

Kingdom of Saudi Arabia

Ministry of Education

Al-Imam Muhammad Ibn Saud Islamic University



Faculty of Science and Humanities - Huraymila

College of Computer Sciences & Information Technology

## GRADUATION PROJECT

Title:

(Android Mobile Application)



*Figure 1: For You Application*

لأجلكم  
**For you**

**Prepared by:**

|                         |                  |
|-------------------------|------------------|
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*Table 1: Student Declaration*

**Supervisor:** Dr. Areej Alghaith.

**SEMESTER 1**

**2021 / 2022**

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## ABSTRACT

*This application aims to enable deaf-mute people to gain independence and self-reliance in completing service procedures. The application is based on defining the target classification according to the deaf-mute category, which enables them to choose text-embed in image, to create sentences then pronounce this sentence using speech reader, so the other person can understand his/her message. This application is designed for People of Determination to remove communication barriers and integrate them with the community around them.*

## PROJECT OUTLINE:

**Chapter 1:** A summary of the problem to be solved, the objectives of the project to be built and the action plan with a clarification of its steps.

**Chapter 2:** literature review of mobile application development and create competitive table.

**Chapter 3:** Explain the System Methodology and describe the user requirement, functional and non-functional requirement.

**Chapter 4:** Represent UML diagrams (Use Case, Sequence Diagram, ERD, Class diagram) and write use-case description.

**Chapter 5:** Description of hardware and software used to develop the application and design the systems interfaces.

**Chapter 6:** In this chapter we will apply different types of testing (Unit Testing & Test Cases) to ensure that the system functions meet all system functional requirements.

**Chapter 7:** Explain Conclusion, challenges encountered, and what we intend to do in the future.

# CHAPTER1

## 1. INTRODUCTION



Figure 2: deaf-mute

## **1.1introduction**

### **Why are our Senses being so Important?**

Our senses have significant impacts on us as our connection to the world around us depends on them, so we need them to perceive our environment and to interact with other people. It also helps with everyday tasks such as driving, talking to people, or performing activities at work. They are closely connected to our emotions and memories as they have a very dramatic impact on the way we feel. Not only that but it is also connected to our enjoyment of many experiences like eating a meal or listening to music. Thus, if anything interferes with the function of these senses, it will limit our interactions with the world and make it harder to perform certain activities. Hearing loss may be caused by a number of factors, including genetics, aging, exposure to noise, some infections, birth complications, and trauma to the ear. However, about half of hearing loss globally is preventable through public health measures through such practices including immunization, proper care around pregnancy, avoiding loud noise, and avoiding certain medications. Consequently, it's important to seek help if you have problems with any of your senses as it's often possible to do something about it. Since many of our senses are detected by organs in the ears, nose and throat, it will often be necessary to see an ENT specialist. Also, The World Health Organization recommends that young people limit exposure to loud sounds and the use of personal audio players to an hour a day in an effort to limit exposure to noise.

## **1.2 Definition of the problem**

Communication difficulties arising from damage of hearing or speaking directly affect the quality of life. Difficulties in communication may result in deviations in emotional and social development and have a significant impact on the quality of life of every person. It is well recognized that hearing is critical to speech and language development. Mutism is defined as an inability or unwillingness to speak which results in an absence or marked paucity of verbal output.

People face many irritations and frustrations that limit their ability to do everyday tasks. Research indicated that mute people, especially children, have high rates of behavioral and emotional issues in relation to different methods of communication. Most people with such disabilities become introverts and resist social connectivity and face-to-face socialization. The inability to speak with family and friends can cause low self-esteem and may result in social isolation.

## **1.3 Proposed solution**

We are developing an application that facilitates the process of communicating and interacting between Deaf-mutes with people, conveying their feelings, helping them express their different needs, promoting their mental development, and ridding them of fear, depression and frustration.

Our proposed system includes converting the meaningful images to pronounced speech and the main software which we will use here is Android Studio and Java programming language.

## There are four types of users:

1. **Deaf-mute:** They are the main users of our application, where there will be a category of most-used places, such as, an airport, a restaurant, a hospital etc., then the deaf-mute will choose the meaningful image, and the word will be pronounced using speech reader, so another person understands what the deaf-mute wants.
2. **learner:** They are non-deaf mutes who want to learn sign language in order to communicate effectively with deaf-mutes, promote and develop the use of sign language.
3. **Guest:** The person who will visit and use the application without creating an account, this user will not be able to add items to Favorite.
4. **Administrator:** A person who manages the user accounts from the database.

## 1.4 System Scope

The scope of our project is to develop an application that helps the deaf-mute to facilitate the process of communicating with others and allows them to express what they want without embarrassment or confusion, also allow non-deaf-mute people to learn sign language in order to communicate more effectively with deaf-mutes. Our application will run using Internet connection, we will need to use SQL server to store the data of users such as name, age, etc. and also to store meaningful images. In our application, we will use a category of places, such as, an airport, a restaurant, a hospital etc. , then the deaf-mute will choose the meaningful image, and the word will be pronounced using speech reader, so another person will understand what the deaf-mute wants. The system will create a profile for each user containing user main information and we will use Adobe XD for designing the user interface. The language of the application will be the Arabic since the main user is an Arab's deaf-mutes, and the project will be designed as a mobile application to be implemented on the Android platform. The app will use the facilities available in the Android platform using java programming language to develop the app.

## **1.5 The main goal**

The main goal of this system is to improve the understanding of the conversation between deaf-mute people and non-deaf-mute, thus facilitating the communication process, and giving an opportunity for non-deaf-mute to learn sign language, including a clear, user-friendly design and accessible application interface. The proposed application provides the following features and benefits:

- 1.** Enabling the Deaf-mute people to be independent and self-reliant in completing the procedure of services.
- 2.** Removing communication barriers to serve the Deaf-mute.
- 3.** The app uses target classification by deaf-mute category of places, such as, an airport, a restaurant, a hospital etc , which enables it to identify and click on the meaningful image and then translate them to pronounce words, so the other person can understand the message.
- 4.** The application allows non-deaf-mute who want to learn sign language in order to communicate more effectively with deaf-mutes, promote and develop the use of sign language.

## **1.6 The main objectives**

1. Our application will be easy to use, and will have an attractive interface.
2. Our application will be available for free and will work properly 24/7.
3. Our application will allow us to classify deaf-mute places such as airports, restaurants, hospitals, etc.
4. Our application will allow to learn sign language in order to communicate more effectively with deaf-mutes.
5. Our application will allow to facilitate the process of communicating between deaf-mute with others.
6. Our application will allow the deaf-mute to choose a category.
7. Our application will allow to create an account and store the user data in databases.
8. Our application will allow to read the text-embed in image using a speech reader.
9. Our application will allow the deaf-mute to display his/her profile information.
10. Our application will allow the deaf-mute to add the meaningful items to Favorite.
11. Our application will allow the learner people to learn from videos and images.

## 1.7 Requirement

### Hardware requirement:

- Laptop.
- Android mobile device.
- Modem to connect to the internet.

### Software requirement:

- Android Studio 2020.3.1.: Android Studio provides the fastest tools for building apps on every type of Android device.
- Adobe XD 22.0.1. : is a vector-based UI and UXdesign tool for web apps and mobile apps,
- Google Chrome: Web browser
- Java SE Development Kit 16.0.2.: development environment for building applications using the Java programming language.
- Cacoo Website: to create and securely share flowcharts, wireframes, UML models, network diagrams and more
- Microsoft Windows 10: operating system for personal computers
- Firebase: is a Backend-as-a-Service (BaaS). It provides developers with a variety of tools and services to help them develop quality apps, grow their user base, and earn profit. It is built on Google's infrastructure.
- Google Docs: Web-based application in which documents and spreadsheets can be created, edited and stored.
- Google Meet: video conferencing app, it is the business-oriented version developed by Google.
- Canva: Canva is a graphic design platform, used to create social media graphics, presentations, posters, documents and other visual content.

- Lucidchart: Lucidchart is a visual workspace that combines diagramming, data visualization, and collaboration to accelerate understanding and drive innovation.
- PowerPoint: a software package designed to create electronic presentations consisting of a series of separate pages or slides.
- Pinterest: is an image-based social media network where users and businesses can promote and explore their interests by pinning images and videos on virtual bulletin boards.

## 1.8 System cost

We will use open-source software.

