

Real-Time College Bus Monitoring and Management System Using Android GPS Platform

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ABSTRACT

How often do you find yourself in dilemma that the vehicle you want to catch is missed or where it is so that you can catch it again to have a perfect journey to your destination? So, this application program is designed to help you locate that particular vehicle by just sending a message to the driver and you get an instant message. Of course, those other tasks sometimes need to take priority. Texting while driving can be dangerous, and this task of texting is hard task for the driver to stop everywhere and text to each and every one where he is. Fortunately, the catch fast app for Android makes texting possible even when you're not available for texting. Our project 'FAST-CATCH' is a GPS based android application which helps the user to locate the vehicle by sending just an SMS. The application tracks the current location of the user through the Google maps API and it provides this location to the message sender, sender can use this location to find out where the vehicle is even though he is not using any internet connection. This projects overall gives the easier tool for finding out where is the position of the vehicle if he wants to catch it even if he is not carrying up a phone which is just capable of sending a message (SMS). It saves time and money. Texting has become a common and very popular method of communicating with friends. Shooting off a quick text is much quicker and easier than calling, and it's possible to text while distracted by other tasks.

KEYWORDS: FAST-CATCH, performance, scalability, Global Positioning System.

INTRODUCTION

GPS is one of the most fantastic utilities ever devised by man. GPS will figure in history alongside the development of the sea-going chronometer. This device enabled seafarers to plot their course to an accuracy that greatly encouraged maritime activity, and led to the migration explosion of the nineteenth century. GPS will affect mankind in the same way. There are myriad applications that will benefit us individually and collectively.



Figure: Global Positioning system

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“FAST-CATCH”. Our project ‘FAST-CATCH’ is a GPS based android application which helps the user to locate the vehicle by sending just an SMS. The application tracks the current location of the user through the Google maps API and it provides this location to the message sender, sender can use this location to find out where the vehicle is even though he is not using any internet connection. This projects overall gives the easier tool for finding out where is the position of the vehicle if he wants to catch it even if he is not carrying up a phone which is just capable of sending a message (SMS). It saves time and money. Texting has become a common and very popular method of communicating with friends. Shooting off a quick text is much quicker and easier than calling, and it’s possible to text while distracted by other tasks.

PROBLEM DEFINITION

How often do you find yourself in dilemma that the vehicle you want to catch is missed or where it is so that you can catch it again to have a perfect journey to your destination? So, this application program is designed to help you locate that particular vehicle by just sending a message to the driver and you get an instant message. Of course, those other tasks sometimes need to take priority. Texting while driving can be dangerous, and this task of texting is hard task for the driver to stop everywhere and text to each and every one where he is. Fortunately, the catch fast app for Android makes texting possible even when you’re not available for texting.

PROPOSED SOLUTION

World is contracting with the growth of mobile phone technology. As the number of users is increasing day by day, facilities are also increasing. Starting with simple regular handsets which were used just for making phone calls, mobiles have changed our lives and have become part of it. Now they are not used just for making calls but they have innumerable uses and can be used as a Camera , Music player, Tablet PC, T.V. , Web browser etc. . And with the new technologies, new software and operating systems are required.

METHODOLOGY:

In order to overcome the drawbacks, a system is proposed. This is an android based system which will provide all required information about BUSES. The reason behind selecting android as a platform for developing this system is that android based mobile phones are used on a very large scale among people. Android is easy to handle and is user friendly, and hence the application will be used by maximum number of citizens. Android is an open source operating system for mobile phones. The application will be based on user friendly environment and hence any one can access it free of charge. The primary idea here is to provide routes and bus timings to the users. Also real-time tracking of the bus will be done.

In our application we have used the following terms and methodology:-

GOOGLE MAP API

Millions of websites and apps use Google Maps APIs to power location experiences for their users.

One of the defining features of mobile phones is their portability, so it’s not surprising that some of the most enticing Android features are the services that let us find, contextualize, and map physical locations.

We can create map-based Activities using Google Maps as a User Interface element. We have full access to the map, allowing us to control display settings, alter the zoom level, and move the centred location. In order to display the map in the application, we can use API provided. There are several API’s related. However Google Maps API is very popular and is extensively used. Google API has the several features available in it which we can use it through simple effort and in an easier way. For this purpose of using Google map API in our application we need to generate API key through the Google Inc’s which in turn provides the API key. This API key is used in the application to display the map.

