



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

Home Maintenance System

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

October/2017

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
**Sudan University of Science and
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الآية

قال تعالى :

﴿قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا

إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ﴾

صدق الله العظيم

سورة البقرة (32)

الحمد لله

الحمد لله الذي زين قلوب أوليائه بأنوار الوفاق، وسقى أسرار أحبائه شراباً لذيذ المذاق، وألزم قلوب الخائفين الوجَل والإشفاق، فلا يعلم الإنسان في أي الدواوين كتب ولا في أيّ الفريقين يساق، فإنّ سامح بفضله، وإن عاقب فبعده، ولا اعتراض على الملك الخلاق

وأشهد أن لا إله إلا الله، وحده لا شريك له، له الملك وله الحمد، وهو على كل شيء قدير، إله عزّ من اعتر به فلا يضام، وذلك من تكبر عن أمره ولقي الأثام

وأشهد أن سيدنا وحبیبنا وشفیعنا محمداً عبد الله ورسوله، وصفیه من خلقه وحبیبه، خاتم أنبیائه، وسید وعلی آله. أصفیائه، المخصوص بالمقام المحمود، فی الیوم المشهود، الذي جُمع فیہ الأنبیاء تحت لوائه وأصحابه، ومن سار علی نهجه، وتمسك بسنته، واقتدى بهدیة، وأتبعهم بإحسان إلى یوم الدین، ونحن معهم یا أرحم الراحمین .

DEDICATION

*To my **MOM and DAD** who always picked me up on time and encouraged me to go on every adventure, gave me the freedom to express creative ideas and the confidence to act on them. **For all those** who encouraged me to fly toward my dream. Let's soar. (Ahmed Alamin)*

*To my **darling Mother** Having a mother like you while growing up was the greatest gift and biggest advantage anyone could ever have given. To my **great father** my first and last pacemaker the one how support me in anything I want thanks you really from the heart. To my **friends and colleagues** thanks for encourage me and thanks for every second of joy and laugh you are really nice friends. To **my supervisor SARA IDRES** thanks for guidance and support throughout this study and Thanks for confidence in us. (Omer Sirri)*

*Dear **Mom and Dad**, Thank you for your constant support throughout my4 years. I will never truly be able to express my sincere appreciation to the both of you. You've inspired me to continue to strive to be the best version of myself every day. You have truly been the best support system I could have asked for .I love you (Moayad Barakat)*

Abstract

Smart mobile phones are considered one of the most important devices currently used in everyday life, people use devices to save some personal and necessary information either in work or in public life.

What distinguish modern technology that it is not limited to specific use or applications areas, but it can be used according to our needs, one of this needs is providing home maintenance services for citizen, so this application is providing good technicians to customers without effort or waste of time. Using android operating system and Global Positioning System (GPS) for this system.

The system is divided into three parts: Customer application, Technician application and administrator web page.

The Customer application is provide technician for customer in specific field, searching for him by his location or select specific technician by his rate .the order of the customer will appear in technician application.

Administrator work is to monitor the system's data and registering technicians to the system.

After implementation and Testing we get the result about application for providing good technicians to the customers.

المستخلص

تعتبر الهواتف الذكية أهم الأجهزة المستخدمة حاليا في الحياة اليومية، والتي تساعد في القيام بالكثير من الاعمال اليومية وتوفير الخدمات عن طريق التطبيقات المتاحة.

ما يميز هذه التكنولوجيا أنها لا تقتصر على استخدام محدد أو مجالات معينة, ولكن يمكن استخدامها وفقا لاحتياجاتنا. واحدة من هذه الاحتياجات انه يتم توفير فنيين مهرة للصيانة المنزليه, بعض هذه الخدمات متاحة في هذا التطبيق .

تم تطوير التطبيق باستخدام نظام التشغيل اندرويد و نظام تحديد المواقع العالمي للمساعدة في تحديد موقع الزبون والفني. النظام مقسم إلى ثلاثة اقسام: تطبيق الزبون وتطبيق الفني وصفحة ويب للمدير.

تطبيق الزبون يقوم بتوفير فني للزبون في مجال معين، يقوم الزبون باختيار الفني المناسب له سواء بالبحث عن الفني عن طريق نظام تحديد المواقع أو اختيار فني معين عن طريق التقييم المعطى له.

تطبيق الفني يقوم باستقبال الطلبات من الزبائن. يقوم المدير بإدارة بيانات النظام ويقوم بتسجيل الفنيين الي النظام ويمكنه حذف بعض المستخدمين اذا لزم الامر.

بعد عملية التنفيذ والاختبار للتطبيق حصلنا على النتيجة حول التطبيق وهي خدمة توفير فني مناسب متخصص للزبون طالب الخدمة.

Glossary

Term	Description
API	Application Programming Interface
IDE	Integrated Development Environment
ADT	Android Development Tools
GPS	Global Positioning System
SQL	Structured Query Language
ORDBMS	Object Relational Database Management System
UML	Unified Modeling Language
HTML	Hypertext Markup Language
XML	Extensible Markup Language
PHP	Hypertext Preprocessor
SMS	Short Message Service
OS	Operating System
API	Application Programming Interface

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Chapter 1

Introduction

1.1 Introduction:

House faults usually occur suddenly and are unexpected to the customers, but they sometimes occur in the wrong time and place for them, these faults always source of concern and great concern to the customers. Also when the person lives in a new house he need technicians the most, but he don't know where the good technicians are.

Mobile Smarts phones are widely use nowadays especially the smart phones with android applications, android application have some characteristics as the flexibility, powerful and easy to use that may be the perfect solution to the house faults, by providing the customer with good technicians in less time ,effort and money

This chapter contains four parts. The first part define the problem that this research well solve, the second part talk about the objectives of project , the third one about the scope of project, and the last part about the motivations that lead us to this project.

1.2 Problem Definition

In our country there are suffering to finding a good technician in specific field because sometimes the customer can be travel in new place so he didn't know the place that the technicians stand, also the technicians can be not available or not around at specific time, also most technicians intervenes himself in field that he is not qualified, so he just fix the problem partially; this in best case, this system will provide professional technician in many fields.

1.3 Objectives

After the application initialized and take place we expect to help customers find a good technician in less time and effort. And also make it easier for technician to get a work orders. The objectives of this system is

- To help users find skilled, efficient and Specialist technicians.
- Limit the technician in specific fields which improve his efficiency in that specific field.
- Provide a competition between technicians (because the rating process).

1.4 The Scope

This Application will be for a local customer of a Khartoum society. This application designed to help the customer find the professional technician to fix his specified damage, in specific fields which are: Plumber, Electricians, Carpentry, Smith, Air Conditioners, Building, and Painter.

The application supports different Smart phones screen size determining the price and method of payment for the technician service is not in this system scope.

1.5 The Motivation

The motivation to make this application is that the difficulty of finding appropriate technician in specific field, the lack of technician in specific places, and the customer can be busy and can't go to get technicians from where they are located and in many cases the technician is involved in field that he has no any knowledge about it.

So propose application software solution for all these issues, it can be partial solution but it will reduce the suffering of finding good technicians.

1.6 Thesis layout

This research has the following Thesis Layout:-

Chapter 1 contains the introduction, problem definition, objectives, scope, motivation and thesis layout of the project.

Chapter 2 discusses previous studies that related to this project.

Chapter 3 talk about System Description and tools and techniques used.

Chapter 4 System analysis using uml diagrams and the database analysis

Chapter 5 Implementation preview the system interfaces and how it works.

Chapter 6 contains the results, recommendations and conclusion.

Chapter 2

Previous Studies

2.1 Introduction:

This chapter contains the previous studies that related to this application. Actually there in no any application provide technicians in Sudan, Sudanese still hire them by the traditional ways, which need a lot of time, effort and money to get the right technician.

2.2 Previous Studies

2.2.1 SANEAH Application:

SANEAH –صنعه– Application developed by MBS company for software solutions for serves Jordan market, and been Expanded to other countries. The application allow technician share their experience and all the works they have done and marketing it for them. The week point in this application that it didn't show technician details. [1]



Figure 2:1 SANEAH application

2.2.2 FANNI Application

FANNI- فني- is an interactive platform for providing home maintenance services in an easy way developed by cloudtech.

FANNI service the Saudi Arabia market. And it's available to download from Google play store. [2]

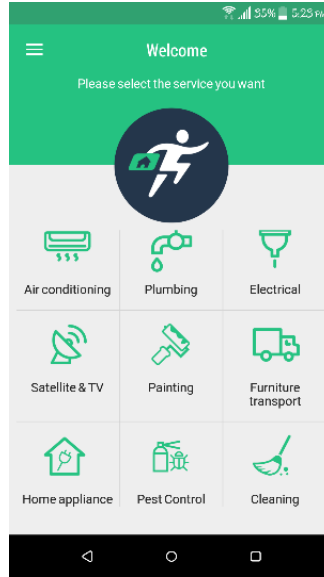


Figure 2:2 FANNI application

2.2.3 MAHARAH Application

Maharah-مهارة is a leading Mobile Application that can help you to book your maintenance services and civil works in short time the user submit a request through the Mobile Application for the job he want to be done in his home or office, and the system will connect him with qualified (Maher) from trusted local professionals. It also service in some places in Saudi Arabia (Jeddah, Riyadh, Mecca) And it's available to download from Google play store. [3]

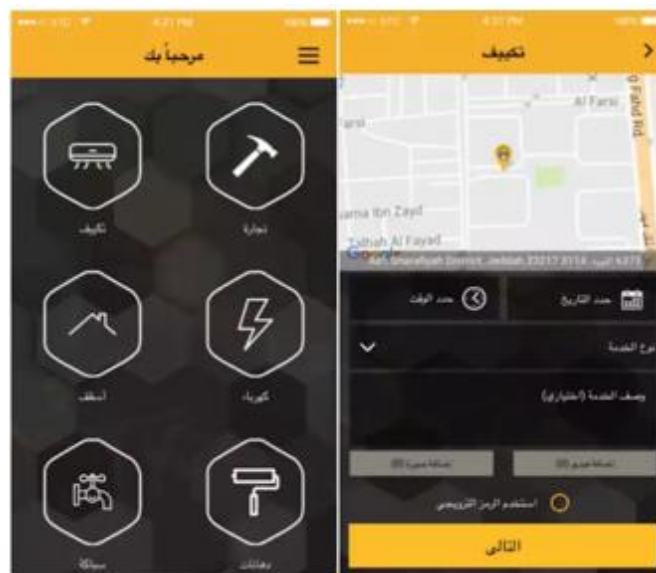


Figure 2:3 MAHARAH Application

2.2.4 SAKROBE Application

SAKROBE-اسكروب-main goal is quality and excellence in addition to customer satisfaction. They provide their services in Saudi and Bahrain market. The app and website are considered one of the prime platforms in home maintenance services and is classified as one of the leading online service providers as it offers variety of service choices and ease of use. They have well-trained technician team is headed and supervised by the most competent Saudi engineers and specialists in the home maintenance field. [4]



Figure 2:4 SAKROBE Application

2.2.5 Android transportation application using GPS

An Android application designed by Sudan university science and technology students to get graduate degree in computer science and information systems the project is develop 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 built using Google Maps API searching for places, driver tracking, and navigation. [5]

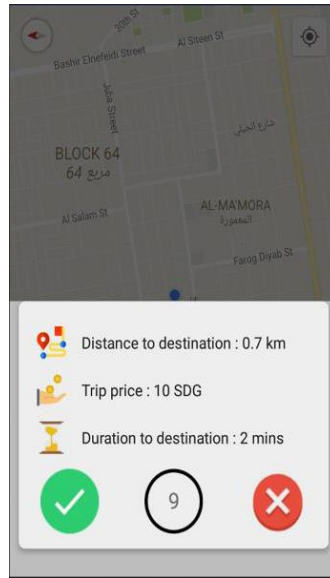


Figure 2:5 Android transportation application

2.3 Summary:

This chapter dealt with the previous studies that related to this system and all most of them are used to serve in other countries.

