

TABLE OF CONTENTS

INTRODUCTION	1
OVERVIEW	2
BUSINESS CONTEXT	3
GLOSSARY	3
GENERAL DESCRIPTION	5
PRODUCT FUNCTIONS	5
USER CHARACTERISTICS AND OBJECTIVES	5
OPERATIONAL SCENARIOS	6
CONSTRAINTS	7
FUNCTIONAL REQUIREMENTS	8
DOWNLOAD APPLICATION	8
ORGANISE PICTURES	8
VERBALIZE WORDS	9
ORDER BY FREQUENTLY USED	9
SYSTEM ARCHITECTURE	10
USER	10
GUI	10
APPLICATION SOFTWARE	11
HIGH-LEVEL DESIGN	12
HIGH-LEVEL DESIGN DIAGRAM	12
STEP-BY-STEP	13
PRELIMINARY SCHEDULE	14
PRELIMINARY SCHEDULE	14
GANTT CHART	15
APPENDICES	16

1.1 Overview

Logopenic Progressive Aphasia - a form of Alzheimer's disease which occurs at a much younger age.

Patients want to say something, but their brain struggles to retrieve and verbalize the word they are thinking of even though they have a clear picture in their brain. When this occurs on a regular every day basis it can be very frustrating and leave the person feeling inadequate. Our intention is to create an Android application which will assist such people to search for and find and verbalizing their word.

The product being developed is described as a Word Retrieval Application. It will help people with linguistic problems to remember the word they are trying to say. The Application will consist of numerous tiles which have a picture on them. Once the user sees the picture they are thinking of, they will click on that tile and the app will produce a voice prompt of the associated word then move onto a set of more specific tiles and repeat the process until the user is satisfied with their outcome. It will also contain a cache which will help users to find tiles they click often, easier.

The need for this system was specifically for sufferers of Logopenic progressive aphasia (LPA), which Primary progressive aphasia. It is most common in people who suffer from dementia. People who suffer from LPA have difficulty in retrieving the words they wish to use, which leads to a decrease in speech rate. The Application could also help any other people who may have trouble in retrieving words or non English speakers.

Also we would like to include a cache memory which would allow more frequently used tiles to appear before less frequently used tiles. However, all of this is in a very early stage.

1.2 Business Context

- **Distributing the product:**
Our intention is to help those that need it the most, therefore we have decided to release the app for free on the Google Play market in hope that it will reach a much wider audience.

1.3 Glossary of Terms

- **LPA:**
Logopenic Progressive Aphasia.
A neurological disease similar to Alzheimer's which affects the patients ability to verbalize the word they have on their mind.
- **XML:**
Extensible Markup Language.
A markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable, it will be used to design the layout of the application.
- **GUI:**
Graphical User Interface.
The user interface which allows the user to interact with the underlying code.
- **App**
A mobile app which is a computer program designed to run on a mobile device such as a phone/tablet or a watch. In this case we are referring to our Word Retrieval App.

- **Cache**
Memory storage, where frequently used program instructions are stored. It is much faster to access cache memory.
- **Android Visual Studio**
The Integrated Development Environment we will be using to develop our App.
- **IDE**
Integrated development environment.
This application facilitates application development and allows software to be run and tested.

2.1 Product/System Functions

Starting with a series of general images displaying several categories which will then produce a voice prompt of the verbal format of the image selected. It will then proceed into a sub category of more specific tiled images from which the user can then select another picture and continue until they eventually reach a word they are satisfied with. An example would be the user would click the music image on the front page, they would then here a voice saying “Music” and a new selection of images would appear, from which there are sub categories like bands, instruments, singers etc.

The goal is to create a product which will have real world use with a basic and be easy to use interface to cause minimum confusion for the user.

Below is a list of the functions we hope to implement in our App. This list may change during the creating of the App, if we feel that any function may become redundant we will not implement it or if a function worth adding is thought of, we will implement it accordingly.

