

**WOLKITE UNIVERSITY**

**COLLEGE OF COMPUTING AND INFORMATICS**

**DEPARTMENT OF COMPUTER SCIENCE**

**PROJECT TITLE**: **ANDROID BASED TAXI BOOKING SYSTEM**

**SUBMITTED BY GROUP 1**

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# Chapter One:

# 1. Introduction

In today’s world the numbers of mobile users are increasing and a lot of applications, and services generate a lot of data, and information to mobile users. These mobile users are anyone who can be executive, sales people, service engineers, teachers, etc. In general everyone is becoming a mobile service user. These users are using different applications; among the many applications used by many users are productivity applications. Our team member will build a productivity application named Android Based Taxi Booking System.

The main objective of the project is to provide an easy to use and handy mobile application to the android users which enables them to book a taxi from any location to any location. The users can keep track of their bookings and the taxi's current status. The aim of this project is to produce a software system that matches customers and taxi drivers in real time using existing cell phone and the designed system consists of a client mobile application for customers, a mobile application for taxi drivers, a server with a database, and web. The purpose here is to book the taxi any point in time using the Android application. The customer just books the taxi using this application and his details and location is sent to the web site where the software finds taxi. After finding the taxi, software sends the customer details to the taxi driver and if the taxi driver accepts the request then the taxi is booked for the given customer; else the customer details are forwarded to other taxi driver.

## Background of the Study

A **taxi** is a type of vehicle for hire with a driver, used by a single passenger or small group of passengers. Nowadays, taxi services are in everywhere big cities, medium-sized cities and even small cities around the world have reasonable infrastructure to provide this service. Taxi systems try to meet service demands of native population and tourists that visit or work on these places. At most of the cities around the world, it is possible to observe that taxi drivers waste a large portion of time about 50% - at vacant times. Because of this high rate of wasting time, there are a large number of studies that intend to improve the efficiency of these services, without increasing the costs. Some years ago, the use of geographical location information has been in expected time to serve. A location-based service (LBS) is a general term denoting software services which use geographic data and information to provide services or information to users. Unfortunately in most of our country parts the existing system do not use digital map/Google map to give the service based on the use of geographical location information. Therefore, the existing system does not meet the demands on an optimized way.

The existing system in the largest part of our country is a manual system, which means customers stand for a long time on the street by waiting for coming taxi or make a call for driver they already know. Its operation looks like this passengers call phones to taxi drivers or to the taxi service providers otherwise; they make physical contact to the taxi drivers or transport service providers. This project needs to make significant change on the existing system. On the other hand, there are some taxi service applications in our country. For example RIDE, ZayRide, Ze-Lucy, Taxiye are a transport hailing and booking platform in Ethiopia, that can be accessed by calling their dispatch center or by using their free passenger app, which are not manual but most of them are available in Addis Ababa.

## 1.2 Statement of the Problem

There are a lot of problems in the existing system. Due to that passengers as well as taxi drivers are wasting their time and money, for example, passengers stand for a long time on the street by waiting for coming taxi or make a call for driver they already know, so it is difficult to customers to find a taxi on the road. In other way taxi drivers are also wasting their time and resource by staying somewhere until the customer call them or come to them or they find customer by roaming . Although as there is no legally specified pick and drop fee for every place based on km or any distance measurement, customers are paying extra money for short route. Road side booking of passengers is inefficient and causes occasional disputes among bookers, passengers and drivers. Therefore, taxi booking project will came up with mobile based system to solve those problems mentioned above by enabling the customer to book taxi and drivers to receive booking order from the system anywhere in the town. This would enable that each customer who made a booking is served within the shortest possible time, as result it will increase operational efficiency and enhancing customer satisfaction. But it is better to use location based response for drivers. Therefore drivers will respond to customers request by current location. And our system makes payment options simply, customers can pay online while they have access of online payment options (systems).

In ride hailing system, the payment mechanism is in hand to hand payment (or the consumer/passenger pays the cost directly to the driver not to directly to the organization). So this payment method has so many negative impacts on the organization, government and consumers/passengers. This payment mode doesn’t reduce man power specifications.

