

Android Based Mobile Smart Tracking System

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Abstract -Travel has always been a man's best pass time, a method to renew from the daily stress, a break from the monotonous life and to experience the thrill of adventure. Until the last decade, camera was a traveler's best friend but little did we know things are going to change a lot better. In today's world, life is always on the move. With the advancement of technology, smart phones today have immense capabilities to provide rich user experience with interactive facilities.

Smart Tracking System is an Android based application for travelers to obtain the geo-location and tag it with multimedia features. This application allows users to create, store and view their Vehicles, Vehicle related information and all the memories that bring with it. Vehicle Tracker Combines places visited, notes taken and the images captured, and display all this information on a map at the exact location where it all took place.

This application is developed to provide the users a rich user experience by having all the information in one place, easy-to-access and interactive. With the help of Google Maps, each Vehicle can be drawn out on the map with all the locations visited and the route taken. The user will also be able to view the description, the location address and the image captured any. Vehicle Tracker, developed in Android, provides extensive flexibility, supports many features and can be among the best travel friendly app.

Keywords: Android, Mobile Application, Web Portal, central database, server, global positioning system(GPS)

I INTRODUCTION

With changing times, the mobile technology has changed a lot and in the last few years we have seen the arrival of various new kinds of gadgets in the form of Smartphone, camera-phone, Android and tablet phones. In fact, the handset industry has turned from simple budget handsets to ultra-modern high end mobile phones. Today's device is almost everything - it is fashionable, innovative, appealing, high-performing, durable, stylish and multi-tasking. Latest gadgets can be used for various purposes like browsing mobile, internet, playing games, emailing, and blogging, messaging, GPS, YouTube, Google search, Gmail and more.

Along with this, there has been a booming market for the multimedia mobile phones. Modern gadgets are coming with built-in cameras with the rise of mobile phone applications, so-called apps; people today are more looking for information on the go. This is one area of mobile phone technology enhancement that allows developers and programmers to offer users just what they seek under their preferred area of interest. Google's Android is one of the latest and unique innovations, which Instantly has taken over the mobile market.

1.1 EXISTING SYSTEM

There are 17,000 location-based travel apps on the market, and 160 million app-compatible devices are owned worldwide – iPhones, Androids, Blackberries and tablet devices such as the iPad and Motorola Xoom. There are apps that can make our travelling a little easier, a bit more fun and more memorable. They let you do anything you can do online or with a guidebook, but more quickly and easily and while you're on the move – with maps and GPS to tell you where you are and capture wonderful memories. This research is based on development of a user-friendly Android-based application called Vehicle Tracker.

Vehicle Tracking Solutions, a leading provider of GPS fleet management services, has introduced a free downloadable "app" for the Android phone that interacts with the fleet supervisor's Vehicle Tracking Solutions account. Called Silent

Passenger, this GPS tracking Android app offers flexibility and mobility to fleet and operations management enabling them to modify settings, get reports, or monitor vehicle status, all from their smart phone.

1.3 NEED

As population numbers in cities increase and gas prices rise, public transportations often suggested as an easy, cheap, and environmentally friendly alternative to driving, but the uncertainty inherent to the system combined with a lack of communication often prevent its widespread adoption by commuters. Busses in particular can be impractical for those who must adhere to a strict schedule or depend on them for emergencies. Buses that are running particularly behind schedule can lead to late arrivals or missed connections while busses running ahead of schedule can indirectly cause travelers to be late if they end up waiting for a bus that has already passed.

While these variations from the official bus schedule are understandable and largely unavoidable, the lack of communication discourages adoption at a rate disproportionate with their actual likelihood. Even if a bus is running exactly on schedule, bus users have no easy way of knowing that information and those that have alternative modes of transportation will be less likely to ride the bus regardless of its actual timeliness.