- Display Picture(s)
- Organise tile(s)
- Contact creators
- Rate App
- Speak word
- Update cache

2.2 User Characteristics and Objectives

The application will be made available through the Google Play Store, free of charge. Our target audience will be anybody with Word Retrieval problems.

The App will be easy to navigate as our users may have other medical problems. To use our App only beginner knowledge of computers would be required. The App will ideally attract sufferers of LPA but could include any other groups with Word Retrieval difficulties. It could even attract children learning to speak.

Ideally, the App will be well presented and include contact information should users notice any problems which we could have missed during debugging. There will be no age restriction on using our App and pictures we use in our App will be taken from Google and must not be copyright protected.

2.3 Operational Scenarios

The operational scenarios for our App will be the same for all users as no sign in or registration is required to use our App.

- The user has some sort of word retrieval problem, whether it be a severe one or a minor one. They will then search the Google Play Store for Applications that may help with this. They find our App and download it onto their device.
 - **Successful Search**
The user opens our App then they will search through the tiles on our App until they find the picture they are looking for. The user will then click on that tile their device will then speak out the associated word. The user now knows the word they are looking for.
 - **Unsuccessful Search**
The user opens our App then they will search through the tiles on our App. They continue to search but are unable to find the picture they are looking for. The user will then find or remember the word through another source. Once the user has got the remembered the word, they will then contact us, through the contact form to inform us that we are missing that word from our App.
 - **Rate**
The user opens our App then they carry out a successful search, after they have finished searching through our App, they are either satisfied with the product or unsatisfied. They then leave a positive or negative review about our App and may suggest some edits to our App.

2.4 Constraints

Below are the main constraints we may face while creating our Application:

- **Picture/Word Quantity**
The number of tiles we can implement into our App will depend on the number of pictures and words we can gather. We will try to use an automatic way of gathering these pictures and words but we have yet to discover one. If we have to do this manually, it could be very time consuming.
- **Memory Size**
The memory size of our App will be a constraint as we must optimize the memory of our App. Many users may not have a lot of free space on their device, so we must be wish when creating our App. The most satisfactory App with the least amount of memory will be our end goal.
- **Sample Size**
Difficulty may arise in relation to the sample size which we can test our App on to receive constructive feedback. The reason for this is, not a huge amount of people suffer from LPA or word retrieval problems.
- **Time**
While creating our App, time will constantly be a constraint as we can never have enough. Many issues can arise while creating the App, which we will have to deal with quickly. More useful features could be thought of, which could add time onto our predicted deadlines.

3.1 Download/ Install App

- **Description:**
The application must be able to successful download onto the user's device and install once downloaded. If this doesn't happen correctly the user will be unable to use it.
- **Criticality:**
The ability of the App to be downloaded successfully from the Google Play store is one of the most critical functions of our App. It's also very critical that the App once downloaded will install correctly and no present any errors to the user.
- **Technical Issues:**
Numerous technical issues could arise when downloading and install the App such as poor internet connection, package errors or file errors. This could be prevented by extensive debugging.
- **Dependencies:**
Dependencies on this requirement being completed are the user must be using an Android Device, have an internet connection, sufficient memory and the App must be designed correctly.

3.2 Organise Pictures

- **Description:**
The Application must be able to sort the pictures in an elegant and easy to navigate way. If the user is unable to easily find the picture they are looking for, they may decide to stop using the App.
- **Criticality:**
This is very critical when it comes to gaining and keeping users. We must create a system which can easily sort the pictures on the App and make the App design look friendly and easy to use.
- **Technical Issues:**
Technical Issues could arise with the image resolution, image quality or sorting problems when the App is displaying an organising the pictures.
- **Dependencies:**
Dependencies on this requirement being completed successful are a good resolution device being used by the user.

3.3 Verbalize Words

- **Description:**
The App must produce a voice prompt of the word associated with the tile clicked.
- **Criticality:**
This is critically important as it is the end goal for the user to hear their word.
- **Technical Issues:**
Generating the sound for each of the pictures could be difficult and there may be limitations on the devices that could be used.
- **Dependencies:**
Device speakers and word translation software.