Google maps have its own symbols and patterns. We may come across the situation that we need to add some markers and symbols on the map. In that situation Google API provides a tool named Overlay. Using Overlays, within the project, we can annotate maps and handle user input to provide map contextualized information and functionality. We can use any no of overlays on the map according to the need and specification. Overlays are a

way to add annotations and click handling to Map Views. Each Overlay lets you draw 2D primitives including text, lines, images and shapes directly onto a canvas, which is then overlaid onto a Map View. We can add several Overlays onto a single map. All the Overlays assigned to a Map View are added as layers, with newer layers potentially obscuring older ones. User clicks are passed through the stack until they are either handled by an Overlay or registered as a click on the Map View itself.

Location-Based Services (LBS) — The services that let us find the device's current location. They include technologies like GPS and Google's cell-based location technology. We can specify which location-sensing technology to use explicitly by name, or implicitly by defining a set of criteria in terms of accuracy, cost, and other requirements. Google map API has the in built library through which we can find the device current location .A location-based service (LBS) is an umbrella term used to describe the different technologies used to find the device's current location. The two main LBS elements are:

- Location Manager Provides hooks to the location-based services.
 - Location Providers each of which represents a different location-finding technology used to determine the device's current location.
- Using the Location Manager, we can:
- Obtain your current location.
 - Track movement.
 - Set proximity alerts for detecting movement into and out of a specified area.

Maps and location-based services use latitude and longitude to pinpoint geographic locations, But users are more likely to think in terms of an address. Android provides a Geo coder that Supports forward and reverse geocoding. Using the Geo coder, We can convert back and forth between latitude/longitude values and real-world addresses. Forward Geo coding is the conversion of address provided in to the latitude and longitude whereas Reverse Geo coding is the conversion latitude and longitude in to the address.

Used together, the mapping, Reverse geo coding, and location-based services provide a powerful toolkit for incorporating phone's native mobility into mobile applications.

TELEPHONY MANAGER

Provides access to information about the telephony services on the device. Applications can use the methods in this class to determine telephony services and states, as well as to access some types of subscriber information. Applications can also register a listener to receive notification of telephony state changes. You do not instantiate this class directly; instead, you retrieve a reference to an instance through `Context.getSystemService(Context.TELEPHONY_SERVICE)`. Note that access to some telephony information is permission-protected. Your application cannot access the protected information unless it has the appropriate permissions declared in its manifest file. Where permissions apply, they are noted in the methods through which you access the protected information.

BROADCAST RECEIVER

You can either dynamically register an instance of this class with `Context.registerReceiver()` or statically publish an implementation through the `<receiver>` tag in your `AndroidManifest.xml`.

A process that is currently executing a Broadcast Receiver (that is, currently running the code in its `onReceive(Context, Intent)` method) is considered to be a foreground process and will be kept running by the system except under cases of extreme memory pressure.

Once you return from `onReceive()`, the Broadcast Receiver is no longer active, and its hosting process is only as important as any other application components that are running in it. This is especially important because if that process was only hosting the BroadcastReceiver (a common case for applications that the user has never or not recently interacted with), then upon returning from `onReceive()` the system will consider its process to be empty and aggressively kill it so that resources are available for other more important processes.

In our application , we have we are using this Broadcast receiver for detecting the SMS which is sent by the client or student.

