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Review Article

Development of an Android App for finding the Nearest Auto Services in Tumkur City, India: Wepathit.Com

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Abstract

The transportation is becoming insecure now days because there were no mobile services. By using mobile value added services we can enable customers and Auto drivers' interaction through an android app that identifies the customer's current location with the help of a GPS enabled phones to hire an auto by the customers. This system will enable the customer's to track the correct path by using Google maps for their particular destination. The communication between the customers and the drivers will be done by Google Cloud Messaging (GCM). This application's goal is to help the people who are new to the city and old age people who cannot walk up to main roads to catch an auto to reach some destination. This will also give services to the people during emergency, where they could not find any means of transportation or when it is in need. The customers and auto drivers are identified by their GCM register id. Through smart phones all the details which are required to transactions are exchanged and that is through server. Mobile verifications, tracing of auto and customer and allocating job to particular auto driver is maintained at server and all details are stored in database for further transactions. Once the user requests for the service the current location and destination address is picked up. The drivers nearest to the current location are intimated through a Google cloud message sent by the server application. The driver who responds the job is allocated. The driver details are then sent to the customer and the customer details are sent to the driver.

Keywords: Android; Google Cloud Messaging; Location Based Services; Google Positioning System; Mobile value added services.

Introduction

Wepathit.com, an Android application offers many advantages to the mobile users to retrieve the information about their current location and process that data to get more useful information near to their location. With the help of a GPS in phones and through Web Services using GPRS, Location based Services [1,2] can be implemented on Android [3,4] based smart phones to provide value-added service like helping the needy to find the nearby auto rickshaws during emergency or at any time in and around the Tumkur city.

This application's goal is to help the people who are new to the city and old age people who cannot walk up to main roads to catch an auto to reach some destination. This will also give services to the people during emergency, where they could not find any means of transportation or when it is in need.

The system provides customers with services such as:

(i) Security during transportation.
(ii) A user friendly interface for customers to access auto rickshaws easily.

Mobile Value added services

A Mobile value-added service (MVAS) [5] is a popular telecommunications industry term for non-core services, or in short, all services beyond standard voice calls and fax transmissions. However, it can be used in any service industry, for services available at little or no cost, to promote their primary business. In the telecommunications industry, on a conceptual level, value-added services add value to

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the standard service offering, spurring the subscriber to use their phone more and allowing the operator to drive up their ARPU. For mobile phones, technologies like SMS, MMS and data access were historically usually considered value-added services, but in recent years SMS, MMS and data access have more and more become core services, and VAS therefore has begun to exclude those services.

Mobile VAS [5] services can be categorized into

(i) Consumer VAS
(ii) Network VAS
(iii) Enterprise VAS

Location based services

A location Based Service (LBS) [1,2] is a service for many applications which depends on the location of LBS enabled device, like mobile phone. Location based service (LBS) is running as very important application in mobile data services and it is the very fast development in wireless communication and location positioning technologies. Users with location-aware wireless devices can find about their surroundings (e.g., finding the nearest auto for transportation in closed area). LBS architecture is described in below Figure 1.

LBS [3] have two important processes, that is:

(i) Determining the location of mobile device
(ii) Using this information to perform some task or to provide some service.

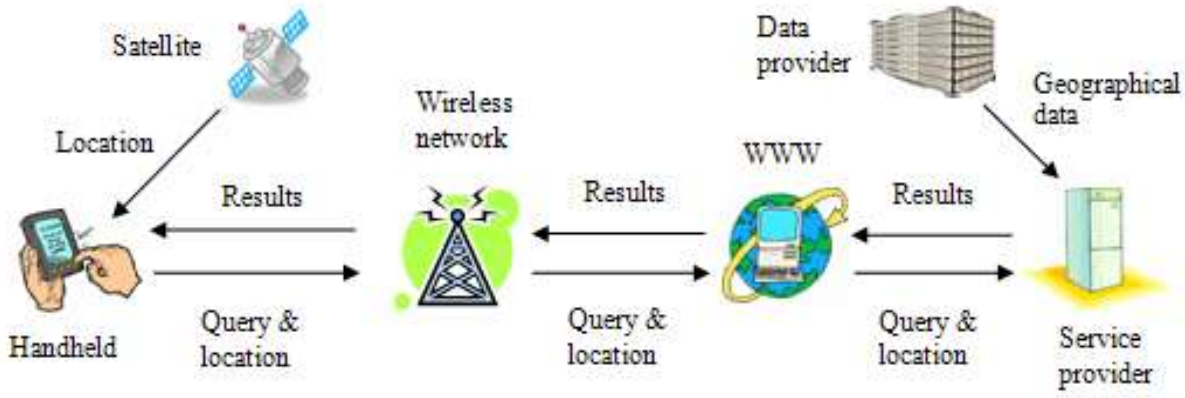

Figure 1. Explains the LBS architecture [3]

(a) Mobile handheld devices [6], which are small computers that can be held in one hand. For most of the cases, they are smartphones and its different operating systems are specified in below Table 1. (b) Positioning system [6], which is a navigation satellite system that provides location and time information to anyone with a receiver. (c) Mobile and wireless networks, which relay the query and location information from devices to service providers and send the results from the providers to devices. (d) Service providers, which provide the location-based services. (e) Geographical data providers, which are databases storing a huge amount of geographical data such as information about restaurants and gas stations.