3.4 Order By Frequently Used

- **Description:**
If the user is frequently clicking on certain images, this may indicate pattern. The App should be able to reorganise the pictures in a way, that makes it easier for the user to find these pictures. It would eliminate a lot of time for the users.
- **Criticality:**
This requirement is not as critical as the ones listed above but is still quite important in our opinion. This would save the user time which would lead to a greater satisfaction from using the App.
- **Technical Issues:**
This may be more difficult to implement using the tools at are disposal, but we will try many different techniques to implement this successfully.
- **Dependencies:**
Cache memory size and an appropriate sorting algorithm.

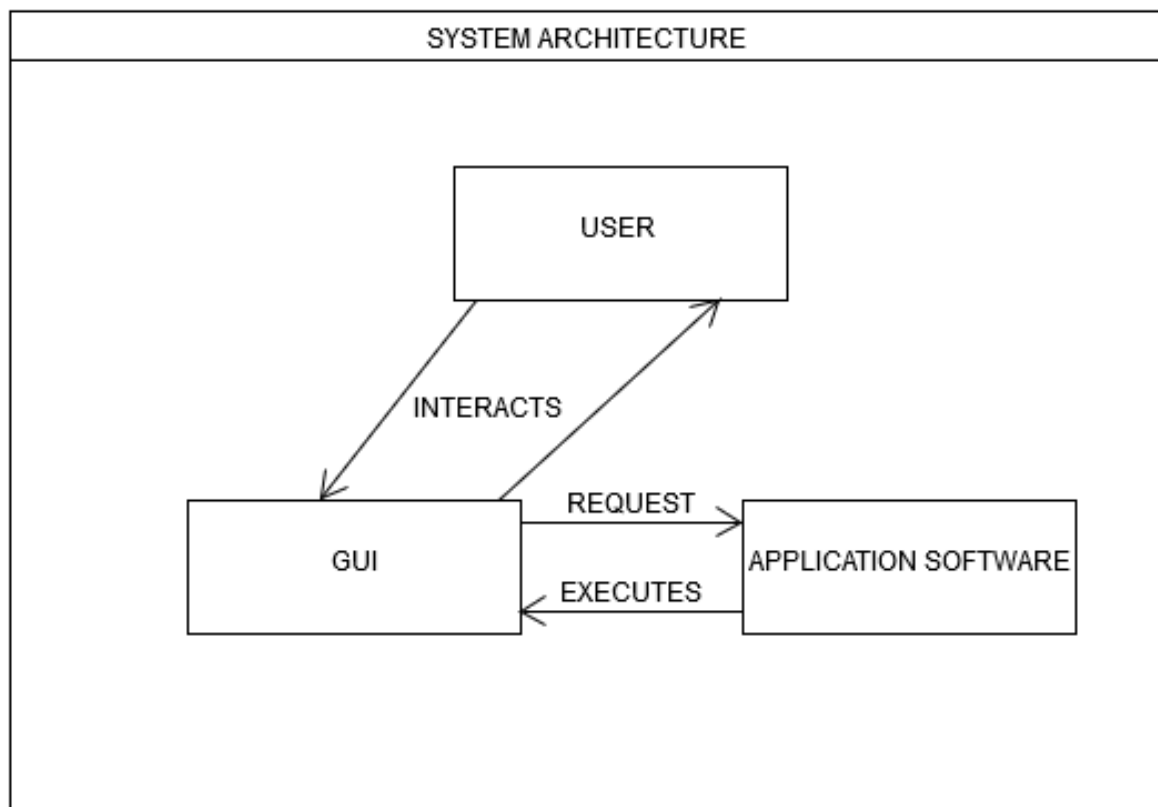
**Fig 4.1**

Fig 4.1 the above diagram illustrates the architecture of our project, the first aspect is the user who then interacts with the graphical user interface (GUI) of the application, which then executes the software of the application.