Chapter 3

System Description

3.1 Introduction:

The system utilizes the advantages of mobile phone technology, its spread ability and ease of use, the use of GPS features and its accuracy in positioning, in providing services that contribute to solving technical problems and maintenance of faults.

This chapter about the general description of the system and its functions and clarifies the system components and the tools and techniques used in the system.

3.2 System Description:

The system consists of three parts: the first one is system administrator web site give the ability to add, view and delete technicians, response to the feedback from the users and also he can delete customers if they misbehavior. The second part is customer's application used to order technicians in various fields, and the last part is technician's application that respond to the customer's orders.

3.3 System Environment:

Database has been created to store and update the user's information and their current location (longitude and latitude) by using GPS in smart phones (client, server).

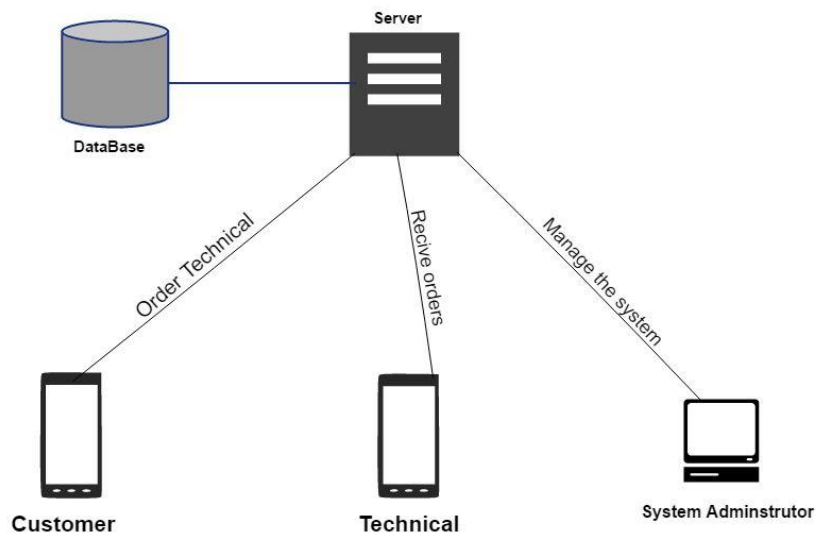


Figure 3:1 System Environment

3.4 System Functionality:

System functions are divided into three main categories, functions provided to the system administrator, functions provided to the customer and to the technician.

3.4.1 System Administrator Functions

- Add a New Technician :

This is main function for the admin, it allows the system administrator to add a new Technician by identifying the basic information (name, phone number, address... etc.) and identify the field of user (plumper, smith, carpenter... etc.). This is the only way that the technician can be added to the system ,that's mean the technician can't add himself-Register- like the customer.so that give the system more control for the technician in the system.

- Delete users :

Allow to delete specific user (customer or technician), if there are many negative feedbacks about this specific technician.

3.4.2 Customer Functions

The main function for the customers are:

- Order technician :

This function is the core of this application. Getting technician.

- Rate the technician:

After the ordering there is the ordering process, will be detailed in chapter 5.

- Give feedback:

The customer can give response after using the application about technician or even about the application as general.

There is some additional functions like share the application, update profile, and also many other functions.

3.4.3 Technician Functions

Technician main function are:

- Accept or reject requests:

When customer submit a request; the specified technician will receive notification with order details (location, problem description, etc...) so the technician will accept or reject the request; when he accept the

system will notify the customer that the technician is in his way ,and if he rejected the customer will select another technician.

- change his status:

The technician has available and unavailable status; so when he is unavailable the customer can't select him from the list.

It's so important that the technician change his status to unavailable if he can't do jobs in specific time.

There are another functions that technician can do like: share application or update his profile, and many other functions.

3.5 System Components:

The System components are divided into two categories, hardware and software.

3.5.1 System Hardware Components

The hardware divided into two parts:

One part of the system is a device works as a server which is a computers with high specifications.

The other part of the system is a smart phone with GPS technique.

3.5.2 System Software Components

The software divided into two parts

- User (Customer/Technician) Part This section uses the Android operating system used in smart phones, and requires that the device is supportive of the Global Positioning System, access to the Internet. This segment consists of the interface allows the user to deal with the system.

- Administrator part is Web page that allows the system administrator to add, delete or modify users.

3.6 Tools and Techniques:

3.6.1 Android Operating System

Android is a mobile operating system 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. [6]

- Advantages :

1. Android Google developer:

The biggest advantage of the Android is Google. Android operating system is owned by Google. Google is one of the most trusted and reputed product on the internet. The name Google provide lots of trust for the users to buy Android device.

2. Android Users :

Android is the most used mobile operating system. It is used by over billion people. Android is also the fastest growing operating system on the earth. Android has billions of users. A number of users increase the number of applications and software under the name of Android.

3. Google Play Store App free Download for Android :

The best part of the Android is the availability of millions of applications. Google Play store is reported as world's largest mobile store. It has almost everything from movies to games and much more. These things can be easily downloaded and accessed through Android phone.

4. Android Notification :

One can easily get access to their notification of any kind of SMS, emails or calls on their home screen or the notification panel of the android phone. Its UI makes easy for the user to view more than 5 Android notification at once. The user can view all the notification on the top bar.
[7]

3.6.2 Programming languages:

3.6.2.1 JAVA

Java is a general-purpose computer programming language that is concurrent, class-based, object-oriented, and specifically designed to have as few implementation dependencies as possible. It is intended to let application developers "write once, run anywhere" (WORA), meaning that compiled Java code can run on all platforms that support Java without the need for recompilation.

The Java language is a key pillar in Android, an open source mobile operating system. Although Android, built on the Linux kernel, is written largely in C, the Android SDK uses the Java language as the basis for Android applications. The bytecode language supported by the Android SDK is incompatible with Java bytecode and runs on its own virtual machine, optimized for low-memory devices such as smartphones and tablet computers. Depending on the Android version, the bytecode is either interpreted by the Dalvik virtual machine or compiled into native code by the Android Runtime.

Android does not provide the full Java SE standard library, although the Android SDK does include an independent implementation of a large subset of it. It supports Java 6 and some Java 7 features, offering an implementation compatible with the standard library. [8]

- **Advantages :**

1. **Simple:**

Java was designed to be easy to use, write, compile, debug, and learn than other programming languages. Java is much simpler than C++ because Java uses automatic memory allocation and garbage collection.

2. **Object-Oriented:**

Allows you to create modular programs and reusable code.

3. **Secure:**

The Java language, compiler, interpreter, and runtime environment were each developed with security in mind.

4. **Allocation:**

Java has the feature of Stack allocation system. It helps the data to be store and can be restored easily.

5. **Multithreaded:**

The capability for a program to perform several tasks simultaneously within a program. [8]

3.6.2.2 XML

Extensible Markup Language (XML) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable through use of tags that can be created and defined by users. Much like natural language is extensible (that is, can grow) when speakers create new words and agree on what they mean, XML is a markup language that can grow when users create new elements and agree on what they mean. [9]

- **Advantages of XML**

1. It is a simultaneously human- and machine-readable format.
2. It supports Unicode, allowing almost any information in any written human language to be communicated.
3. It is based on international standards.
4. It manifests as plain text files, which are less restrictive than other proprietary document formats.
5. It is platform-independent, thus relatively immune to changes in technology. [9]

3.6.2.3 HTML

HTML is a computer language devised to allow website creation. These websites can then be viewed by anyone else connected to the Internet. It is relatively easy to learn, with the basics being accessible to most people in one sitting; and quite powerful in what it allows you to create. [10]

- Advantages:
 1. First advantage it is widely used.
 2. Every browser supports HTML language.
 3. Easy to learn and use.
 4. It is by default in every windows so you don't need to purchase extra software. [11]

3.6.2.4 SQL

SQL is a standard language used to access and manipulate databases in: MySQL, SQL Server, Access, Oracle and other database systems. [12]

SQL consists of a data definition language, data manipulation language, and a data control language. The scope of SQL includes data insert, query, update and delete, schema creation and modification, and data access control.

- Advantages
 1. Well defined standards
Long established are used by the SQL databases that is being used by ISO and ANSI. There are no standards adhered by the non-SQL databases.
 2. Portability
SQL can be used in the program in PCs, servers, laptops, and even +some of the mobile phones.
 3. Interactive Language

This domain language can be used for communicating with the databases and receive answers to the complex questions in seconds.

4. Multiple data views
With the help of SQL language, the users can make different views of database structure and databases for the different users. [13]

3.6.2.5 PHP

PHP is an open source server-side scripting language designed for web development but also used as a general-purpose programming language. [14]

- **Advantages of PHP**

1. Open source: It is developed and maintained by a large group of PHP developers, this will help in creating a support community, abundant extension library.
2. Speed: It is relatively fast since it uses much system resource.
3. Stable: Since it is maintained by many developers, so when bugs are found, it can be quickly fixed.
4. Powerful library support: You can easily find functional modules you need such as PDF, Graph etc.
5. Built-in database connection modules: You can connect to database easily using PHP, since many websites are data/content driven, so we will use database frequently, this will largely reduce the development time of web apps. [15]

3.6.3 Platforms

3.6.3.1 Android Studio

Android Studio is the official (IDE) for the Android platform. It was announced on May 16, 2013 at the Google I/O conference.

Android Studio was in early access preview stage starting from version 0.1 in May 2013, then entered beta stage starting from version 0.8 which was released in June 2014.[6] The first stable build was released in December 2014, starting from version 1.0.

