Projection Visual Acuity

Chart-Calibration

Software Requirements Specification of the project being carried out at

Visint Health Care Pvt. Ltd.

Manipal

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submitted by

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Chapter 1

Introduction

The unprecedented opportunity offered by mobile technology to transform eye care is driving transformational innovation. The current system is a computerized version of the eye diagnosis application for windows. Drawbacks observed in the existing system are that the application is not a portable device and is a standalone system.

The application developed will be for an android device such as smart phone or a tablet which is portable and very helpful to doctor in taking consideration the present scenario, where usually doctors use different type of charts such as Snellens Chart, Landolt C Chart, etc. which is printed on a chart paper. This application makes sure that the entire eye check-up is fully digitized and helps the doctor in finding a better solution for different eye problems.

1.1 Document Purpose

The main purpose is to help the designers, developers and testers who are responsible for the development of the application entitled ”Projection Visual Acuity Chart”. It should give the developers all the information necessary to design, develop and test the system. It assists in validating with the client that the product which is being delivered satisfies their need. This section of the Software Requirements Specification helps the readers of this document to understand the purpose of this system and the document at a glance.

1.2 Product Scope

This describes the requirement of the system. It is meant for use by the developer and will be the basis for validating the final delivered system. Any changes made to the requirement in the future will have to go through the formal change approval process. This document contains a complete description of the functioning of the ”Projection Visual Acuity Chart”. This is to ensure that the person reading the document understands in brief what the system is all about.

Chapter 2

Overall Description

This chapter includes characteristics, design, implementation constraints and few concepts that describes overall functionality of the application.

2.1 Product Perspective

The ”Projection Visual Acuity Chart” project is a new, self-contained product intended for use on the Android platform. The Project ”Projection Visual Acuity Chart-Calibration” is an Android application developed on the basis of the drawbacks observed in the existing standalone system in windows. The existing system is an application through which doctors examine the patient's vision. The drawback is that the existing system is not portable easily. The Android application developed will be used in Android devices such as tablets and smart phones, thus easily maintaining the patient details in an efficient manner and displaying the charts using a mini projector connected to the Android device thus displaying different charts with different character sizes, different number of characters per line and number of lines displayed which helps doctors get information of the patient's vision.

Flowchart: Shows the work flow of the system as shown in figure 2.1.

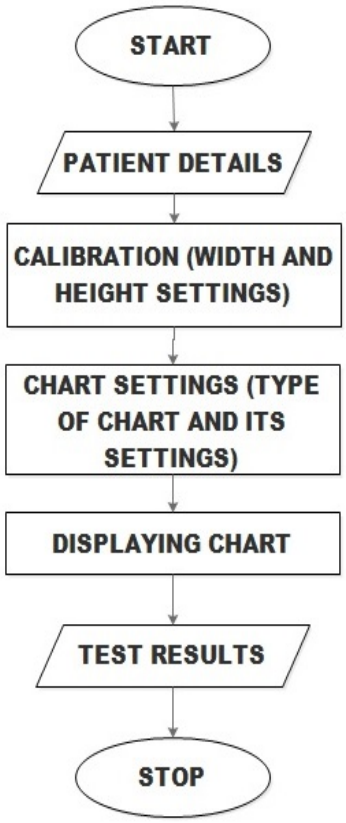

Figure 2.1: Flow Chart

2.2 Product Functionality

The following list offers a brief outline and description of the main features and functionalities of this project. The proposed project has following functionalities:

- Patient details module : This module helps the doctor to maintain the details of the patients and retrieve the same when required. It also allows the doctor to maintain the details of new patients.
- Search Box : Any search given by a user works basically to retrieve the information about patients from database and to filter out the results for quick access.

- Calibration : In the calibration module, we adjust the height and width of the character in the chart in order to diagnose patient's vision. We additionally adjust the character on the projection screen with respect to the distance between the patient and projection screen. The size of the characters in each line and the number of lines varies from chart to chart.

- Chart Settings : In this module we select different types of chart, number of lines in the chart, the number of characters per line, the shuffling of characters, the vision test settings for different eye.

- Visualizing Charts : This module exhibits the selected chart for patient's vision testing. The visualization displays different types of charts such as Snellens, Logmar, Landolt C and Sloan charts.

- Test Result : The displaying of vision details of patient with respect to the tests.

