



**& SUDAN UNIVERSITY OF SCIENCE
TECHNOLOGY
& FACULTY OF COMPUTER SCIENCE
INFORMATION TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND
INFORMATION SYSTEMS**

***Android transportation application
using GPS***

October 2016

THESIS SUBMITTED AS A PARTIAL REQUIREMENTS OF
B.Sc. (HONOR) DEGREE IN COMPUTER SCIENCE AND
INFORMATION SYSTEMS

بسم الله الرحمن الرحيم

& SUDAN UNIVERSITY OF SCIENCE

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2016

October

الآية

قَالَ عِفْرِيتٌ مِّنَ الْجِنَّ أَنَا آتِيَكَ بِهِ قَبْلَ أَنْ تَقُومَ مِنْ مَّقَامِكَ وَإِنِّي عَلَيْهِ لَقَوِيٌّ أَمِينٌ (39) قَالَ الَّذِي عِنْدَهُ
عِلْمٌ مِّنَ الْكِتَابِ أَنَا آتِيَكَ بِهِ قَبْلَ أَنْ يَرْتَدَّ إِلَيْكَ طَرْفُكَ فَلَمَّا رَآهُ مُسْتَقَرًّا عِنْدَهُ قَالَ هَذَا مِنْ فَضْلِ
رَبِّي لِيُبْلُوَنِي أَأَشْكُرُ أَمْ أَكْفُرُ وَمَنْ شَكَرَ فَإِنَّمَا يَشْكُرُ لِنَفْسِهِ وَمَنْ كَفَرَ فَإِنَّ رَبِّي غَنِيٌّ كَرِيمٌ (40)

صدق الله العظيم

سورة النمل الآيات (39-40)

DEDICATION

Mohammed Ali Abdullah

I dedicate this project to my father Ali Abdullah who has been a great source of encouragement and support, to the man who suffered to bring me up, and raised me to the man I am today. I dedicate this project to the great woman who was there for me, in sickness and health and looked up after me in all stages of my life, my great mother that I love Insaf Ibrahim.

I want to thank my two colleagues, for the great team work, and the support provided by Mohaned Mohammed and his family, who have set up a place for us to stay.

I want to thank my amazing supervisor T. Sara Ali who has helped us a lot through our work, giving us ideas and opinions which has made a big impact to our project, and for always being there for us when we needed her.

Mohaned Mohamed Hussain

This project is dedicated to Allah, my source of inspiration, wisdom, knowledge and understanding.

It's also dedicated to my ideal my father Mohamed Hussain, who taught me that the best type of knowledge to have is that which is learned for its own sake.

I want to thank my love and my whole life my mother Nahid Abdullah, who taught me that even the largest task can be accomplished if it is done one step at a time.

Acknowledgement

At the beginning and the end all thanks belong to Allah. We thank the almighty for giving us the willpower and patience to complete this work, without his grace nothing is achievable.

A lot appreciation and gratitude to the ones who have put their trust on us to complete this research:

Our supervisor:

Sara Mohammed Ali.

Abstract

The purpose of this project is to develop an Android application to digitize a portion of the transportations system in Sudan. Enabling customers and drivers to find each other automatically for faster and easier transportations.

The application is developed on java, supporting Android operating system devices with Android 4.0 or above. It consists of two parts, customer and driver. The interface is designed using modern techniques for ease of use and clarity.

It is built using Google Maps API, accompanied by other Google provided APIs. It provides essential functions ensuring seamless and error free interactions, supporting driver account sign up, searching for places, driver tracking, navigation using google maps navigation, and a feedback system.

Data is stored in a MySQLi Database provided by a back end as a service to ensure reliable, and fast reaction times. PHP language is used to send JSON format data between different clients.

The application was tested in real life situations, achieving the goal of routing customers' requests to drivers, and providing further tools to fulfill the requests.

المستخلص

الهدف من هذا المشروع هو برمجة برنامج أندرويد يقوم بتحويل جزء من نظام المواصلات في السودان إلى نظام رقمي، و يسمح للزبائن و السائقين إيجاد بعضهم البعض أوتوماتيكيا لتوفير مواصلات أسهل و أسرع.

البرنامج تم تطويره باستعمال لغة الجافا أجهزة الآندرويد الإصدار 4.0 فما فوق. ينقسم البرنامج إلى قسمين، سائق و زبون. تم تصميم الواجهات باستعمال التقنيات الحديثة لتوفير سهولة الإستخدام و الوضوح.

تم تصميمه بناء على خرائط جوجل API متضمنا APIs أخرى موفرة من قبل جوجل. يوفر البرنامج وظائف عديدة للزبائن و السائقين لضمان تعامل سلس و خال من الأخطاء، داعما تسجيل دخول حساب السائق، البحث عن الأماكن الهامة، متابعة السائق، الملاحه عبر استخدام خرائط جوجل للملاحه، و نظام شكاوي و تقارير.

يتم حفظ البيانات في قاعدة بيانات MySQLi موفرة من قبل خدمة عبر الإنترنت لتوفير ردود عالية السرعة، مع استخدام لغة PHP لإرسال البيانات بصيغة JSON بين المستخدمين.

تم اختبار البرنامج في الواقع، و قد استطاع البرنامج تنظيم الطلبات بين السائقين و الزبائن بنجاح، و توفير خدمات إضافية لهم لتلبية هذه الطلبات.

List of terms:

Terms	Description
GPS	Global Position System
CS	Computer Science
API	Application Program Interface
iOS	iPhone Operating System
OS	Operating System
JDT	Java Development Tool
PHP	Hypertext Preprocessor
SDK	Software Development Kit.
IDE	Integrated Development Environment
UML	Unified Modeling Language
OOP	Object Oriented Programming
IMEI	International Mobile Equipment Identity

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CHAPTER ONE

1 INTRODUCTION

1. INTRODUCTION

1.1 INTRODUCTION

Sudan is an underdeveloped country with a population that exceeds 38 million citizens according to World Bank. The major cities such as Khartoum and Madani are large, but most citizens do not own private vehicles.

This is why citizens rely on transportation buses and services to travel from one place to another. This huge demand on transportation services thrived the private business, leading to the implementation of many types of transportation vehicles for different purposes and sizes. These vehicles cover most of the country's roads from dawn to midnight, and can be booked for private purposes.

1.2 PROBLEM DEFINITION

Light transportations drivers usually drive around a certain area in constant search for consumers, wasting fuel and losing money. Consumers find it inconvenient having to wait on the street for transportations, and stopping multiple ones if they can't agree on a price, especially for women.

These problems intensify at night, where demand is lower and prices are higher, thus making it harder to find suitable transportations.

1.3 SOLUTION

Produce an Android application that allows the consumer to determine their destination, which is then routed as a request to the nearest driver to the consumer along with his location, and automatically calculated fare.

The driver has the choice to decline or accept the request. In the case of acceptance, the driver can call the consumer, or navigate to his location, and onto their destination.

1.4 PROJECT OBJECTIVES

- Provide additional income for drivers by saving time and fuel wasted in the process of searching for a consumer.
- Provide a comfortable alternative to find transportations for people with special need.