Based on JetBrains' IntelliJ IDEA software, Android Studio is designed specifically for Android development. It is available for download on Windows, macOS and Linux, and replaced Eclipse ADT as Google's primary IDE for native Android application development.

- **Advantages:**

1. Gradle-based build support.
2. Android-specific refactoring and quick fixes
3. Lint tools to catch performance, usability, version compatibility and other problems
4. ProGuard and app-signing capabilities
5. Template-based wizards to create common Android designs and components.
6. A rich layout editor:

7. It allows you to drag-and-drop UI components, preview layouts on multiple screen configurations. Preview appears instantly as you change in the layout editor. You can choose a language, and can see the preview of layout with that locale.
8. Rich Color Preview editor:
9. While adding colors as a resource, and we can see the color preview at the left hand side of the editor.
10. Deep Code Analysis:
11. If you point to a line and it gives detailed explanation about an exception based on the annotation added. And you can also know which constants are allowed for which API. It also has the powerful code completion. You can also inspect code in whole project, IntelliJ lists all Lint errors during code inspection. [16]

3.6.3.2 Enterprise Architect

Enterprise Architect is a powerful platform that can be used to define the strategic context for an Enterprise Architecture, the Enterprise Architecture itself and the Implementation initiatives that realize the designs and that finally deliver the business value. It can serve as both the architectural repository, and a tool for managing the process by which architectures are created and maintained including an architectural requirements management platform. Powerful visualization capability allow models to be transformed and presented in a variety of compelling ways that will delight stakeholders from the executive level down to implementation teams. [17]

3.6.4 Other tools

3.6.4.1 Google Maps

Google Maps is a web mapping service developed by Google. It offers satellite imagery, street maps, 360° panoramic views of streets (Street View), real-time traffic conditions (Google Traffic), and route planning for traveling by foot, car, bicycle (in beta), or public transportation. [18]

3.6.4.2 GPS

GPS is a space-based radio navigation system owned by the United States government and operated by the United States Air Force. It is a global navigation satellite system that provides geolocation and time information to a GPS receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The GPS system does not require the user to transmit any data, and it operates independently of any telephonic or internet reception, though these technologies can enhance the usefulness of the GPS positioning information. The GPS system provides

critical positioning capabilities to military, civil, and commercial users around the world. [19]

3.6.4.3 WAMP Server

WAMP is a Windows OS based program that installs and configures Apache web server, MySQL database server, PHP scripting language, phpMyAdmin (to manage MySQL database's), and SQLiteManager (to manage SQLite database's). WAMP is designed to offer an easy way to install Apache, PHP and MySQL package with an easy to use installation program instead of having to install and configure everything yourself. WAMP is so easy because once it is installed it is ready to go. You don't have to do any additional configuring or tweaking of any configuration files to get it running. [20]

3.6.4.4 UML

The Unified Modeling Language (UML) 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. [21]

- **Advantages :**
 1. The UML can be used to model just about any type of application, running on any type and combination of hardware, operating system, programming language, and network, in UML.
 2. UML can be used for modeling middleware and this is effective for modeling large, complex software systems
 3. Built upon the Microsoft Operating Framework (MOF) met model for object oriented modeling.
 4. UML Profiles (that is, subsets of UML tailored for specific purposes) help to model Transactional, Real-time, and Fault-Tolerant systems in a natural way.
 5. This has an ability to generate test scripts apart from stub code when integrated with integrated development network.
 6. The reverse engineering support, UML regenerate design level artifacts in accordance with the changes you made to the structure of class relationship. [22]

3.7 Summary:

This chapter describe the system and its environment also about the most important techniques and tools that will be used to achieve the objectives of this research.

Chapter 4

System Analysis

4.1 Introduction:

This chapter about system analysis and represent the uml's diagrams of the system. And the database analysis

4.2 Analysis using UML schemas:

To analyze this system was used UML diagrams; it was illustrated symbols of these schemes in Appendix I in partial appendices, and has been used four schemes are:

4.2.1 Use Case Diagram

This scheme is used to identify the different types of users and representation their interaction with the system. [21] Shown in figure (4:2)

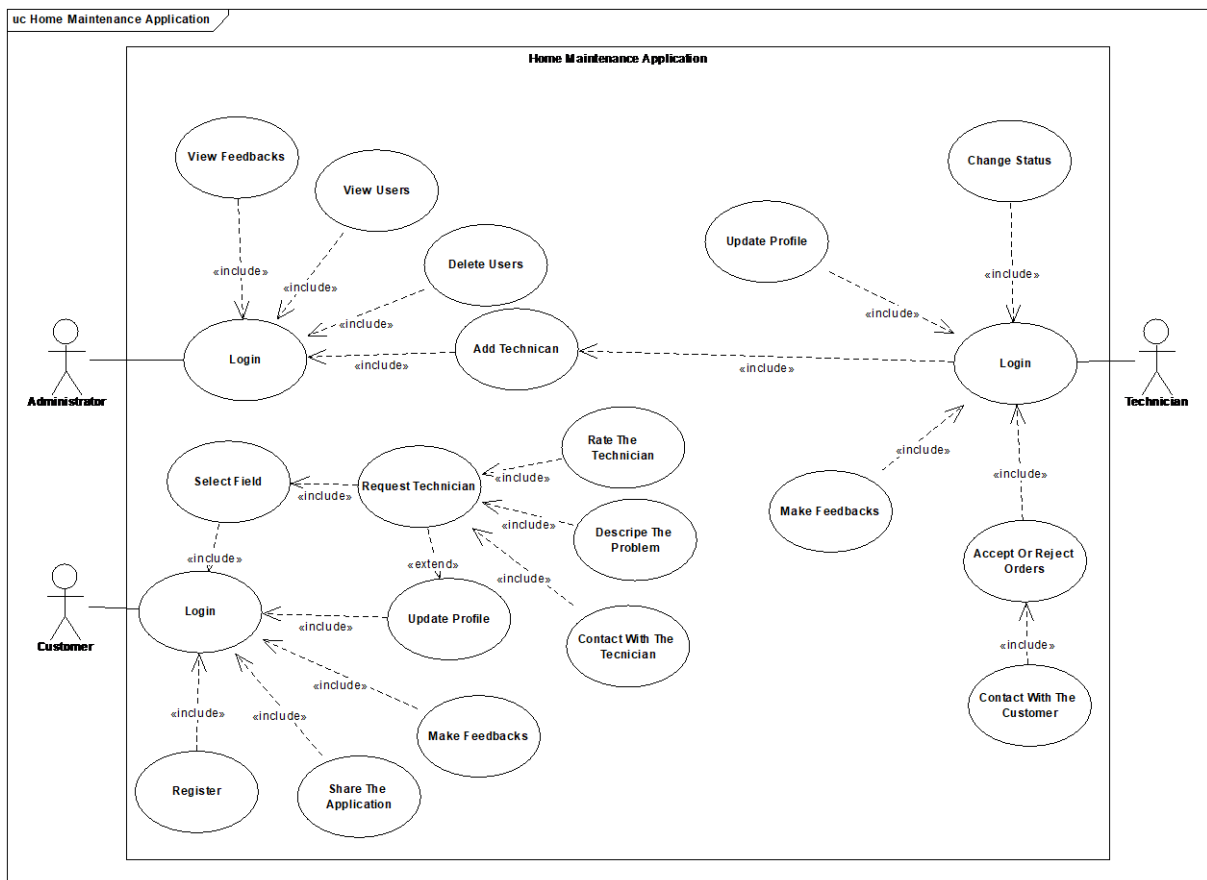


Figure 4:1 Use Case Diagram

4.2.2 Sequence Diagram

This scheme is used to shows how processes operate with one another and in what order, and used to show the flow of data and messages between the various system components. The horizontal component in

diagram illustrate the objects in the system and the vertical components illustrate the order of messages exchanged on the order they are presented in the system. [21]

- **Login process for customer:**

The system will asks the customer to enter his phone numbers to login, and then the system verify this number by sending sms message containing verification code to that number. And the customer should enter the right code to successfully login to the application, if the phone number is not already in the system – not registered – the system will create new one as shown in figure (4.3).

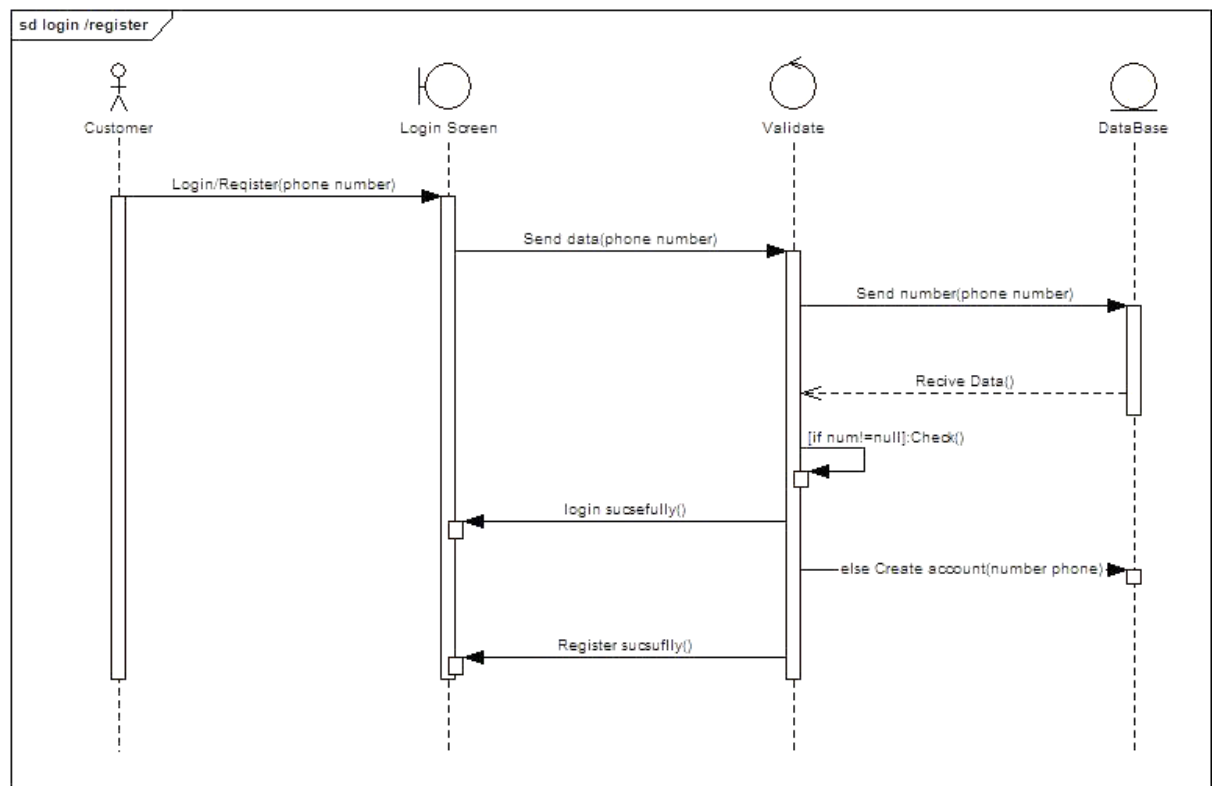


Figure 4:2 Customer Login process Sequence Diagram

- **Login process for technician:**

The system will asks the technician to enter his phone numbers to login, and then the system verify this number by sending sms message containing verification code to that number. And the technician should enter the right code to successfully login to the application, if the phone number is not already in the system –not registered – the system will deny him from login in the system as shown in figure (4.3).