On the new updated software, order history doesn't show the date on the order detail. As you all know the app didn't support corporate option, you guys also blocked and increased the tariff of telephone line we are using for corporate booking service. It doesn’t support daily corporate Passengers. Most of the time this application has a problem of opening through 3G networks and most of our countries phone are using this network.

## 1.3 Objectives of the Study

### 1.3.1 General Objectives

The aim of this work is to design Taxi Booking apps to order taxi online with support for mobile devices working on Android OS.

### 1.3.2 Specific Objectives

* To plan the design and development of our system
* To develop an application that is easy and convenient way in getting a taxi.
* To develop procedures for appropriate recording of passengers
* To develop interactive and user friendly interface
* To understand the problems in the current system.
* To plan the solution for the problems identified.
* To plan the way to ensure the integrity of data in our proposed system.
* To determine how data will be entered into our system.

## 1.4 Feasibility Study

### 1.4.1 Technical Feasibility

The assessment of this feasibility must be based on an outline design of the system requirement in the terms of input, output, programs and procedures. Having identified an outline system, the investigation must go on to suggest the type of equipment, required method developing the system, of running the system once it has been designed.

Technical issues raised during the investigation are:-

❖Does the existing technology sufficient for the suggested one?

❖Can the system expand if developed?

We will be using XML and android (java) for the Front-end, PHP and MySQL database for the back-end that are not that much new for us. So, the proposed system is technically feasible.

### 1.4.2 Behavioral Feasibility

The proposed system should be easy to operate, convenient in maintenance and effective in its. So, that our system is using simple and interactive user interface and problem occurs the admin can maintain it easily by using the given settings. Due to this reason our project is behaviorally feasible.

### 1.4.3 Operational feasibility

Operational Feasibility deals with the degree to which the proposed application solves business problems. This application will solve the problems in the following ways.

* By providing a new and reliable means to handling booking taxi.
* By providing current location and appropriate confirmation for booking.
* Better management of taxi.

### 1.4.4 Economic Feasibility

Economic Feasibility is about identifying the costs and benefits related with developing the project. That is why it is sometimes called Cost-Benefit Analysis. It encompasses resources like hardware cost, software cost and time. This project will use free and open-source libraries, frameworks and IDE’s to develop the system. The development and deployment of this project result in ultimate benefit to the drivers and customers from economic perspective. The current system used by the taxi booking in most of our country parts result in enormous expenditure on phone call, fuel, time and other costs due to improper mechanism in the existing system. Our system resolves this additional requirements and expenditures by using a computerized system. As a result, the proposed system will be economically feasible.

### 1.4.5 Schedule feasibility

Schedule feasibility determine how the proposed system accomplished with the given time table. It implies effective time management for the system, and the project should finished within deadline. So the team decides to implement and configure the new system on time without any delay.

Our project has four main phases:

**1. Proposal**: in this phase the project contains the fact of the existing system such as the background of the organization, the problem of the existing system, the objectives of the new system, methodology and others. And also contain the plan to accomplish the project within the given time.

**2. Analysis:** in this phase the requirement will be determined. It is concerned with becoming aware of the problem, identifying the relevant and most decisional variables, analyzing and synthesizing the various factors and determining an optimal or at least a satisfactory solution.

The system is going to be conducted including:

* Description of the existing system
* Problem of the existing system
* Functional and non-functional requirements
* Proposed system
* System design
* Implementation
* Testing

**3. Design:** the transformation of analysis model into design model. In this stage we will make the diagrammatic that show how the new system does in its implementation stage. In this stage different modelling technique used for instant use case diagram, sequence diagram etc.

**4. Implementation:** in this stage the new system run and test based on the layout specified in the design and requirements of analysis stage.

## Scope and Limitation of the Study

Under this we deal with scope that describes what our project can do and the limitations that we will be faced when doing this project.

### Scope of the Project

* **Smart Geo-location**

Once the service seeker accesses the app, it tracks the real-time location and shows the available taxis nearby. After tapping “Book-now,” available drivers (nearby) will be notified and the passenger's pickup location is confirmed (once the ride request has been accepted).

