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MONITORING AND TRACKING SYSTEM OF VEHICLES USING GIS, GPS AND GPRS TECHNOLOGY AT TIMOR LESTE

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ABSTRACT

Along with the development of the age and the economy in the Timor Leste an increasing number of vehicles present a significant potential to create disorder, violation of traffic signs, vehicle lane violations, and theft of vehicles, both vehicles are moving or parked, to the smooth, security and management targets that move like cars government, trucks, buses, airplanes and so on, needed a system for controlling and monitoring a moving object from other places through long distance communication lines, such as taxi fleet tracking, tracking for car rental services, tracking for trucks carrying food, tracking for rail, airplane tracking, etc, are objects and targets that need to be supervised and monitored in order to function properly.

Vehicle tracking system using GPS and GPRS integration googlemaps provide information that is maximized with the technology of a GPS (Global Positioning System) receiver, which can indicate the position of the vehicle with the map and the ability of the appointment of direction and position coordinates (x, y, latitude, longitude) textually and visually at any location. A vehicle tracking system is built using equipment GIS (Geographic Information System) and dedicated to smartphones, which support the Global Positioning System (GPS), as well as portable computers, using General Packet Radio Service (GPRS) as a connection to the internet. The hardware used is a smartphone that supports GPS, and the supporting tools used are Google Maps,

The results of this system in the form of a tracking system capable of monitoring the movement of vehicles in an ongoing position by utilizing GPS and GPRS as the senders of the wireless data and Internet connections.

Key Words: Tracking System, GPS, GPRS, GIS, smartphones, **latitude, longitude, vehicles, Monitoring**

Introduction

Along with the development of the age and the economy in the world an increasing number of vehicles present a significant potential to create disorder, violation of traffic signs, vehicle lane violations, and theft of vehicles, both vehicles are moving or parked, to the smooth, security and management targets that move like cars, trucks, buses, airplanes and so on, needed a system for controlling and monitoring a moving object from other places through long-distance communication lines, such as taxi fleet tracking, tracking for car rental services, tracking for trucks carrying food, tracking for rail, airplane tracking, etc, are objects and targets that need to be supervised and monitored in order to function properly.

Methods

The Control Segment on GPS

The control segment of the Global Positioning System consists of one Master Control Station (MCS) located at Falcon Air Force Base in Colorado Springs, Colorado, and five unmanned monitor stations located strategically around the world. In addition, the Air Force maintains three primary ground antennas, located more or less equidistant around the equator. In the event of some catastrophic failure, there are also two backup Master Control Stations, one located in Sunnyvale, California, and the other in Rockville, Maryland.

The unmanned monitor stations passively track all GPS satellites visible to them at any given moment, collecting signal (ranging) data from each. This information is then passed on to the Master Control Station at Colorado Springs via the secure DSCS (Defense Satellite Communication System) where the satellite position ("ephemeris") and clock-timing data (more about these later) are estimated and predicted.

The Master Control Station then periodically sends the corrected position and clock-timing data to the appropriate ground antennas which then upload those data to each of the satellites. Finally, the satellites use that corrected information in their data transmissions down to the end user.

This sequence of events occurs every few hours for each of the satellites to help insure that any possibility of error creeping into the satellite positions or their clocks is minimized (French, 1996)[1].

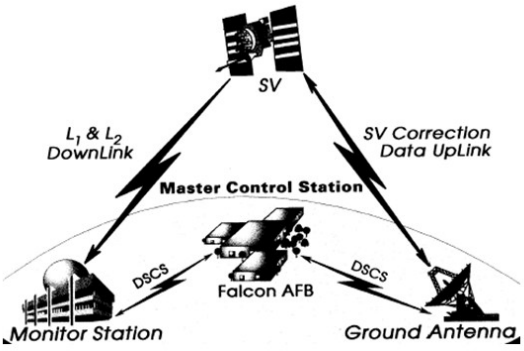

Figure 1 Control Segment on GPS (French, 1996).

Tracking Approach

We assume that moving objects are constrained by a road network and that they are capable of obtaining their positions from an associated GPS receiver. Moving objects, also termed "clients," send their location information to a central database, also termed "the server,"

via a wireless communication network. We assume that disconnects between client and server are dealt with by other mechanism in the network than the tracking techniques we consider. When a disconnect occurs, these mechanisms notify the server that may then take appropriate action.