In this modern era of technological communication, it is increasingly easy for people to stay in contact at all times with the use of smart phones and other internet capable mobile devices. While business has traditionally been conducted during specified business hours and preplanned locations, communication and scheduling software advances in recent years have made it easier to facilitate impromptu meeting or work schedule changes.

1.4 DEFINITION

In case of our software the device that we are going to use is an android phone and the vehicles will be watched using android application. As urban living environment is becoming more and more complex, the road condition is becoming worse because of heavy traffic, increase of traffic accidents and high ratio of empty vehicle. It increases the cost of transportation and wastes time of bus movement. To solve such problems, a land bus tracking system has been developed.

Android supports to develop a location-aware application utilizing Global Positioning System (GPS) and Android's Network Location Provider to acquire the user location. Although GPS is most accurate, it only works outdoors; it quickly consumes battery power, and doesn't return the location as quickly as users want. Android's Network Location Provider (NLP) determines user location using cell tower and Wi-Fi signals, providing location information in a way that works indoors and outdoors, responds faster, and uses less to battery power.

This is one such social travel mapping application designed to organize and store information about our route with a lot more information about them. This research is oriented in creating a travel logger integrated with GPS to track. This application is developed with intensive research on Location-based services and Map Overlays to provide the users to create a personalized travel.

1.5 OBJECTIVES OF THE PROPOSED SYSTEM

We are going to use GPS for locating the position of vehicle. We will also find the speed of the vehicle in real time. We can track vehicles through android application using GPS to find out here a bus is using a web application which requires login of administrator for Vehicle Details and User. We use the Vehicle details From Vehicle Registration Form i.e. (Vehicle Name, Vehicle No. Driver Name, Driver Mobile No.). This is the Administrative Activity. From that detail we can track the location of Vehicle, only registered vehicles location can track

Scope:

- . School and Employment:-STS can alert when vehicle is approaching
- . Public Service: - STS avoids misuse
- . Private Yatches and Fishing Boats :- STS locates the vehicle in case of emergency
- . Logistics, Cargo, Distribution, and Transportation:- Fleet management
- . Police:- Communication with other vehicles
- . Rent a Car Firms: - Monitor the vegicle in agreement terms
- . Working Vehicle: - Monitoring vehicle which project they are working

1.6 ORGANIZATION OF PROJECT REPORT

This project report is organized as follows

Chapter 1: It outlines the introduction to Android Application Smart Tracking System with related existing system problems, scope, requirements and related terms

Chapter 2: It involves the review of major technologies required for the development of Android Application Smart Tracking System and theoretical background behind them. It also explains the timeline and project planning.

Chapter 3: Briefs the analysis and design part of Android Application Smart Tracking System focusing on use case diagrams, ER diagrams, class diagrams and schema of the project.

Chapter 4: This involves the testing and cross checking of results and screenshots of UI.

Chapter 5: This involves the conclusion and future scope.

2. THEORETICAL BACKGROUND

2.1 MOBILE PLATFORM

The mobile phone is one of the quickest to be adopted technologies in human history. As smart phones drop in price, we will see a rapid shifting how mobile phones are perceived: from simple communication devices to general purpose mobile computers.