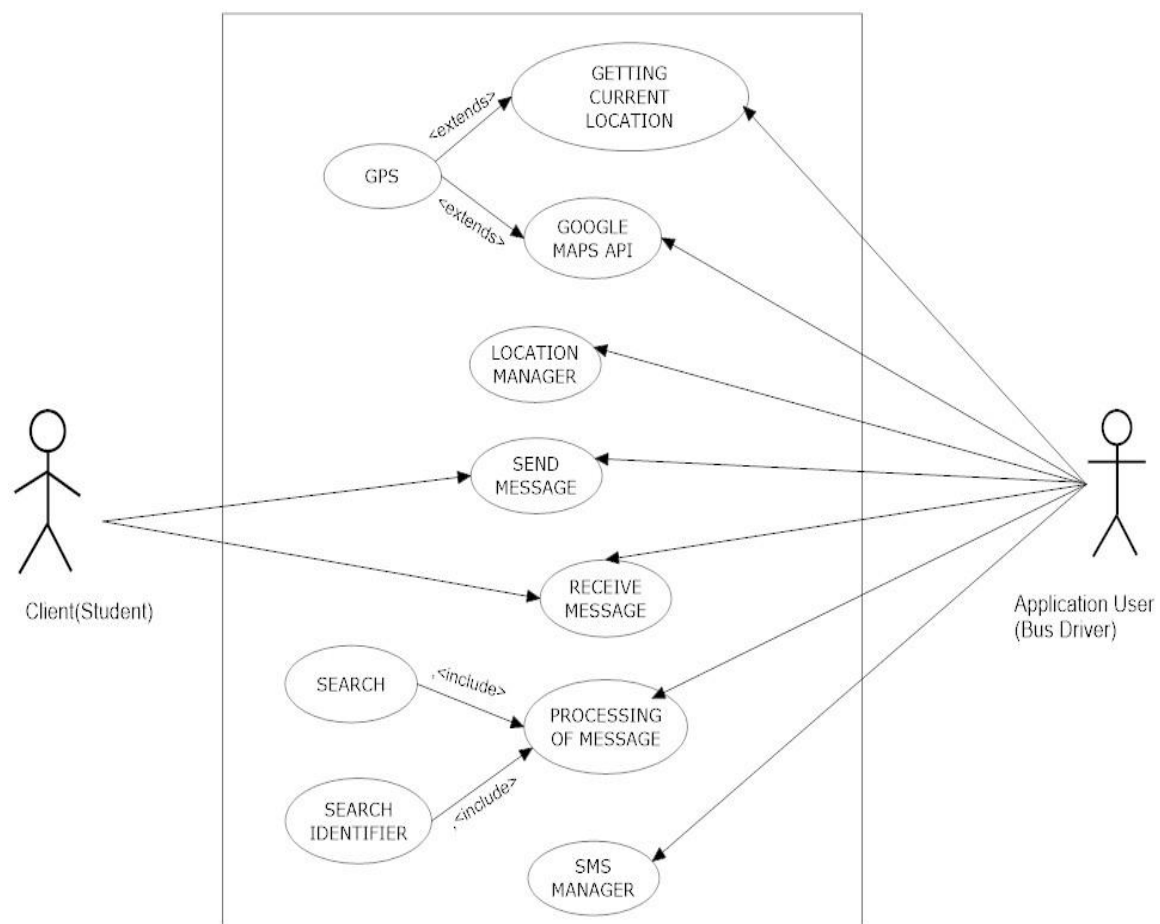
SMS MANAGER

Manages SMS operations such as sending data, text, and pdu SMS messages. Get this object by calling the static method getDefault(). In our application , SMS Manager is used get the address of the sender using intent Bundles , the SMS body which is very essential for determining the key identifier which is predefined, as soon as we get the key identifier in the SMS body(content) the application reply automatically the location of the vehicle instantly.

SYSTEM DESIGN

The System Design Document describes the system requirements, operating environment, system and subsystem architecture, input formats, output layouts, human-machine interfaces, detailed design, processing logic, and external interfaces.