After each update from a moving object, the database informs the moving object of the representation, or prediction function, it will use for the object's position. The moving object is then always aware of where the server thinks it is located. The moving object issues an update when the predicted position deviates by some threshold from the real position obtained from the GPS receiver. We term this the "shared prediction-based approach" to tracking.

Figure 2 presents a UML activity diagram for this tracking approach (activity diagrams model activities that change object states). The object initially obtains its location information from its GPS receiver. It then establishes a connection with the server and issues an update, sending its GPS information and unique identifier to the server (Civilis et al, 2004)[2].

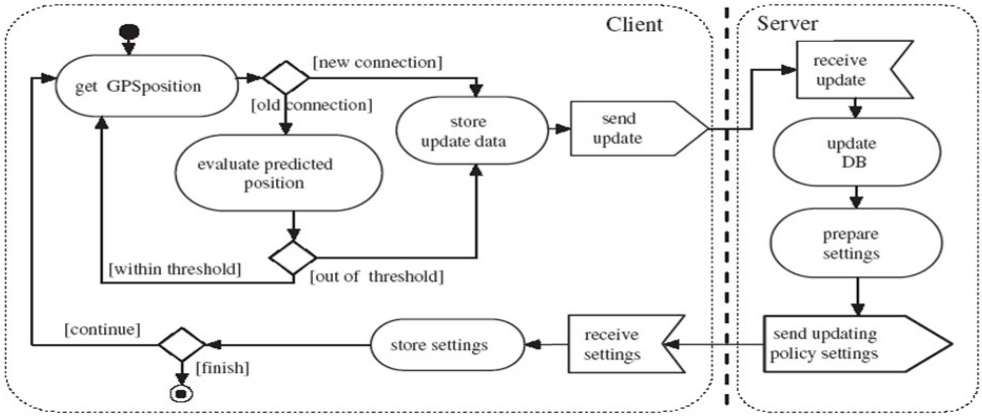

Figure 2 Diagram of the Tracking Scenario (Civilis et al, 2004).

Results and Discussion

System designed to handle the addition, subtraction, and changes in poi. Poi dynamic requires a person or managers who specialize in those changes. Thus, the system created two users, distinguished on the admin and general user. Admin reserves the right to do administration in point of interest (POI). Admin is closed, requiring verification for entry into the system. Admin reserves the right to change, increase, or delete existing data, while the general user can only poi data via mobile to add poi to a website. See on Figure 3.

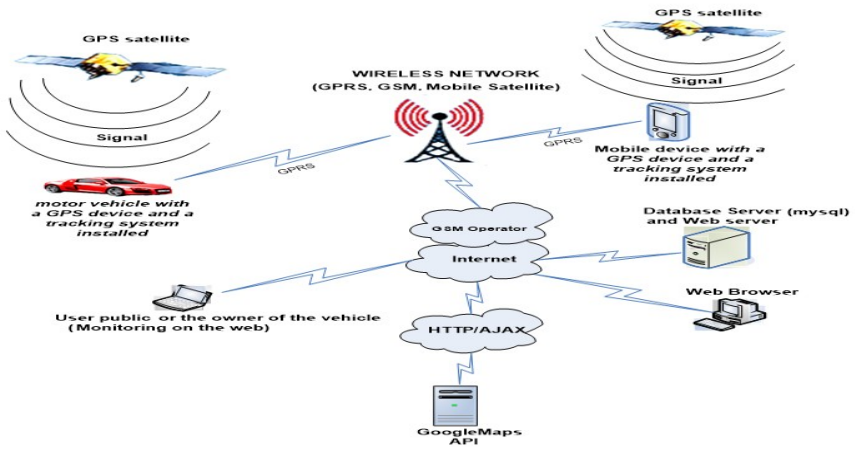

Figure 3 The Concept of the Monitoring and Tracking System

The GPS Tracking on Vehicles

On the main menu, input data on a mobile GPS tracking application used by the public, which serves to input POI, is located. In this case using traditional poi 32-876. TLS and entering the url, in this case the author uses getgooglemap2.php. For example, use the url http://serverexample.com/ website address; the url is working for her position; insert the poi; can also set the update folder every between 1 minute and 10 minutes; then parse the tracking data from the mobile device to the web server. See between Figure 4 and Figure 6**.**