## 1.9 Timeline

| task      | start date | end date | duration |
|-----------|------------|----------|----------|
| chapter 1 | 7-Sep      | 23-Sep   | 16       |
| chapter 2 | 28-Sep     | 7-Oct    | 9        |
| chapter 3 | 7-Oct      | 19-Oct   | 12       |
| chapter 4 | 20-Oct     | 10-Nov   | 21       |
| chapter 5 | 10-Nov     | 19-Nov   | 9        |
| chapter 6 | 1-Feb      | 26-Apr   | 84       |
| chapter 7 | 20-Nov     | 29-Nov   | 9        |

Table 2: Timeline

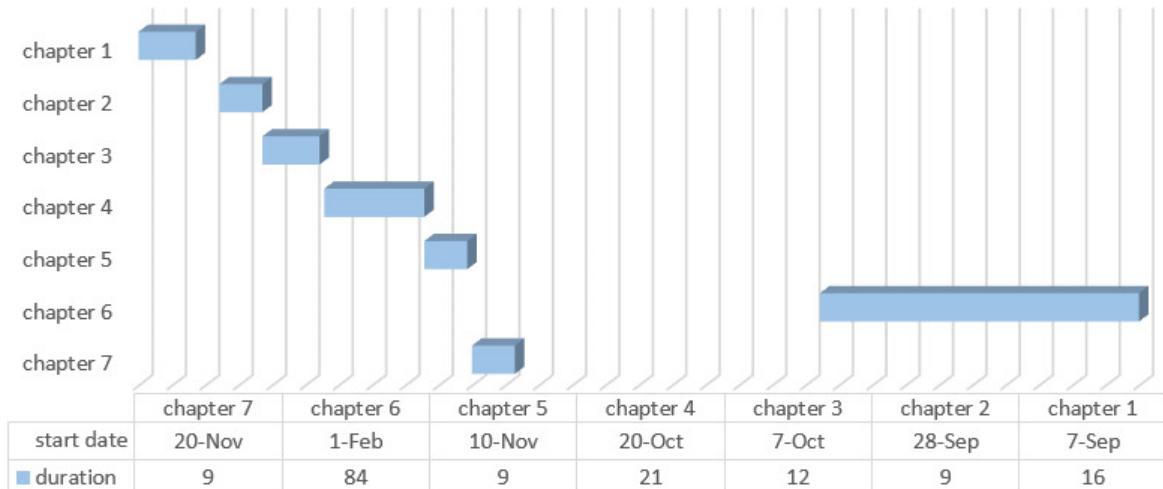


Figure 3: Gantt chart timeline

## 1.10 Roles & Responsibilities

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| <b>Introduction &amp; Definition of the problem .</b>   | Manal Alotaibi   |
| <b>Proposed solution &amp; System Scope.</b>  | Sabah Alhasan    |
| <b>Abstract &amp; The main goal is to &amp; The main objectives.</b>  | Maram Alazzony   |
| <b>Requirement &amp; timeline &amp;Roles &amp; Responsibilities.</b>  | Rahaf Abualkhair |
| <b>Audit and review.</b>  | All team members |
| <b>Project outline.</b>   | All team members |
| Chapter 2   |                  |
| <b>Introduction.</b>  | Maram Alazzony   |
| <b>Background &amp; related work &amp; Competitive Analysis.</b>  | All team members |
| <b>Audit and review.</b>  | All team members |
| Chapter 3   |                  |
| <b>Introduction &amp; System Methodology &amp; User Characteristics &amp; User Requirements &amp; Software Requirements and Specifications.</b> | All team members |
| Chapter 4   |                  |
| <b>Case &amp; Sequence Diagram &amp; Class Diagram &amp; Database Design.</b>   | All team members |
| Chapter 5   |                  |
| <b>Hardware &amp; Software tools System Interfaces in Detail.</b>   | All team members |
| Chapter 6   |                  |
| <b>Conclusion and future work.</b>  | All team members |

Table 3: Roles & Responsibilities

## CHAPTER 2

### 2. BACKGROUND AND LITERATURE REVIEW



*Figure 4: android*

## 2.1 Introduction

Android applications have indicated a sensational improvement in their usefulness. Therefore, clients all over the world are currently ready to peruse and compose messages, and peruse website pages. This pattern has been elevated to propose the utilization of the Android application for better correspondence. Our social setup believes in dealing with every community equally. The goal of our project is to offer a social responsibility to improve the usability of android applications for deaf-mute so that they can enjoy ordinary experiences of communication through these android devices.

Our deaf-mute application is an android application that aims to facilitate the understanding of the conversation between deaf-mute people and non deaf-mute, thus facilitating the communication process, and giving an opportunity for non deaf-mute to learn sign language, where there will be a category of places, such as, an airport, a restaurant, a hospital etc., then the deaf-mute will choose the meaningful image, and the word will be pronounced using speech reader, so the opposite person understands what the deaf-mute wants.

**This chapter is an introduction to the applications which are related to our application. We are going to compare our applications' functions with another application by using a competitive table.**

## 2.2 Background

### 2.2.1 Deaf-mute people:

Deaf-mute: This is a term that was used historically to identify a person who was either deaf and used sign language or both deaf and could not speak.

According to the World Health Organization, 360 million people globally, about 5% of the world's population, suffer from disabling hearing loss, 32 million of whom are children, and 1.1 billion people "aged between 12 and 35 years" are at risk of hearing loss due to the noise of music.

Statistics also confirmed that a third of people over the age of 65 suffer from disabling hearing loss.

**September 23 is observed as World Sign Language Day.** The thought behind it is to preserve and to support the linguistic identity and cultural diversity of all deaf people and other sign language users across the globe, every year, along with the International Week of the Deaf.

So, we created this application to facilitate the process of communicating with others

### **2.2.2 sign language:**

Sign language: defined as a way to communicate using hand gestures and symbols for words or letters of the alphabet, often used by those who are hard-of-hearing.

The recorded history of sign language in Western societies starts in the 17th century, as a visual language or method of communication, although references to forms of communication using hand gestures date back as far as 5th century BC Greece.

The ancient Greek philosopher Socrates is credited with saying; "

If we hadn't a voice or a tongue, and wanted to express things to one another, wouldn't we try to make signs by moving our hands, head, and the rest of our body."

Today there are over 137 different forms of recognized sign language. Some have legal recognition while others have no status whatsoever.

### **2.2.3 Android:**

With technological development and the reliance on modern technologies even in the simplest matters of life, it was necessary and logical to direct technology to its intended recipients. So, we are going to develop our application using the Android platform. Android began in 2003 as a project of the American technology company Android Inc., to develop an operating system for digital cameras. In 2004 the project changed to become an operating system for smartphones. Android Inc. was bought by the American search engine company Google Inc.

Android Studio: provides the fastest tools for building apps on every type of Android device. It has become necessary to have an integrated, unified application for the deaf-mute because it is the way for them to enjoy their lives and practice their daily activities in a normal way.

#### **2.2.4 Speech Reader:**

Speech Reader: converts the text to spoken speech. Text-to-speech is commonly used as an accessibility feature to help people who have trouble speaking to another person.

The proposed app converts the text (text from an image action) to the corresponding speech reader as output. The converted voice comes out from the phone speakers in Arabic language. Thus, in this way the deaf-mute will be able to communicate easily with non-deaf mutes.

### **2.3 Related Work**

There are few androids based mobile applications that have been developed for deaf-mute like speak it, Live Transcribe etc. The features of these applications enable the deaf-mute to communicate with other people through.

**This section is an introduction to the applications which are related to our application. We will mention an overview of each application and features of each of them. And then make comparison between these applications and our application.**

### 2.3.1 Live Transcribe

Live Transcribe is a smartphone application to get real-time captions developed by Google for the Android operating system. Development on the application began in partnership with Gallaudet University. It was publicly released as a free beta for Android 5.0+ on the Google Play Store on February 4, 2019.

