PROFILING OF ANDROID PHONE CUSTOMERS USING GPS TRACKING SYSTEM

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Abstract

The Global Positioning System (GPS) is progressively being adopted by private and public businesses to track and monitor humans for location-based services (LBS).The enhancement of GPS technology enables the use of GPS devices not only as navigation and orientation tool, but also as an instrument used to capture travelled routes: as sensors that measure activity on a city scale or the regional scale. Some of these applications include personal locators for people using Android Phone especially between the age group of 15 to 60. This application target people who are food lovers by profiling the customers on their behavior and demographics. The main purpose of this research paper is to study the methodology that can be used to attract more food lovers and customers through GPS Tracking System.

Keywords: GPS-Global positioning system, Tracking, LBS- location based services, Navigation.

Introduction

The availability of Geopositioning devices such as GPS (Global Positioning System) devices has grown enormously in the last decade and is still increasing. More and more people own a navigation system for outdoor uses like searching a route and place. GPS has the ability to calculate the position, time, and velocity of any GPS receiver. GPS devices are mainly used for orientation (determining where you are), navigation (determining where to go) and communication (exchanging information with others or accessing information services). But the devices can also be used for tracking, i.e. tracking the current position of a device and a route from that position to the desired place.GPS is a Global Navigation Satellite System (GNSS). GNSS is a system for location or position determination, geopositioning. Using a special receiver, a geoposition in space and time can be calculated based on the reception of satellite signals. The capability for geopositioning in the built-up (urban) environment is still one of its major weaknesses. The future availability of Galileo is expected to increase the performance of GPS significantly. New technology such as high-sensitive GPS receivers will improve the accessibility to GPS signal.

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Scope

The research paper is about explaining use of Global Positioning System (GPS) in an application to track customer. It consists of restaurants and how they will track the customer within certain radius and send them notification. It explains how effectively GPS system can be used in an android application to increase the business.

Objective

The main objective is to demonstrate the working of GPS system and its usefulness in android application.

Methodology

step 1- personal information and mobile no. of an android phone of regular customers are stored into database for keeping track.

step 2- use of android application to track the customer's location within 100 meters provided their internet connection is on.

step 3- the tracking includes certain rules, that is followed below

- Only the registered customers are tracked.
- Nothing is hidden while taking personal information from customers. Every single thing is explained to them that how and why owner or user will be using their number to track them.
- Customers do not wish to be tracked or to get notifications are not included.
- The customer is tracked only if the customer is within the range of 100 meters from the restaurant.
- No misuse of personal information and phone number.

step 4- notification to customer within 100 mts range.

step 5- update customer record and application.

Data collection

The collection of data is done by restaurant owner or the restaurant worker handling the application. The data is collected only after customer agrees to give. Demographic data is used to register the customer with the restaurant. Collected data is fed into database of restaurant. Data is used only in terms for tracking the customers to remind them that they are nearer to the restaurant.

Table 1.1 Demographic data

Name	Android device number	Address
Kruti	+917788665534	Matunga
Rutuja	+915643890234	Worli
Bhim	+919986534523	Chembur
Appa	+919876524334	Vashi
Shanti	+918876774555	Panvel
Prema	+918877656455	Vashi
Bhanu	+919899345566	Colaba
Jimmy	+919983454646	Colaba
Parag	+919988776655	Seawoods
Rashmi	+919833456778	Thane
Bijal	+919974567783	Andheri
Gaurav	+919274652390	Andheri
Komal	+918834578745	Nerul
Ishan	+919988223346	Borivali
Ulka	+919833457623	Kalyan
Prajakta	+919833427656	Thane
Priyanka	+919876565645	Byculla
Rahul	+919985363434	Kharghar
Suvidha	+917986563456	Panvel
Purnima	+919908776723	Wadala