1.5 SCOPE

Our application includes private cars, Amjads, and Tuktuks as categories for customers to choose from

1.6PROJECT STRUCTURE

This project is divided into five chapters organized as the following:

- First chapter included the introduction.
- Second chapter discussed the technologies and techniques used in this project, as well as previous studied relevant to this project.
- Third chapter discussed special concepts, application architecture and analyzes the system using UML diagrams.
- Fourth chapter demonstrated the Android application user interface, Database schema and implementation.
- Fifth chapter contained recommendations for further development in the future

CHAPTER TWO

2 GENERAL CONCEPTS AND LITERATURE REVIE

2. GENERAL CONCEPTS AND LITERATURE REVIEW

2.1 INTRODUCTION

This chapter discusses the main methods, applications, and programming languages we used in our project.

2.2 GLOBAL POSITION SYSTEM (GPS)

The Global Positioning System (GPS) [1] is a space-based [navigation](#) system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The United States government created the system, maintains it, and makes it freely accessible to anyone with a [GPS receiver](#).

The US began the GPS project in 1973 to overcome the limitations of previous navigation systems, integrating ideas from several predecessors, including a number of classified engineering design studies from the 1960s. The [U.S. Department of Defense](#) (DOD) developed the system, which originally used 24 satellites.

2.3 GOOGLE MAPS

Google Maps [2] is a Web-based service that provides detailed information about geographical regions and sites around the world. In addition to conventional road maps, [Google](#) Maps offers aerial and satellite views of many places. In some cities, Google Maps offers street views comprising photographs taken from vehicles.

Google Maps offers several services as part of the larger Web application, as follows:

- A route planner offers directions for drivers, bikers, walkers, and users of public transportation who want to take a trip from one specific location to another.
- The Google Maps application program interface ([API](#)) makes it possible for [Web site](#) administrators to embed Google Maps into a proprietary site such as a real estate guide or community service page.
- Google Maps for Mobile offers a location service for motorists that utilizes the Global Positioning System ([GPS](#)) location of the mobile device (if available) along with data from [wireless](#) and [cellular](#) networks.
- Google Street View enables users to view and navigate through horizontal and vertical panoramic street level images of various cities around the world.
- Supplemental services offer images of the moon, Mars, and the heavens for hobby astronomers.

2.4 ANDROID OPERATING SYSTEM

Android [3] is a [mobile operating system](#) (OS) currently developed by [Google](#), based on the [Linux kernel](#) and designed primarily for [touchscreen](#) mobile devices such as [smartphones](#) and [tablets](#).

Android's [user interface](#) is mainly based on [direct manipulation](#), using touch gestures that loosely correspond to real-world actions, such as swiping, tapping and pinching, to manipulate on-screen objects, along with a [virtual keyboard](#) for text input.

The operating system's current [design language](#) is Google's [Material Design](#). Android's primary [app store](#) is [Google Play](#), with over one million Android applications ("apps") published and 50 billion downloads as of July 2013, according to Phonearena.com.

In addition to touchscreen devices, Google has further developed Android [for television](#), [cars](#), and [wristwatches](#), each with a specialized yet similar interface. Variants and [forked](#) versions of Android are also used on [notebooks](#), [game consoles](#), [digital cameras](#), and other electronics.

2.5 ANDROID STUDIO

Android Studio [4] is the official [integrated development environment](#) (IDE) for [Android](#) platform development. It was announced on May 16, 2013 at the [Google I/O](#) conference. Android Studio is freely available under the [Apache License 2.0](#).

Based on [JetBrains' IntelliJ IDEA](#) software, Android Studio is designed specifically for Android development. It is available for download on [Windows](#), [Mac OS X](#) and [Linux](#), and replaced [Eclipse Android Development Tools](#) (ADT) as Google's primary IDE for native Android application development.

New features are expected to be rolled out with each release of Android Studio. The following features are provided in the current stable version:

- [Gradle](#)-based build support.
- Android-specific [refactoring](#) and quick fixes.
- [Lint](#) tools to catch performance, usability, version compatibility and other problems.
- [ProGuard](#) integration and app-signing capabilities.
- Template-based wizards to create common Android designs and components.
- A rich [layout editor](#) that allows users to drag-and-drop UI components, option to [preview layouts](#) on multiple screen configurations.

- Support for building [Android Wear](#) apps
- Built-in support for Google Cloud Platform, enabling integration with Google Cloud Messaging and App Engine.

2.6 UNIFIED MODELING LANGUAGE (UML)

The Unified Modeling Language (UML) [5] is a general-purpose, developmental, [modeling language](#) in the field of [software engineering](#) that is intended to provide a standard way to visualize the design of a system.

UML was originally motivated by the desire to standardize the disparate notational systems and approaches to software design developed by [Grady Booch](#), [Ivar Jacobson](#) and [James Rumbaugh](#) at [Rational Software](#) in 1994–95, with further development led by them through 1996.

In 1997 UML was adopted as a standard by the [Object Management Group](#) (OMG), and has been managed by this organization ever since. In 2005 UML was also published by the [International Organization for Standardization](#) (ISO) as an approved ISO standard. Since then it has been periodically revised to cover the latest revision of UML.

Though well-known and widely used in education and academic papers, UML is seldom used in 2013, and most usage is informal.

2.6.1 USE CASE DIAGRAM

A use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved.

A use case diagram can identify the different types of users of a system and the different use cases and will often be accompanied by other types of diagrams as well.

2.6.2 SEQUENCE DIAGRAM

A Sequence diagram is an [interaction diagram](#) that shows how objects operate with one another and in what order. A sequence diagram shows object interactions arranged in time sequence. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario.

A sequence diagram shows, as parallel vertical lines (lifelines), different processes or objects that live simultaneously, and, as horizontal arrows, the messages exchanged between them, in the order in which they occur.

2.6.3 ACTIVITY DIAGRAM

Activity diagrams are graphical representations of [workflows](#) of stepwise activities and actions with support for choice, iteration and concurrency. In the [Unified Modeling Language](#), activity diagrams are intended to model both computational and organizational processes (i.e. workflows). Activity diagrams show the overall flow of control.

Activity diagrams are constructed from a limited number of shapes, connected with arrows.

2.6.4 DEPLOYMENT DIAGRAM

A deployment diagram in the [Unified Modeling Language](#) models the physical deployment of [artifacts](#) on [nodes](#). To describe a website, for example, a deployment diagram would show what hardware components ("nodes") exist (e.g., a web server, an application server, and a database server), what software components ("artifacts") run on each node (e.g., web application, database), and how the different pieces are connected (e.g. JDBC, REST, RMI).

The nodes appear as boxes, and the artifacts allocated to each node appear as rectangles within the boxes. Nodes may have sub nodes, which appear as nested boxes. A single node in a deployment diagram may conceptually represent multiple physical nodes, such as a cluster of database servers.

2.6.5 VISUAL PARADIGM

Visual Paradigm is a software tool designed for software development teams to model business information system and manage development processes. Visual Paradigm supports key industry modeling languages and standards such as [Unified Modeling Language \(UML\)](#), [SysML](#), [SoaML](#), [BPMN](#), XMI, etc.

