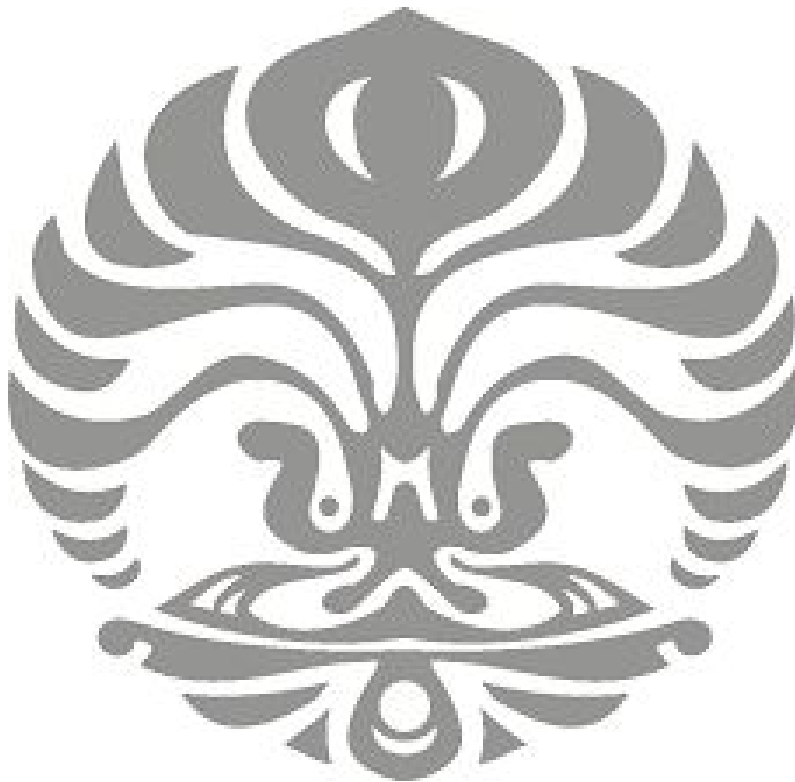


Aware-D : Voice Recognition-based Driving Awareness Detection

Software Requirements Specification

v.0.3



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Revision History

Date	Description	Author	Comments
01-10-15	v.0.1	PM	First SRS Build of the project
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11-10-15	v.0.2	SM, PM	Functional Requirements updated
05-12-15	v.0.3	SM	Diagrams and Functional Requirements updated

Document Approval

The following Software Requirements Specification has been accepted and approved by the following:

Signature	Printed Name	Title	Date
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	Cécile Duthoit	Software Manager	01 October 2015

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1. Introduction

This section gives a scope description and overview of everything included in this SRS document. Also, the purpose for this document is described and a list of abbreviations and definitions is provided.

1.1 Purpose

The purpose of this document is to give a detailed description of the requirements for the Aware-D application. It will illustrate the purpose and complete declaration for the development of system. It will also explain system constraints, interface and interactions with other external applications. This document is primarily intended to be proposed to a customer for its approval and a reference for developing the first version of the system for the development team.

In order to make the reading of this paper easier for the readers, we will consider that our main user is a man, which allows us not to need to precise “him or her”.

1.2 Scope

Aware-D is a Voice-recognition-based android application which detects if driver of a car is aware enough before driving, and while driving. The app will give simple aware-testing questions through voice and accepts answers from the driver’s voice which help to identify if the driver is still aware or not when driving, and helping the driver to keep his awareness level while driving.

The user must initiate the app to start it and answer the questions provided by the app through voice and by voice. The user also has to answer periodic questions provided by the app to make sure the driver stays aware. The app will alert the driver if certain error threshold (quantity of wrong answer) is passed by the driver in form of alarming sound, and optional sms sending to a chosen person.