4.1 User

- The user will interact with the GUI of the App. This will consist of the user pressing and clicking on different parts of the App. Depending on where the user does this, the App will react differently.

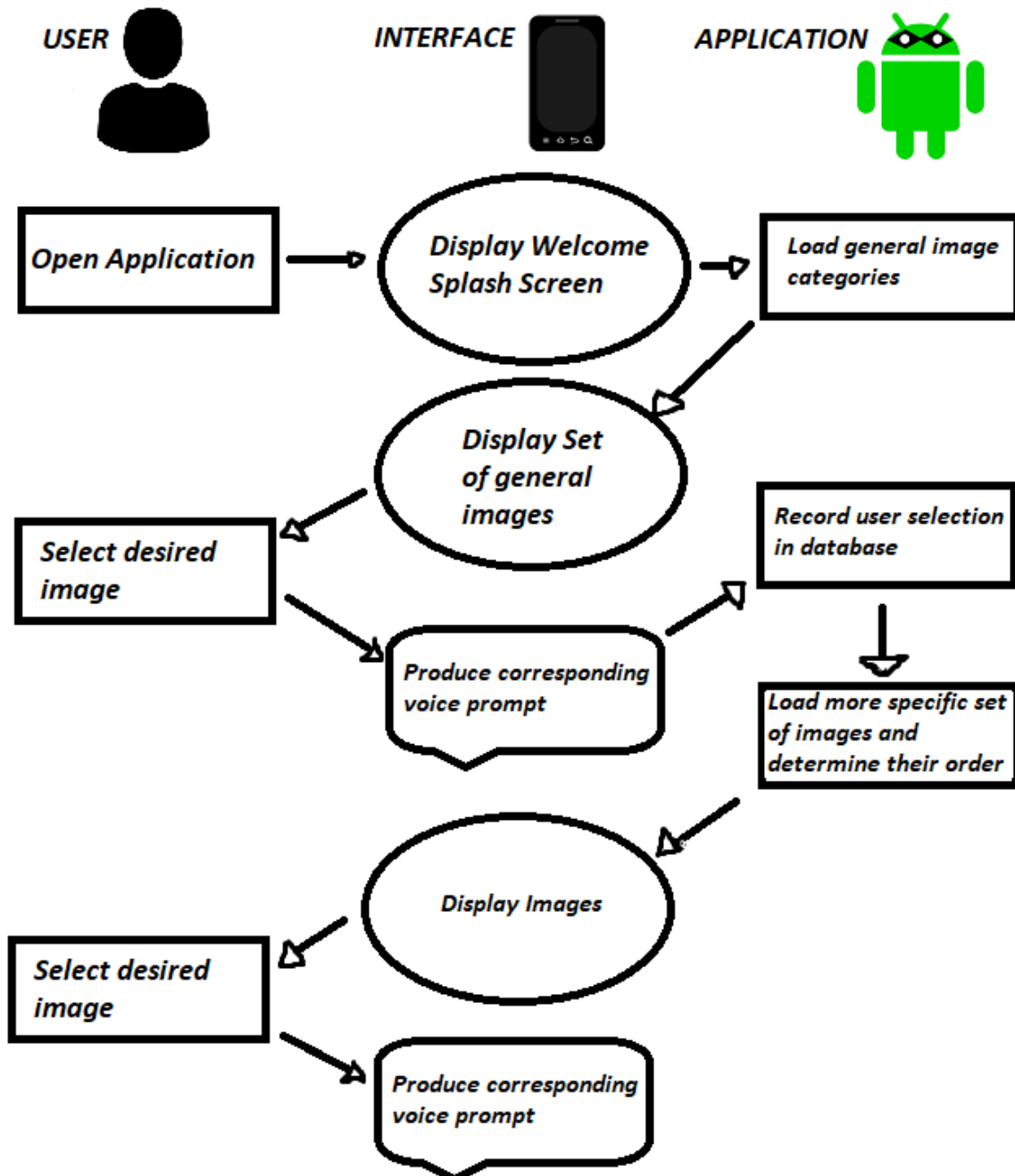
4.2 GUI

- This is the interface which the user will be seeing and interacting with when using the App. It will consist of pictures, task bars and other relevant elements.