In addition to modeling support, it provides report generation and code engineering capabilities including [code generation](#). It can [reverse engineer](#) diagrams from code, and provide [round-trip engineering](#) for various [programming languages](#).

2.7 MOBILE BACKEND AS A SERVICE

Known as "backend as a service" (BaaS) [6], is a model for providing web and mobile app developers with a way to link their applications to backend cloud storage and APIs exposed by back end applications while also providing features such as user management, push notifications, and integration with social networking services.

These services are provided via the use of custom software development kits (SDKs) and application programming interfaces (APIs). BaaS is a relatively recent development in cloud computing, with most BaaS startups dating from 2011 or later.

Although a fairly nascent industry, trends indicate that these services are gaining mainstream traction with enterprise consumers.

2.8 HOSTINGER

Hostinger [7] is a cloud services provider that enables many client side services which include but not limited to MySQL databases, file managers, analysis, domains, and Emails.

It allows developers to build applications without having to deal with the client side of code, just focusing on creating the best applications

2.9 GITHUB

GitHub [8] is a web-based [Git](#) repository [hosting service](#). It offers all of the [distributed revision control](#) and [source code management](#) (SCM) functionality of [Git](#) as well as adding its own features.

Unlike Git, which is strictly a [command-line](#) tool, GitHub provides a [Web-based graphical interface](#) and desktop as well as mobile integration. It also provides [access control](#) and several collaboration features such as [bug tracking](#), [feature requests](#), [task management](#), and [wikis](#) for every project.

Projects on GitHub can be accessed and manipulated using the standard Git command-line interface and all of the standard Git commands work with it. GitHub also allows registered and non-registered users to browse public repositories on the site.

A user must create an account in order to contribute content to the site, but public repositories can be browsed and downloaded by anyone. With a registered user account, users are able to discuss, manage, create repositories, submit contributions to others' repositories, and [review changes to code](#).

2.10 LITERATURE REVIEWS

2.10.1 UBER

Uber [9] is the leading Ride sharing service in the world, founded on 2009. Their application allows consumers with smartphones to submit a trip request which is then routed to Uber drivers who use their own cars.

The application determines the consumer's location, and sends it to the Uber driver along with his basic info. The Uber driver then has the choice to accept or decline. In the case of acceptance, the Uber driver is directly navigated to the consumer's location, and onto their destination.

Uber manages its Uber drivers and consumers by a rating system. It allows both parties to rate each other, Uber drivers or consumers with constant low ratings and complaints will have their services discontinued.

Uber expanded internationally, it is now available in 58 countries worldwide. The legality of Uber has been challenged by governments and taxi companies, who allege that its use of drivers who are not licensed to drive taxicabs is unsafe and illegal. Uber's constant legal withstanding might be the reason why such services are gaining growing popularity around the world.

2.10.2 LYFT

Lyft [10] is one of Uber's competitors in the US. Aside from what Uber provides, Lyft tenets supports establishing trust among its

users. Therefore, their drivers undergo an interview, and more screening processes than Uber.

While Uber is focused, though not limited, to luxurious professional rides, Lyft has received acclaim for creating a community that makes transportation a more welcoming, uplifting and fun experience.

2.10.3 TAXI FINDER ANDROID APPLICATION

Taxi finder is application made by students of Information Systems in Sudan University of Science and Technology since July 2013. The main application objectives are to help consumers to find a taxi with ease, and help taxi drivers reduce time and fuel in the process of searching for consumers.

The application supports Android devices. It uses the GPS of the device to identify the location of the consumer and driver on Google Maps. The IMEI is used to identify the consumer.

2.11 SUMMARY

This chapter demonstrated the technologies, tools, and techniques used, as well as the previous projects relevant to the project.

CHAPTER THREE

3 METHODOLOGY

3. **METHODOLOGY**

3.1INTRODUCTION

This chapter discusses the problems the research resolved, tools, and methodology used in the project. Also discusses the application architecture and application analysis using UML.

3.1.1 Sudan vehicles types

Most citizens in Sudan do not own private vehicles, so they rely on public transportations such as:

- Buses

Buses are the main public transportation in Sudan. They travel in fixed routes to all parts of Khartoum, Omdurman, and Bahri, and they can be booked for private purposes. This type of transportation is not supported by our application.

- Taxis

Taxies are private vehicles. They are not as popular as other services in Sudan. They are supported under the “Car” category in our application.

- Amjad

Amjads are mini-buses, operating in the private sector. They are popular in Sudan, and can be found roaming until midnight. They are supported under the “Amjad” category in our application.

- Raksha (Tuktuk)

Rakshas are the most popular way of transportation in Sudan due to its reasonably low fare. It is supported under the “Tuktuk” category in our application.

Our application also enables private cars owners to be a part of the transportation industry. By allowing them to transport consumers as a side job.

3.2TOOLS

We used a lot of tools to achieve our goal we will discuss some of them in this section.

- Android Studio

We used Android Studio because:

1. Gradle Integration

Android Studio uses the quick growing Gradle build system that is integrated within it.

2. Organization of Project

Android Studio uses modules to manage and organize your code modules have their own Gradle build files which mean it can state their own dependencies.

3. System stability

Android Studio is now released with very less bugs, and provides a more stable performance.

4. Drag-and-Drop

Android Studio provides a GUI (Graphical User Interface) that supports drag and drop for layout design. However, the drag-and-drop feature is not essential for coders.

- Hosting site (hostinger.ae).

Hostinger is a hosting site that provides free, stable and legal server for developers to host their backend infrastructure.

3.3 METHODOLOGY

Designing the user interfaces and database schema is the first step in the methodology, followed by creating the interfaces and database, and connecting them. Choosing a suitable maps API and setting it up.

Coding the functions necessary to locate nearest driver, calculate fare, request system, tracking system, navigation system, and the driver's choice.

Finally, connect all the different functions to the database, and test to ensure optimization and speed.

3.4 APPLICATION ARCHITECTURE

This section describe the main structure of the application. This structure contains three components (Server, and two clients).

3.4.1 SERVER REQUIREMENTS

- Large memory to store drivers' details, and customers' requests.

- High bandwidth to route requests between drivers and customers.

3.4.2 CLIENT COMPONENTS

The application supports all android devices with Ice Cream Sandwich (4.0) or above installed. It supports two types of clients:

1. Customer.
2. Driver.
3. Admin.

3.4.2.1 Customer component

Defines the customer's side of the application. It handles sending requests and tracking.

3.4.2.2 Driver component

Defines the driver side of the application. It handles receiving requests and navigations.

3.4.2.3 Admin component

Defines the admin side of the application. It handles displaying statistics and feedback.

3.5APPLICATION ANALYSIS

Created through UML. It contains a brief explanation for each diagram and describe how the system task flows and the activities of each actor.

3.5.1 Use case diagram

We will discuss the actors in the system (Driver, customer and admin) and the operations for every actor (See Figure 3-1).