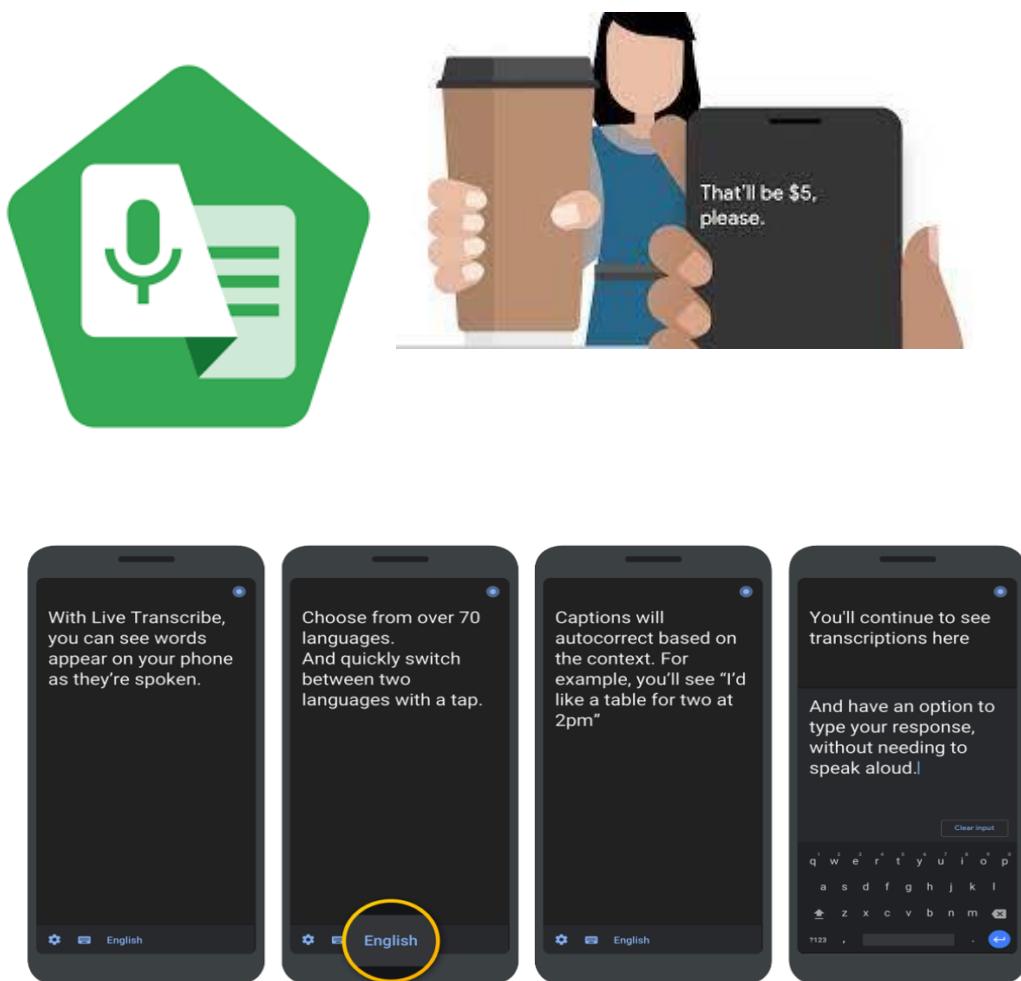


Figure 5: Live transcribe interfaces

The application is primarily aimed at helping people with disabilities who are deaf and hard of hearing. This app utilizes Google's sound detection and automatic speech recognition technology in its operation. It uses external microphones, Bluetooth headset, wired headset, and USB mics to allow for better audio reception. as it provides them with a way to communicate with others, as this application allows converting surrounding sounds into text on the phone screen, which can be used in another way to write spoken texts. Information about it is as follows:

- This application relies on automatic speech recognition in the cloud and displays the spoken words on the screen, as the application converts spoken speech to text in real time depending on the phone's microphone.
- Live Transcribe is available for Android 5.0 Lollipop and later users.
- The application supports more than 80 languages, including Arabic.
- Allows the ability to respond to conversations textually and convert them to speech, for people who have difficulty or inability to speak.
- To use the service, the user needs to enable the feature from the availability or accessibility settings on the phone, and then the service can be accessed.
- Allow the user to equip user device to vibrate whenever user name is spoken out loud.
- Allow the user to receive alerts with vibration or flashing light on user device.
- Allow the user to get notification of hazards and personal alarms by sounds made, e.g. smoke alarm, siren.
- Allow the user to mask profanity.

### 2.3.2 LetMeTalk

LetMeTalk is an Android application which supports communication in all areas of life and therefore provides a voice to everyone.

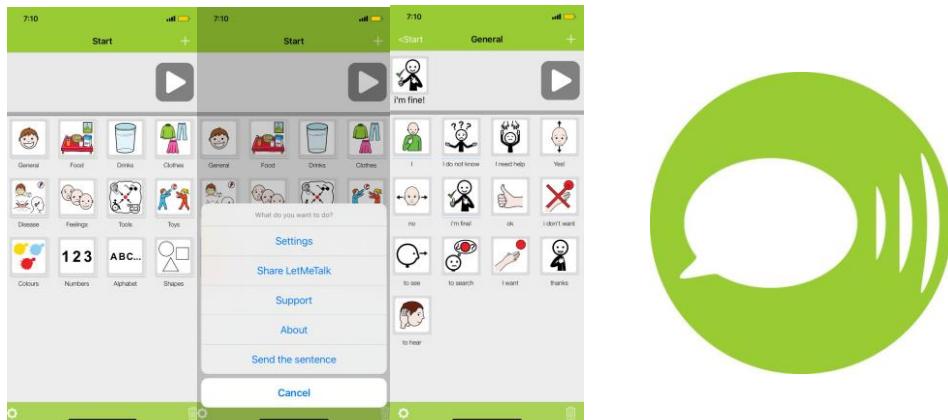


Figure 6: LetMeTalk interfaces

#### App features:

- Allow the user to order images in a meaningful way to read this row of images as a sentence.
- Allow the user to create a new category.
- Allow the user to search for an image.
- Support multiple languages.
- Allow the user to change the size of the sentence bar.
- Allow the user to create sentences.

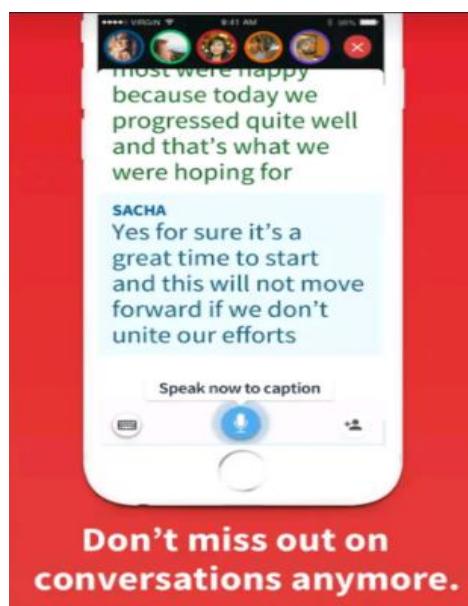
### 2.3.3 Ava

Speech to Text, Live Transcribe Hearing Assistant for Deaf and Hard of hearing (HoH) Accessibility.

Ava is an app designed to empower people who are Deaf or hard-of-hearing by allowing them to follow conversations in real time. The app provides 24/7 real-time captioning (with up to 95% accuracy, based on artificial intelligence), on your smartphone.

The app can be used for quick and spontaneous interactions such as talking with colleagues at work or meeting people in public. Ava can also be used at events, classrooms, churches, doctor's appointments, business meetings, and many more.

Transcribing any live communication makes it now very easy for friends, family and organizations to be accessible.



#### App features:

Figure 7: Ava interfaces

- Allow users to create their own account.
- “Discover” menu and learn how to set up Ava in any situation.
- Allow users to make Conversation Sessions.
- Allow Convert text-to-speech.
- Save transcripts to remember your conversations.

### 2.3.4 Talk to deaf

If one of your friends is deaf or has a hearing impairment, it is quite difficult to communicate with them.

With this app you can use your phone to translate your speech into text.

The deaf person can then easily read your message.

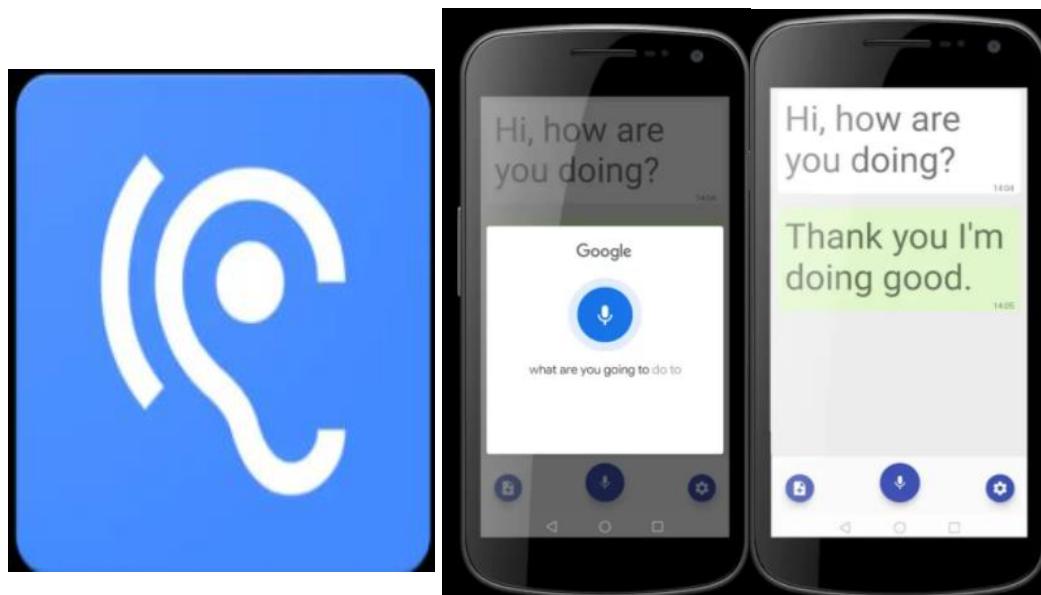


Figure 8: Talk to deaf interfaces

#### App features:

- Allows user to voice as input and automatic translation into text.
- Allow users to text entry using the keyboard for providing answers.
- Allow users to enlarge and reduce font size as desired.

### 2.3.5 Deaf-Mute Communication Helper

Deaf-Mute communication helper for IOS is an application designed especially for people with hearing and speech difficulties.

