Truck Loader Android Application: Implementing Logistics Support using Android S.D.K and G.P.S

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Abstract – *Many people want to travel or shift goods to various places within short duration of time. They do not get right services at the right time or desired fare. Vehicles return empty after unloading goods. There is a requirement to solve these problems. An android application related logistics can solve these problems. This article presents an android application which solves almost all the logistics related problems such as availability of appropriate drivers, cost issues etc. People using the app or website book online truck facility. The current application is implemented using android SDK, Google maps. In this application, the customers as well as truck owners both will be satisfied as the calculation of the cost of trip, selection of path for a trip is transparent to both of them. The article explains the modeling and design of different modules of the current application.*

Key Words: **Android Application, Android SDK, Google Maps, Truck Loader, Logistics, Truck Owners, Customers.**

1. INTRODUCTION

Due to the rapid advancement in the mobile computing field, the use of Mobile applications is dramatically increasing [4]. Transportation in this age of technological advancement has also been an important matter of concern since there is huge demand for logistics support. Transport is one among the important infrastructures of any country. The main problem about the transportation in present scenario is that the uncertainty of waiting time because of traffic jams and any other issues related to it [2]. Nowadays most of the general public and commercial transportation organizations are using the vehicle tracking system to trace and monitor the vehicles in real time [5]. The purpose of this project is to provide people an effective way to handle their logistics transportation from source to destination with the usage of an android application that uses Android GPS. This application helps in tracking the vehicle in real time such that it is helpful for the user to know where and how exactly the entire process of logistics transportation takes place.

To track the vehicle's position, an electronic device is used which is referred as vehicle tracking system. Basically the tracking systems use GPS module to locate and monitor the position of the vehicle. Communication components like satellite transmitters are combined in many systems to communicate the vehicle's location to a distant user. Google maps are used to view the vehicle's location [6].

In this project, the main aim is to build an application for the logistics support called Truck Loader Android Application. Truck Loader app consists of 2 major applications, one for the consumer and the other for truck owners. This application will provide information about vehicles that are available to take goods. This app can also tell about the live location of vehicles, especially when they are carrying the goods of the customers by using Google's GPS (Global Positioning System). This application is implemented across the states of India. By using the web application, admin can login by giving his credentials. He is the one who monitors the android applications.

Our project involves the usage of vehicles such as vans and trucks etc. The vehicle tracking system provides a total security protection and fleet management solution. By using the newest GSM & GPS (smart phone) technology to protect and monitor the truck (moveable asset) virtually anywhere and then locate it after some time. User makes sure to know what he / she is delivering and they want to make best way to find out the size, weight, and any special accommodations of their luggage delivery might need [5].

Android is an open-source operating system that is supported by Linux with a Java programming interface for mobile devices like Smartphone (Touch Screen Devices who supports Android OS) and Tablets too. It provides a lot of great features.

- Its open-source and we can customize the OS based on our requirements.

- It supports connectivity for GSM, CDMA, WIFI, NFC, Bluetooth, etc, for telephony or data transfer. It will allow us to make or receive calls / SMS messages and we can send or retrieve data across mobile networks.

- By using WIFI technology we can pair with other devices using apps.

- Android has multiple APIs to support location-based services such as GPS.

- We can perform all data storage related activities by using lightweight database SQLite.

- It has an integrated open-source WebKit layout based web browser to support HTML5, CSS3.

- It supports multi-tasking, we can move from one task window to another and multiple applications can run simultaneously.

- It will give a chance to reuse the app components and the replacement of native applications.

- We can access the hardware components like Camera, GPS and Accelerometer.

Android app components are the essential building blocks of an Android application. Each and every components acts as an entry point through which the system or a user can enter the app. Some components depend on others.

There are four different types of app components:

- Activities.

- Intents.

- Services.

- Broadcast Receivers.

- Content Providers.

Activities:

In android, Activity represents a single screen with a user interface (UI) of an application and it will act as an entry point for users to interact with an app.

Android apps in general will contain multiple screens and each screen of our application acts as an extension of Activity class. By using activities, we will be able to place all android application UI components in a single screen.

One activity from the multiple activities in an android app can be marked as a main activity. Upon launching the application, this main activity will be the first screen to appear. Based on the requirements to perform different actions, each activity can start another activity to function.

Intents:

To request an action from another app component, Intents can be used as a messaging object.

Generally, in android, Intents will help us to take care of the communication between app components from the same application as well as with the components of other applications.