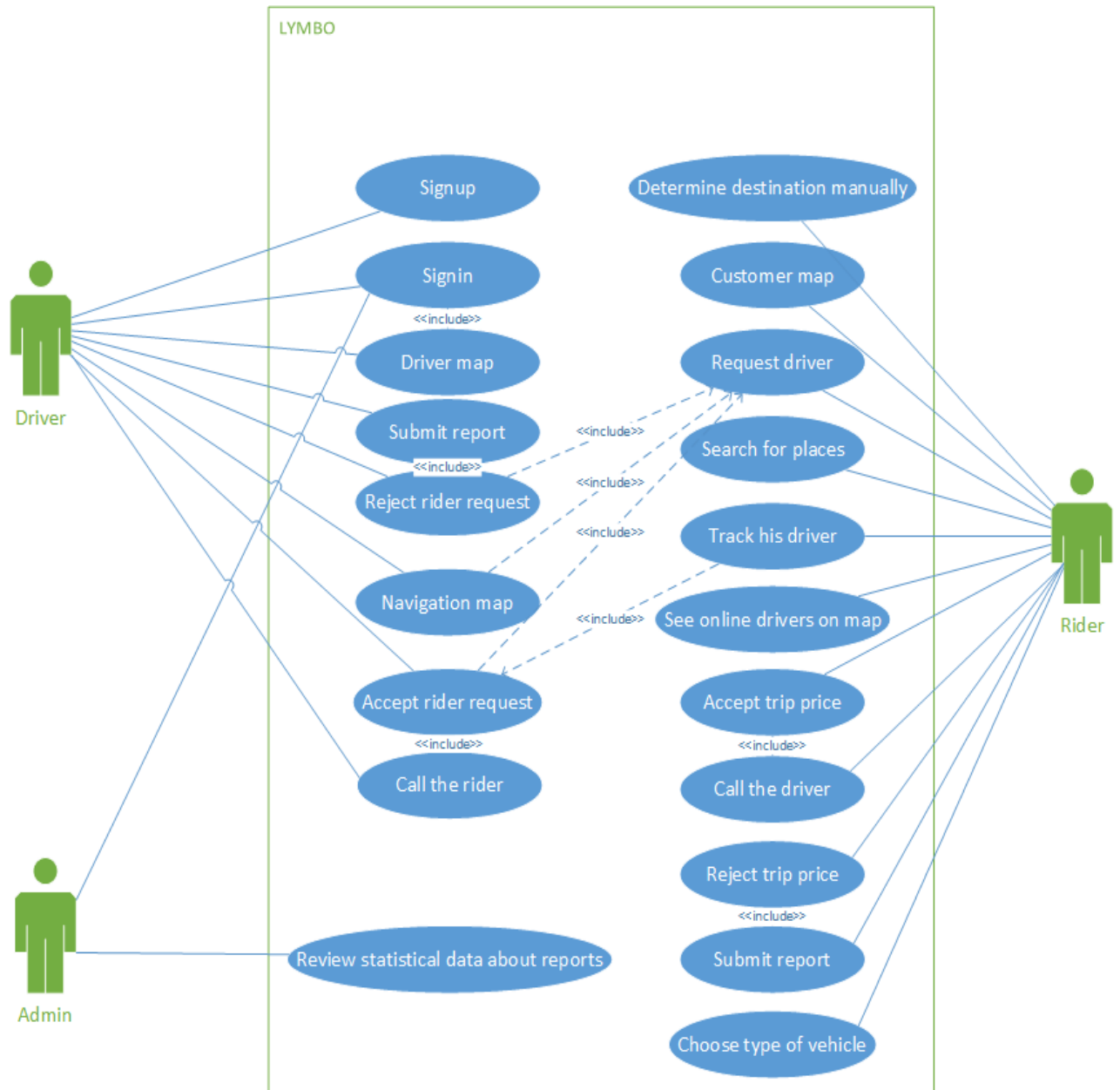


Figure 3 Clients operations

3.5.2 Activity diagram

We will discuss the relations between the actors of the system and the DB (See Figure 3-2).

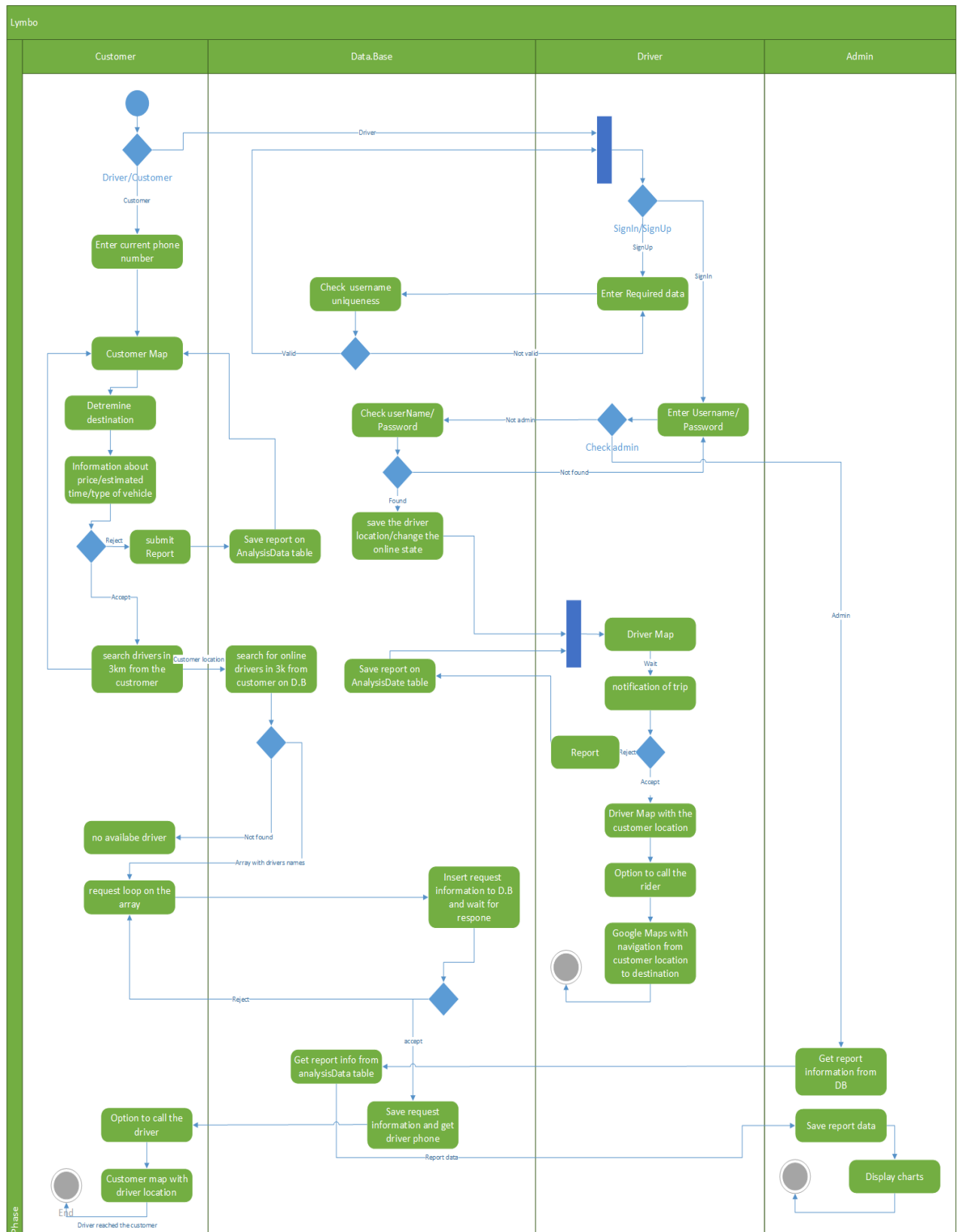


Figure 3 Activity diagram of the application

3.5.3 DEPLOYMENT DIAGRAM

We will discuss the relation between the classes in the system and the hardware requirements.