Tracking Customer and purpose

The process works within the radius of 100 meters from the restaurant. The application locates the exact position of the customer on map. The customer needs to register initially to be tracked by the restaurant. The database of application stores the number of android devices of customers. The purpose of tracking customers is to send them notification if they are within the range. The notification consists of invitation that reminds customer that they are nearer to the restaurant it may also include the discount coupons to attract them. The customers within the range of 100 meters are shown in the map with the help of marker. The customers whose internet or GPRS is turned off won't be shown on to the map and will not get any notifications. There might be more people within the range but only customers which are registered are being shown on to the map. Figure 1.1 gives the idea of how the customers are being tracked.
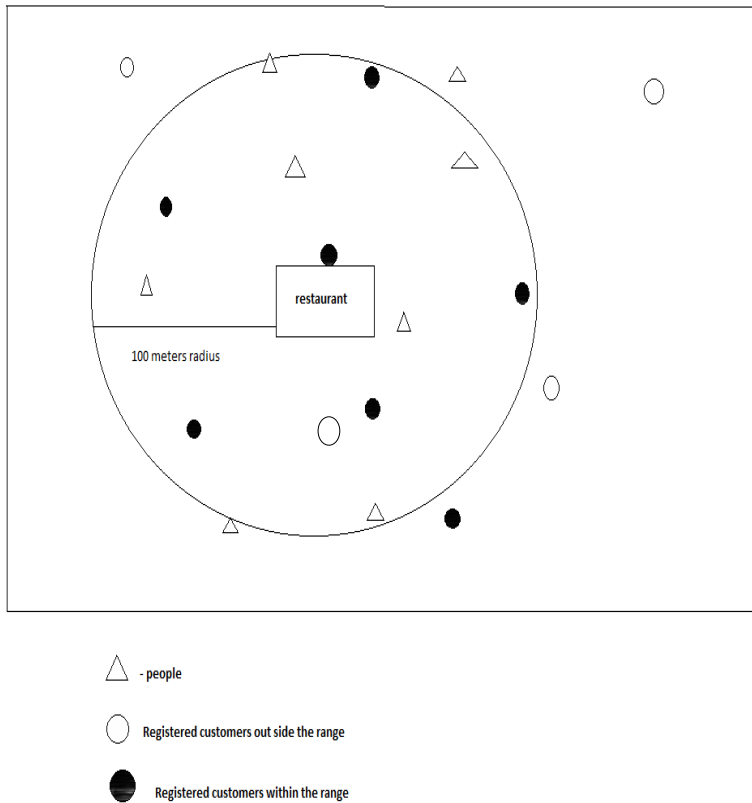
Fig 1.1: **Customer Tracking.**

Rules and Regulations

The rules are defined in the methodology are described below.

- This tracking application is used only by certified restaurants. These restaurants collect data from customers who agree to share their personal information.
- This information includes their name, age, android device number. Every single thing is explained to customer while collecting their information.
- The main purpose is only to track them if they are nearer to the restaurant. If they do not wish to be tracked their information is not collected.
- Restaurant owner makes assurance that collected information will be kept safe and hidden. As the restaurant is certified it becomes very important for them to keep the information confidential and that it is not misused by any other person.
- The customer whose information is being stored gets the notification while they are within 100 meters from restaurant.
- Customers do not agree to the policy are not being included, that is their information is not collected if they are not wished to get notifications.

- As customers are being tracked only if their GPRS service or internet connection is on, they won't get any notification if no internet connection. No matter if they are registered with the restaurant.

 Experimental results
The experimental results depend on the data collected by restaurant and how effective the response is by customers. Experimental results are measured by charts on monthly basis. Data of 20 customers are being collected for experiment. Charts are made based on the notification they have sent in a month and how many have responded back. It also depends on how many people have registered with the restaurant. Fig 1.2 depicts the pie chart for data of 5 months and their comparison for a particular restaurant.
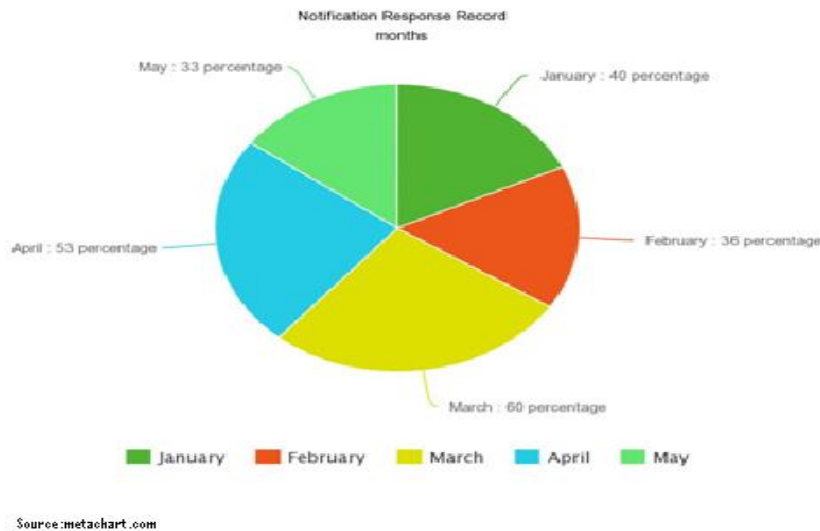
Fig. 1.2: **Pie Chart**

In the chart the numbers shows the notification response of each month. The fluctuation of number shows that how much successful they are in each month and by comparing every month they get an idea of overall business rise up in a year by the app. By collecting experimental data and comparing them new strategies can be made to boost the business.