- Import and Export Database : This feature allows users to export the data related to the application and store it on the internal memory associated with device. This data can be transferred to other device and can be accessed through that device by importing the data back to phone memory.

- Report Bugs : This module is used to report bugs to the developer. The bugs is specified by the user and is sent through Gmail to the developer.

2.3 Users and Characteristics

Doctor : Doctor is a potential user who uses this software to perform optometric tests to the patients. He is the only user who uses this software and performs the tests by displaying different charts through a mini projector.

2.4 Operating Environment

The application is designed to function within android platform. The system is built using Android Studio. We utilize the Android Software Development Kit that avails us develop mobile applications on Android platform. The main component of the ”Projection Visual Acuity Chart” project is the software application, which will be limited to the Android operating system (specifically Android 4.0 and above). The application is not resource or graphics intensive, so there are no practical hardware constraints. The application will rely on several functionalities built into Androids Application Programming Interface (API). So ensuring appropriate usage of the Application Programming Interface will be a major concern. Beyond that, the application is a self-contained unit and will not rely on any other Android-related software components.

2.5 Design and Implementation Constraints

This project is completely Android based, so the basic knowledge of using an Android smart phone or tablet is necessary. In order to maintain the reliability and durability of the system, some design and implementation constraints are applied. User must have the basic knowledge of the domain in order to understand the results which are retrieved.

The primary design constraint is the mobile platform. Since the application is designated for mobile handsets, limited screen size and resolution will be a major design consideration. Creating a user interface which is both effective and easily navigable will pose a difficult challenge. Other constraints such as limited memory and processing power are also worth considering. This application is meant to be quick and responsive, even when dealing with large number of patients details, so each feature must be designed and implemented with efficiency in mind.

2.6 User Documentation

User Manual will be provided along with this product, which helps user to understand regarding how to install and use the product.

2.7 Assumptions and Dependencies

Few Assumptions and Dependencies that is taken into consideration are:

- One assumption about the product is that it will always be used on mobile phones that have enough performance. If the phone does not have enough hardware resources available for the application, for example the number of patients might be more and accessing their data would be time consuming, there may be scenarios where the application does not work as intended or even at all.
- User must have basic knowledge of how to use an Android device.

Chapter 3

External Requirements

This chapter discusses about the external requirements that are required to develop the application. It mainly tells the hardware, software and communication requirements.

3.1 User Interfaces

This application is developed using Android Studio. Adding patient details like name, address, contact details etc. as shown in figure 3.1.

Figure 3.1: Patient Registration

Calibration module : This module is used to set the distance between the patient and the projection screen . as in figure 3.2.

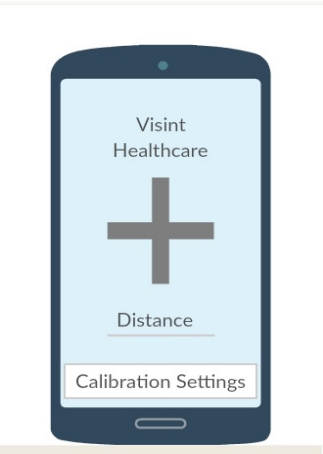

Figure 3.2: Calibration

Chart settings : This module is used to set the default value of the acuity chart. as in figure 3.3.

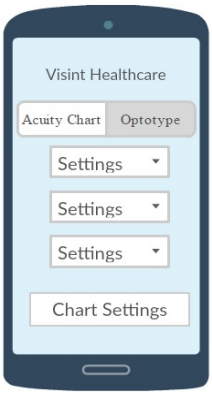

Figure 3.3: Chart Settings

3.2 Hardware Interfaces

”Projection Visual Acuity Chart” is intended as a mobile application for the Android platform and hence is solely supported on Android-powered devices.

3.3 Software Interfaces

Android Software Development Kit : The Android SDK (Software Development Kit) is a set of development tools used to develop applications for Android platform. The Android Software Development Kit includes the following:

- Required libraries
- Debugger
- An emulator
- Relevant documentation for the Android application program interfaces (APIs)
- Sample source code
- Tutorials for the Android OS

SQLite : SQLite is an in-process library that implements a self-contained, zero-configuration, serverless, transactional SQL database engine. The source code for SQLite exists in the public domain and is free for both private and commercial purposes.