2.2 ANDROID OPERATING SYSTEM ARCHITECTURE

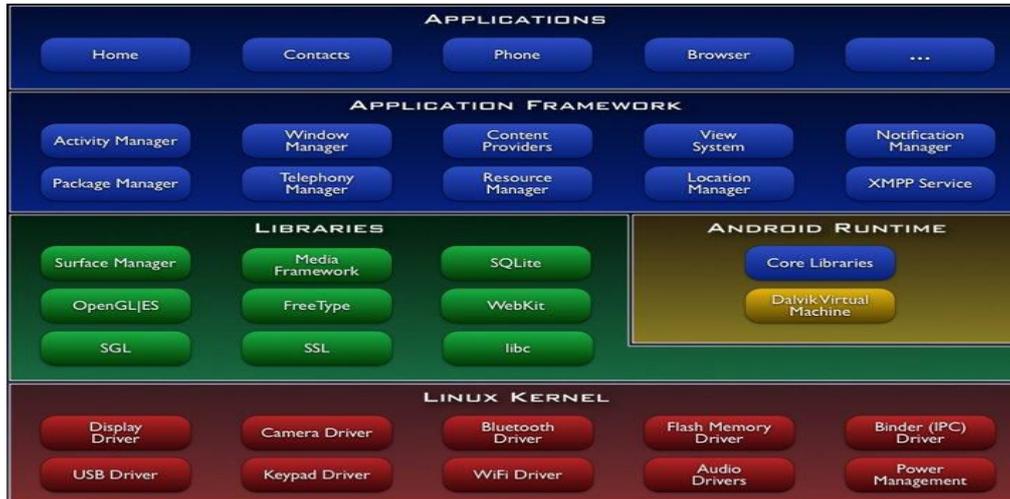


Figure 2.1 Android Operating System Architecture

2.2.1 Linux kernel

At the bottom of the layers is Linux - Linux 2.6 with approximately 115 patches. This provides basic system functionality like process management, memory management, device management like camera, keypad, display etc. Also, the kernel handles all the things that Linux is really good at such as networking and a vast array of device drivers, which take the pain out of interfacing to peripheral hardware.

2.2.2 Libraries

On top of Linux kernel there is a set of libraries including open-source Web browser engine Web Kit, well known library libc, SQLite database which is a useful repository for storage and sharing of application data, libraries to play and record audio and video, SSL libraries responsible for Internet security etc.

2.2 ANDROID SYSTEM ARCHITECTURE

2.2.3 Android Runtime

This is the third section of the architecture and available on the second layer from the bottom. This section provides a key component called Dalvik Virtual Machine which is a kind of Java Virtual Machine specially designed and optimized for Android. The Dalvik VM makes use of Linux core features like memory management and multi-threading, which is intrinsic in the Java language. The Dalvik VM enables every Android application to run in its own process, with its own instance of the Dalvik virtual machine. The Android runtime also provides a set of core libraries which enable Android application developers to write Android applications using standard Java programming language.

2.2.4 Application Framework

The Application Framework layer provides many higher-level services to applications in the form of Java classes. Application developers are allowed to make use of these services in their applications.

2.2.5 Applications

You will find all the Android application at the top layer. You will write your application to be installed on this layer only. Examples of such applications are Contacts Books, Browser, and Games etc. Application components are the essential building blocks of an Android application. These components are loosely coupled by the application manifest file AndroidManifest.xml that describes each component of the application and how they interact.