Figure 3 Deployment diagram

3.6SUMMARY

This chapter illustrates special concepts about the project, the main structure and analysis of the application using UML diagrams.

CHAPTER FOUR

4 APPLICATION IMPLEMENTATION AND DESIGN

4. APPLICATION IMPLEMENTATION AND DESIGN

4.1 INTRODUCTION

This chapter displays the graphical interfaces of the application including a brief description of its components, functions and DB schema.

4.2 DATABASE SCHEMA

This section will describe the DB tables, default values, and keys.

4.2.1 Table structure for table analysisData

Table 5 Table structure for table analysisData

Column	Type	Null default
ID	Int(11)	No
priceR	Int(11)	No
farR	Int(11)	No
personalR	Int(11)	No
driverR	Int(11)	No
sumR	Int(11)	No
priceD	Int(11)	No
farD	Int(11)	No
personalD	Int(11)	No

carErrorD	Int(11)	No
sumD	Int(11)	No

4.2.2 Table structure for table RequestTable

Table 5 Table structure for table RequestTable

Column	Type	Null
ID	Int(11)	No
rejectStatus	Int(11)	No
Dname	Text	No
Type	Text	No
Price	Int	No
Latitude	Double	Yes
Longitude	Double	Yes
destLatitude	Double	No
destLongitude	Double	No
custLatitude	Double	No
custLongitude	Double	No
custPhone	Double	no

4.2.3 Table structure for table signup

Table 5 Table structure for table signup

Column	Type	Null
ID	Int(11)	No
firstName	Text	No
lastName	Text	No
Dname	Text	No
Dpassword	Text	No
Phone	Double	No
Type	Text	No
Latitude	Double	Yes
Longitude	Double	Yes
OnlineState	Int(11)	No

4.3APPLICATION ACTIVITIES

4.3.1 CHOICES ACTIVITY

The user is given the choice to choose between logging in as a driver or a customer, by clicking one of the two icons (See Figure 5-1). Run time permissions are requested in this activity.

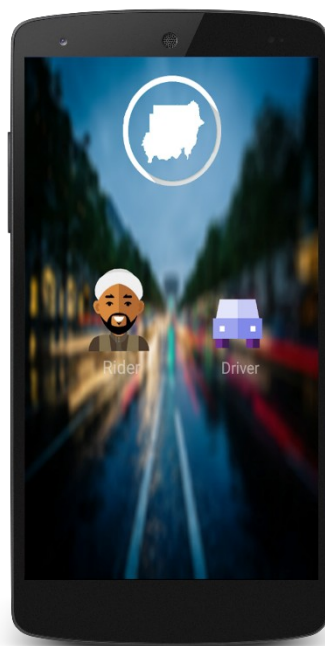


Figure 5 Choices activity

4.3.2 CUSTOMER ACTIVITIES

4.3.2.1 CUSTOMER GPS CHECK

When the user's GPS is disabled, the application generates a dialog as (See Figure 5-2), navigating the user to settings to enable the GPS. Else, he can't use the application.

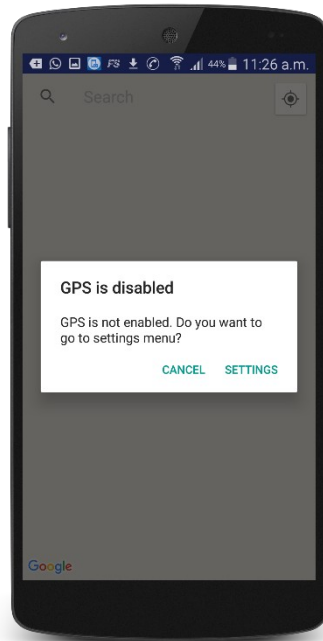


Figure 5 Customer GPS check

4.3.2.2 CUSTOMER MAP

After the user logs in as a customer and has his GPS enabled, he is then directed to the main map (See Figure 5-3). The application locates him and displays his location on the map. He can set a destination either by clicking on the map, or by searching using the search bar on the top of the screen.

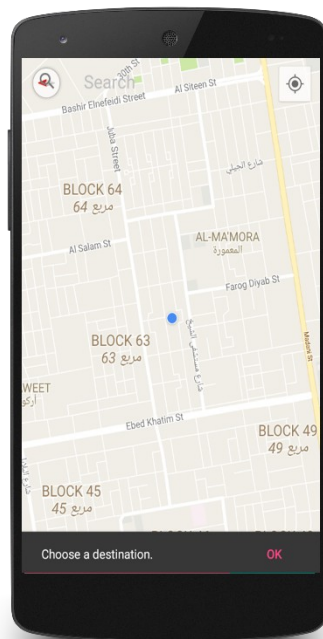


Figure 5 Customer map

4.3.2.3 CUSTOMER DETERMINE DESTINATION

A marker appears on the place the customer clicked on in the map (See Figure 5-4), the application stores the destination to send it later to the database. When the customer confirms his destination, the application downloads and displays the route.

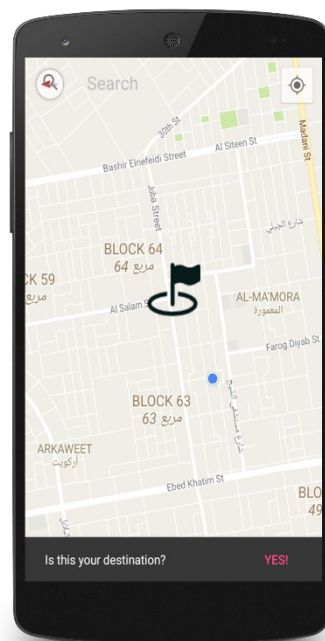


Figure 5 Customer determine destination

4.3.2.4 CUSTOMER SEARCH FUNCTION

A Google provided search function. It allows the user to search for his destination, and shows him suggestions as he types (See Figure 5-5).