Table 1. Shows the top 5 different operating systems and its features

Mobile OS	Android	BlackBerry	iOS	Symbian	Windows
Creator	Open Handheld Alliances	RIM	Apple	Nokia	Microsoft
Development Languages	Java	Java	Objective C/C++	C++,Java	Visual C++
Kernel Type	Linux	Unix	Hybrid	Microkernel	Windows CE 6/7
Source Model	Open	Closed	Closed (open for the core)	Closed	Closed
Mobile Application store	Android market	App world	App Store	Ovi store	Windows market place

Google Cloud Messaging

The Figure 2 describes the interaction between mobile, GCM cloud and the server.

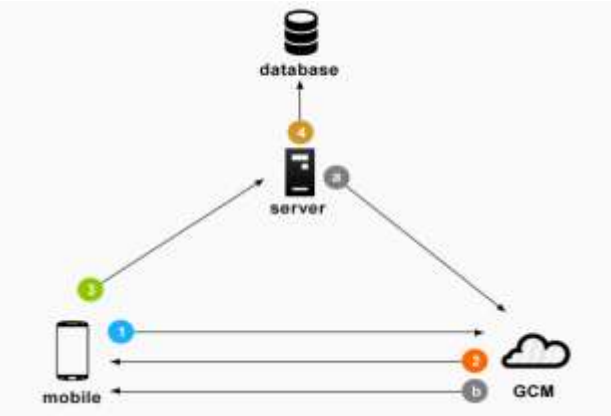

Figure 2. Google Cloud Messaging [7]

Procedure to register at GCM

(i) Android device request to register with GCM [7,8] server by sending app id and sender id.
(ii) Google Cloud provides registered id to the android device after the registration.
(iii) Requested android mobile device send registered id to local server for future references.
(iv) Register id will store in database of our local server for later usage.

Procedure to send notification

(i) If an android device required to send push notification [7,8] it request the server and the local server sends a request to GCM with registered id which was stored earlier.
(ii) GCM server will sends that message to requested Android device using its registration id.

The users must register their details with server, for this they must download the app from Google play store and to get push notifications, the smart phone must be registered with Google Cloud Messaging (GCM) [7,8] service by which the communications will be established between auto drivers and customers. Mobile number will be verified through OTP [9] and it should be based on encrypted [10] key exchange to increase security against dictionary attacks [11] (One Time Password). By using Location based services the geo coordinates (Latitude and Longitude) of current location, destination and auto driver locations will be identified and stored in both server and smart phone using SQ Lite [12] database for finding the path between source and destination and also to find the shortest distance between the customer and drivers. By using Euclidian distance [13] formula distances will be stored in server in descending order and based the nearest distances the notification will be sending to the auto drivers until any one auto driver accepts the request.

Euclidian distance =

$$\sqrt{(slat - dlat)^2 + (slong - dlong)^2}$$

Where
slat: Source latitude.
dlat: destination latitude.
slong: Source longitude.
dlong: destination longitude.

Customers can select the destination either in maps; The Global Positioning System (GPS) uses a constellation of 24 satellites orbiting the earth. GPS finds the user position by calculating differences in the times the signals, from different satellites, take to reach the receiver. GPS signals are decoded, so the smart phone must have in-built or they can type the location name [14]. By using the Geo coders that is Location based service in android the location name will be converted into latitude and longitude. For every auto driver there will be separate app that will be issued by the maintenance team when they register with the system. Auto drivers should indicate their status which indicates their willingness to take the job, when they will to take the job for them push notification will be sent and the notification will dis appear automatically after 2 minutes. After the transaction completes they need to confirm once again their status to the server by clicking on simple button, on the completion of every transaction all the details will be stored in the server.

Architecture of the system

The architecture of the system is shown in Figure 3.

Login activity

In this activity the customer must enter the phone number and the password to login into the system. If the user is new then he/she should be registered and activity signup must be executed.

Signup activity

This activity is used to register new customers to the system and while registration

GCM will provide register id to every app that will be stored in server automatically. Mobile number will be verified in activity OTP.