1.3 Definitions, Acronyms, and Abbreviations

No	Term	Definition
1	User	The one who drives and use the system
2	App	The application/the system itself

1.4 References

This subsection should:

- (1) Provide a complete list of all documents referenced elsewhere in the SRS, or in a separate, specified document.*
- (2) Identify each document by title, report number - if applicable - date, and publishing organization.*
- (3) Specify the sources from which the references can be obtained.*

1.5 Overview

The rest of the document will cover things in 4 chapters. The next chapter, the General Description, gives the overall overview of the product's functionality. It describes the whole system, and is used to establish a context for the technical requirements in the next chapter, the third chapter.

The third chapter, the Specific Requirements, covers about the functional and quality requirements of the system. It describes the system in technical details of the functionality of the product.

The fourth chapter, Analysis Model will list the analysis model used in developing specific requirements previously given in this SRS. the model will include an introduction and a narrative description of the product

The last chapter, the Change Management Process identifies and describes the process that will be used to update the SRS, as needed, when project scope or requirements change. It also includes who can submit changes and by what means, and how will these changes be approved.

2. General Description

This section of the document will give an overview of the whole software system. The system will be explained in its context in how the system interacts with the other system (user, mobile, database, server) to provide basic functional of the system. It will also explain the type of users of the system, and at last the constraints and assumptions for the system will be explained.

2.1 Product Perspective

The system does not need a web server. We only use the smartphone and its database.

The mobile application will use the Google Voice Recognition to ask vocal questions to the user and understand their answers. All the questions and the expected answer will be stocked in the smartphone database.

2.2 Product Functions

The app will be used as a monitoring system to identify whether the driver is aware or not aware enough to drive, based on simple questions provided to be answered. The app can also be used by a third person (family, partner, etc) to monitor the user's condition when driving and give notifications through sms alert.

2.3 User Characteristics

The user will be a car driver. A driver has to drive in a good condition (not drunk, not sleepy, not on drugs), and tends to drive in long distances or in a long period of time. The user uses the app to assist him to stay alert when driving, or to identify if he is not capable of driving.

2.4 General Constraints

The app will be constrained by the Google Voice Recognition API capability and accuracy, which is used in the app to transform text into speech and speech into text form.

The hardware used to capture the voice (the mic/transducer) will also be a constraint to the app, as the mic on every smartphone varies by quality and accuracy of voice-capturing.

Another constraint is the user, the user must activate the app before usage for the app to be functional.

2.5 Assumptions and Dependencies

The assumption on the app, the mobile app will only run on mobile phones with Android OS running version 4.0 and later, with sufficient hardware requirement (microphone and sufficient storage space).

3. Specific Requirements

This section covers about the functional and quality requirements of the system. It describes the system in detail including the features of the app.

3.1 External Interface Requirements

This section gives a description of all inputs and outputs of the system, hardware, software, and communication interfaces of the application, and displays the basic design of the user interface.

3.1.1 User Interfaces

The user interface must be simple. When the user opens the application, there is one “Start” button, and if the user clicks, a vocal question is pronounced by the app, and the user must answer. Then another question is pronounced, etc, with a total of 3 questions.

At the end of the questions, a message appears, “You seem to be able to drive” or “You do not seem to be able to drive, do not take your car”, depending of the result. If the user has answered the 3 questions correctly or not.

If the user’s answers indicate that he seems able to drive, a button called “Start to drive” appears. The user should click it before starting to drive. Then, some simple vocal questions are going to be asked every 5 minutes to be sure that the driver is still awake. If the app detects too many bad answers (less than 66% of correct answers), it makes a noisy alarm to alert the driver.

There is also a button called “Stop driving” the user can click on when they stop driving to end the questions. Then we go back to the first interface with the “Start” button.

3.1.2 Hardware Interfaces

The mobile application is not purposed for a specific hardware interfacing, a general Android Smartphone with OS version of 4.0 and later can run the application. The mic will be managed by the android system, and be used by the app through Google Speech Recognition API to convert the human voice into text, and the text in the database into voice through the speaker of the phone.