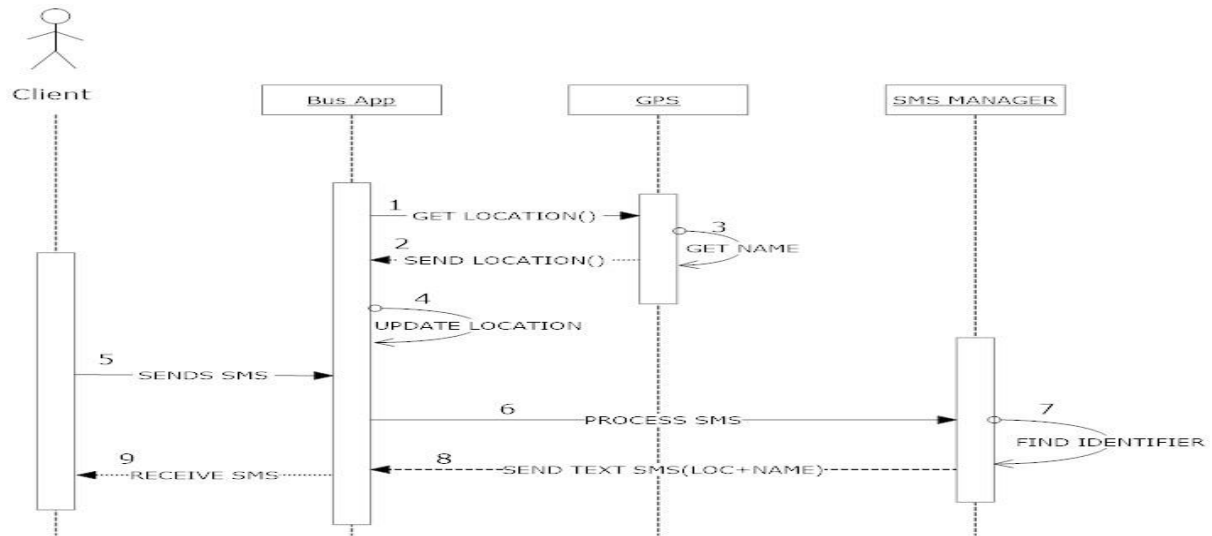
USE CASE DIAGRAM



USE CASE OF FAST CATCH

Figure: Use Case Diagram

SEQUENCE DIAGRAM



Sequence Diagram Of FAST CATCH

Figure: Sequence Diagram

DATA FLOW DIAGRAM

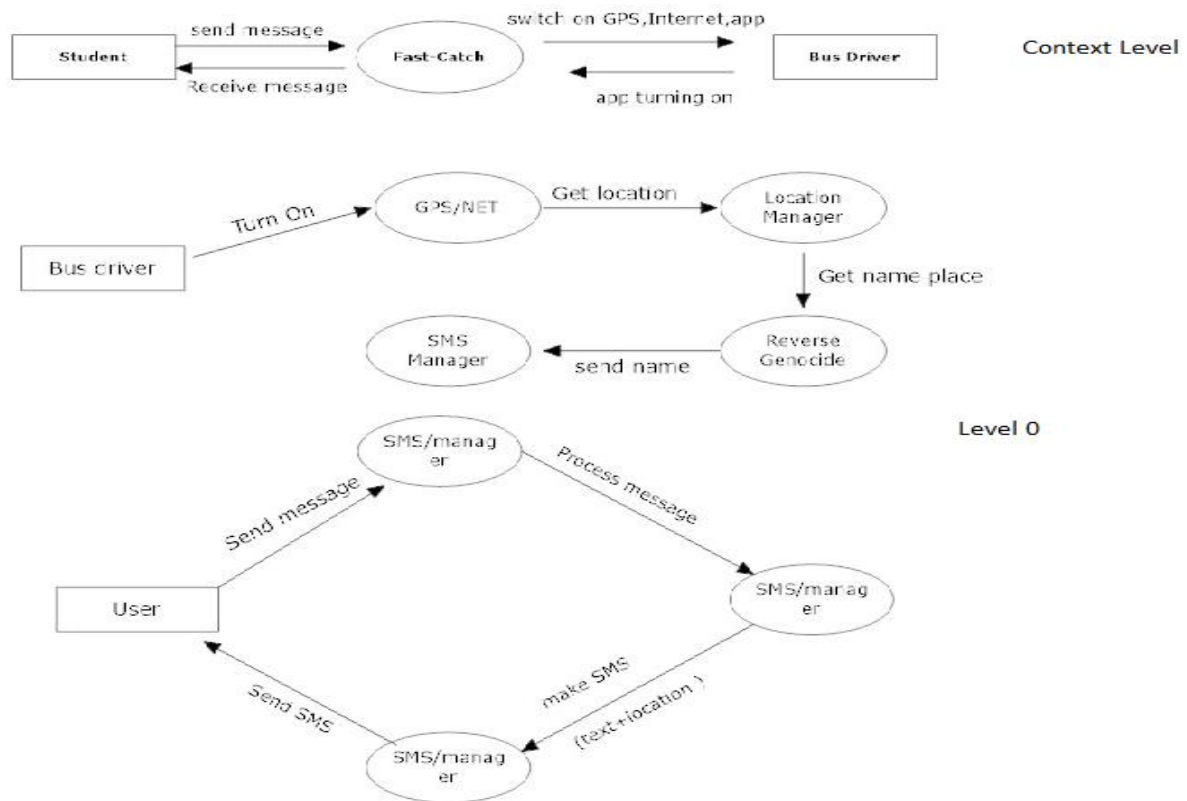
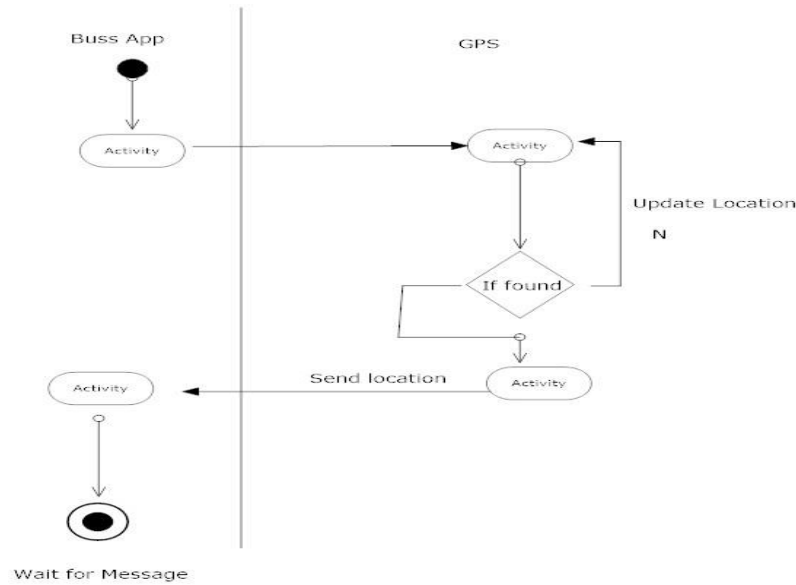
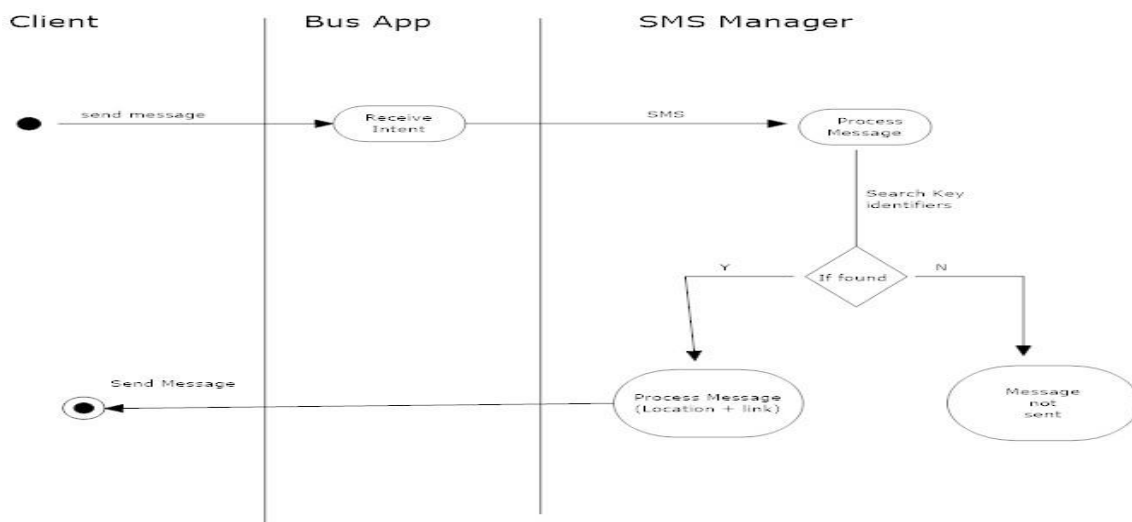


Figure: Data Flow Diagram

ACTIVITY DIAGRAM



Activity diagram of Fast-catch



Activity diagram of Fast-catch for client

Figure: Activity Diagram

CONCLUSION & FUTURE ENHANCEMENT

The conclusion reached on the basis of evidence is that to track a bus location we don't need any costly equipment and does not require any data centre it can be done very easily using a simple app in very affordable manner it is beneficial for both user and client. In our project we have focused on how student can easily get location by just sending a message and the response immediate. Student doesn't need to call the bus driver and ask about his current location which is very risky as it can cause accidents. On, bus driver side also it is very easy for bus Driver also because he does not need to attend many call for telling bus location as well can see his bus location using same apps as it provide Google maps in build and can drive without disturbance. This project can be extended by providing two more services i.e missed call auto messaging and dynamic key identifiers .

1. Missed call auto messaging: using this feature the user which wants to know a location of the bus can just give a missed call and get the reply from app about location.
2. Dynamic key identifiers: key identifiers used in our app are pre default and can't not be changed which can future enhanced can be user defined can be dynamic on user needs.