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Bus Tracking System Using Data Mining With GPS and GSM

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ABSTRACT

A real-time Bus Tracking System using a Global Positioning System (GPS) technology module to receive the location of the bus to connect internet by General Packet Radio Service(GPRS) technology for displaying a real time on the website developed by Google Map which allows inspection of vehicles at all times. the GPS module will locate the bus via the satellite, and the GPRS module will assemble all data and extract it using concepts of data mining send it to the website. With the Google Map on a real-time website, bus can be monitored and located very effectively with the help of Lucene and Haversine algorithm.

Keywords— Data mining, GPS, Lucene and Haversine.

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I. INTRODUCTION

The ability to track, trace, control and store anything by anyone from anywhere on the planet has been mankind's unfulfilled desire. The usefulness of GPS and Data Mining has made it popular in its own context. Bus Tracking System is the combination of these two technologies. In today's world public transport system plays an important role in the development of the country. Many factors such as mobility, environmental and energy objectives place demands on public transport systems. Current systems which are old and in need of upgrading, must expand service area, improve efficiency and increase service frequency to serve these demands of the public travelling through the improved transportation system. Research is necessary to solve operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the transport industry and provide people with the real time arrival predictions so as to save their time over waiting measure the performance of different transport systems.

II. EXISTING SYSTEM

In existing system there are computerized systems for bus timetable schedules. But it cannot give the exact timing for arrival and departure.There is no instant enquiry system. One have to go and ask personally for any bus related enquiry. It is really hectic to wait for buses for unknown time.

III. PROPOSED SYSTEM

At admin end of web app, one can see the live bus location of each bus in navigation. Every bus will be installed with GPS system, whose co-ordinates will be tracked by the web application. At monitor end it will keep giving the information about arriving and departing buses at particular depot.

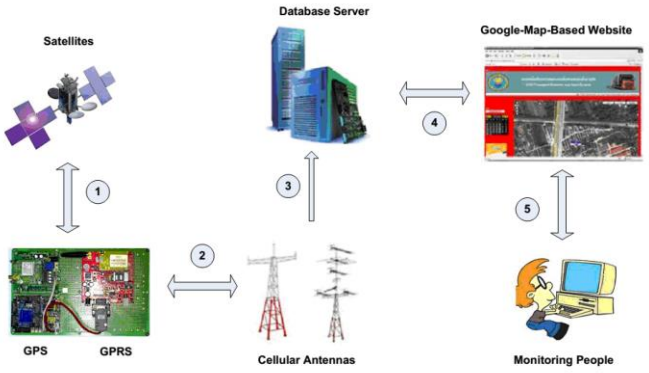


Fig.1 System Architecture

IV. ALGORITHMS USED

- **GPS Triangulation**

GPS Triangulation Algorithm also known as Trilateration
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. This process is used in getting the GPS co-ordinates.
If we know positions of three points P1, P2, and P3, as well as our distance from each of the points, r1, r2, and r3; we can look at the overlapping circles formed to estimate where we are relative to the three points. The technique can be extended to 3D, finding the intersecting region of spheres surrounding the points.

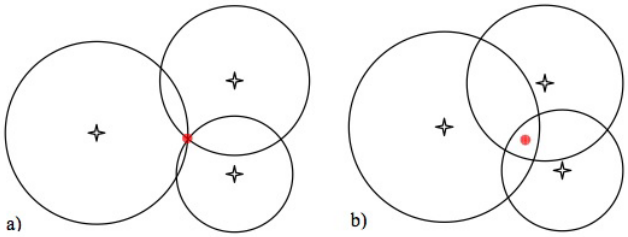


Fig. 2. Triangulation Algorithm 3 routers

- **Haversine Algorithm**

The haversine formula is an equation important in navigation, giving greatcircle 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

$$\operatorname{haversin}\left(\frac{d}{r}\right) = \operatorname{haversin}(\phi_2 - \phi_1) + \cos(\phi_1)\cos(\phi_2)\operatorname{haversin}(\lambda_2 - \lambda_1)$$

where

- *haversin* is the haversine function:

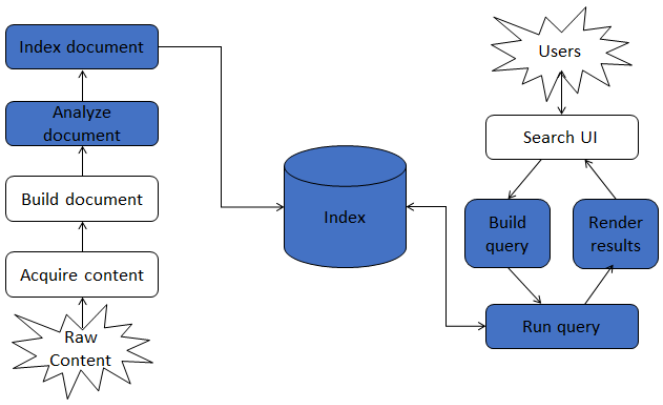
$$\operatorname{haversin}(\theta) = \sin^2\left(\frac{\theta}{2}\right) = \frac{1-\cos(\theta)}{2}$$

- 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
- λ_1, λ_2: longitude of point 1 and longitude of point 2

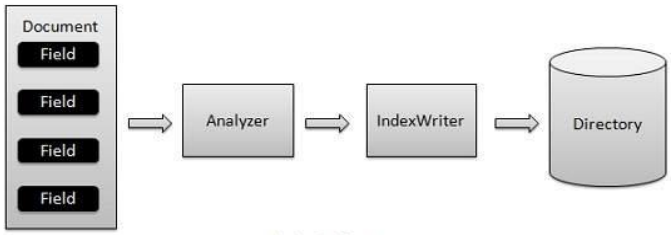
Fig. 3 Haversine Formula

- **Lucene**

Open source Java library for indexing and searching
-Lets you add search to your application
-Not a complete search system by itself
-Written by Doug Cutting
Used by LinkedIn, Twitter,etc..Ports/integrations to other languages like C/C++, C#, Ruby, Perl, Python, PHP, etc



Indexing Process



Indexing Process

V. CONCLUSION

This paper provides technique for bus tracking system using data mining along with GPS and GSM. Major application is it can be used as a smart city project. This project can be helpful in traffic management and transport system. But all buses should be installed with GPS device.

VI. ACKNOWLEDGEMENT

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