Notification to customer
Notification is a message sent to an android device. Restaurant sends notification to customers to let them know that they are nearer to the restaurant. As discussed earlier the notification is sent to customers who are within the range of 100 meters. Notification may contain discount coupons or simply a message that the customer is nearer to the restaurant. As discussed earlier notification are sent to customers who are registered with the restaurant. No notification is sent to the customers do not wish to get tracked. There are two types of notifications. Notification depends on the regularity of a customer to

restaurant. Most regular customers gets discount coupon notification while less regular customer gets just a message and an invite from restaurant. Notification type is decided as per the old records

Table 1.2: Data of customer's visit

Name	Frequency
Kruti	Frequent
Rutuja	Less Frequent
Bhim	Less Frequent
Appa	Frequent
Shanti	Frequent
Prema	Less Frequent
Bhanu	Frequent
Jimmy	Frequent
Parag	Less Frequent
Rashmi	Frequent
Bijal	Less Frequent
Gaurav	Frequent
Komal	Less Frequent
Ishan	Frequent
Ulka	Frequent
Prajakta	Frequent
Priyanka	Frequent
Rahul	Less Frequent
Suvidha	Frequent
Purnima	Less Frequent

As shown in Table 1.2, data which was collected earlier is monitored based on the how often that customer comes to the restaurant. Based on this monitored data the notification is being sent. Fig 1.3 shows the flow diagram.
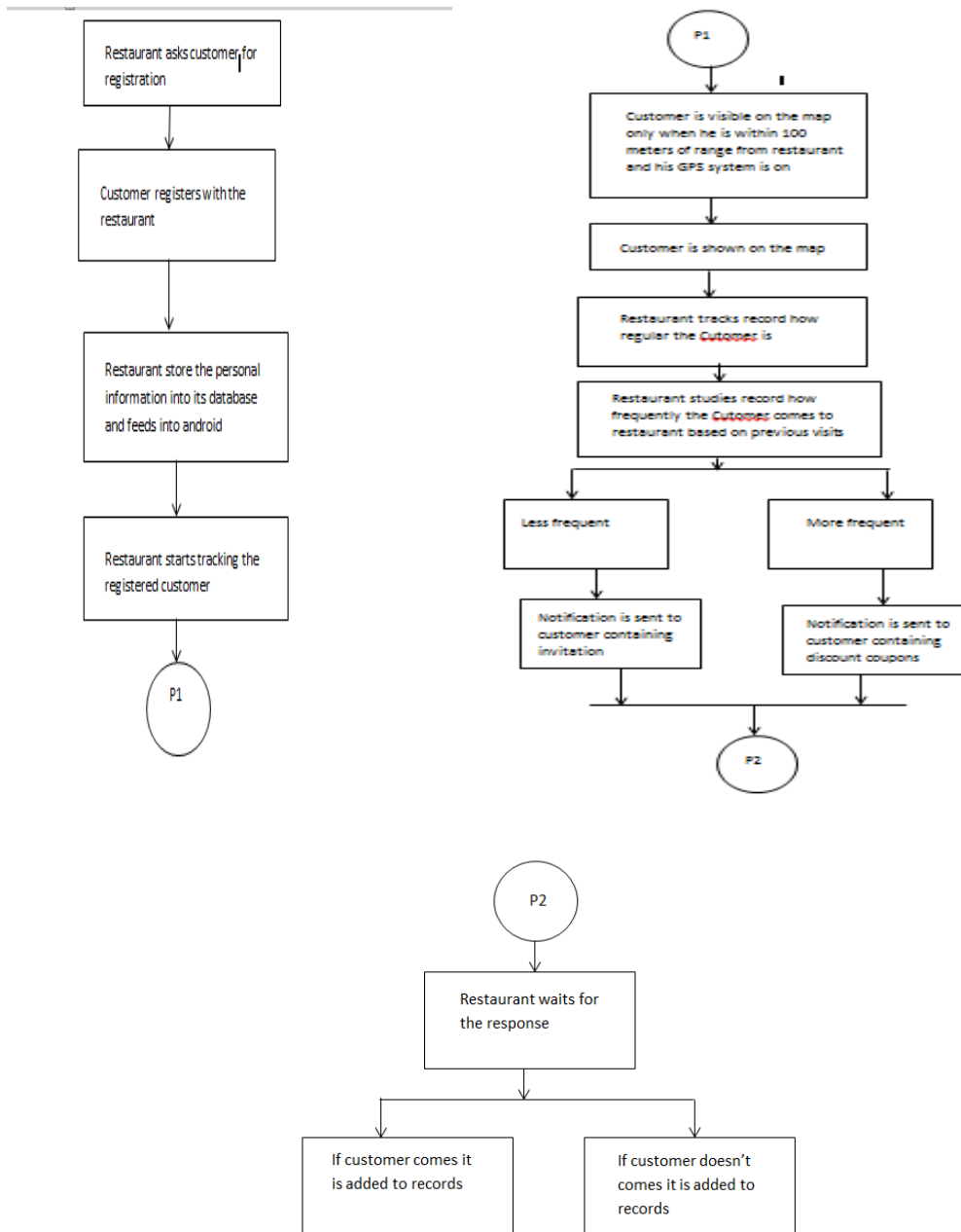
Fig 1.3 Flow diagram