Simple way to communicate for people with hearing and speech difficulties using speech recognizing and converting to text or synthesizing conversational speech from the typed text. This app is the best way to communicate with family members and friends.



*Figure 9: Deaf-mute communication helper interface*

## App features:

- Allows users to convert speech into text in 34 languages.
  - Allows users to convert text to speech in 27 languages.
  - Allows users to change the font used in text.
  - Allow the user to change the size of the sentence bar.
  - Easy to use.
  - The only thing that requires an internet connection is the speech-to-text feature.

### 2.3.6 RAMZ

The RAMZ application translates speech and writing into Jordanian sign language, which facilitates the process of communication between deaf and hearing people.

The translation process is done through the translator and Waleed, who hears or reads the phrases and tries to understand them, and then marks the sentence in Jordanian sign language. The RAMZ application can be used to communicate with the deaf or to learn sign-language.

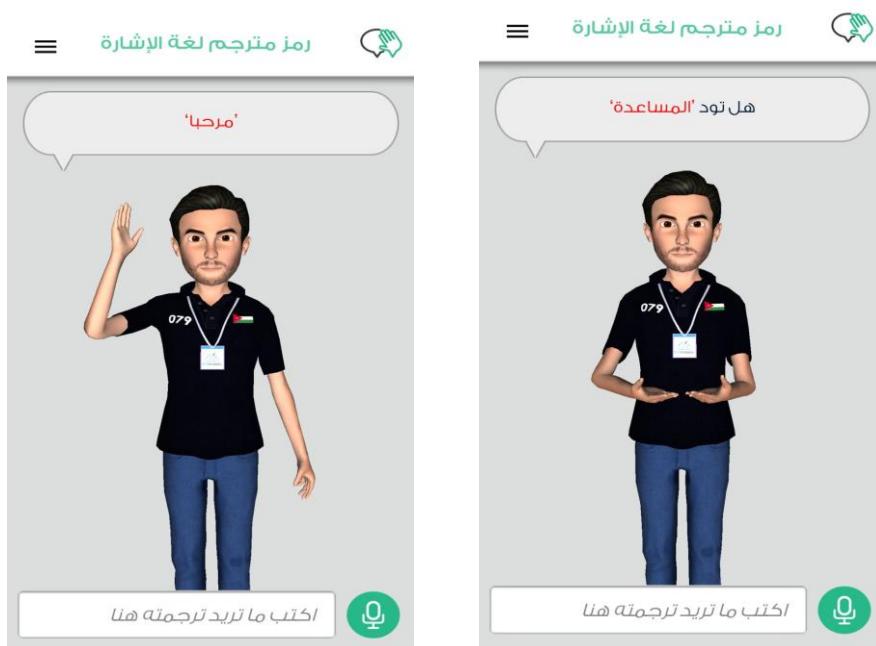


Figure 10: Ramz interfaces

#### App features:

- Allows users to translate speech into sign language.
- Allows users to translate writing into sign language.
- Allows users to a very rich dictionary of indicative terms.
- Allows users to whole sentence to sign-language in addition to repeat the sentence as need.

## 2.4 Competitive Analysis

| Criteria   | Live Transcribe                        | LetMe Talk | Talk to deaf | Deaf-Mute Communication Helper | مز (لأجلكم) | for you (لأجلكم) |
|------------|--|------------|--------------|--------------------------------|-------------|------------------|
| App Design | Layout (1-10)                          | 9          | 6            | 9                              | 5           | 8                |
|            | Look and Feel (1-10)                   | 9          | 6            | 9                              | 3           | 7                |
|            | Required Internet Connection           | Yes        | No           | Yes                            | Yes         | No               |
|            | Supports Speech recognition Technology | Yes        | No           | Yes                            | Yes         | No               |
|            | Supports speech-reader technology      | No         | Yes          | No                             | Yes         | No               |
|            | Supports write speech technology       | No         | No           | Yes                            | Yes         | No               |
|            | Cost                                   | Free       | Free         | Free Trial                     | Free        | Free             |
|            | Application Rate                       | 4.1/5      | 3/5          | 4.2/5                          | 4.8/5       | 4.2/5            |
|            | Effectiveness                          | 9          | 8            | 9                              | 6           | 7                |
|            | Efficiency                             | 7          | 8            | 9                              | 4           | 6.5              |
|            | Satisfaction                           | 7.5        | 7            | 9                              | 6.5         | 8                |

| Criteria                     | Live Transcribe            | LetMe Talk | Talk to deaf | Deaf-Mute Communication Helper | مز (لأجلكم) | for you |
|------------------------------|----------------------------|------------|--------------|--------------------------------|-------------|---------|
| Features                     | Support multiple languages | Yes        | Yes          | No                             | Yes         | No      |
| Support changing text size   | Yes                        | Yes        | Yes          | Yes                            | No          | No      |
| Create an account            | No                         | No         | Yes          | No                             | No          | Yes     |
| Categorization               | No                         | Yes        | No           | No                             | No          | Yes     |
| Support learns sign-language | No                         | No         | No           | No                             | Yes         | Yes     |
| Support sends notification   | No                         | No         | No           | No                             | No          | Yes     |
| Support Add to favorite      | No                         | No         | No           | No                             | No          | Yes     |
| Support builds a sentence    | No                         | Yes        | No           | Yes                            | Yes         | Yes     |
| Support Search item          | No                         | Yes        | No           | No                             | No          | Yes     |

Table 4: Competitive Analysis

## CHAPTER 3

### 3. SYSTEM ANALYSIS



*Figure 11: System Analysis*

### **3.1 Introduction**

Systems analysis is the process of studying a procedure or business to identify its goal and purposes and create systems and procedures that will efficiently achieve them. Another view sees system analysis as a problem-solving technique that breaks down a system into its component pieces, and how well those parts work and interact to accomplish their purpose.

This chapter includes a description of how the system will be implemented by defining user characteristics and system requirements (functional and non-functional requirements).

## 3.2 System Methodology

In the following section we will focus on the definition of a system development methodology and give some background information on the essence of system development methodologies.

The whole purpose of system development is the enhancement of the productivity of the organization and the group of people working in that organization. As system development got bigger there was a need to systemize the process of system development and come up with a set of steps that are required for any system development.

The system development life cycle is a common methodology used in almost every organization. As the system development projects got bigger and the discipline of software engineering began to set some standards of its own a lot of methodologies have seen light and were put together by organizations seeking success according to their own measurement of success.

We will use the Iterative Waterfall Model; Iterative Waterfall Model is the extension of the Waterfall model. Iterative waterfall allows you to go back to the previous phase and change the requirements and some modification can be done if necessary. This model reduces the developer's effort and time required to detect and correct errors.

System methodology used for systematically regulating the best ways to develop systems efficiency. It includes, for example, descriptions of work to be performed at each stage of the development process and drafted documents. Multiple methodologies "which differ according to viewpoint "are available. In terms of the development process, some example methodologies are "water-fall development," "spiral development," and "agile-software development," and "Iterative Waterfall Model." And in

terms of the design approach, some example methodologies are the object-oriented approach (OOA) or (OOP).

Object-oriented programming (OOP) is a computer programming model that organizes software design around data, or objects, rather than functions and logic. An object can be defined as a data field that has unique attributes and behavior.

OOP focuses on the objects that developers want to manipulate rather than the logic required to manipulate them. This approach to programming is well-suited for programs that are large, complex and actively updated or maintained. This includes programs for manufacturing and design, as well as mobile applications. For example, OOP can be used for manufacturing system simulation software.

OOP concepts in Java are the main ideas behind Java's Object-Oriented Programming. They are an abstraction, encapsulation, inheritance, and polymorphism. Grasping them is key to understanding how Java works. **Basically, Java OOP concepts let us create working methods and variables, then re-use all or part of them without compromising security.**

## **2.4 User Characteristics**

### **2.4.1 The Deaf-mute:**

They are the main users of the application, where there will be a category of places, such as, an airport, a restaurant, a hospital etc., then the deaf-mute will choose the meaningful image, and the word will be pronounced using speech reader, so the opposite person understands what the deaf-mute wants.

### **2.4.2 Learner:**

They are non-deaf mutes who want to learn sign language in order to communicate more effectively with deaf-mutes, promote and develop the use of sign language.

### **2.4.3 Guest:**

The person who will visit and use the application without the need to create an account, this user will not be able to add items to Favorite.

### **2.4.4 Administrator:**

A person who manages user accounts from the database.