3.1.3 Software Interfaces

We will use the Google Voice Recognition API to do the words-to-speech and speech-to-words conversions.

All the datas (questions and answers expected) are saved in the mobile phone database, as well as the users’ data (username and contact to be alerted in case of a loss of awareness detected) and the statistical data.

3.1.4 Communications Interfaces

The communication between the parts of the system and between the app and the smartphone database will be managed by Android OS.

3.2 Functional Requirements

This section describes specific features of the software project and includes the requirements that specify all the fundamental actions of the software system

3.2.1 User

3.2.1.1 User Function 1.1

ID : UF1

Title : Download Mobile Application

Desc : A user should be able to download the mobile application through an APK file of this application. It's free to download

RAT : In order for a user to download the mobile application.

DEP : None

3.2.1.2 User Function 1.2

ID : UF2

Title : Download and notify users for new releases

Desc : When a new/updated version or release of the software is released, the user should check for these manually. The download of the new release should be done through the mobile phone in the same way as downloading the mobile application

RAT : In order for a user to download a new/update release

DEP : UF1

3.2.1.3 User Function 1.3

ID : UF3

Title : User ability to hear and speak english– Mobile application

Desc : Given that a user should be able to hear, understand and speak english and so be able to answer the questions.

RAT : In order for a user to understand and answer the app questions.