2.3 ANDROID APPLICATION LIFE CYCLE

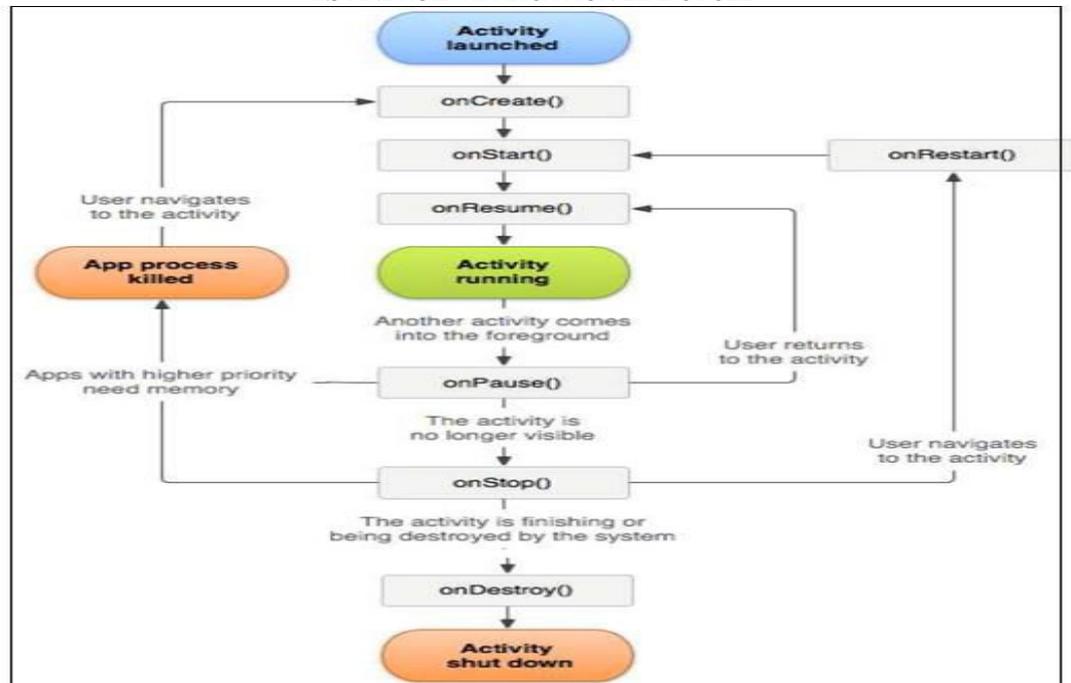


Fig.Android Application Life cycle

1) Starting State:

When an activity does not yet exist in memory, it is in the starting state.

2) Resumed/Running State:

An activity that is in the foreground is in the running state. Any activity that is currently on the screen and interacting with the user is the running activity at that particular point in time. It exists at the top of the Activity stack.

3) Paused State:

When an activity is not in focus (i.e. not interacting with the user), but is still visible on the screen, it is in the Paused state.

4) Stopped State:

An activity that is not visible on the screen, but exists in the memory is in the Stopped State.

5) Destroyed State:

A Destroyed activity results from the removal of an activity (that is no longer required) from the memory. Such removals generally occur, when the activity manager decides that there is no use for such activities anymore.

2.4 Android GPS

The Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense.

- . GPS devices may have capabilities such as: maps, including streets maps, displayed in human readable format via text or in A graphical format,
- . Turn-by-turn navigation directions to a human in charge of a vehicle or vessel via text or speech,
- . Directions fed directly to an autonomous vehicle such as a robotic probe,
- . Traffic congestion maps (depicting either historical or real time data) and suggested alternative directions,
- . Information on nearby amenities such as restaurants, fueling stations, and tourist attractions.

GPS may be able to answer:

- . Traffic congestion and alternative routes.

- . Roads or paths that might be taken to get to the destination.
- . The location of food, banks, hotels, fuel, airports or other places of interests.
- . The shortest route between the two locations.
- . The different options to drive on highway or back roads.

3.SYSTEM DESIGN

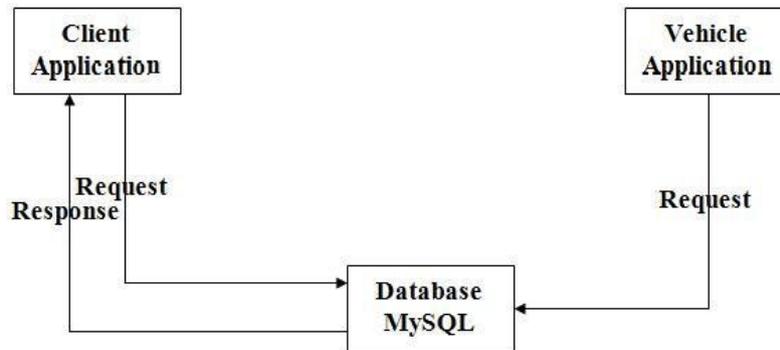


Fig. Typical Architecture

Above figure 3.1 shows the typical architecture of the system, it shows how system works and what phases of system are. The major content of this architecture are following:

- . User interface (Android application).
- . Server.
- . Database (MySQL).