* **Booking Procedure**: passenger can book or order taxi by sending their pick up, drop of place, time and date. Therefore anyone who has an android device can book taxi easily.
* **Information exchange between drivers and customers**: The driver can send his details to the customer including taxi current status.
  + Live location (of driver) sent to the passengers’ app
  + Booking requests to drivers
  + Booking cancellation (Driver and passenger app)
  + Pick-up location (of passengers) to the driver app
  + Drop-off location (of passengers) to the driver app
* **Location Tracking**: The driver can track the current location of passengers easily when the passenger send request by specifying starting location, destination location and arrival time.
* **Administration (Web App):-**A web application for performing administration and dispatching operations. Web App controls and manages the whole process between taxi drivers and passengers. This is for administration staff.

### 1.5.2 Limitation of the Project

Just as any researcher is bounded and restricted to encounter some limitation, this project is also faced with the following limitations. This project is only limited to contract taxi service center and will not accommodate for higher officials and is also limited to transport within the town. Therefore, passengers travelling are not possible outside the town and drivers will not be accommodated.

* Works in android operating system only.
* It would not work without the internet connection because it needs high accuracy GPS system.

## 1.6 Significance of the project

The significance of the study is to create android based taxi booking system that will provide services to customers and easy to use. Some of the significances of the proposed system described as follows:

Taxi Booking Application is the ideal taxi booking application for individuals on the travel. This user-friendly application offers convenience by allowing users to pre-set their favorite locations and journeys for their taxi bookings. It even allows users to book a taxi at their current location. For ease of convenience, users can also access and book from a list of completed trips.

Instead of dialing to the service center, taxi booking application will help the users deliver their requests directly to the nearest taxi drivers through internet. It greatly saves the trouble calling to service center and waiting reply from it. It will serve to:-

* Reduce waiting time
* Customers can send pickup, drop off place and arrival time to the drivers
* Taxi drivers can decline or accept the request
* Avoid paper based or hand recording system.
* Prevent the users from stress and confusion.

## 1.7 Target beneficiaries of the project

Different parts are going to be benefited from the new system such as:

* **Drivers: -** drivers will be benefited from this system by tracking the pickup and destination place of the passenger and decrease tiredness that comes from searching the passengers on the road. Drivers who use this system will perform their work effectively and efficiently without time loss and loss of resource.
* **Customers:** -This will remove wastage of customers’ time that are stand for a long time on the street waiting for coming taxi, again they will gain fast access and save their time.
* **Transport office:** -By using this system transport officecan properly manage all taxi those are inside the service provider.
* **Government:** The development of this project includes sales report of drivers which is information source for the government and government can collect fair tax.

## 1.8 Methodology of the Project

Methodology is the way or mechanism in which we gather the information’s to develop the system. To develop appropriate android based taxi booking mobile application the current system must investigate thoroughly and enough information has to be gathered.

### 1.8.1 Data Collection Tools/Technique

Methods and methodology we are going to use in these project to collect essential information and requirements. We will use the following techniques to gather requirements and to describe the ABTBS application.

* Internet is our major source to gather information.
* Review related works
* By Observing the existing problem
* We observe the place where taxi exists and by observing the actual work of taxi transportation we will determine how taxi is going to be available for the customers.
* By discussing and analyzing the problems with project team
* To get the necessary information we will explore and analyze written materials that describe the operations conducted in taxi booking.

### 1.8.2 System Analysis and design

We decide to use object oriented system analysis and design methodology because of the following reason:

* **Object-oriented techniques** work well in situations where complicated systems are undergoing continuous maintenance, adaptation and design
* **Simplicity:** software objects model real world objects, so the complexity is reduced and the program structure is very clear.
* **Reusability**: the object oriented provides opportunities for reuse through the concepts of inheritance, polymorphism, encapsulation and modularity.
* **Increased Quality:** Increases in quality are largely a by-product of this program reuse.
* **Increased extensibility: -**when we need to add new feature to the system we only need to make changes in one part of the applicable class.
* **Maintainable:** OOP methods make code more maintainable. Objects can be maintained separately, making locating and fixing problems easier. The principles of good OOP design contribute to an application's maintainability.
* **Modifiability:** It is easy to make minor changes in the data representation or the procedures in an OO program.