4.3 Application Software

- This part of the software will contain all the code for our Application. This will decide how our GUI reacts when the user interacts with it. This code will be written using the Android Visual studio software and is one of the most important parts of the system.

5.1 High Level Design Diagram



5.2 High Level Design, step by step.

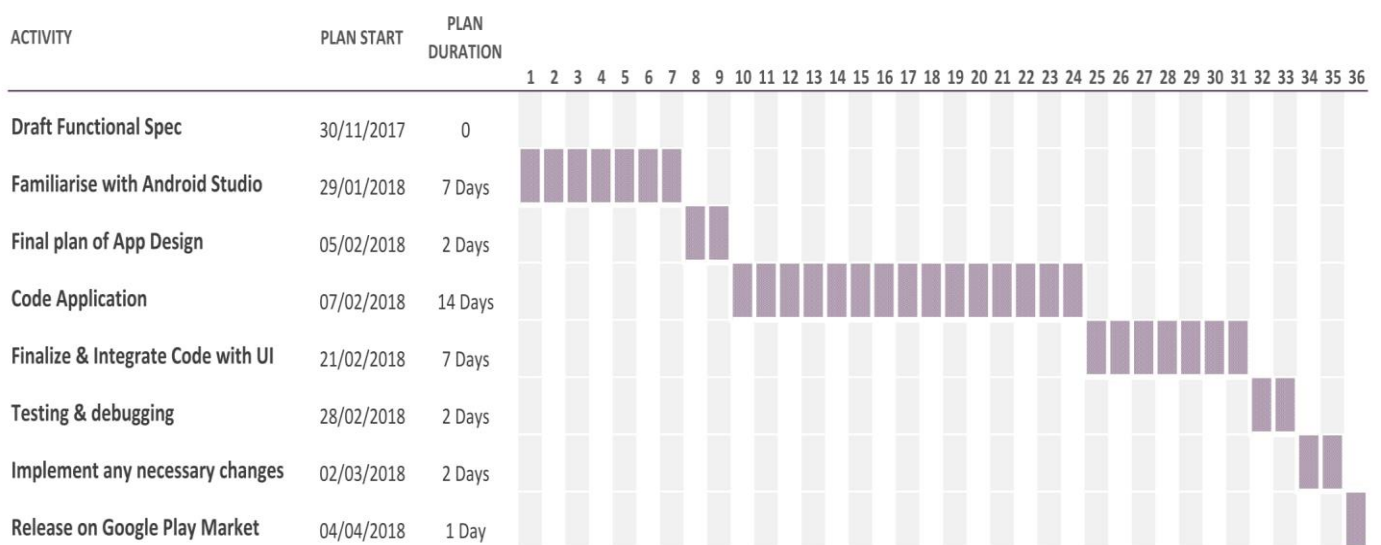
1. User opens Application.
2. Application produces loading splash screen.
3. Interface displays a set of general images.
4. User selects desired category.
5. The interface then produces a voice prompt associated with the users selection.
6. The app records the users choice and then loads a set of more specific images determined by users past choices.
7. The user can then select from another series of images.

6.1 Preliminary Schedule

1. Get a firm understanding of Android studio and Android App development.
2. Finalize design plan of the application.
3. Commence coding of application and GUI.
4. Finalize coding and integrate with interface.
5. Testing and debugging.
6. Fix and resolve any issues encountered.
7. Release on Google Play Market.

6.2 GANNT Chart

Word UP!



7. Appendices

Information sources:

<http://www.theaftd.org/understandingftd/disorders/logopenic-variant-primary-progressive-aphasia>

Image source:

<https://openclipart.org>

Android Studio:

<https://developer.android.com/studio/index.html>

Java API Libraries:

<https://docs.oracle.com/javase/7/docs/api/>