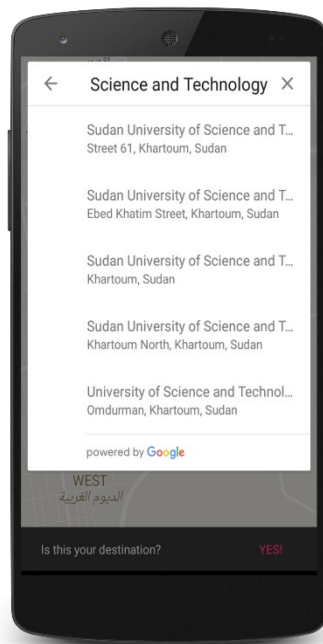


Figure 5 customer search function

4.3.2.5 CUSTOMER CHOOSES DESTINATION THROUGH SEARCH

When the customer chooses his destination through searching, it will be set as his destination (See Figure 5-6).

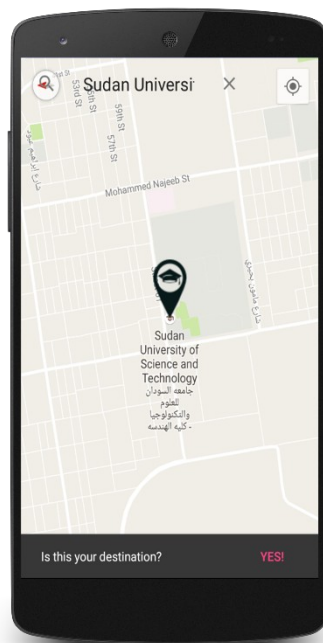


Figure 5 Customer chooses destination through search

4.3.2.6 DOWNLOADING ROUTE ACTIVITY

After setting the destination a progress dialog informs the customer to wait till the route is downloaded (See Figure 5-7).

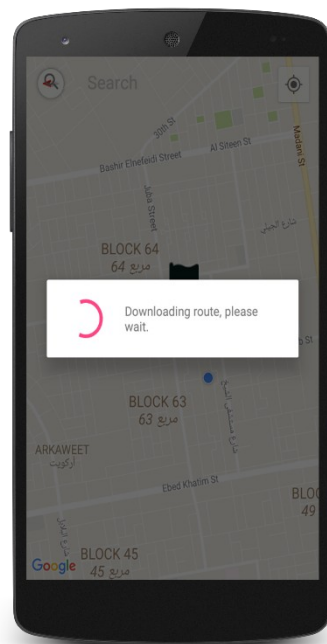


Figure 5 Downloading route activity

4.3.2.7 CUSTOMER REQUEST SHEET

After the route finishes downloading a sheet appears (See Figure 5-7). From this sheet the customer chooses the type of transportation. His options are tuktuk, car or amjad. He is informed of the price, estimated distance and duration of the trip.

When the customer chooses the type of vehicle the application calculates the fare which changes according to the type of vehicle, time of the day and distance. The customer can accept or cancel.

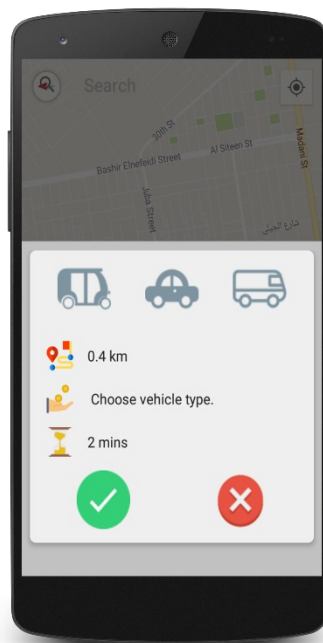


Figure 5 Customer request sheet

4.3.2.8 CUSTOMER FEEDBACK SHEET

If the customer rejects the trip, he can report the reason of his rejection (See Figure 5-9), which is stored in the database.

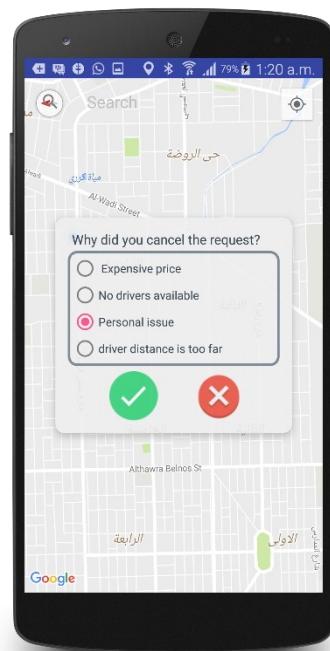


Figure 5 Customer feedback sheet

4.3.2.9 INSERT CUSTOMER NUMBER

The customer is required to enter his phone number to be used by the driver in need of contact (See Figure 5-10).

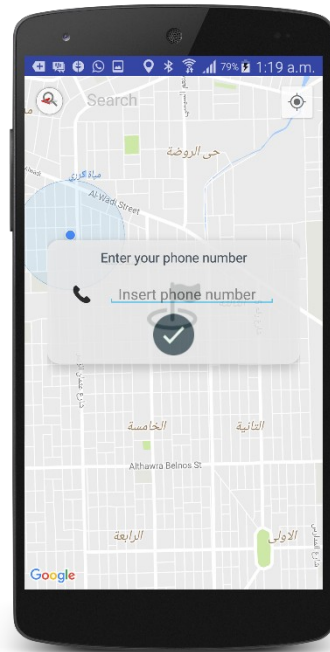


Figure 5 Insert customer number

4.3.2.10 SEARCHING FOR DRIVERS ACTIVITY

If the customer accepts, the customer location is sent to the database along with the request details. The closest driver is notified. If the driver declines the request the application notifies the next closest driver and so on. Customer gets notified if a driver accepts (See Figure 5-11).

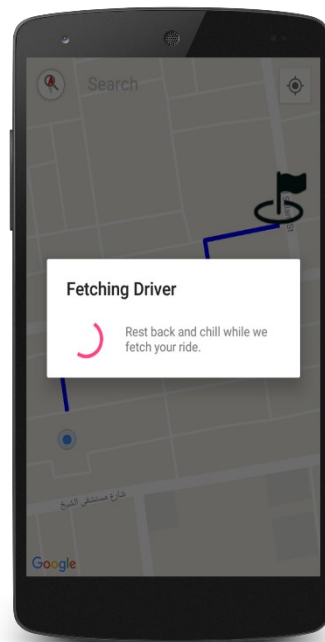


Figure 5 Searching for drivers activity

4.3.2.11 DRIVER ACCEPT

A progress dialog is shown while the application downloads driver details (See Figure 5-12).

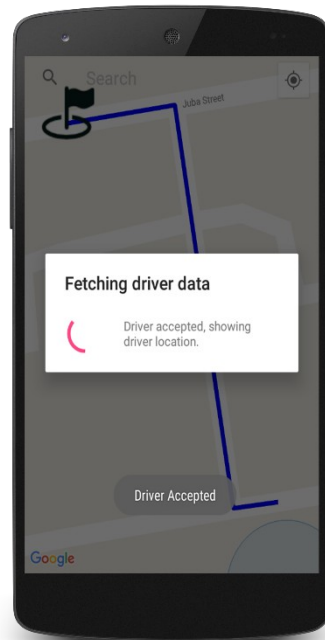


Figure 5 Driver accept

4.3.2.12 CALL DRIVER OR CANCEL REQUEST

When the driver accepts the request the customer will have the choice to call the driver, or cancel the request (See Figure 5-13).