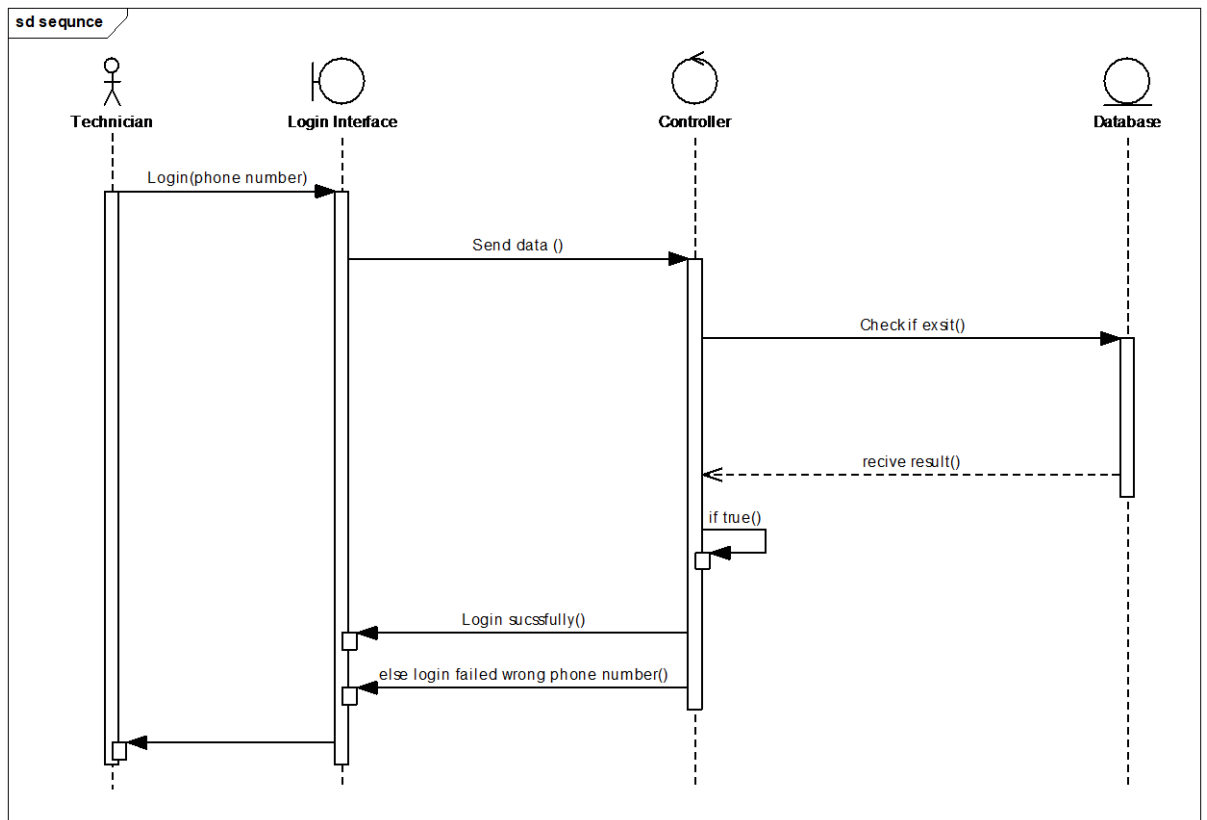


Figure 4:3 Login Process for technician

- Request Technician process:

The customer will request the technician that he selected and he will enter his problem description and the location will be taken and then the technician will be notified as shown in figure (4.4).

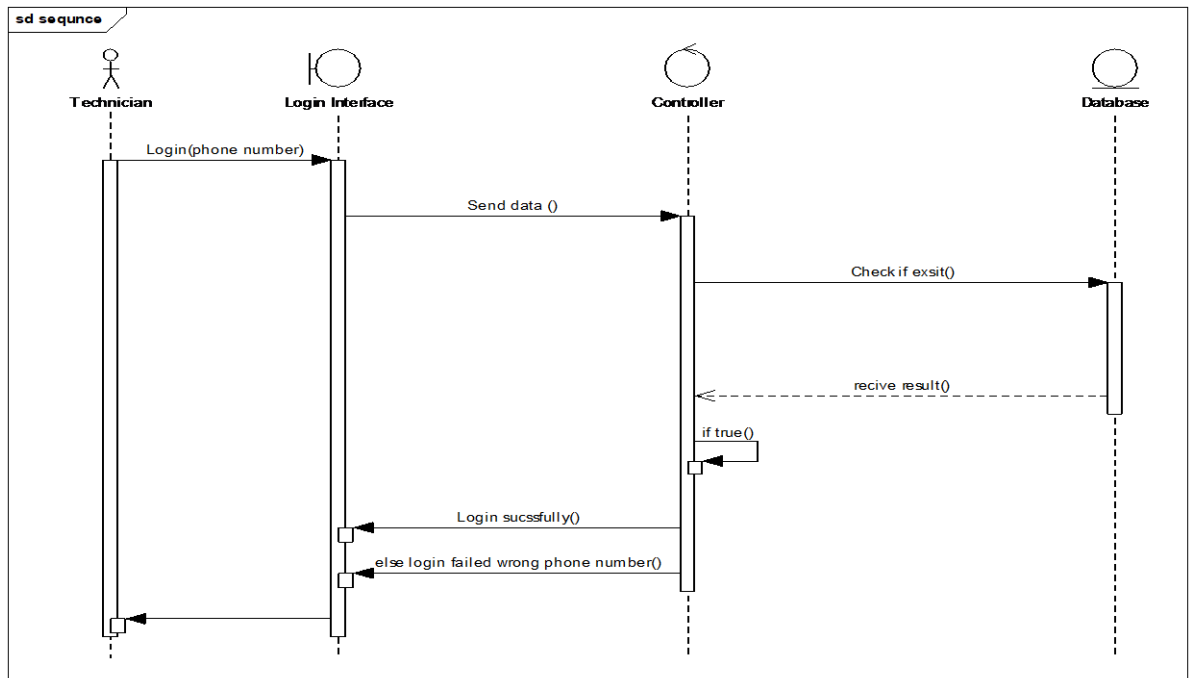


Figure 4:4 Request Technician Sequence Diagram

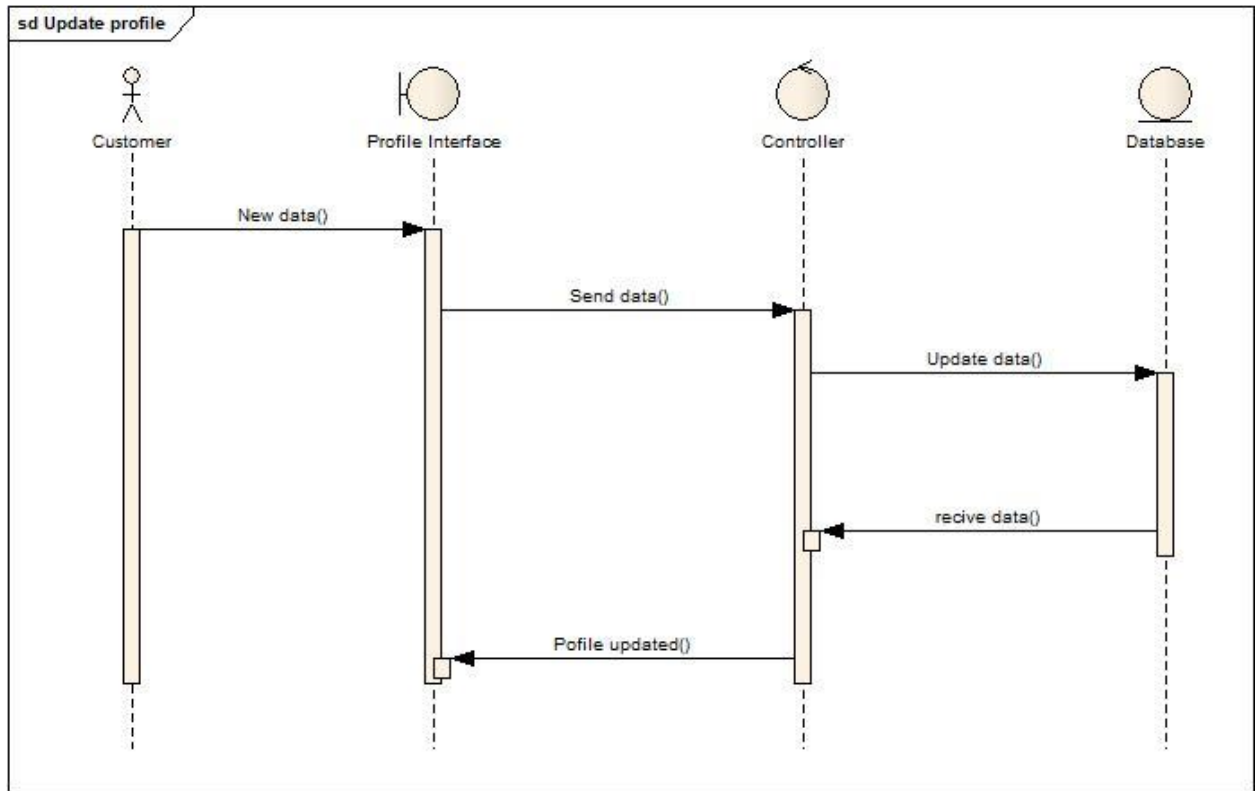


Figure 4:5 Update Profile Sequence Diagram

- Make Feedback process:

The system receive feedback from users and submits it in the database so the administrator handle it as shown in figure (4.3).