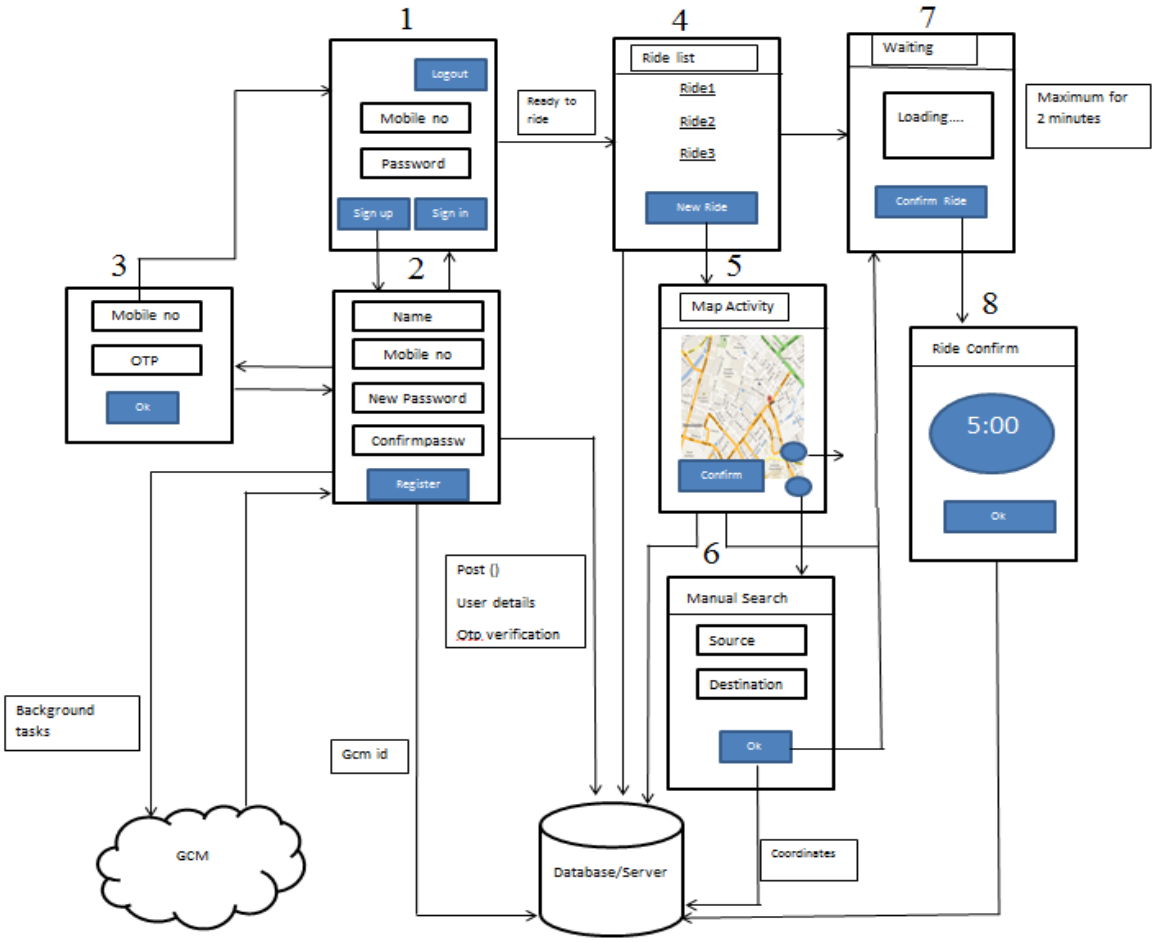

Figure 3. Architecture of the system

OTP activity

Here phone number will be verified. Four digits random number will be sent to the phone number and that will be compared with the existing pin in database.

Rides Activity

In this activity recent rides will be populated in list view that would be stored in database of the smart phone. When customers click on ride# that ride will be submitted.

Map Activity

Here map will be populated and customers are allowed to select their destination address by tapping location on the map and here we have 3 buttons they are confirm, GPS enable button and manual search button: it allows customer to type source and destination address.

Manual Search activity

Customers are allowed to type both source and destination addresses and by using Geo coders which is a service of location based services the address will be converted into geo coordinates (latitude and longitude) and stored in database.

Waiting activity

This activity contains only progress bar and it will be loading until any one driver accepts the request, if no driver accepts the transaction will be end after particular time.

Ride Confirm activity

In this activity after the auto driver accepts the details of the customer and the auto driver will be exchanged.

Conclusions

Android was the most popular smartphone OS in India and most of all are using android smartphones and our system will be focused only on android smartphones, It is very easy to use and user friendly mobile app. Since all the transactions are stored in our server we can achieve security for transportations. The location of the client can be determined by the mobile carrier hence it finds great use during Emergency

since it can be used during the emergency/health hazard to locate the mobile clients.

Conflicts of Interest

The authors hereby declare that they have no conflict of interest.

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