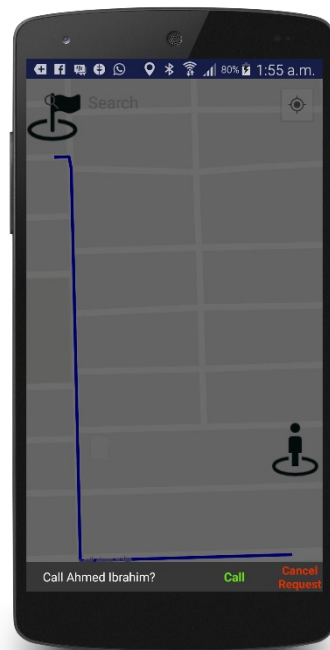


Figure 5 Call driver or cancel request

4.3.2.13 TRACKING DRIVER

The customer tracks the driver until he arrives. The driver is displayed as a human icon, while the flag icon displays the destination (See Figure 5-14).

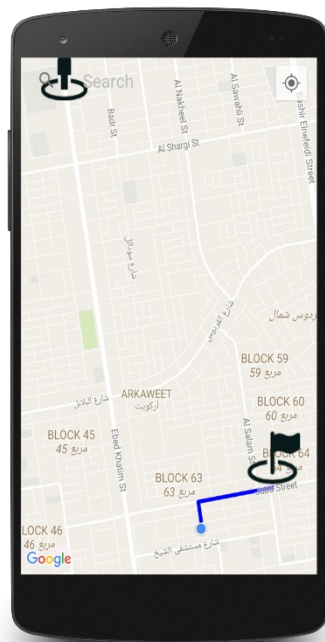


Figure 5 Tracking driver

4.3.2.14 NO DRIVERS ACCEPT THE REQUEST ACTIVITY

The customer is notified if the application is unable to find any drivers that fit the search criteria (See Figure 5-15).

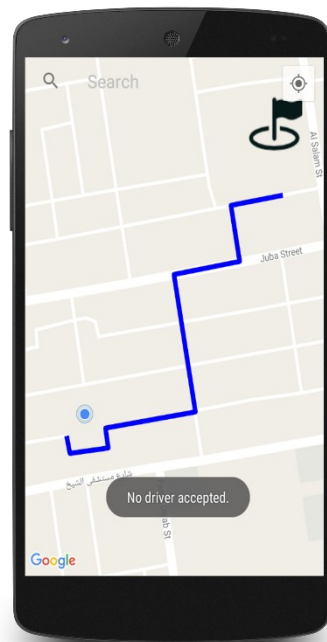


Figure 5 No drivers accept the request activity

4.3.3 DRIVER ACTIVITIES

4.3.3.1 SIGN IN ACTIVITY

Driver sign in activity (See Figure 5-16), with a button that redirects driver to sign up if he doesn't have an account.

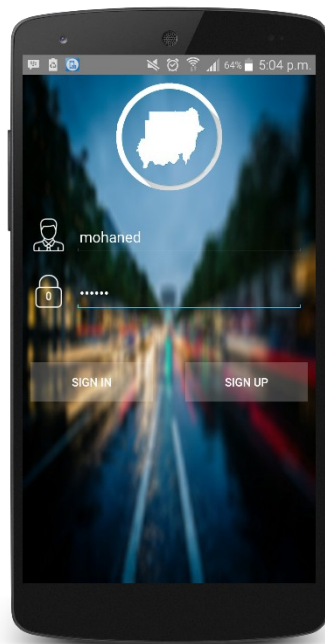


Figure 5 Sign in activity

4.3.3.2 DRIVER SIGN UP ACTIVITIES

Both activities (See Figure 5-17 and Figure 5-17) display the fields necessary for sign up (Username, password, first name, last name, type of vehicle, and phone number).



Figure 5 Driver sign up activity 1

Figure 5 Driver sign up activity 2

4.3.3.3 DRIVER MAP

Driver map activity (See Figure 5-19), with an options menu for driver specific options such as map type, account options, and online status.

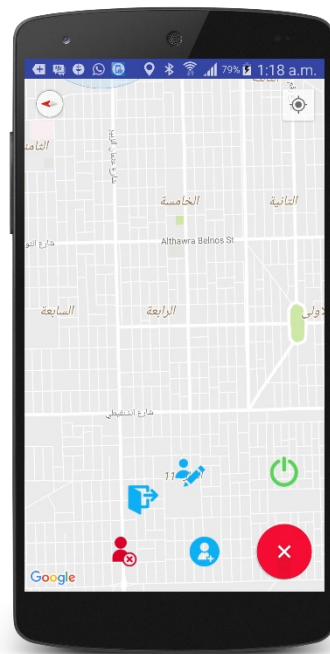


Figure 5 Driver map

4.3.3.4 DRIVER SIGN OUT

When the driver chooses to sign out in options, the dialog appears to confirm (See Figure 5-20).

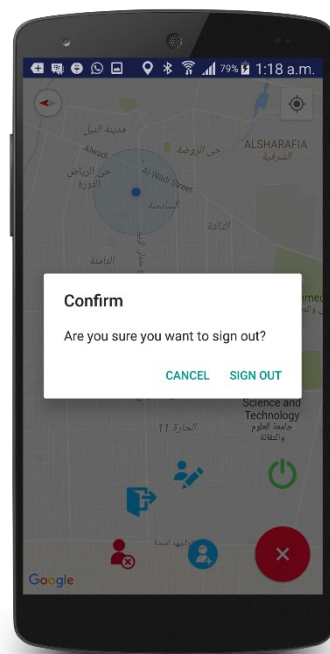


Figure 5 Driver sign out

4.3.3.5 DRIVER DELETE ACCOUNT

When the driver chooses to delete his account in options, the dialog appears to confirm (See Figure 5-21).

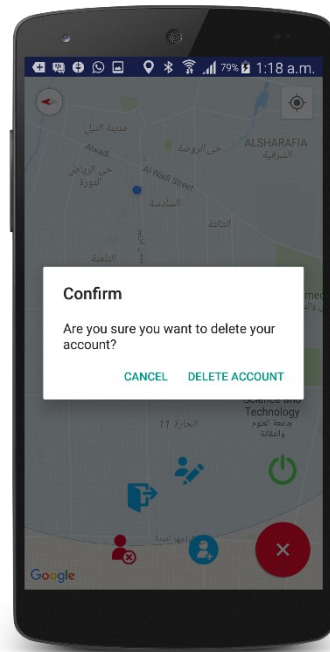


Figure 5 Driver delete account

4.3.3.6 DRIVER EDIT PROFILE

When the driver chooses to edit profile in options, the dialog appears to insert his new details (See Figure 5-22).