DEP : UF2

3.3 Use Cases

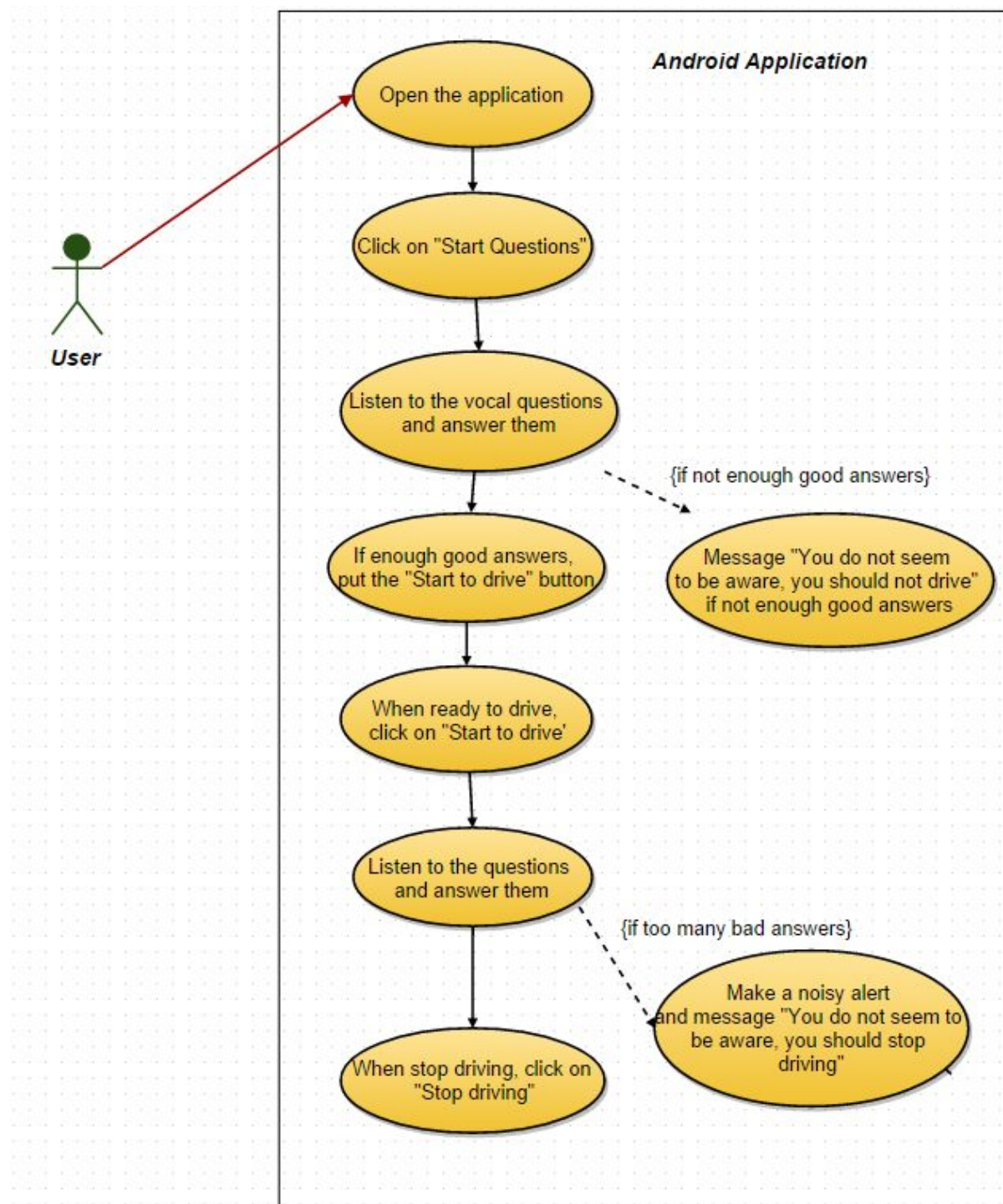


Figure 1. DATS Use Case Diagram

3.4 Classes / Objects

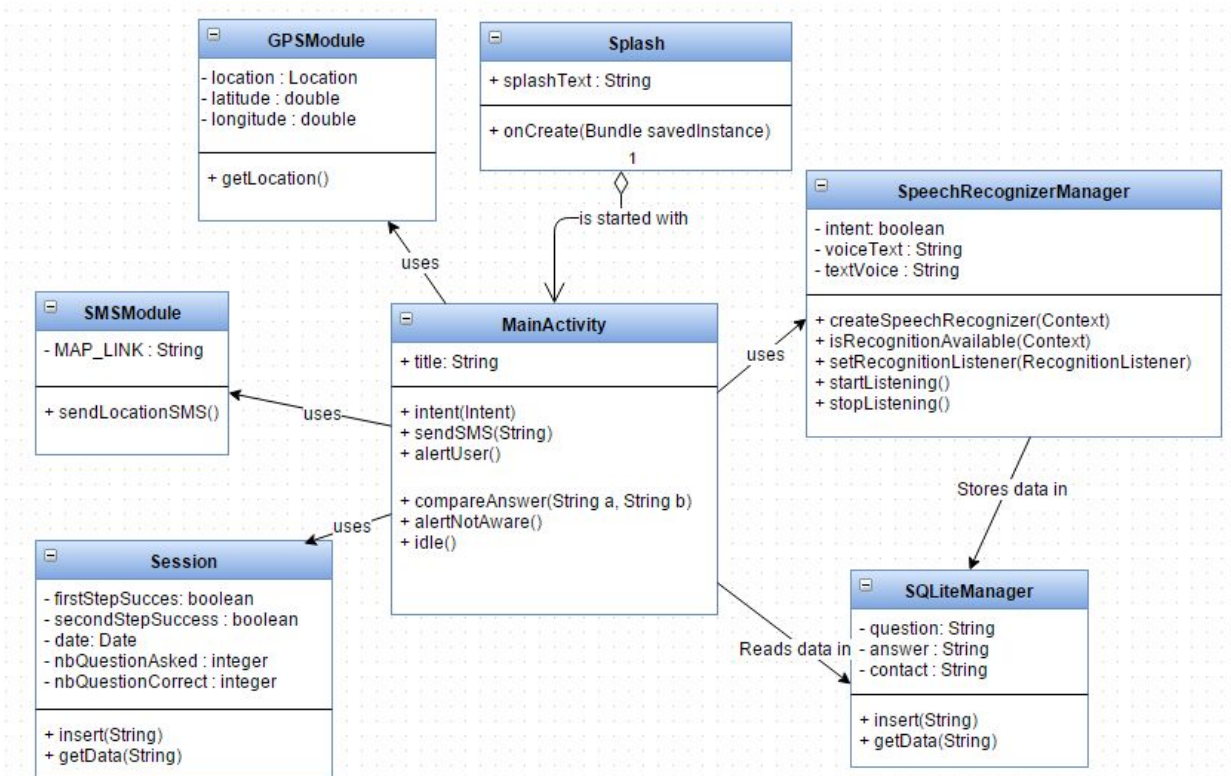


Figure 2. DATS Class Diagram

3.4 Functional Requirements

This section will cover the non-functional requirements of the application, which is achieved by the overall of the system.

3.5.1 Performance

This section give detail specification of the user interaction with the system and the system performance is measured

3.5.1.1 Usage of the user interface

ID: NFR1

TITLE: Usage of the User interface

DESC: The user interface should be user friendly and should clearly provide the basic information (button for the operations and to exit).

RAT: In order to make the user easily using the app.

DEP: none

3.5.1.2 System Fault Tolerance

ID: NFR2

TITLE: System Fault Tolerance

DESC: The fault tolerance of the system, if the system loses the connection to the Internet (needed for the voice recognition), the user will be alerted

3.5.2 Reliability

This section explains the reliability aspect of the system.

ID: NFR3

TAG: SystemReliability

GIST: Reliability of the system

SCALE: The system provides a correct voice recognition of what the user says.

METER: Measurement is obtained from 50 hours of the test

MUST: More than 60% of the time

PLAN: More than 80% of the time

WISH: 99% accuracy

3.5.3 Availability

This section explains the availability aspect of the system.

ID: NFR4

TITLE: Internet Connection

DESC: The application should be connected to the Internet.

RAT: In order for the application to use the Google Voice Recognition.

DEP: none

3.5.4 Security

ID: NFR5

TITLE: Security of users personal information

DESC: The application should be secure enough not to let anyone else than the user have access to his answers and personal information.

RAT: In order to protect the user

DEP: none

3.5.5 Maintainability

ID: NFR6

TITLE: Application extendibility