3.2 System Requirements

3.2.1 Android Smartphone

- . Android OS 2.3 or higher

This version of android is very stable as compare to previous version. Every application is compatible with this version and this is most popular version. This version is available on low cost mobile.

- . GPS-Enable

We are using inbuilt GPS device of android mobile phone for a reliability and convenient to use with greater performance.

- . Internet connection

We are using 2G or 3G internet data connection for a data transferring and connection between client and server application.

3.2.2 Development toolkit

Android Development Toolkit (Eclipse) Android Development Tools is a plug-in for the Eclipse IDE that is designed to give you a powerful, integrated environment in which to build Android applications. ADT extends the capabilities of Eclipse to let you quickly set up new Android projects, create an application UI, add packages based on the Android Framework API, debug your applications using the Android SDK tools, and even export signed .apk files in order to distribute your application. This document provides step-by-step instructions on how to download the ADT plug-in and install it into your Eclipse development environment. Note that before you can install or use ADT, you must have compatible versions of both the Eclipse IDE and the Android SDK installed. For details, make sure to read installing the Eclipse Plug-in.

- . Map plug-in Google Maps is a web mapping service application and technology provided by Google, that powers many map-based services, including the Google Maps website, Google Ride Finder, Google Transit, and maps embedded on third-party websites via the Google Maps API. It offers street maps and a route planner for traveling by foot, car, bike (beta), or with public transportation. It also includes a locator for urban businesses in numerous countries around the world

3.2.3 Additional Requirements

- . Access to the latest route information in GTFS format.

- . A phone network data plan for Internet access.
- . Administrator privileges for creating database in My SQL.
- . Google Map/Navigator service.
- . Vehicle Details.

3.4 System Implementation

3.4.1 ITERATIVE MODEL

Iterative and Incremental development is any combination of both iterative design or iterative method and incremental build model for development. The combination is of long standing and has been widely suggested for large development efforts. For example, the 1985 DOD-STD-2167 mentions "During software development, more than one iteration of the software development cycle may be in progress at the same time. This process may be described as an "evolutionary acquisition" or "incremental build" approach." The relationship between iterations and increments is determined by the overall software development methodology and software development process. The exact number and nature of the particular incremental builds and what is iterated will be specific to each individual development effort.

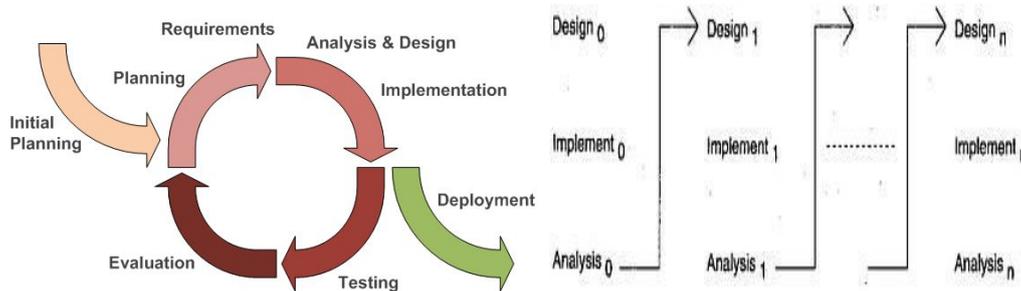


Figure 3.11 Design of Iterative model

The basic idea behind this method is to develop a system through repeated cycles (iterative) and in smaller portions at a time (incremental), allowing software developers to take advantage of what was learned during development of earlier parts or versions of the system. Learning comes from both the development and use of the system, where possible key steps in the process start with a simple implementation of a subset of the software requirements and iteratively enhance the evolving versions until the full system is implemented. At each iteration, design modifications are made and new functional capabilities are added.