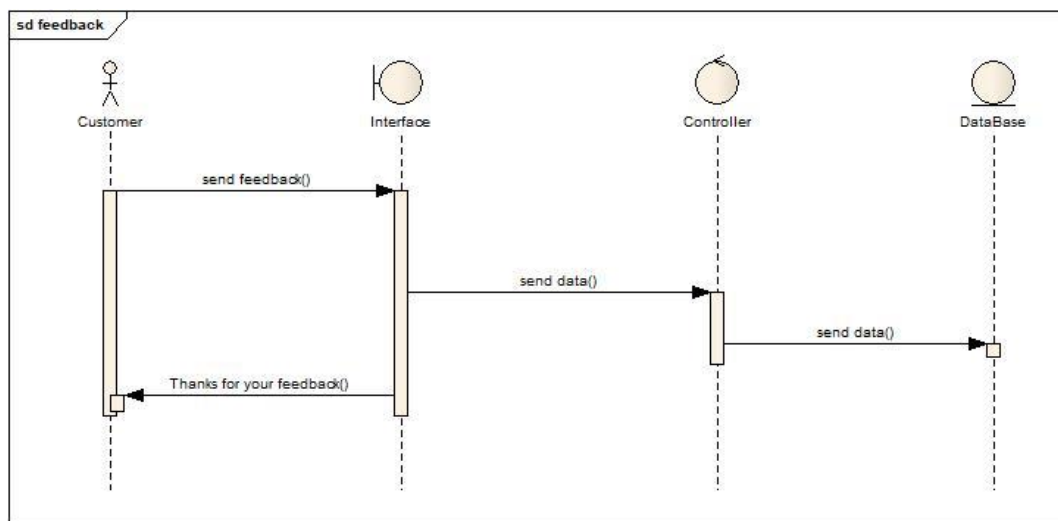


Figure 4:6 Send Feedback Sequence Diagram

4.2.3 Activity Diagram

Activity diagrams are intended to model both computational and organizational processes. Activity diagrams show the overall flow of control. Has been used two activity diagrams in this system, illustrate activity diagram for Customer and Technician.

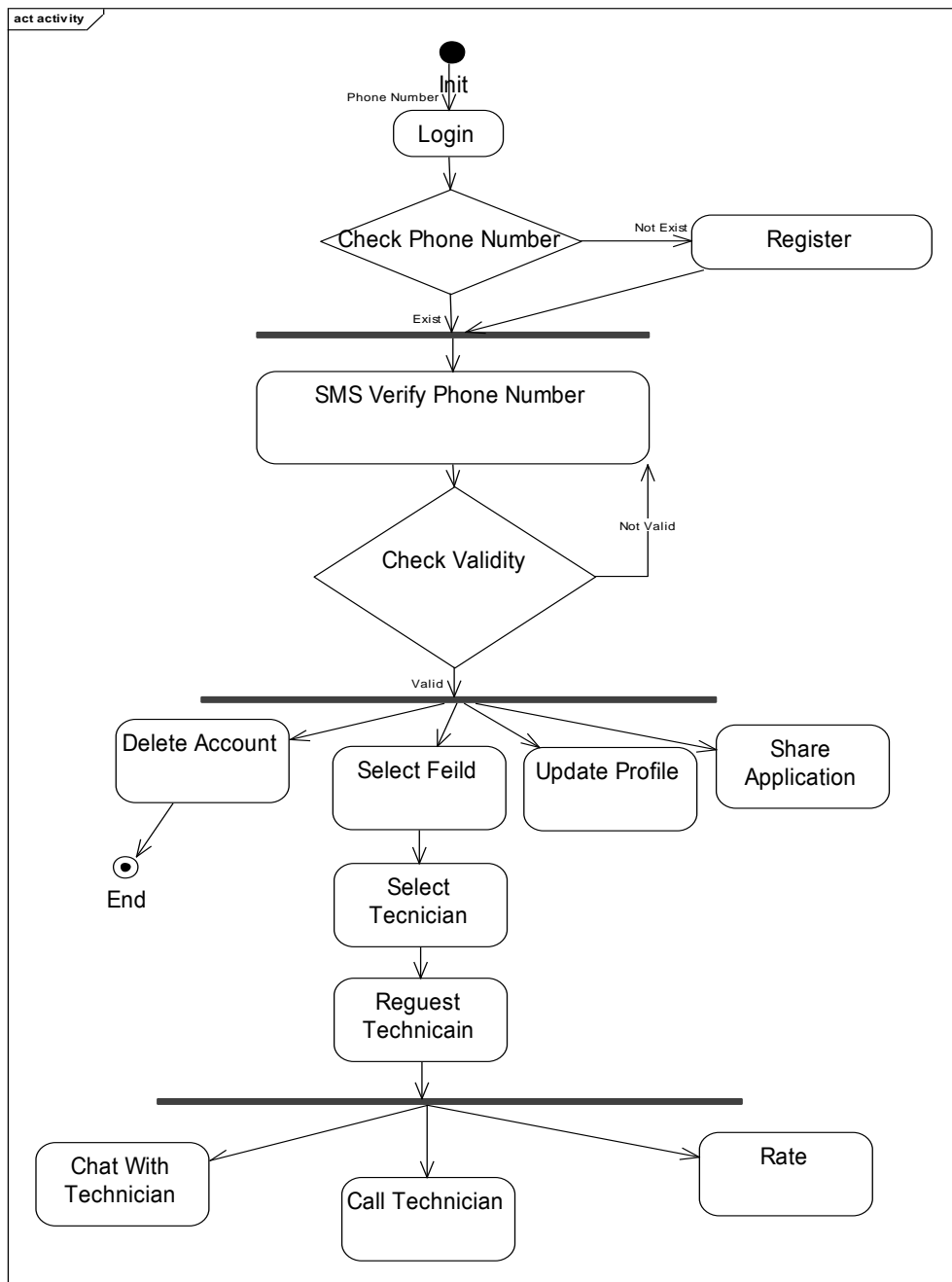


Figure 4:7 Customer Activity Diagram

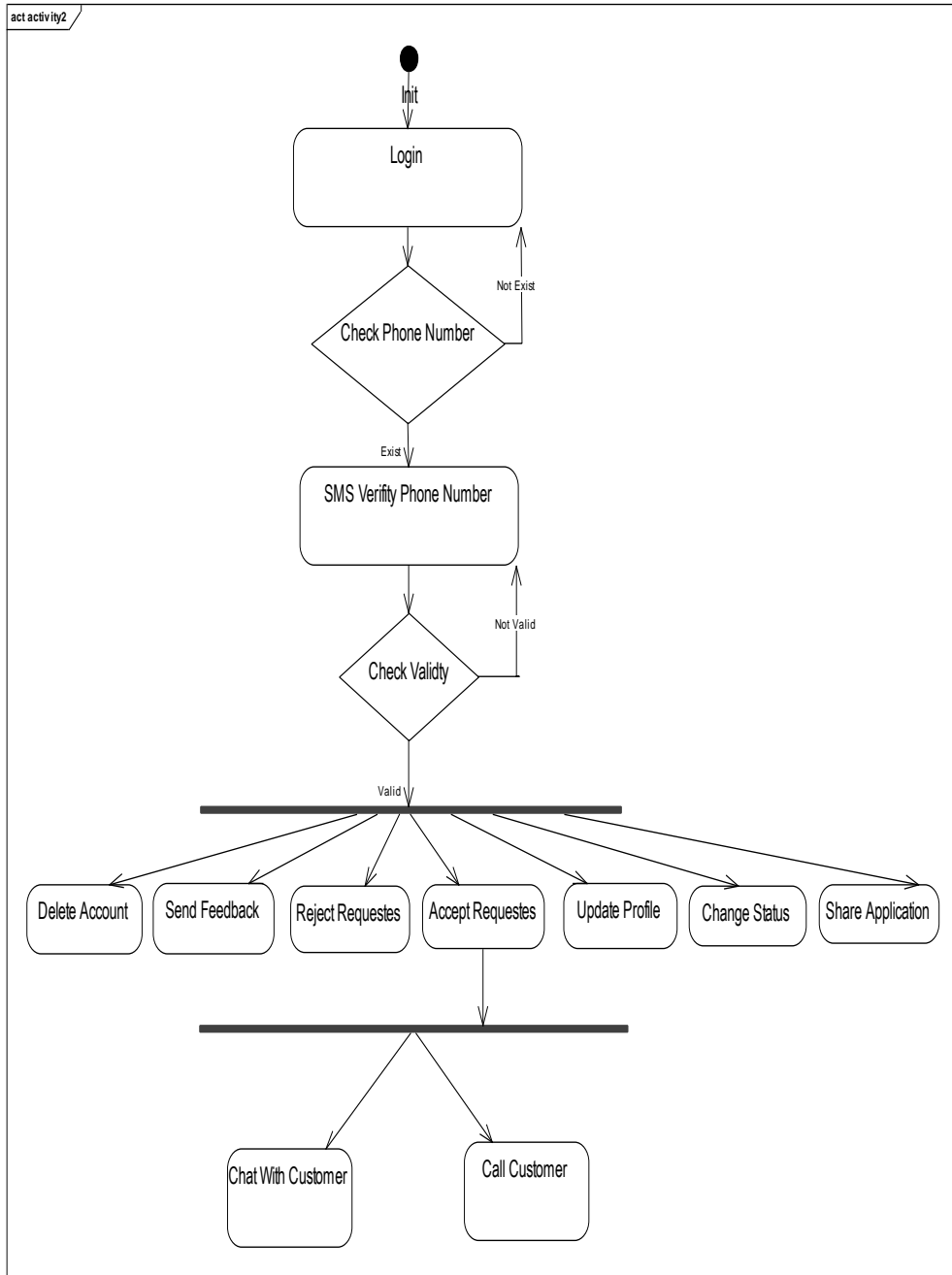


Figure 4:8 Technician Activity Diagram

4.2.4 Deployment Diagram

Deployment diagram illustrate hardware and software used in the system and how these components interact with each other. [21]