DESC: The application should be easy to extend. The code should be written in a way that it favors implementation of new functions.

RAT: In order for future functions to be implemented easily to the application.

DEP: none

ID: NFR7

TITLE: Application testability

DESC: Test environments should be built for the application to allow testing of the applications different functions.

RAT: In order to test the application.

DEP: none

3.5.6 Portability

ID: NFR8

TITLE: Application portability

DESC: The application is only portable with Android

RAT: The adaptable platform for the application to run on.
DEP: none

3.6 Design Constraints

This section will cover the design constraints of the software caused by hardware limitations.

3.6.1 Disk Drive Space

ID: NFR9

TAG: DiskDriveSpace

GIST: Disk drive space.

SCALE: MB (Mega Bytes)

METER: The application's need of disk drive space.

MUST: No more than 15 MB.

PLAN: No more than 10 MB.

WISH: No more than 5 MB.

3.6.2 Memory Usage

ID: NFR10

TAG: MemoryUsage

GIST: The amount of Operate System (Android) memory occupied by the application.

SCALE: MB (Mega Bytes).

METER: Observations done from the performance log during testing

MUST: No more than 15 MB.

PLAN: No more than 10 MB

WISH: No more than 5 MB

3.7 Logical Database Requirements

This section explains the database requirements used in the system in order to support the mobile application with stored data in the database.

3.7.1 Data Format

In the smartphone database will be store all the questions and answers expected for the application. Also the user will be allowed to add one or several phone number(s) of people they want to alert if the app detects a possible drunk driving behaviour. All the data from the previous use are also stored in the database to make statistics charts.

4. Analysis Models

This Section will list all analysis models used in developing specific requirements previously given in this SRS.