## **2.5 User Requirements**

1. The user shall be able to login into his/her account.
2. The user shall be able to reset his/her password.
3. The user shall be able to edit his/her profile.
4. The user shall be able to add items to Favorite.
5. The user shall be able to remove items from the Favorite.
6. The user shall be able to add and save specific sentences for daily use.
7. The user shall be able to delete his/her account.
8. The user shall be able to logout of his/her account.
9. The user shall be able to create an account.
10. The user shall be able to preview all categories in the application.
11. The user shall be able to search for the specific item.
12. The user shall be able to select category.
13. The user shall be able to create meaningful sentences.
14. The user shall be able to convert the text to voice.
15. The user shall be able to delete a word from the sentence.
16. The user shall be able to navigate application pages.
17. The user shall be able to preview the videos and images that teach sign-language.
18. The user shall be able to return to the previous page.
19. The user shall be able to continue without creating an account as a guest.
20. The user shall be able to preview the welcome video.
21. The administrator shall be able to create user account from the database.
22. The administrator shall be able to delete user account from the database.
23. The administrator shall be able to update user account from the database.
24. The administrator shall be able to find user account from the database.

## **2.6 Software Requirements and Specifications**

A software requirements specification is a document that describes requirements for a software product, program or set of programs. Requirements in the software requirements specification are expressed in normal language and are not concerned with technical implementation.

A software requirements specification is the basis for the entire project. It lays the framework that every team involved in development will follow.

## **2.6.1 Functional Requirement:**

- 1. The user shall be able to login into his/her account.**
  - 1.1-The system shall allow the user to enter an email and password.
  - 1.2- The system shall check if there is any missing information, and if so, an error message must be display.
  - 1.3- The system shall check if the entered information is correct, and if they are not, an error message must be display.
  - 1.4- The system shall redirect the user to his/her homepage if all information are correct.
- 2. The user shall be able to reset his/her password**
  - 2.1- The system shall ask the user to enter his/her registration email.
  - 2.2- The system shall check if this email has been registered in the database.
  - 2.3- The system shall send a verification code to the user's email.
  - 2.4- The system shall ask the user to enter a verification code sent to the his/her email.
  - 2.5- The system shall check if the code entered by the user is the same code sent to user email.
  - 2.6- The system shall ask the user to enter the new password and confirm password.
  - 2.7- The system checks if new password and confirm password are matched.

**3. The user shall be able to edit his/her profile.**

- 3.1- The system shall allow the user to edit his/her profile.
- 3.2- The system shall allow the user to change his/her data in the application.
- 3.3- The system shall allow the user to change email, name, age etc.
- 3.4- The system shall allow the user to reset his/her password.
- 3.5- The system shall accept the user's edit and save the new data.

**4. The user shall be able to add an item to Favorite.**

- 4.1- The system shall allow the user to select an item to add it to Favorite.
- 4.2-The system shall show the user items in Favorite.
- 4.3- The system shall allow the user to preview item from Favorite.
- 4.4-The system shall allow the user to add more than one item to the Favorite.

**5. The user shall be able to remove selected items from the Favorite.**

- 5.1-The system shall show the items from the Favorite that the user wants to remove.
- 5.2- The system shall allow the user to select items to remove from favorite.

**6. The user shall be able to add and save specific sentences for daily use.**

- 6.1- The system shall allow the user to add specific sentences to the favorite.
- 6.2- The system shall allow the user to click favorite button.
- 6.3- The system shall save the sentence in favorite.
- 6.4- The system shall allow the user to re-use the sentence whenever he/she wants.

**7. The user shall be able to delete his/her account.**

- 7.1- The system shall allow the user to delete his/her account.
- 7.2- The system shall allow the user to click the “delete account” button in his/her account.
- 7.3 - The system shall be able to remove user accounts from the database.
- 7.4- The system shall be denial the user to log in with the removed account unless he/she creates a new account.

**8. The user shall be able to logout of his/her account.**

- 8.1- The system shall allow the user to logout of his/her account.
- 8.2- The system shall allow the user to click the “logout” button in his/her account.
- 8.3- The system shall be logged out from a particular device.

**9. The administrator shall be to manage the user account from the database.**

- 9.1- The administrator shall be able to create user account from the database.
- 9.2- The administrator shall be able to delete user account from the database.
- 9.3- The administrator shall be able to update user account from the database.
- 9.4- The administrator shall be able to find user account from the database.

### **2.6.1.1 Common Functions:**

- 1. The user shall be able to create an account.**
  - 1.1- The system shall allow the user to enter the required information.
  - 1.2- The system shall check if there is any missing information and if so, an error message must be displayed.
  - 1.3- The system shall check if the entered information is correct and if they're not an error message must be displayed.
  - 1.4- The system shall redirect the user to the homepage if all information is correct.
- 2. The user shall be able to preview all categories in the system**
  - 2.1- The system shall allow the user to show the category in the system.
  - 2.2- The system shall separate the main categories in the home page.
  - 2.3- The system shall show the images of each category as thumbnails.
  - 2.4- The system shall show the name of each category.
- 3. The user shall be able to search for the specific item.**
  - 3.1- The system shall have a search box.
  - 3.2- The user shall be able to enter the item's name in the search box.
  - 3.3- The system shall give a result that matches the user entry.

**4. The user shall be able to select the required category.**

- 4.1- The system shall allow the user to select a specific category.
- 4.2- The system shall show a collection of images when the user clicks on a specific category.

**5. The user shall be able to create meaningful sentences.**

- 5.1- The system shall allow the user to create meaningful sentences from a group of images.
- 5.2- the system shall be able to organize the words to create meaningful sentences with correct format in Arabic language.

**6. The user shall be able to convert the text to voice.**

- 6.1- The system shall read the text-embedded in images to generate a sentence.
- 6.2- The system shall produce the voice using speech reader.
- 6.3- The system shall ensure the voice in Arabic and its clear and understandable.

**7. The user shall be able to delete a word from the sentence.**

- 7.1- The system shall allow the user to delete specific word from an organized sentence.
- 7.2- The system shall be able to organize the sentence after deleting the words.
- 7.3- The system shall be able to read the sentence after modifying it.

**8. The user shall be able to navigate application pages.**

8.1- The system shall be able to have a menu bar contain main pages.

8.2- The system shall have the menu bar in all pages.

**9. The user shall be able to preview the videos and images that teach sign-language.**

9.1- The system shall allow the learner to view the videos and images so the learner can learn sign language.

9.2- The system shall allow the learner to add specific video or image to Favorite.

**10. The user shall be able to return to the previous page.**

10.1- The system shall be able to use previous button "◀" to return the previous page.

**11. The user shall be able to continue without creating an account as a guest.**

11.1- The system shall allow the user to preview some application pages without creating an account.

**12. The user shall be able to preview the welcome video.**

12.1- The system shall show a welcome video when the user opens the application for the first time.

12.2- The system shall show a welcome video only once.

12.3- The system shall allow the user to skip the welcome video.

## **2.6.2 Non-Functional Requirements:**

### **1. Accessibility:**

- The system shall be providing a complete user interface with a suitable font.

### **2. Availability:**

- The system is available 24 hours.

### **3. Usability:**

- The system should be arranged to facilitate its use.
- The user shall take at most 30 minutes on learning the system.
- The number of errors for system users should not exceed 10 percent.
- Pages contain a global navigation bar for easy movement between pages.
- The system should contain colors that match the nature of the application.
- The system should be able to use previous button "◀" to return the previous page.

### **4. Reliability:**

- The system displays correct information.
- The system is running most of the time and does not face a huge failure.

### **5. Performance requirements:**

- The user waiting for a system response must not exceed 10 seconds.
- The system performs the process requested by the user at a high speed.

## **6. Maintenance:**

- The system must provide continuous improvement.

## **7. Environmental and Operational Requirements:**

- The system supports ANDROID OS.

## **8. Development Requirements:**

- The implementation shall use JAVA, JSON

## **9. Security requirements:**

- The system allows the user to reset the password if he forgets it.
- The system allows logging in to his account by using the correct information (Email and password).