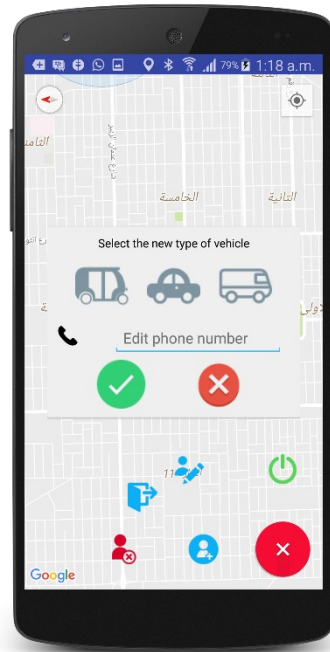


Figure 5 Driver edit profile

4.3.3.7 DRIVER WAITING FOR REQUEST

Driver is informed the application is automatically searching for requests (See Figure 5-23).

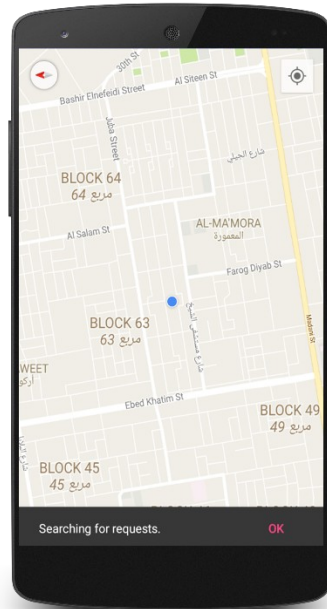


Figure 5 Driver waiting for requests

4.3.3.8 DRIVER REQUEST SHEET

Request details of the trip (distance, price, duration) with a 15 seconds timer (See Figure 5-24). If the timer reaches 0 the request will be automatically rejected.

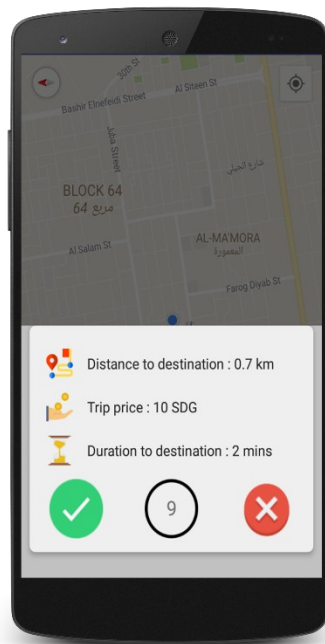


Figure 5 Driver request sheet

4.3.3.9 NAVIGATION

Navigation from the driver to customer (See Figure 5-25).

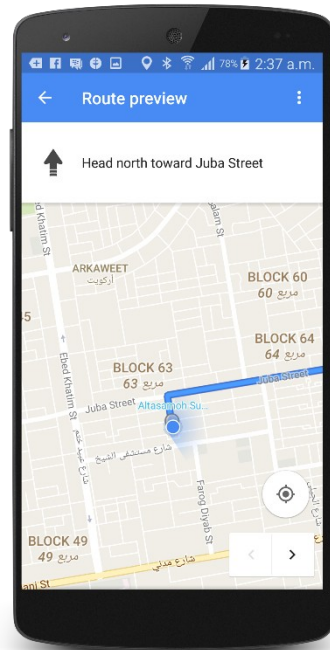


Figure 5 Navigation

4.3.3.10 DRIVER FEEDBACK SHEET

If the driver rejects the request, he can feedback the reason of his rejection (See Figure 5-26) which is stored in the database.

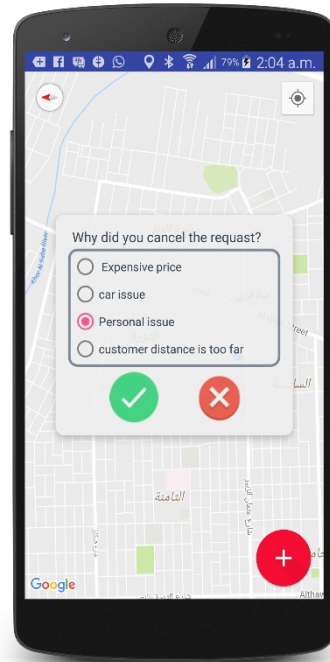


Figure 5 Driver feedback sheet

4.3.4 ADMIN'S ACTIVITIES

4.3.4.1 CUSTOMER FEEDBACK ANALYSIS

Customer feedback data in a pie chart (See Figure 5-27).

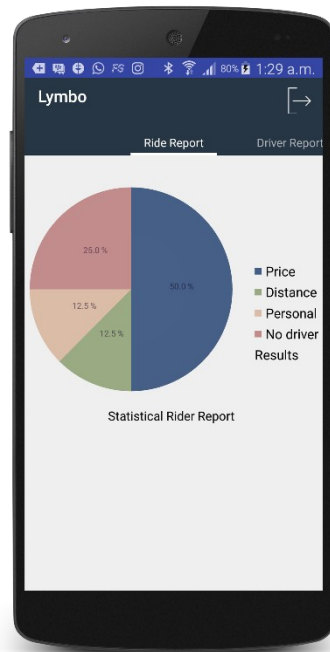


Figure 5 Customer feedback analysis

4.3.4.2 DRIVER FEEDBACK ANALYSIS

Driver feedback data in a pie chart (See Figure 5-28)

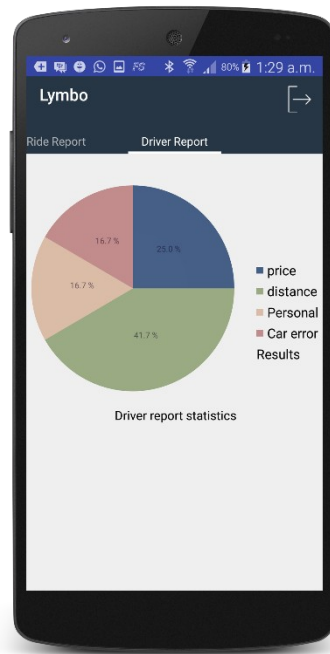


Figure 5 Driver feedback analysis

5 CHAPTER SIX RECOMMENDATIONS

6. RECOMMENDATION AND CONCLUSION

5.1INTRODUCTION

This chapter contains the recommendations in case of further development in the future.

5.2Results

The application set out to provide a fast, reliable, and error free method of interaction between drivers and customers, which is made possible through the back end hosting service.

The user interface had to provide an intuitive layout, which has been achieved through the simplistic design layout.

Added extra functions handles unexpected situations, and guarantees the application achieves its goals using the least amount of user input.

5.3RECOMMENDATIONS

- Create a NoSQL database instead of MySQL database for fast transactions.
- Use a paid hosting site for unlimited execution time.
- Use an open source map's API for further control on map functions and navigation.
- Usage of Real time databases such as Firebase.

- Import the application to other platforms and ensure cross platform compatibility (E.g. .iOS).

5.4Conclusion

There are many problems in the Sudanese transportation system, including long bus routes, insufficient number of buses in rush hours, difficulty for elder people, and high prices.

Our project aims to solve some of these issues. By providing an easy to use application for requesting transportation, increasing comfort, and some formality to a community managed system.

The issues of the transportation system can be fixed. It will, however, require such projects to be further developed, supported, and implemented. If done, we will surely provide a higher luxury for Sudanese citizens, less accidents, and more transportation efficiency.

6 REFERENCES

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