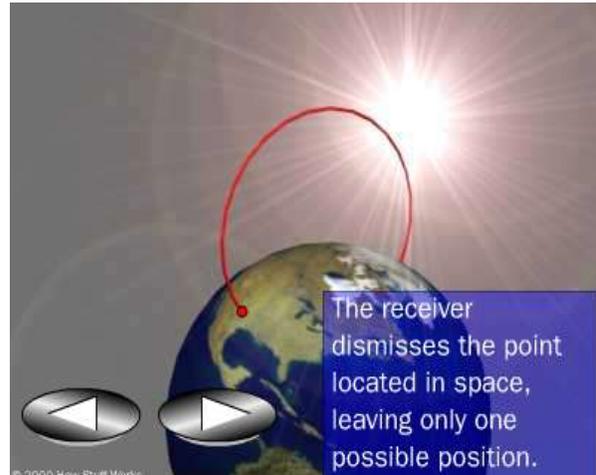


Fig. 3.1: (GPS – F)

Implementation of GPS is done in my project M-Reporter by me during my internship. M-Reporter is combination of Android Application and PHP base dashboard. The project “M-Reporter” aims at developing an automated Fielding Reporting DSR system based on Android application and PHP dashboard, by using this executive can update his DSR using his phone and

manager can get live report by using Dashboard panel, Manager also can track employee by using GPS and also assign work to him by using Push Notification.

In "M-Reporter", we have implemented GPS technology to track the location of employees. As services are measure part of M Reporter, any servicing company gets servicing call from different locations some of them are urgent bases. It is responsibility of service manager to handle issues and send particular service executive to solve the problem. It is very difficult to know the location of every employee in that area he may available. Manager uses different resources like telephone, messaging etc. This is very hectic and may result into anonymous waste of time as well as money. To overcome this problem we have proposed M Reporter system application which is installed on every executive's mobile phone. It has functionality which makes call after every 15 minutes to server and update his location details (latitude, longitude).

III. PROPOSED IDEAS

A. *Treasure Shield:*

As we know all the position in the world are in fix coordinate. Each Position has its own latitude and longitude measure from east west and north south respectively. GPS system is technology which has ability to send the latitude and longitude of current position which is universally unique to that position. Treasure shield is concept which totally relies on this factor.

The Basic idea behind this application is to fit the system on the particular object which should not be move from its position under any supervision. This can be used to secure home door or treasure lock. If thief tries to enter into house or open treasure door it will immediately give you notification.

1) *Explanation:*

Each device which is fixed on particular objects has its own latitude and longitude. If the device moved from position its latitude and longitude changes. GPS has ability to emit signal between particular given duration. Purposed application will contain feature where user will set the position by pressing set button. After pressing the button latitude and longitude will set in constants declared in algorithm. The GPS applied for application will continuously send signal which will be stored in variables. Algorithm of the application will measure difference between these two values. As the door should be on constant place required difference will be null. If anyone tries to open the door its current latitude and longitude values will differ.

If difference is more than specified values then it will rings a siren and message will be send to concern person about the issue.

2) *Limitation:*

if network not available then application may fail. as application emits signal continuously there is possibility of switching off the phone.

B. *Remind me GPS!*

This is another application of GPS for general purpose. In our day today life we roam different cities and places for different reason such as tourism. Before going to particular place I research about that place. What are famous places to visit, popular hotels etc. Another is we hear from people if you are going to this place you must visit this famous place or such thing like that. But the major problem is we are not able to remind all these places and another issues is we are just nearby to that place but we don't know actually that famous place is nearby to us. We are targeting the second issue. Because there are so many application available for reminder but nobody has targeted second issue yet.

In our proposed application we will provide a Google map where user has to enter the famous place by typing manually or pointing on map. When User will save the place in application its latitude and longitude save in a table. User has to enter radius limit where he can define limit of distance by which application notify user when he is in particular range. When user goes out of his home all the places that are stored in application are check against its current location. It calculates difference between current location's latitude and longitude with values of locations latitude and longitude. After calculating the difference it converts into the measurable unit such as kilometer, meter. This converted value is checked by value entered by user for particular range he wants to be notified. If the resulted value comes into positive then application will send notification to customer that the particular place is falls within this range.

Remind me GPS! Can be sync with the local contacts, because contacts menu of mobile is also has Address field, whenever we are passing nearby any address of contacts we get notification. So we can meet people if they are available at that place. It may become useful.

C. *App for Blind and Visually Impaired People Walking:*

Latitude and longitude are angles that uniquely define points on a sphere. Together, the angles comprise a coordinate scheme that can locate or identify geographic positions on the surfaces of planets such as the earth.

Altitude or height is defined based on the context in which it is used. As a general definition, altitude is a distance measurement, usually in the vertical or "up" direction, between a reference datum and a point or object.

I haven't see any app for people with needs like blind or visual impaired where could make it easier to walk in different environments like cities where everything is in constant change making difficult just to follow a GPS route from any GPS map My idea here is with the help of a latitude, longitude as well as Altitude, proposed android app will find person's position and

acknowledge him if altitude is changed rapidly., Android Text to Audio API may use for acknowledge blind person. Blind Person can use it to read the walking environment and detect hazards on the visual impaired person pathway, and make it easier for the person to avoid different obstacles, like a pothole, speed breaker etc. for a safe walk [5].

IV. CONCLUSION

In this paper we have proposed new ideas of GPS which will track the current position of the object (door, blind person, and user) perform particular task if specific location is traced or location of object is changed. Treasure Shield will be innovative idea to use GPS for security purpose. Remind me GPS will may become popular for connecting peoples. And App for Blind and Visually Impaired people walking idea is towards the social responsibility. None of these ideas are implemented before. GPS is very strong technology which can be used as very innovative ways.

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