# CHAPTER 4

## 4. SYSTEM DESIGN

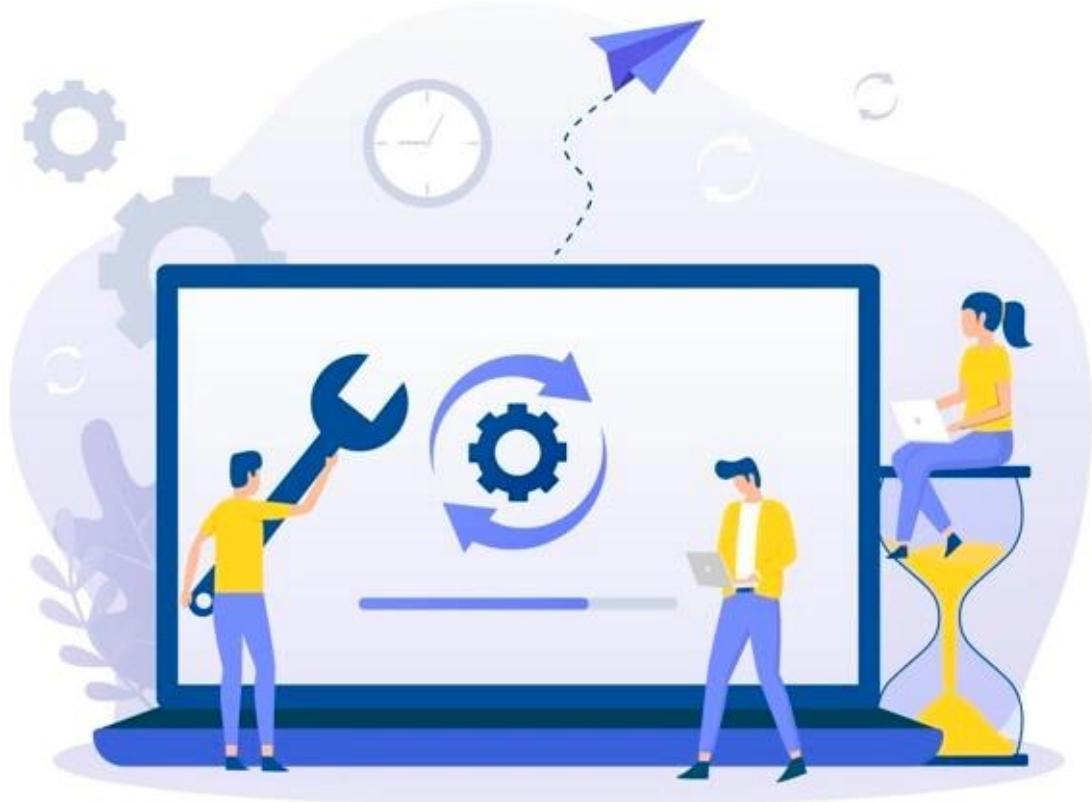


Figure 12: System Design

## 4.1 Introduction

System design is the process of defining the elements of a system such as the architecture, modules and components, the different interfaces of those components and the data that goes through that system. It is meant to satisfy specific needs and requirements of a business or organization through the engineering of a coherent and well-running system.

In this chapter We prepare UML and ER diagrams to understand the system in a better and simple way and to satisfy the system requirements, a single diagram is not enough to cover all the aspects of the system. UML defines various kinds of diagrams to cover most of the aspects of a system. Diagrams are generally made in an incremental and iterative way.

We use UML for modeling a system independent of a platform language and because its structural, emphasizing the organization of the system or it may be behavioral, emphasizing the dynamics of the system, helps you visualize a system and provides a template that guides you in constructing a system.

## 4.2 Use-case diagram

Use case diagrams are a set of use cases, actors, and their relationships. They represent the use case view of a system. A use case represents a particular functionality of a system. Hence, a use case diagram is used to describe the relationships among the functionalities and their internal/external controllers. These controllers are known as actors.

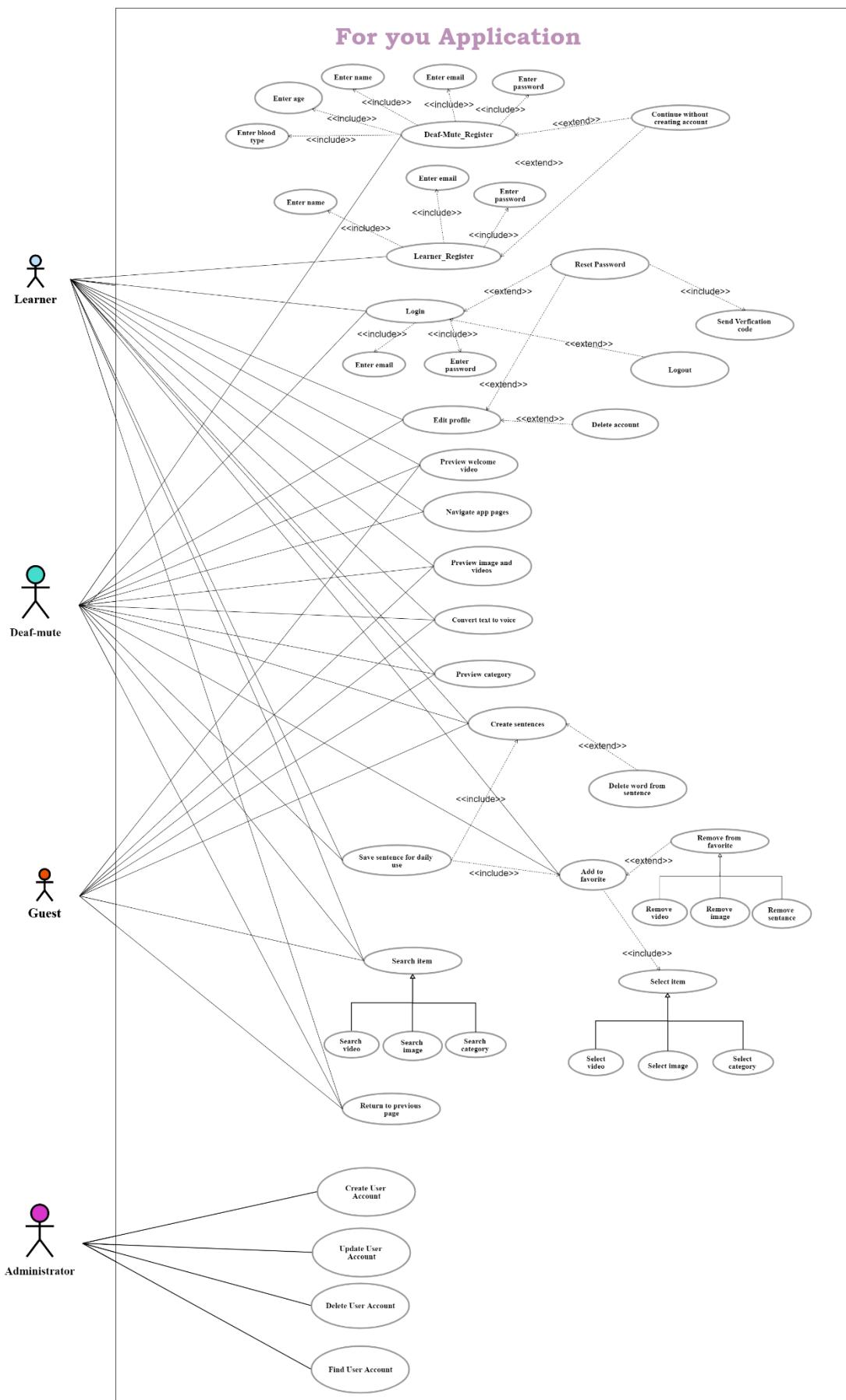


Figure 13: Use-case diagram

#### **4.2.1 Use Case Description:**

A use case description is a text-based narrative of a functionality consisting of detailed, step-by-step interaction between the actor and the system. It describes the outcomes of an action taken to accomplish a specific goal. It also details different paths that can be followed by defining primary, alternate, and exception flows. Use cases are written from the point of view of the actor and avoid describing the internal aspects of the solution. Also, some formats for use case descriptions include two columns. The left-hand column usually represents the actions the actors will take, while the right-hand column represents the system response to the actions taken.

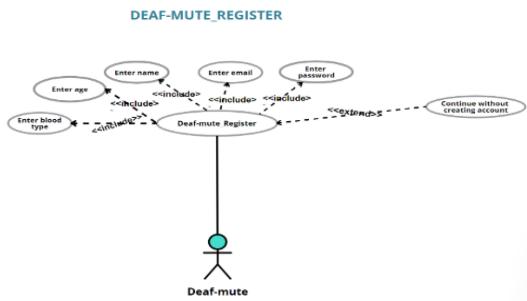


Figure 14: Use Case Deaf-mute\_Register.

| Use Case description  |   |              |                 |   |  |
|---|---|--------------|-----------------|---|--|
| <b>Use Case Name:</b>   | Deaf-mute_Register.   |              |                 |   |  |
| <b>Primary Actors:</b>  | Deaf-mute.  |              |                 |   |  |
| <b>Description:</b>   | This use case allows the deaf-mute to create an account.  |              |                 |   |  |
| <b>Include use case:</b>  | <ol style="list-style-type: none"> <li>1. Enter name.</li> <li>2. Enter email.</li> <li>3. Enter password.</li> <li>4. Enter age.</li> <li>5. Enter blood type.</li> </ol>  |              |                 |   |  |
| <b>Extend use case:</b>   | <ol style="list-style-type: none"> <li>1. Continue without creating account</li> </ol>  |              |                 |   |  |
| <b>Precondition:</b>  | <ol style="list-style-type: none"> <li>1. The user must have an email address.</li> </ol>   |              |                 |   |  |
| <b>Postcondition:</b>   | <ol style="list-style-type: none"> <li>1. The user will have an account.</li> <li>2. The system redirects the user to the home page.</li> </ol>   |              |                 |   |  |
| <b>Main Flow:</b>   | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Actor Action</th><th style="text-align: center;">System Response</th></tr> </thead> <tbody> <tr> <td style="vertical-align: top;">           1. The user clicks Register Button.<br/><br/>           3. The user enters email and a password and other information.         </td><td>           2. The system display register page.<br/><br/>           4. The system checks if there is any missing information.<br/><br/>           5. The system displays a successful register message.         </td></tr> </tbody> </table> | Actor Action | System Response | 1. The user clicks Register Button.<br><br>3. The user enters email and a password and other information. | 2. The system display register page.<br><br>4. The system checks if there is any missing information.<br><br>5. The system displays a successful register message. |
| Actor Action  | System Response   |              |                 |   |  |
| 1. The user clicks Register Button.<br><br>3. The user enters email and a password and other information. | 2. The system display register page.<br><br>4. The system checks if there is any missing information.<br><br>5. The system displays a successful register message.  |              |                 |   |  |
| <b>Alternative Flow:</b>  | <p>Step4: if there is missing information; error message displayed.</p> <p>Step4: if the email already exists; error message displayed.</p> <p>Step4: incorrect input format; error message displayed.</p>  |              |                 |   |  |

Table 5 Deaf-mute\_Register.