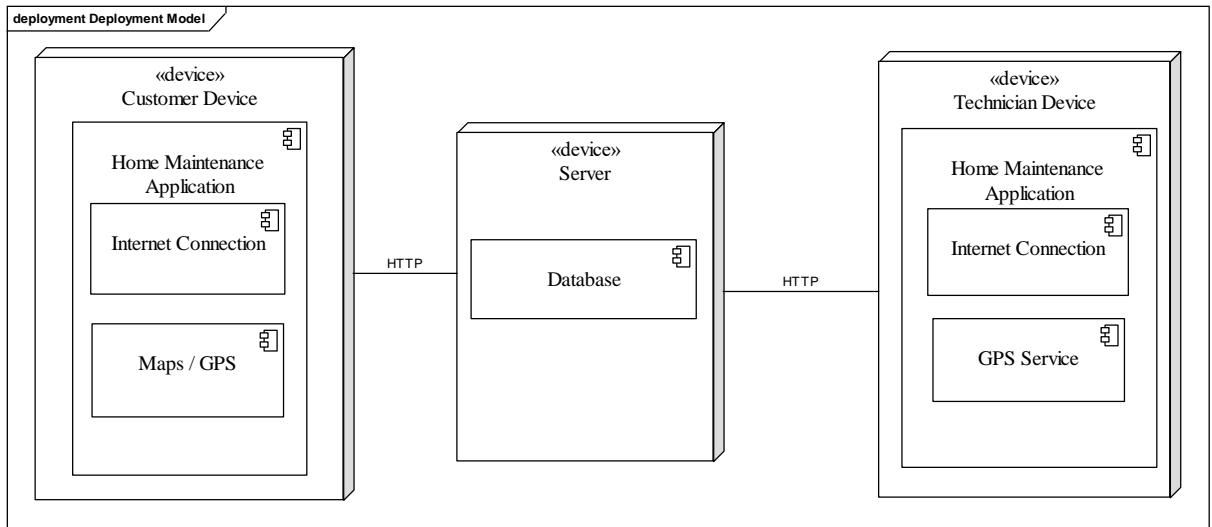


Figure 4.9 Deployment Diagram

4.3 Database Design

4.3.1 Database Structure:

Table 4-1 Customer Table

Column Name	Column Data Type	Note
ID	Int	Primary
Name	Char	-
Phone	Int	Unique
Address	Char	-
Latitude	Double	For location
Longitude	Double	For location

Table 4-2 Technician Table

Column Name	Column Data Type	Note
ID	Int	Primary
Name	Char	-
Phone	Int	Unique
Field	Char	1 of 7 (Enum)
Rate	Double	Value from 0 to 5
Address	Char	-
Work Address	Char	-
Latitude	Double	For location
Longitude	Double	For location

Table 4-3 Orders Table

Column Name	Column Data Type	Note
Order ID	Int	Primary
Customer ID	Int	-
Technical ID	Int	-
Problem Description	Char	-
Latitude	Double	For location
Longitude	Double	For location

Table 4-4 Feedback Table

Column Name	Column Data Type	Note
Sender Name	Char	-
Sender Email	Char	-
Message	Char	-

4.3.2 Class Diagram:

Class diagram illustrate database tables, their attributes and relationships among tables. [21]

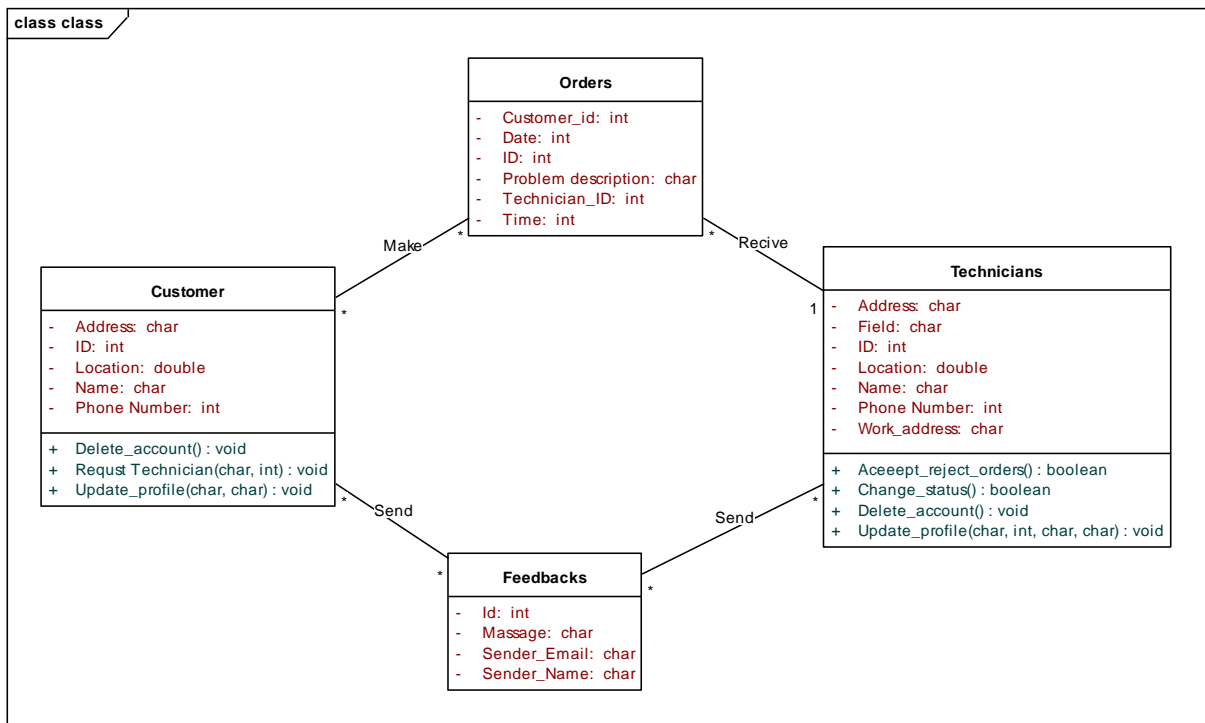


Figure 4:10 Class Diagram

4.4 Summary:

This chapter dealt with analysis of the system, where addressed to describe the system and processes provided by the system for the user and the system administrator, also addressed to the hardware and software components of the system. On the other hand, this section takes to analysis the operations of the system using the schemes UML.

Chapter 5

Implementation

5.1 Introduction

This chapter will deal with graphical interfaces for both administrator and users (technician, customer) simple explanation for the program and how its work.

5.2 Administrator Interface:

- Login interface:

This interface ask the administrator to enter the username and password, then his inputted data will be validated and if it right he will login to the main page, and if not he will be denied from accessing. Shown in figure (5:1)

➤ Note: the default user name is admin and password is 123.

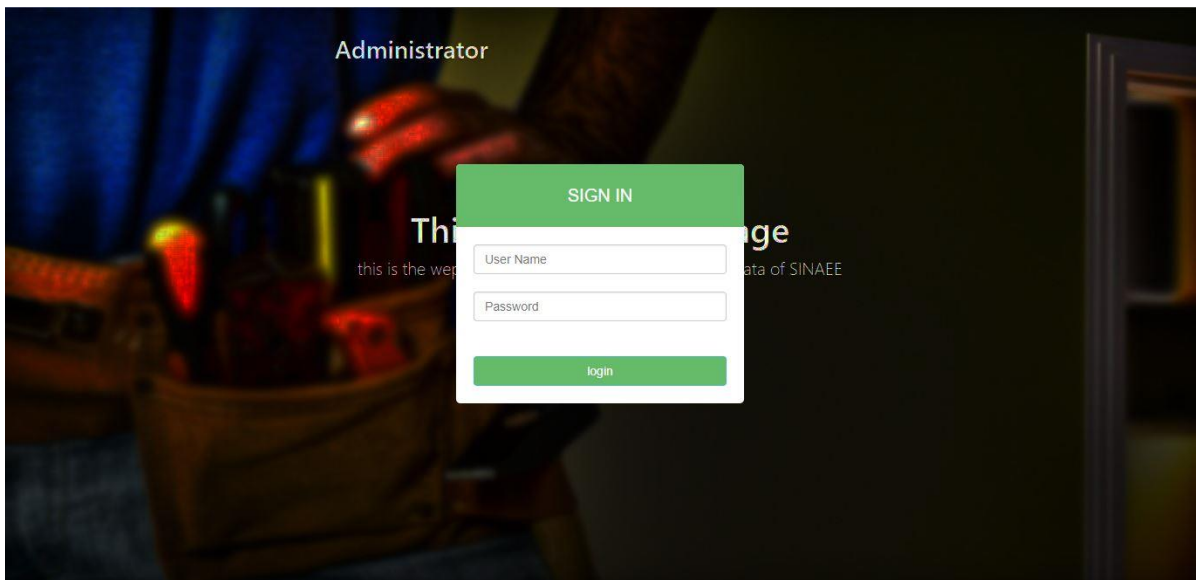


Figure 5:1 administrator login interface

- Add technician interface:

This interface where the administrator must enter technician's information to create account form them, because the technician can't register to the system by themselves like the customer, this the only way the technician can be registered to the system. Shown in figure (5:2)

ADD TECHNICIAN

Add

Figure 5:2 Add technician interface

- **Show/delete technician**

Here where the administrator can View and delete the technicians this inter face is a table of all registered technicians and button to delete any one of them. Shown in figure (5:3)

TECHNICIANS

ID	Name	Phone	Age	Rate	Field	latitude	longitude	Address	Work Address	Status	Delete?
1	احمد	0905141494	34	3	tbreed	15.543247	32.539856	جزء شارع 12	الصحافة محطه 7	0	
2	صلاح	0905141444	27	4	ece	15.557209	32.579611	الشرقي	الفرانس اخر محطه	1	
3	اسامه	0123556799	40	1	ece	15.515022	32.578278	المعموره مربع 53	الازهري مربع 34	1	
4	الطريفي بابكر	0927298900	20	5	ngar	15.548254	32.56588	الطائف جنوب مربع 52	محطة البنايل	1	
5	سبحي	014897643	25	1	hdad	15.560642	32.557439	المدارات شارع 41	الساحه الخضراء	1	
6	علي محمد	0905141894	33	4	lba	15.548254	32.56588	المعموره مقابل مسجد القران	محطة البنايل	1	
7	محمد	0921473647	47	4	ngash	15.561515	32.56378	المعموره مقابل مسجد القران	الشرقي	0	
8	صابر	0912349799	47	2	sbak	15.543247	32.539856	جزء شارع 16	الصحافة محطه 7	1	
9	ممتاز	0912345679	31	3	hdad	15.557196	32.579616	الصحافة محطه 10	الفرانس اخر محطه	0	

Figure 5:3 Administrator view/delete Technician interface

- **View/delete Customer**

In this interface the administrator can View and delete the customer, this interface is a table just like the previous one of all registered customers and button to delete any one of them. Shown in figure (5:4)

CUSTOMERS

ID	Name	Phone	Address	Altitude	Latitude	Delete?
4	محمد أحمد	0913534421	الفرانس جوار الشايبي			
5	sirri	0923512321	khartom 2			
6	عمر سري ابراهيم	999999999	الخرطوم، الطائف جنوب			
7	معتز علي	0923554421	الخرطوم 3			
8	ممتاز جعفر	012222377	الطائف شمال مربع 53			
9	خالد عمر	0923534421	المعمورة لفة جوبا			
11	طه محمود	0905141494	الأزهري			
12	omer	0913894800	khartoum			
14	منى عبد الله	0123849781	السمارات شارع 41			

Figure 5:4 Administrator view/delete Customers Interface

- Show/delete Feedbacks

Here where the administrator can View and delete users feedbacks, this interface is a table of all the feedbacks that summited from the users (customer, technicians) and button to delete any one of them. Shown in figure (5:5)

FEEDBACK

ID	Name	Email	Massege	Delete?
45	احمد محمد عمر	hamoo@gmail.com	فكرة التطبيق جميلة جدا وسهلت علينا الكثيره من الجيد	
44	محمد عبد الله	aomda@yahoo.com	التطبيق سهل ومفيد جدا	
43	عبد المان	abd02822@gmail.com	تطبيق رائع وجميل وشكرا لتعاونكم	
1	عبد الله احمد	abu@hotmail.com	تطبيق ممتاز	
46	علي محمد احمد	Ali@hotmail.com	التطبيق رائع ارجو اضافة حقول اخرى	
47	منى عمر عبد الطيف	Mona80@gmail.com	good job but it have some bug ,hopefully you fixed soon	

Figure 5:5 Administrator view/delete users' feedbacks

5.3 Users Interface:

5.3.1 Common interfaces:

This section preview the interfaces in common between two users customer and technician

- Login interface:

In this interface the application ask the user (customer or the technician) to enter his phone number as shown in figure (5:6), when he does the system check if this phone number already exist in the database if so the user will be verified by sending sms to phone number containing a code to be sure that number belong to this user, the user will go to verify interface to enter the code that sent to them as shown in figure (5:7), if he entered the right code he will login to the system.