Java Development Kit : The Java Development Kit (JDK) is a software development environment used for developing Java applications and applets. It includes the Java Runtime Environment (JRE), an interpreter/loader (java), a compiler (javac), an archiver (jar), a documentation generator (javadoc) and other tools needed in Java development.

3.4 Communication Interfaces

Sending an email to report bugs if any to the developers through Gmail. This requires Internet Connection from the service provider.

Chapter 4

Functional and Behavioral Requirements

This chapter discusses about the Functional and Behavioral requirements that are required to develop the application.

4.1 Functional Requirements

Functional requirement is described as a set of inputs, the behavior, and outputs. These are the following requirements

- The code needs to be highly maintainable, as software engineering and design methodology is constantly evolving. If this software product is to be updated or maintained in a time and cost effective manner, the code needs to be highly maintainable.

- The performance of a number of functions is described as being interactive. This is defined as the user being able to get continuous and quick-to-respond on the operation that they are performing.

4.2 Behavioral Requirements

Behavioral requirements defines all constraints on the system outputs (e.g., value, accuracy, timing) and resulting system state for all possible inputs and current system state. By this definition, security, safety, performance, timing, and faulttolerance are all behavioral requirements. Following are the diagrams related to ”Projection Visual Acuity Chart”:

1. Activity Diagram : Activity diagrams are graphical representations of stepwise activities. as shown in figure 4.1.

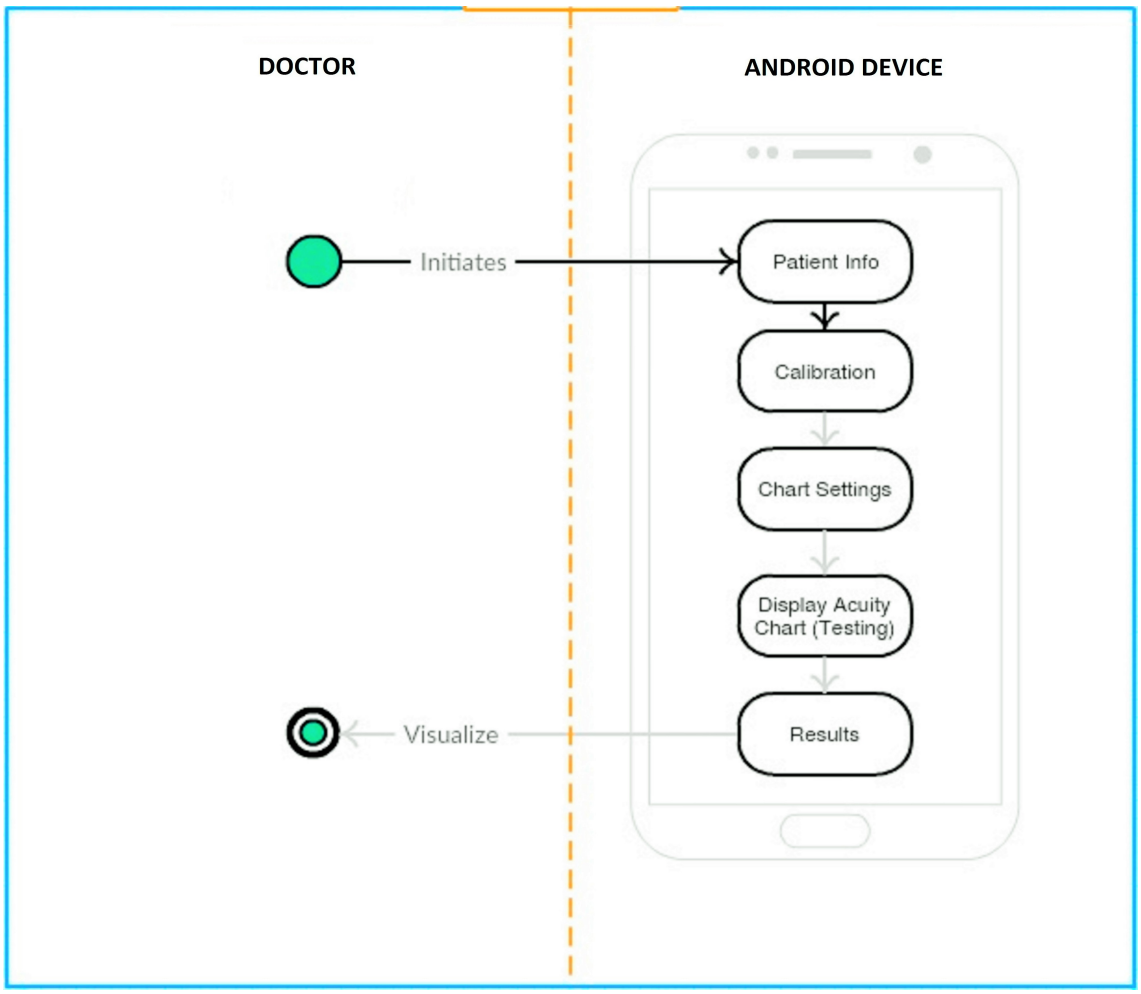

Figure 4.1: Activity Diagram

2. Sequence Diagram : Sequence diagram is an interaction diagram that shows how processes operate with one another and in what order. as shown in figure 4.2.

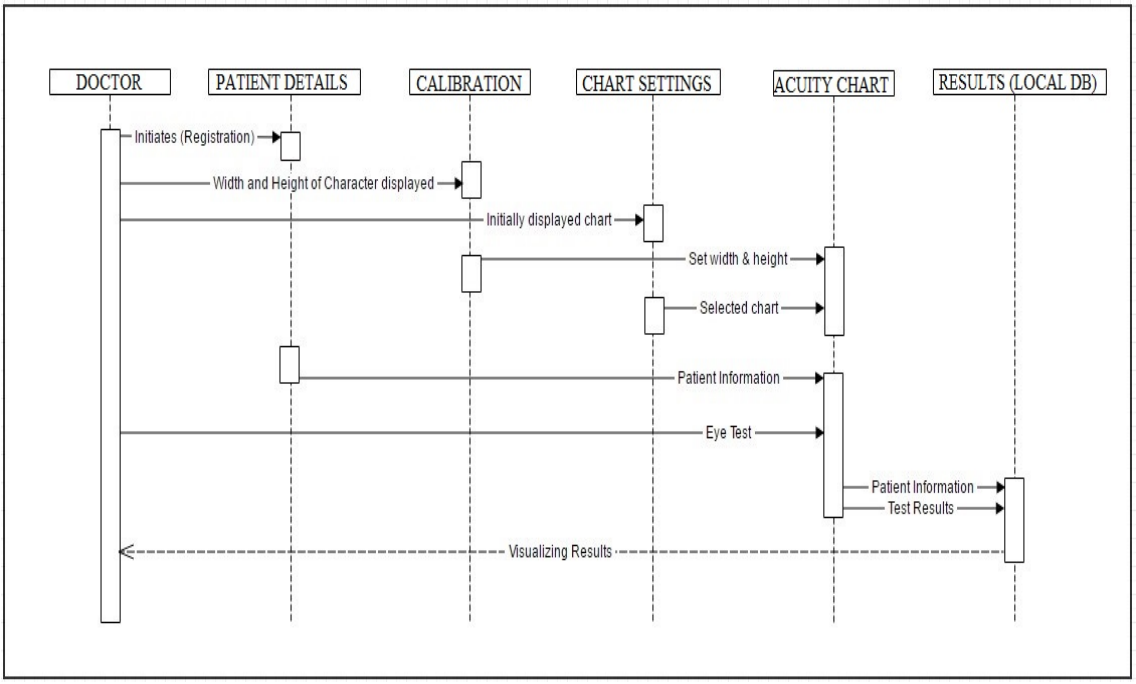

Figure 4.2: Sequence Diagram

Chapter 5

Other Non-Functional Requirements

This chapter discusses about the performance, quality and security requirements that are required to develop the application.

5.1 Performance Requirements

This application ensures fast response and works very well with the light graphics to provide user friendly experience. Changing screens will require very little computation and thus will occur very quickly. The performance depends upon hardware components of the device. This product is real time and hence should be performed in minimum requirements.

5.2 Safety and Security Requirements

There are no safety requirements with this application, other than any normal hazards of a mobile device. It cannot cause any damage to the phone or its internal components.

5.3 Software Quality Attributes

The graphical user interface of Projection Visual Acuity Chart-Calibration is to be designed with usability as the first priority. The application will be presented and organized in a manner that is both visually appealing and easy for the user to navigate. From this application the eye specialists will find it easy to perform the tests which gives accurate results and it is time saving than performing manual operation. It also makes the doctor in taking decision about further treatment, if required.

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