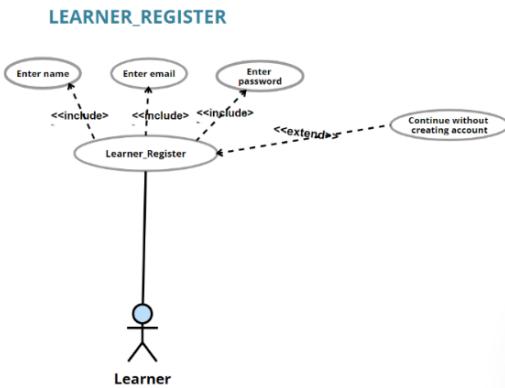


Figure 15: Use Case Learner\_Register.

| Use Case description     |  |  |
|--------------------------|--|--|
| <b>Use Case Name:</b>    | Learner_Register.  |  |
| <b>Primary Actors:</b>   | Learner.   |  |
| <b>Description:</b>      | This use case allows the learner to create an account.   |  |
| <b>Include use case:</b> | 1. Enter name.<br>2. Enter email.<br>3. Enter password.  |  |
| <b>Extend use case:</b>  | 1. Continue without creating account   |  |
| <b>Precondition:</b>     | 1. The user must have an email address.  |  |
| <b>Postcondition:</b>    | 1. The user will have an account.<br>2. The system redirects the user to the learner page.   |  |
| <b>Main Flow:</b>        | <b>Actor Action</b><br>1. The user clicks Register Button.<br><br>3.The user enters email and a password and other information.  | <b>System Response</b><br>2. The system display register page.<br><br>4.The system checks if there is any missing information.<br><br>5.The system displays a successful register message. |
| <b>Alternative Flow:</b> | <b>Step4:</b> if there is missing information; error message displayed.<br><b>Step4:</b> if the email already exists; error message displayed.<br><b>Step4:</b> incorrect input format; error message displayed. |  |

Table 6 Learner\_Register.

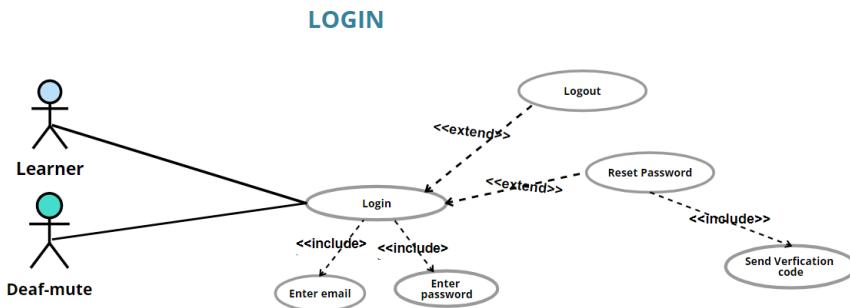
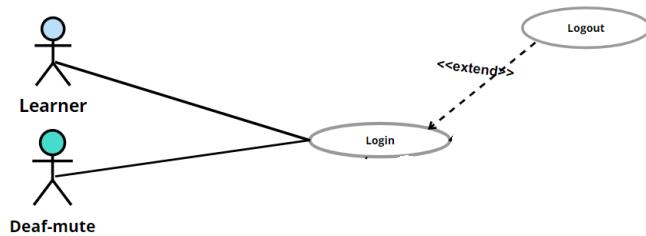


Figure 16: Use Case Login.

| Use Case description     |  |  |
|--------------------------|--|--|
| <b>Use Case Name:</b>    | Login.   |  |
| <b>Primary Actors:</b>   | Deaf-mute, Learner.  |  |
| <b>Description:</b>      | This use case allows the users to login into the system to access the services that require creating an account like: “favorite”.      |  |
| <b>Extend use case</b>   | <ol style="list-style-type: none"> <li>1. Reset Password.</li> <li>2. Logout.</li> </ol>   |  |
| <b>Include use case</b>  | <ol style="list-style-type: none"> <li>1. Enter email.</li> <li>2. Enter Password.</li> </ol>  |  |
| <b>Precondition:</b>     | <ol style="list-style-type: none"> <li>1. The user should enter the email and password.</li> </ol>                                     |  |
| <b>Postcondition:</b>    | <ol style="list-style-type: none"> <li>1. The user must have an account.</li> </ol>  |  |
| <b>Main Flow:</b>        | <b>Actor Action</b>  | <b>System Response</b>   |
|                          | <ol style="list-style-type: none"> <li>1. The user clicks login Button.</li> <li>3.The user enters email and the password.</li> </ol>  | <ol style="list-style-type: none"> <li>2. The System displays Login interface.</li> <li>4.The system checks the user if the email and the passwords are correct.</li> <li>5.The system redirect user to homepage.</li> </ol> |
| <b>Alternative Flow:</b> | <b>Step3:</b> email or password are missed, error message displayed.<br><b>Step4:</b> incorrect input format; error message displayed. |  |

Table 7 Login.

## LOGOUT



*Figure 17: Use Case Logout.*

| <b>Use Case description</b> |   |   |
|-----------------------------|---|---|
| <b>Use Case Name:</b>       | Logout.   |   |
| <b>Primary Actors:</b>      | Deaf-mute, Learner.                                       |   |
| <b>Description:</b>         | This use case allows the user to logout from the account. |   |
| <b>Precondition:</b>        | 1. The user logged into account.                          |   |
| <b>Postcondition:</b>       | 1. The system logs out the user from the app.             |   |
| <b>Main Flow:</b>           | <b>Actor Action</b>                                       | <b>System Response</b>                          |
|                             | 1.The user clicks the logout button in the menu.          | 2.The system logs out the user from the system. |
| <b>Alternative Flow:</b>    | None  |   |

*Table 8 logout.*

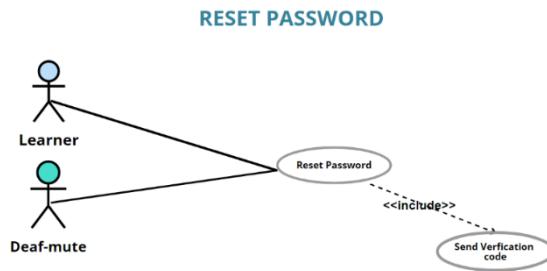


Figure 18: Use Case Reset password

| Use Case description |  |  |
|----------------------|--|--|
| Use Case Name:       | Reset password.  |  |
| Primary Actors:      | Deaf-mute, Learner.  |  |
| Description:         | This use case allows the users to reset his/her password.  |  |
| Include use case     | 1. Send verification code  |  |
| Precondition:        | 1. The user must have an account.  |  |
| Postcondition:       | 1. The system saves the new password.  |  |
| Main Flow:           | Actor Action   | System Response  |
|                      | 1.The user click reset password button.<br><br>2.The user enter his/her registration email.<br><br>5.The user enter the verification code sent to his/her email.<br><br>7.The user enter the new password. | 3. The system shall check if this email has been registered in the Application.<br><br>4. The system shall send a verification code to the user's email.<br><br>6. The system shall check if the code entered by the user is the same code sent to his/her email.<br><br>8.The system save the new password. |
| Alternative Flow:    | <b>Step3:</b> if the email does not find; error message displayed.<br><br><b>Step6:</b> if the verification code does not match; error message displayed.  |  |

Table 9 Reset password.