If the phone number is not exist to in system database, an account will be created for the customer after he is been verified, but for the technician he will be denied for login because the technician can't register themselves.

➤ Notes:

1. The phone number pattern user is ten digits begin with 0.
2. There is no another information required from the customer in the login process just his phone number, the other information will be entered when he want to get a technician.

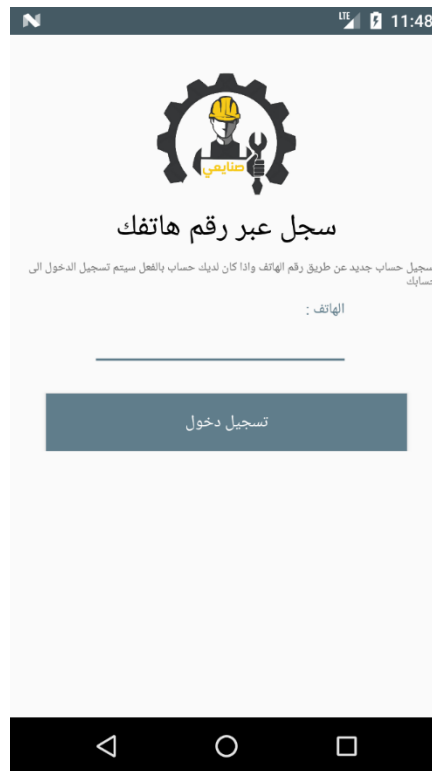


Figure 5:6 login interface

- **Sms verification number interface:**

In this interface the user enter the code that has been sent to them in order to verify that this phone number belong to them. Shown in figure (5:7)

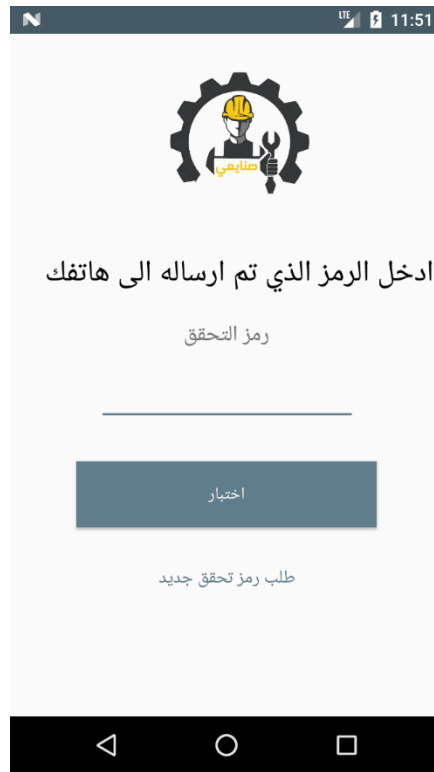


Figure 5:7 Sms Verification Interface

- **Permission for accessing GPS service:**

This popup interface will be shown to get permission for the user (customer and technician). Shown in figure (5:8)

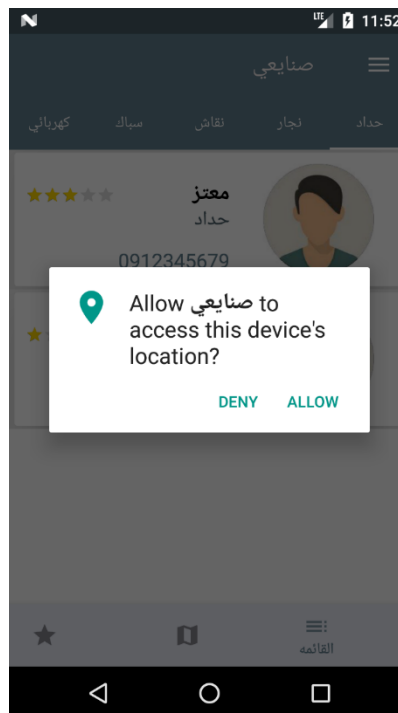


Figure 5:8 Permission for accessing user Location

➤ Send feedback interface:

In this interface the users can make feedback to system administrator thanking them complaining or any feedback they want. Shown in figure (5:9)

Figure 5:9 feedback interface

5.3.2 Customer Interfaces:

- Home interface:

This the main interface in the customer application in contains from three views; the first one is list of all technicians in specific field order by their rates Shown in figure (5:10), which the user can select from –selecting by rate-, the second is map the show all the near technicians from the customer in specific field.-selecting by location- shown in figure (5:11), the last view is interface with customer favorite technicians.

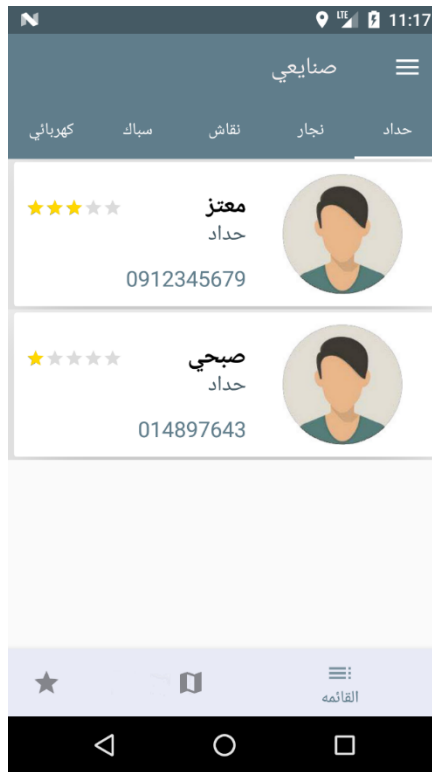


Figure 5:10 Home interface for Customer



Figure 5:11 Map interface

- Profile interface:

He is where the customer can view his profile edit it and delete his account. Shown in figure (5:12)

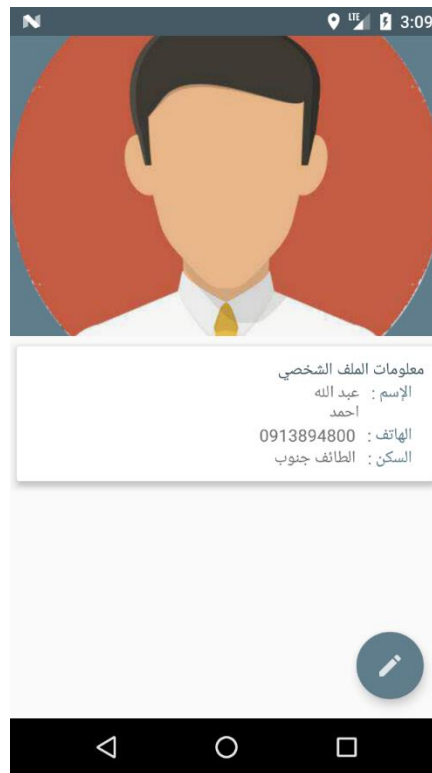


Figure 5:12 Customer Profile Interface

- Order technician interface

When customer select specific technician this interface will appear containing the detailed information about the technician and bottom to order them shown in figure (5.13),when the customer order them an order go to the technician when technician accept it, three bottoms will appear in this interface which is: call the technician bottom, text them bottom and rate them bottom. Shown in figure (5:14).

- Note:

In this interface the customer can add the specific technician to favorite list shown in figure (5:15).



Figure 5:13 Order technician interface



Figure 5:14 Three bottoms appear

- **Favorite interface:**

This is the list of customer's favorite technician to keep them near and easy to find. Shown in figure (5:15)

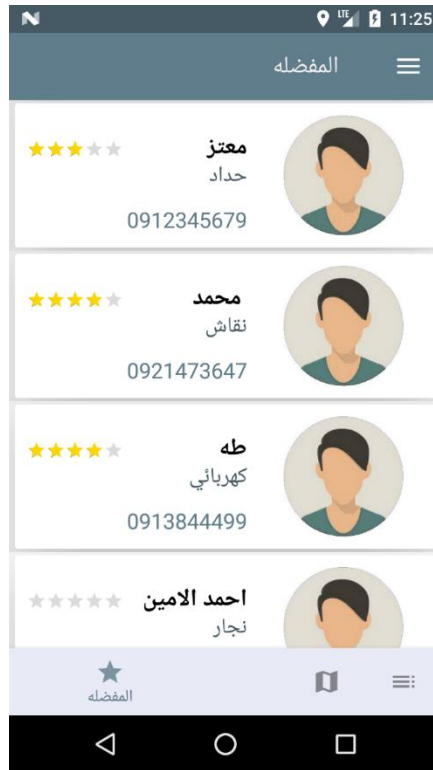


Figure 5:15 favorite interface

- **Problem description interface:**

Before the customer submit his order he may descrip the problem to the technican to give them overview about the problem. Shown in figure (5:16)

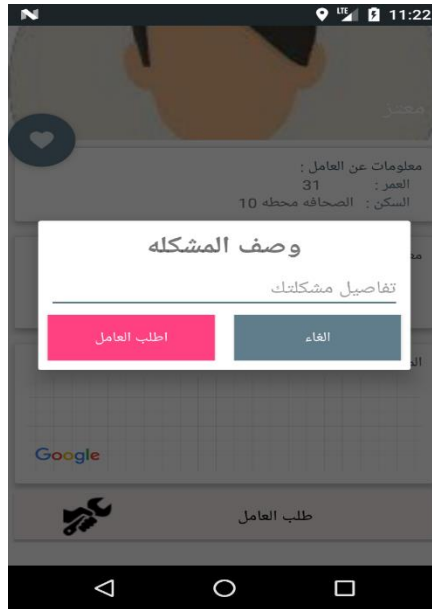


Figure 5:16 Problem Description interface

- Rate the technician interface:

In this interface the customer will rate the technician. Shown in figure (5:17)

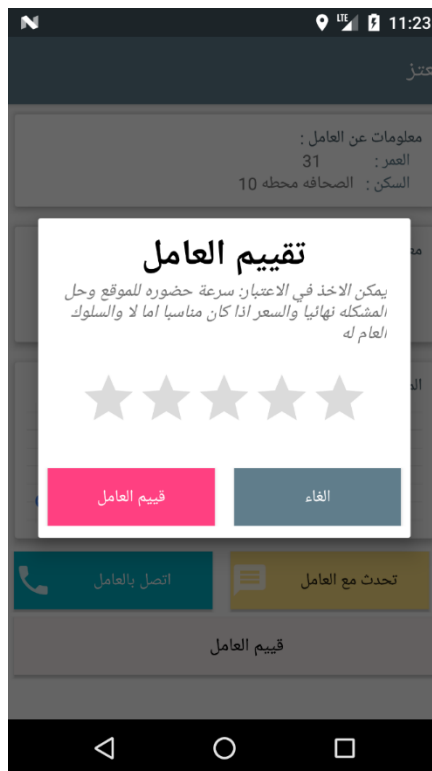


Figure 5:17 Rate the technician interface

- About Repairing System interface

It is interface with brief information about the application and bottom to submit a feedback Shown in figure (5:18)



Figure 5:18 About Repairing System Interface

- Navigation interface:

Its interface that help user get from one interface to another easily. Shown in figure (5:19)

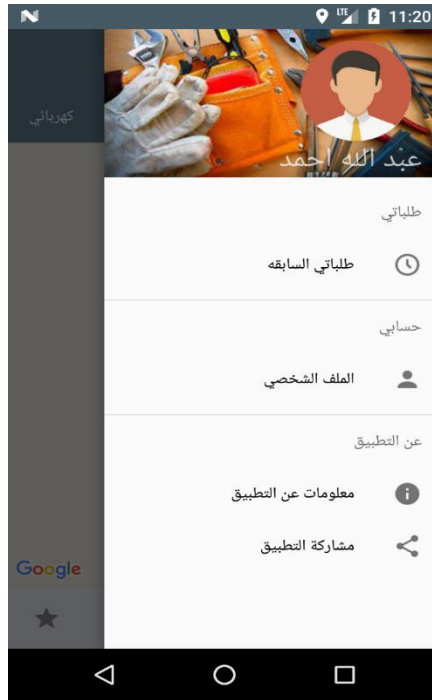


Figure 5:19 Customer Navigation Menu

- Share application interface:

Here is where the customer can share the application with his friends. Shown in figure (5:20)

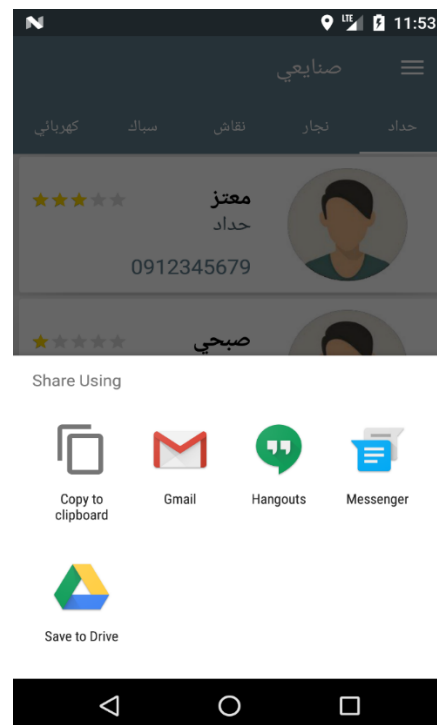


Figure 5:20 Share Application Interface

5.3.3 Technician Interfaces:

- Home interface:

In technician application the home interface displays his old and new order shown in figure (5:21), also it show the location of these orders as shown in figure. There are on off toggle to let the technician change his status available of unavailable when he is not available the interface the application color will be in red ,also he will not appear in the customer’s list of technicians.

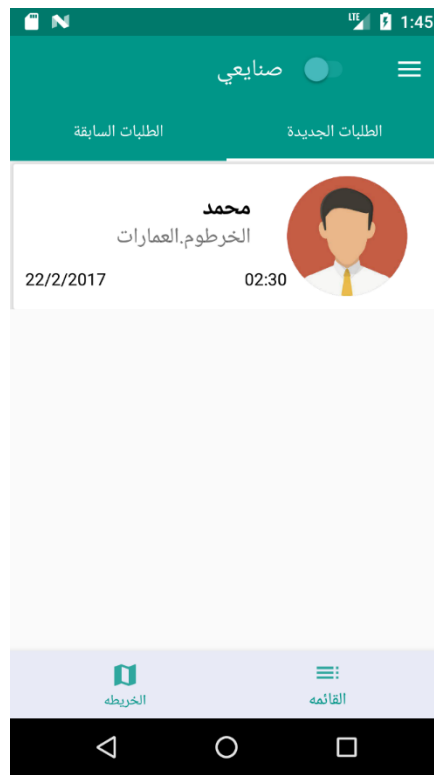


Figure 5:21 Technician Home interface



Figure 5:22 Technician Map interface

- Order accept or reject:

When the technician receive new order he can see the details of it and then he decide to accept or reject the order as show in figure (5:23).

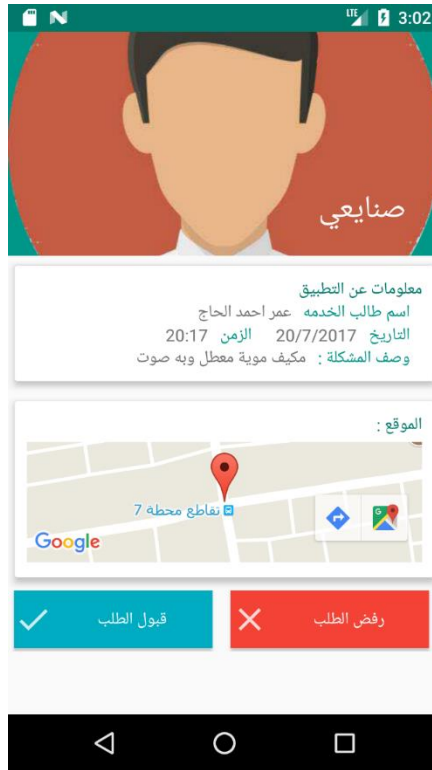


Figure 5:23 Accept or reject order interface

- Profile interfaces:

This interface display the technician main information as shown in figure (5:24), also he can edit some of these information.as shown in figure (5:25).The technician can't change his field or phone number, only the administrator can.



Figure 5.24 Profile Interface

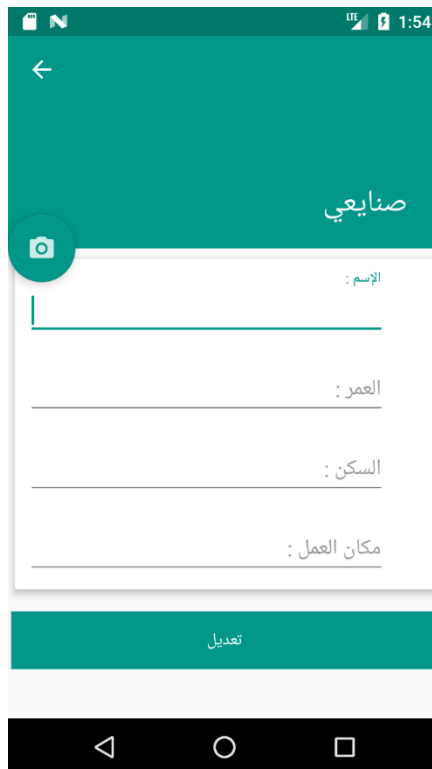


Figure 5.25 Edit Profile data interface

- Navigation interface:

Its interface that help Technician get from one interface to another easily. Shown in figure (5:26)

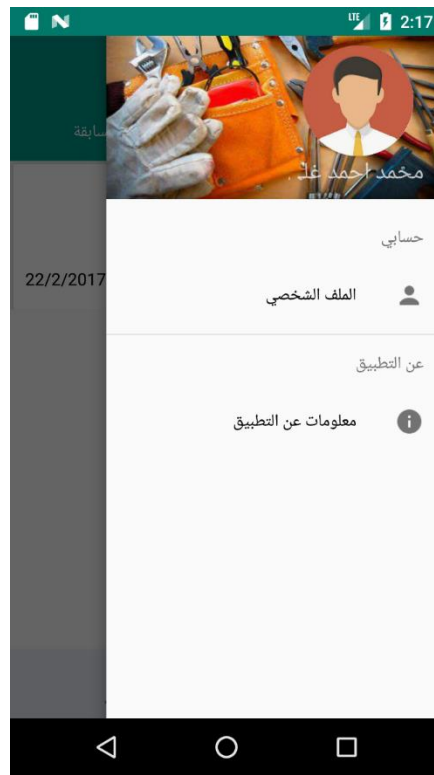


Figure 5:26 Technician navigation menu

5.4 Summary:

This chapter dealt with Application of the system and a review of the system interface of the system administrator and the users (Customer, Technician).

Chapter 6

Results, Conclusion and
Recommendations

6.1 INTRODUCTION

This chapter deals with the search results that have been accessible after conducting various tests on the system and recommendations for future research and studies.

6.2 RESULTS

The application was tested in android smart phone with GPS service and achieved the goals of the research successfully by:

- Identified the locations of the technicians to help users find efficient technicians.
- Save time and effort for the user in spending hours to search for a suitable technician.
- The application has help technicians to find jobs.
- The application provide a competition between technicians (because the rating process).

6.3 CONCLUSION

The nature of human is to hope to the best plan for the worst. After testing the application and showing the result, the performance was as expected.

As we hope and expect it to be in the near future this application or similar a fundamental procedure for find skilled, efficient and Specialist technician

6.4 RECOMMENDATIONS

After the completion of this project and applied it, we recommend the following to improve the system

- More development of the system and make it work on more than one operating system for smart phones (e.g. IOS, Windows Phone) to keep up with technological evolution.
- Make the application support wider android versions (under API 15 screen sandwich).
- Find average prices for faults through which prices are determined.
- Develop the application so that support the electronic payment.
- Add the possibility to attach photos and video files for failures.
- Create a mechanism to test the technician and prove their actual skill in specific field.

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