4.1 Sequence Diagrams

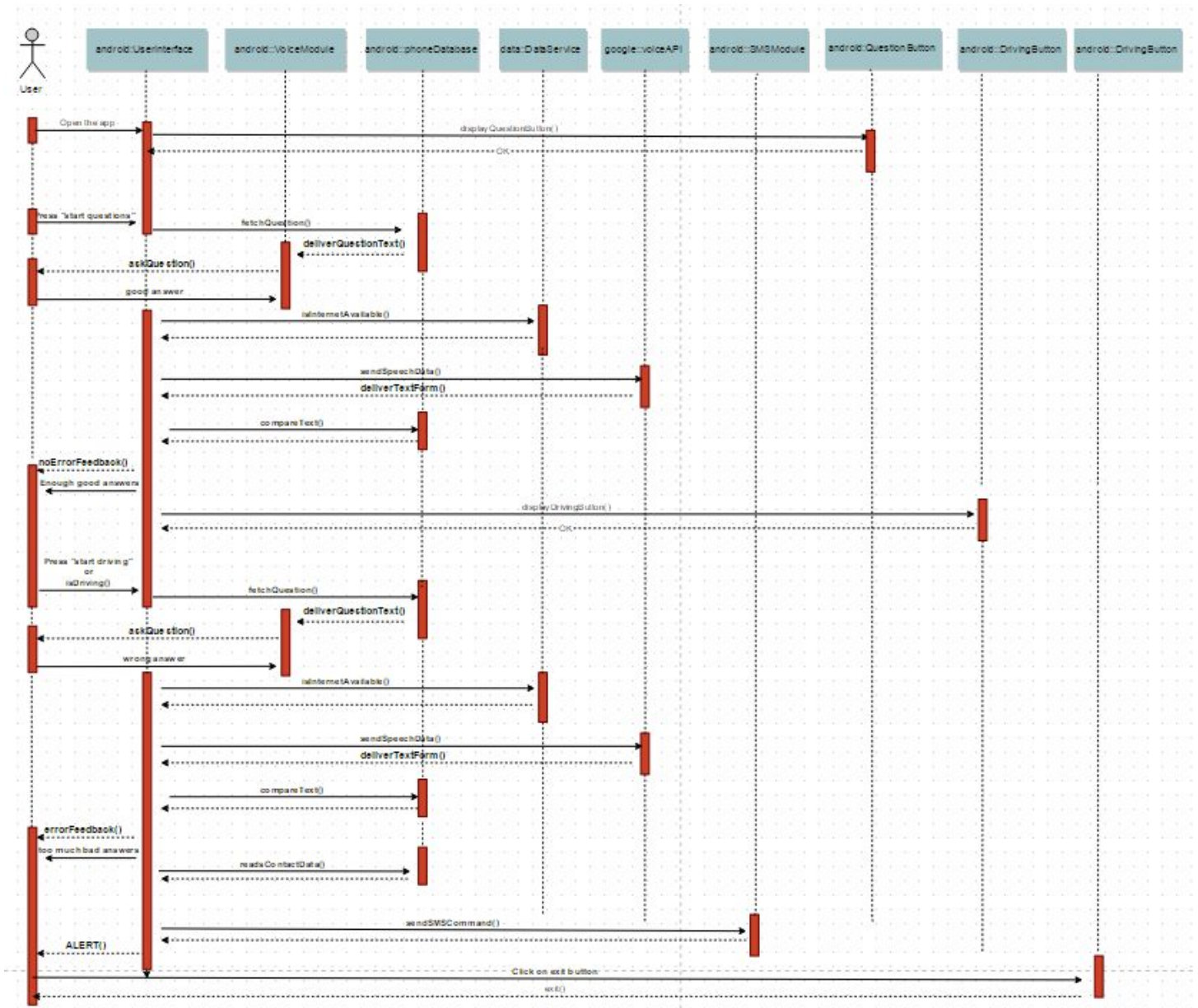


Figure 3. DATS Sequence Diagram

5. Change Management Process

Changes in the document will be made after approval from the Project Manager. The change themselves will be done by the team members.