The procedure itself consists of the initialization step, the iteration step, and the Project Control List. The initialization step creates a base version of the system. The goal for this initial implementation is to create a product to which the user can react. It should offer a sampling of the key aspects of the problem and provide a solution that is simple enough to understand and implement easily. To guide the iteration process, a project control list is created that contains a record of all tasks that need to be performed. It includes such items as new features to be implemented and areas of redesign of the existing solution. The control list is constantly being revised as a result of the analysis phase.

The iteration involves the redesign and implementation of iteration is to be simple, straightforward, and modular, supporting redesign at that stage or as a task added to the project control list. The level of design detail is not dictated by the iterative approach. In a light-weight iterative project the code may represent the major source of documentation of the system. However, in a critical iterative project a formal Software Design Document may be used. The analysis of iteration is based upon user feedback, and the program analysis facilities available. It involves analysis of the structure modularity, usability, reliability, efficiency & achievement of goals. The project control list is modified in light of the analysis results. Phases Incremental development slices the system functionality into increments (portions). In each increment, a slice of functionality is delivered through cross-discipline work, from the requirements to the deployment. The unified process groups increments/iterations into phases: inception, elaboration, construction, and transition. Inception identifies project scope, requirements (functional and non-functional) and risks at a high level but in enough detail that work can be estimated. .

4. RESULT

User View

1. Install the smart tracking system application on your mobile.
2. Fill up the registration form for user.
3. Home activity will display.
4. Select the Bus Index option to see the available vehicle.
5. Select required bus to see route and location of the bus on the map.
6. You can track your current location by selecting Track Me option.
7. Next Setting option will help to on GPS settings.
8. Bus Schedule provides time schedule, route travelers, and date by the bus.
9. Help option give you facility to send SMS to whom you want to send when any problem occurs referring to travelling time.

Tracker System

1. Install the tracker application for those vehicles you want track on their drivers mobile.

2. Fill up the registration form for Vehicle.
3. Then you have to click Start Service option to start the updating location on user map.
4. Stop Service option will be useful to stop to updating the location.
5. If any problem will caused regarding to vehicle Help option provide you to send SMS to getting help to salve the vehicle problem.

This project contains following steps

4.4.1 Client View

4.4.1.1 Registration Activity:



Figure 4.3 Registration Activity

This Activity used for to register the user .Without registration user cannot use the application.

4.4.1.2 Home Activity:



Figure 4.4 Home Activity

After the registration successful this activity will open on screen.

4.1.3 GPS Setting:

This activity for allow the GPS services on your device.

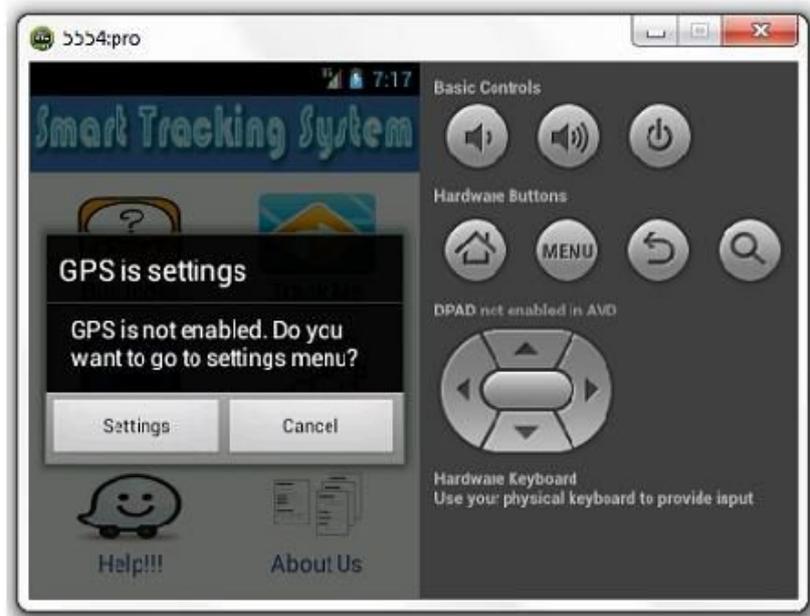


Figure 4.5 GPS Setting

4.4.1.4 Bus Index



Figure 4.6 Bus Index

It shows all available bus which are registered.