Technology

Android technology is used to create mobile application; it effectively uses GPS system for tracking. It is **Android** is an **operating system** based on Linux with a Java programming interface. It is an operating system for mobile devices such as smartphones and tablet computers. It permits developers to write managed code in the Java language, managing the device by means of Google-developed Java libraries.

Advantages

- The biggest advantage of Android is that it is an open source, integrated software platform. Companies can release updates and revisions which users can download on their own.
- The Android Software Development Kit (SDK) allows you to create your own apps. SDK includes a comprehensive set of development tools like debugger, libraries, handset emulator, sample code, documentation and tutorials. So if you get hands on an SDK, you can develop applications on your own for Android.
- Android uses the standardized and open programming language Java. The emulator of the Android platform has a modern design and is easy to use.
- The installation of whole environment to develop Android applications is possible on every operating system.
- It uses GPS system to locate the exact position of the device by using satellite. It finds the latitude and longitude of device and then displays the exact position.
- Android offers a relational database which is SQLite for data storage purposes. Android also has an integrated web browser which allows a PC like usage.
- Association with Google has made it more powerful with Google Maps and Google Voice Apps.
- Android allows developers to design applications for users based on their preferences. This provides the ability for users to have unique experiences tailored specifically for them. This is possible as Android OS is customizable.
- There are numerous partners involved in Android which has led developers to create a standardized way of developing applications for users without botheration of the platform. This has also helped in defining documentation, procedures and application sharing.
- As android is an open platform it always tends to be far less expensive than other than conventional products. This has notified users about the decrease in cost as compared to other handhelds operating systems like Windows Mobile, Apple IOS and so on.

Disadvantages

Need internet connection - Android requires an active internet connection. At least there should be a GPRS internet connection in your area, so that the device is ready to go online according to our needs.

Advertising - Application in the Android phones can indeed be obtained easily and for free, but the consequences in each of these applications, will always be ads on display, either the top or bottom of the application.

Update

1. Data update

The data collected by the customer should be updated frequently as per the change of their personal data. To have more customers registered with the restaurant the restaurant should be very particular with the data. How often the customer comes should be noted

with the personal data of customer and it should be updated with his every visit to the restaurant.

It is necessary to update data to make monthly analysis about the business. The analysis is based on every customer who responses back to the notification, and notification sending is based on the customer's past records that how often he has come to the restaurant. Hence it becomes necessary to keep on updating the records.

2. Application update

The application can be updated based on the experimental results as well as adapting new technologies. Application can be made vast if many restaurants use it. It can be updated by adding proper database to store information of customer and also to add franchisee if any restaurant has it, by adding franchisee the application can be more useful in terms of tracking as a customer nearer to any of the franchisee will be tracked.

The current application is based for only admin side. We can add client side as well which may include following facilities.

- Customer can send notification to restaurant to book table for them.
- There can be new facility added like gather points and customer can redeem those points for dine out.
- The point increase will be totally on based of the frequency of customer to come to restaurant.
- This client side application can be used for online ordering, and admin side can be updated to store those orders of customers and deliver them on time.
- Admin side can be updated using customer's feedback on the technology as well as the food.

Conclusion

This paper focuses on method for sending notification to customers using GPS system. It focuses on the effective use of android technology to create applications. A brief idea of GPS and its usage with the android technology in today's electronic and computerized world to track the location of customers which are registered with the restaurant was given.

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