### 1.8.3. System Development Model

We select software development life cycle models is iterative because of the following reason: -

* Iterative process starts with a simple implementation of small sets of the software requirements.
* Iteratively enhances the evolving version until the complete system is implemented and ready to deploy.
* It doesn’t attempt to start with a full specification of requirements instead development begins by specifying and implementing just part of the software which is then reviewed in order to identify further requirements
* Easier to test and debug during a smaller iteration.
* Easier to manage risk because risky pieces are identified and handled during its iteration

### 1.8.4. System Testing Methodology

* **Unit testing:** every developer and analyst would test each module. In our system we will test whether the return type of functions is correct, whether functions are called correctly, whether correct output is produced for different inputs and efficiency of the code in terms of CPU and memory usage.
* **System testing:** after the whole integration of all expected system modules, the whole system would be tested using sample. In this level of testing process, we will have examined how the whole subsystems came together to achieve the desired goal. The goals of system testing are to detect faults that can only be exposed by testing the entire integrated system or some major part of it.

#### Integration Testing:-is the activity of software testing in which individual software modules are combined and tested as a group. It occurs after unit testing and before acceptance testing. Thus, Integration testing is a logical extension of unit testing. In its simplest form, two units that have already been tested are combined into a component and the interface between them is tested.

### 1.8.5 Development tools and Technologies

1.8.5.1 Frontend Technologies: - It’s all about what a user able to see.

* XML
* Android(java) programming

1.8.5.1 Backend Technologies: of anything is not visible to general user or administrator. It can be a piece of code or a program running on the server machine to serve the user need.

* PHP
* Database

#### 1.8.5.3 Documentation and Modeling Tools

* Microsoft word 2016:-To write the documentation
* Microsoft PowerPoint 2016:-For presentation at the end of the project
* Edraw max:-to draw different UML diagrams such as use cases, sequence diagrams, activity diagrams, class diagrams…….and so on.
* Editor**:-**Sublime, android studio for writing programs or codes
* Browser**: -**Googlechrome used to run the program.

#### 1.8.5.4 Software Requirements

For the development of this project, the following software requirements will be considered.

* Operating System : Windows 10
* Language : Android SDK 3.1 or above, Java
* Database : MySQL version 5.1
* Tools : Eclipse Juno IDE or android studio
* Technologies : Java, MySQL, Android, XML,
* Network : Mobile network and Internet (cellular or Wi-Fi)

#### 1.8.5.6 Hardware Requirements

For the development of this project, the following hardware requirements will be considered.

* Processor : Pentium IV or higher
* RAM : 500 MB
* Space on disk : 250MB or higher
* Device : Android phone with version 2.3 or higher
* Space to execute : 3 MB

# CHAPTER TWO

# DESCRIPTION OF THE EXISTING SYSTEM

## INTRODUCTION OF EXISTING SYSTEM

Existing system is totally on book and thus a great amount of manual work has to be done. In existing system, there are various problems like customer/taxi finding, prices of services and fixing bill generation on each bill and also finding out details regarding any information is very difficult. Major problem was lack of security because customers don’t have any guarantee about the driver’s identity. With this existing low priority in terms of exchanging of data within short period of time. And usually there is no published fares and the customers will end up paying what the Driver demand for the service amount and also there is no standard system that will number the distance in the sense that customers are not assured of the distance preference.

## THE EXISTING SYSTEM

1. **RIDE** Application is made in Addis Ababa, withstanding strict Ethiopian directions to guarantee that their customers have the best quality apparatus in the market. RIDE is Transit Application. The application gives a stage to different stakeholders in a substantial endeavor to work together and share data for enhanced administration and administration ability. Through cutting edge APIs, the framework is fit for interfacing with outer frameworks like planning framework, resource control framework, and corporate money related/stock framework.

The key elements of RIDE platform is:-

* Location tracking see the area which the driver and the customer located.
* Assign driver to customers through nearest location of drivers for customers.
* Deal with different provider to give services for customers.
* Multi-gadget support from PC to cell phones, to tablets.
* Fare calculator for payment options
* Capacity to refresh vehicle data and transfer photographs of the vehicle for documentation reason and care
* Capacity to audit travelled course for now, yesterday, this week, and the whole month
* See the vehicle type, vehicle data and driver data of the vehicle.

1. **FERES MILES:** As one of the prestigious selection of GPS following framework supplier in Ethiopia. FERES offers Driver GPS tracker, vehicle GPS tracker, and costumer GPS tracker. It has an opportunity to make taxi booking sufficiently. It can handle and gives an appropriate ordering and servicing for appropriate costumer requests.