4.4.1.5 Google map and Navigation:



Figure 4.7 Google map and Navigation

This is the actual location of vehicle that choose through the Bus index from our location to Bus location

4.4.1.6 Track Me Location



Figure 4.8 Google near Places

Figure 4.8 shows Google near places activity it displays the public services which are present at current location.

4.4.1.7 Vehicle Schedule

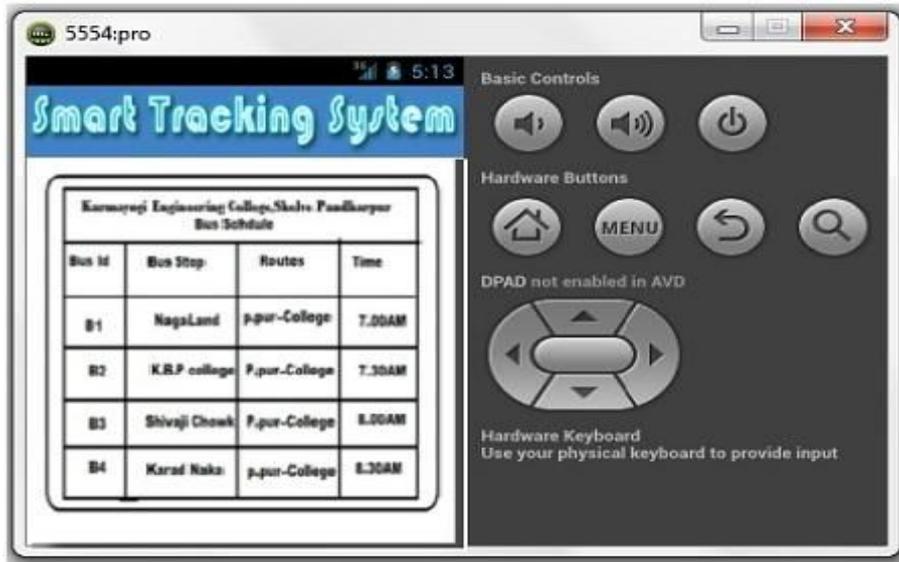


Figure 4.9 Vehicle Schedule

It provides the schedule of the vehicle. If any vehicle may arrive late or earlier that information will provide by this activity.

4.4.1.8 Help Activity



Figure 4.10 Help Activity

This activity provide help facility to user to send message in emergencies condition. We can send multiple message at a single time and Enter the message in message box and send it to the recipient.

4.4.2 Tracker system

4.4.2.1 Vehicle Registration:



Figure 4.12 Vehicle Registration Activity

Registration form for vehicle and driver detail.

4.4.2.2 Start Service and Stop Service



Figure 4.13 Start Service

The above figure shows start service to updating vehicle location and shows stop service to updating vehicle location.

4.4.2.4 Driver Help

This activity shows driver help facility by using message service.

5. CONCLUSION

5.1 Conclusion

Vehicle tracking system resulted in improving overall productivity with better fleet management that in turn offers better return on your investments. Better scheduling or route planning can enable you handle larger jobs loads within a particular time. Vehicle tracking both in case of personal as well as business purpose improves safety and security, communication medium, performance monitoring and increases productivity. So in the coming year, it is going to play a major role in our day-to-day living.

This system has many advantages such as large capability, wide areas range, low operation costs, effective, Strong expandability and Easy to use in vehicle traffic administration. Upgrading this setup is very easy which makes it open to future a requirement which also makes it more efficient.

5.2 Future scope

Adding the ability to share the track and other related information obtained via SMS, Bluetooth or mail. Adding the ability to share the track via Chat Messenger (“WhatsApp”) and social networking site (“Facebook, Twitter”).

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