Intents are generally used to perform the things as described below.

- Start an Activity.
- Start a Service.
- Deliver a Broadcast.
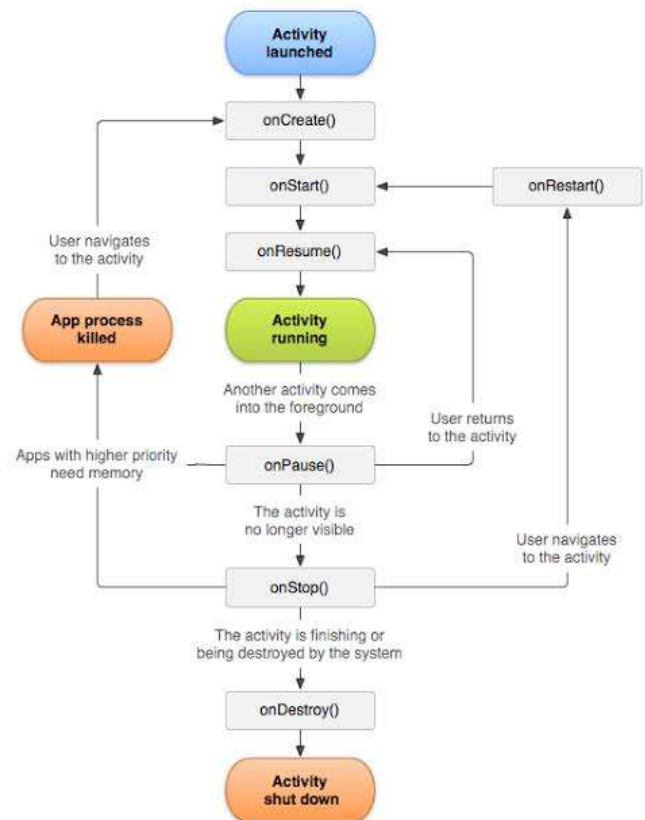
Fig -1: A simplified illustration of the activity life cycle.

Services:

Service is a component that keeps an app running in the background to perform long-running operations based on our requirement.

For Service, we don't have any user interface and it will run the apps in background like play music in background when the user is in different app.

There are two types of services available in android.

- Local Services.
- Remote Services.

Broadcast Receivers:

Broadcast Receiver is a component which is able to allow an android system or other apps to deliver events to the app like notifying and sending a low battery message or screen turned off message to the app.

Generally, Intents are used to deliver broadcast events to other apps and Broadcast Receivers uses status bar notifications to let the user know that if the broadcast event has occurred or not.

Based on our requirements, we can register the app to receive only specific broadcast messages. When a new broadcast is received, the system will check for specified broadcasts have subscribed or not. This in turn helps to route the broadcasts to the application.

Content Providers:

In android Content Providers, other apps can query or modify the data of our app based on the permissions provided by content provider.

2. TECHNOLOGY USED

Android SDK:

Android SDK is provided by Google and allows developers to use important Google resources like android code library, GPS system, Google map, media, database and components related to user interface. Android SDK also provides location manager class which provides functionality to manipulate the GPS data.

G.P.S:

Global Positioning System commonly referred as GPS is a satellite based navigation system. It comprises network of 24 satellites placed into orbit. GPS satellites circle the earth twice a day in very precise orbit and transmit signal information to earth. GPS receivers take this collective information from the satellite and uses triangulation to calculate user's exact location. Also, the GPS receiver compares the time, that a signal was transmitted by a satellite, with the time it was received.

SQL:

SQL (Structured Query Language) is a database query language. It is used for storing and managing data in Relational DBMS. SQL was the first commercial language to be introduced for E.F Codd's Relational model of database. Today most of the RDBMS (MySql, Oracle, Infomix, Sybase, MS Access) use SQL as the standard database query language. In general, SQL is employed to perform all the operations related to data and its components in RDBMS.

SQLyog:

SQLyog is the most powerful manager, admin and GUI tool for MySQL. In a single intuitive interface it combines the features of MySQL Query Browser, Administrator, phpMyAdmin and other MySQL Front Ends and MySQL GUI tools. SQLyog as a tool is a fast, easy to use and compact graphical tool for managing the MySQL databases. SQLyog was developed for all who use MySQL as their preferred RDBMS. Whether you enjoy the control of handwritten SQL or prefer to work in a visual environment. SQLyog makes it easy for you to get started because it provides you with tools to enhance your experience in MySQL.