FERES has different functions to perform:

* Location tracking for services.
* Driver and customer registration for security issues.
* Capacity to refresh customer, driver and vehicle data/information for transfer to documentation in future use.
* Capacity to audit daily, monthly and yearly usages.
* Capacity for price calculation in the payment system through appropriate distance traveled [2].

## COMPARISON BETWEEN THE EXISTING SYSTEM

Table 2. 1 Comparison between the Existing Systems

|  |  |  |
| --- | --- | --- |
| Features | RIDE | FERES MILES |
| Payment option | No | No |
| GPS | Yes | Yes |
| Book a vehicle feature | Yes | Yes |
| Real time tracking | Yes | Yes |
| Help Option | No | Yes |
| Platform | Yes | Yes |
| Route history | No | Yes |

## PASSENGERS OF EXISTING SYSTEM

* **Passengers/customers:** Those are consumers who has to be serviced by an organization for their transportation system. These consumers can communicate with the organization through a passenger app module in their mobile phone.
* There is some functionalities of these consumers such as:-
* Register/log-in
* Booking requests to Admins
* Pick-up location (of passengers) to the driver app
* Drop-off location (of passengers) to the driver app
* Price calculator
* Tracking taxi
* Interactive map
* **Driver:** These are peoples who have a job in the organization to drive taxis to give services for consumers. And they have accessed the organization and the consumers through a driver app module on their android phone. The have some functionalities such as:-
  + Registration
  + Pick-up & drop-off navigation
* **Admin**: Those are the organizations administrator or manager who controls the whole functionalities inside the organization. And it manages and controls the drivers, cars, cost estimation, and so on inside the organization.
  + Driver management
  + Vehicle management
  + Payment management
  + Earnings report
  + Tracking trips
  + Cost estimation
  + Receipt
  + Notification when starting the travel
  + Manage service requests
  + Matching drivers & passengers

## MAJOR FUNCTIONS OF THE EXISTING SYSTEM

* **For the Transportation Service**

Upon service request and using GPS technology, customer and the third party service provider will have real time communication and established connection to detect location information to the service provider.

If the Service Provider accepts your request, the Application program notifies you and provides information regarding the Service Provider - including driver's name, vehicle type and vehicle plate number, and the ability to contact the Service Provider by telephone.

The Application also allows you to view the Service Provider's progress towards the pick-up point, in real time.

* **For Better Security**

This application gives a better security for passengers and drivers. It protects everyone’s privacy with respect to login systems. Although these applications are legally registered, so the passenger’s didn’t afraid of any danger or robbery.

## DRAWBACKS OF THE EXISTING SYSTEM

As the fast growing of technologies in the country there are a lot of new software’s and applications are developed rapidly.

In ride hailing system, the payment mechanism is in hand to hand payment (or the consumer/passenger pays the cost directly to the driver not to directly to the organization). So this payment method has so many negative impacts on the organization, government and consumers/passengers. This payment mode doesn’t reduced man power specifications.

On the new updated software, order history doesn't show the date on the order detail. As you all know the app didn't support corporate option, you guys also blocked and increased the

Tariff of telephone line we are using for corporate booking service. It doesn’t support daily corporate Passengers. It doesn’t support all android devices which doesn’t access play store like Huawei android phones. Most of the time this application has a problem of opening through 3G networks and most of our countries phone are using this network.

## BUSINESS RULES OF THE EXISTING SYSTEM

Business rule is effectively an operating principle or policies that we try to specify for both the existing system and the new system must satisfy. The business rule is principle or a policy in which the proposed system operates accordingly. There are some business rules and constraint to prevent any violation during the process. This focuses on access control issue.

BR01: Passengers should have Passenger name and password.

BR02**:** Passengers should fill appropriate personal information (Name, address, starting location, destination location, starting time, arrival time).

BR03: Drivers should have a valid driving license.

BR04: Drivers fill appropriate personal information (Name, Address, locations, starting time and arrival time).

BR05: Cost estimation is calculated through the distance traveled by the passengers and located on the passenger’s app and administrators.

BR06: Location tracking is done by all the Passengers in the system.

BR07: Passenger and driver can cancel booking by giving their booking No for cancelation confirmation.