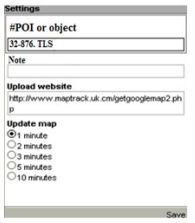

Figure 4 Input POI on Mobile

Parsing

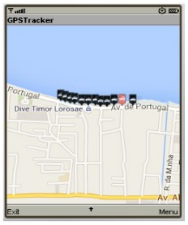

Figure 5 GPS Tracking on Mobile

Parsing

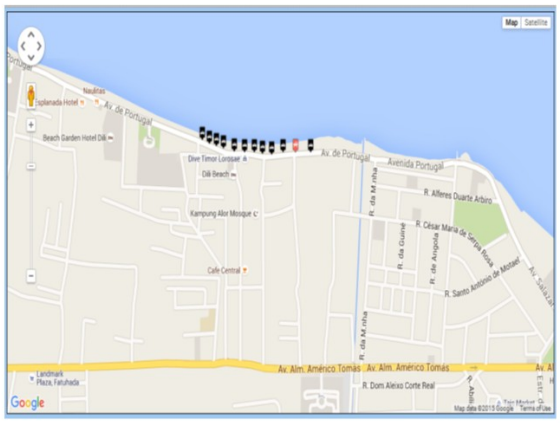

Figure 6 Monitoring and Tracking System on Web Server

Table 1 the results sender tracking data on a web server

GPSLocationID	Latitude	Longitude	poi	speed	LastUpdate	Location Method	gpsTime
1	-8.547857	125.558313	32-876. TLS	64	2015-10-17 13:46:16	262145	2015-10-17 10:46:15
2	-8.547963	125.558592	32-876. TLS	67	2015-10-17 13:48:20	262145	2015-10-17 10:48:17
3	-8.548037	125.558871	32-876. TLS	36	2015-10-17 13:50:33	262145	2015-10-17 10:50:31
4	-8.548090	125.559129	32-876. TLS	67	2015-10-17 13:52:33	262145	2015-10-17 10:52:33
5	-8.548165	125.559579	32-876. TLS	67	2015-10-17 13:54:45	262145	2015-10-17 10:54:43
6	-8.548196	125.559976	32-876. TLS	76	2015-10-17 13:56:49	262145	2015-10-17 10:56:48
7	-8.548196	125.560373	32-876. TLS	76	2015-10-17 13:58:56	262145	2015-10-17 10:58:55
8	-8.548239	125.560684	32-876. TLS	61	2015-10-17 14:01:05	262145	2015-10-17 11:01:04
9	-8.548260	125.561049	32-876. TLS	58	2015-10-17 14:03:05	262145	2015-10-17 11:03:05
10	-8.548196	125.561500	32-876. TLS	67	2015-10-17 14:46:16	262145	2015-10-17 11:07:15
11	-8.548196	125.561993	32-876. TLS	65	2015-10-17 13:48:20	262145	2015-10-17 11:12:17
12	-8.548196	125.562594	32-876. TLS	67	2015-10-17 14:50:33	262145	2015-10-17 11:19:31

Conclusion

1. Vehicle tracking systems using GPS and GPS with Google Maps integration are made in accordance with the with the goal of being capable of continuously monitoring the movement of motor vehicles.
2. Vehicle tracking systems using gps and gprs with Google Maps integration take advantage of GPS receivers in the form of latitude and longitude, then parse it into a website via a GPRS connection, and position data is sent from the GPS receiver in NMEA-0183 format.
3. Vehicle tracking systems using GPS and GPS with integration with Google Maps use Google Maps to display the existing waypoints on the map.
4. The system built has to be dynamic so that the changes to data can be done if there are changes to objects that can be done by the administrator.

5. The system built has been providing search facilities and displaying the position of the objects; this facility is only found on the website.
6. The system was built especially in the absence of mobile search facilities for objects, and there are no navigational facilities to display the objects that are mobile.

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