Apache Tomcat:

The Apache Tomcat software is an open source implementation of the Java Servlet, JavaServer Pages, Java Expression Language and Java WebSocket technologies.

The software is developed in an open and participatory environment and released under the Apache License version 2.

It powers numerous large-scale, mission-critical web applications across a diverse range of industries and organizations.

MVC Architecture:

Basic MVC Architecture or Model View Controller is a software design pattern for developing web applications.

- Model – It is the lowest level of the pattern that is responsible for maintaining the data
- View – This is responsible for displaying all or a portion of the data to the user.
- Controller – Controller acts as a software code that controls the interactions between the Model and View.

MVC is popular as it isolates the application logic from the user interface layer and supports separation of concerns. Here the Controller receives all requests for the application. It then works with the Model to prepare any data needed by the View. The View then uses the data prepared by the Controller to generate a final presentable response.

3. LITERATURE SURVEY

A number of approaches to vehicle tracking, monitoring and alerting system has been proposed so far. Various authors have described different technologies and implementations related to vehicle tracking, security and monitoring.

The main purpose of one of the paper is to review the past work of vehicle tracking, monitoring and alerting system. They have encountered various problems about the vehicle system. Few of the problems encountered are to know proper real time location, managing the tracking system, controlling the GPS trans-receiver, etc. Radio Frequency Identification (RFID) is one of the technologies they have implemented for monitoring the vehicle. Global System for Mobile Communication (GSM) is used to find the location and information of the vehicle for alerting system. As these technologies provide the location of the vehicle, which is used for safety purposes. Say, when the vehicle is stolen, immediately we can find the location, so tracking gets easier. Web application is used for tracking current location via SMS and GPS tracking tools. This system focuses on predicting exact arrival time and position of vehicle. It is a user friendly application built with minimal cost [2].

Another paper proposed Real time GPS Tracking System for Transport Operations. In the recent times, auto-fares have gone high as few drivers make use of faulty meters. This

application mainly focused on fairness in the price. By making use of GPS, person travelling can track the route. It chooses the best route by using the optimal path and calculates the fare of vehicle by using Android SDK and GPS. The application asks the user to provide his destination address and by using GPS, it tracks the user's current location with the help of navigation system. By using the current location of the user, the application requests the central server for apt fare results as it consists of fare charts of various cities. Thus, application provides the fare rate to the user. User can lodge complaint and give feedback for the same [4].

A paper proposed a project which was done to ensure an effective vehicle tracking, online monitoring, data storage, sharing of transport and other features like security in a single system. Android application and website both are available to check for availability of trucks and book it if needed. Many-a-times, trucks travel longer distances having fewer luggages and more empty space, thus sharing can be done. It reduces the number of vehicle travelling, thereby reducing the pollution. It is also cost effective as it uses the BINDING concept. It mainly focuses on the tracking and protection of the vehicle. The security feature is handled by providing the SP Tracking ID, which tracks the live location of the vehicle [5].

GPS based vehicle tracking system is used to find the vehicle location with a range of features. In this paper, they have used a GPS unit, GSM Modem and MCU units for completing the design. The main objective of this project is to track the location of the vehicle remotely by switching on and off the ignition system. Here, the design phases are divided into basic, intermediate and advance. Short text messages (SMS) are sent at each design step. Mainly, a webpage is designed by using the Google maps, to view the location of the vehicle. In this tracking system, positioning and navigation of a vehicle can be done with a distance accurate up to 10m. For positioning, they have used latitude, longitude and exact position of vehicle by using Google maps. The system tracks the location of particular vehicle on the user's request and responds to the user via S.M.S [6].

4. CONCLUSIONS

The truck loader application implementing logistics support presented in this paper can be used for transporting goods from source to destination. In this paper, we have reviewed various technologies essential for the tracking of vehicles, monitoring the position and navigation of the vehicle using Android SDK and GPS. The tracking system helps the users in monitoring the path taken by the vehicle, also help in providing the security features along with it. These services allow the application to obtain constant time to time updates of the vehicle's geographical location. Various authors have described different methods and algorithms in determining the technologies used for the same. It is important to optimize these methodologies to make the system more functional and user friendly with wide application. The

application will have optimized algorithms that calculate optimal routes for the travel from source to destination, calculate exact fare for the journey and predict the time required to arrive at the destination.

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