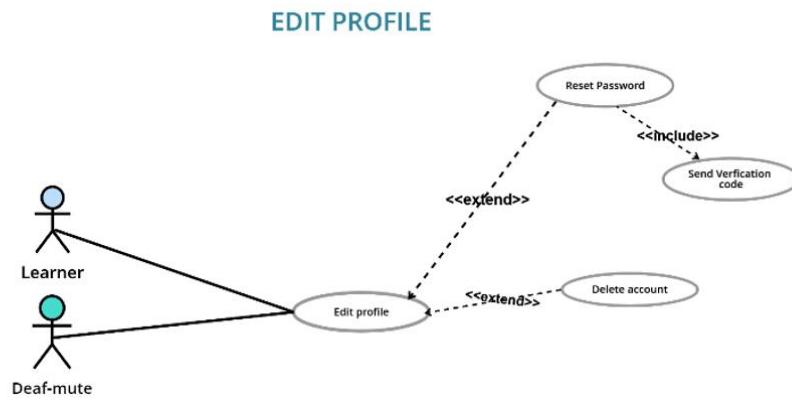


Figure 19: Use Case Edit profile

| Use Case description |   |  |
|----------------------|---|--|
| Use Case Name:       | Edit profile.   |  |
| Primary Actors:      | Deaf-mute, Learner.   |  |
| Description:         | This use case allows the users to modify his/her information.   |  |
| Extend use case      | 1. Delete account.<br>2. Reset Password.  |  |
| Precondition:        | 1. The user logged into his/her account.  |  |
| Postcondition:       | 2. The user account information is updated.   |  |
| Main Flow:           | Actor Action  | System Response  |
|                      | 1. The user clicks Edit profile Button.<br><br>3. The user changes his/her data.  | 2. The System displays user information in edit profile interface.<br><br>4. The system accepts the user's edit and save the new data. |
| Alternative Flow:    | <b>Step3:</b> if there is missing information; error message displayed.<br><br><b>Step3:</b> incorrect input format; error message displayed. |  |

Table 10 Edit profile.

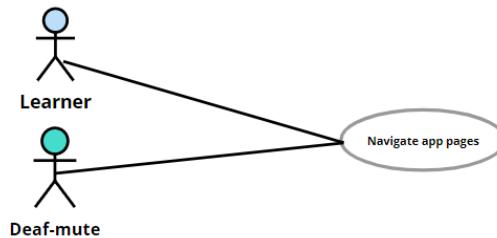


*Figure 20: Use Case Preview welcome video*

| Use Case description                                  |   |              |                 |   |                                       |   |   |  |
|---|---|--------------|-----------------|---|---------------------------------------|---|---|--|
| <b>Use Case Name:</b>                                 | Preview welcome video.  |              |                 |   |                                       |   |   |  |
| <b>Primary Actors:</b>                                | Deaf-mute, Learner, Guest.  |              |                 |   |                                       |   |   |  |
| <b>Description:</b>                                   | This use case allows users to show a welcome video when the user opens the application for the first time.  |              |                 |   |                                       |   |   |  |
| <b>Precondition:</b>                                  | None.   |              |                 |   |                                       |   |   |  |
| <b>Postcondition:</b>                                 | 1. The user shows the welcome video.  |              |                 |   |                                       |   |   |  |
| <b>Main Flow:</b>                                     | <table border="1"> <thead> <tr> <th>Actor Action</th><th>System Response</th></tr> </thead> <tbody> <tr> <td>1.The user open the app for the first time.</td><td>2. The System displays welcome video.</td></tr> <tr> <td>3. The user watch or click on skip the welcome video.</td><td>4.The system redirect the user to the homepage.</td></tr> </tbody> </table> | Actor Action | System Response | 1.The user open the app for the first time. | 2. The System displays welcome video. | 3. The user watch or click on skip the welcome video. | 4.The system redirect the user to the homepage. |  |
| Actor Action  | System Response   |              |                 |   |                                       |   |   |  |
| 1.The user open the app for the first time.           | 2. The System displays welcome video.   |              |                 |   |                                       |   |   |  |
| 3. The user watch or click on skip the welcome video. | 4.The system redirect the user to the homepage.   |              |                 |   |                                       |   |   |  |
| <b>Alternative Flow:</b>                              | None.   |              |                 |   |                                       |   |   |  |

*Table 11 Preview welcome video.*

## NAVIGATE APP PAGES



*Figure 21: Use Case Navigate app page*

| Use Case description     |  |                                       |
|--------------------------|--|---------------------------------------|
| <b>Use Case Name:</b>    | Navigate app page.   |                                       |
| <b>Primary Actors:</b>   | Deaf-mute, Learner.  |                                       |
| <b>Description:</b>      | This use case allows users to navigate app pages comfortably.                              |                                       |
| <b>Precondition:</b>     | 1. The user logged into his/her account.   |                                       |
| <b>Postcondition:</b>    | 1. The system displays all app pages.  |                                       |
| <b>Main Flow:</b>        | Actor Action   | System Response                       |
|                          | 1. The user opens the menu bar.<br><br>3. The user chooses any page he/she want to access. | 2. The System shows all pages' names. |
| <b>Alternative Flow:</b> | None.  |                                       |

*Table 12 Navigate app page.*

## PREVIEW IMAGE AND VIDEOS

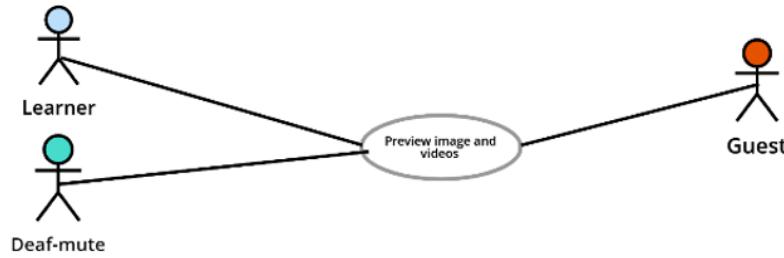
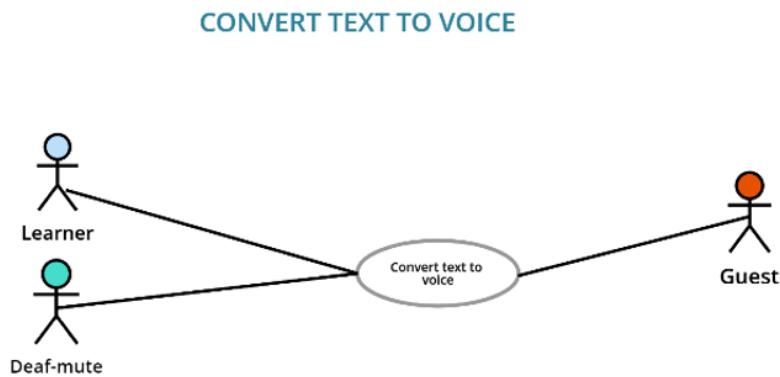


Figure 22: Use Case Preview image and videos

| Use Case description                   |   |              |                 |  |  |  |  |  |
|--|---|--------------|-----------------|--|--|--|--|--|
| <b>Use Case Name:</b>                  | Preview images and videos.  |              |                 |  |  |  |  |  |
| <b>Primary Actors:</b>                 | Deaf-mute, Learner, Guest.  |              |                 |  |  |  |  |  |
| <b>Description:</b>                    | This use case allows the users to preview images or videos in each category.  |              |                 |  |  |  |  |  |
| <b>Precondition:</b>                   | None.   |              |                 |  |  |  |  |  |
| <b>Postcondition:</b>                  | 1. The system displays the image or videos in the category.   |              |                 |  |  |  |  |  |
| <b>Main Flow:</b>                      | <table border="1"> <thead> <tr> <th>Actor Action</th><th>System Response</th></tr> </thead> <tbody> <tr> <td>1.The user clicks a specific category.</td><td>2.The system displays image inside category.</td></tr> <tr> <td>3.The user views the videos or images.</td><td></td></tr> </tbody> </table> | Actor Action | System Response | 1.The user clicks a specific category. | 2.The system displays image inside category. | 3.The user views the videos or images. |  |  |
| Actor Action                           | System Response   |              |                 |  |  |  |  |  |
| 1.The user clicks a specific category. | 2.The system displays image inside category.  |              |                 |  |  |  |  |  |
| 3.The user views the videos or images. |   |              |                 |  |  |  |  |  |
| <b>Alternative Flow:</b>               | None.   |              |                 |  |  |  |  |  |

Table 13 Preview image and video.

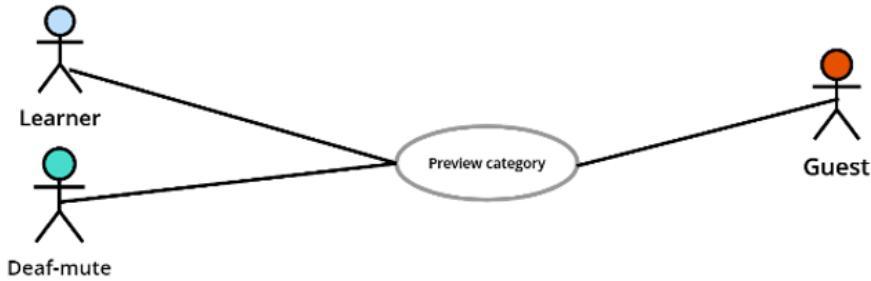


*Figure 23: Use Case Convert text to voice*

| Use Case description     |   |  |
|--------------------------|---|--|
| <b>Use Case Name:</b>    | Convert text to voice.  |  |
| <b>Primary Actors:</b>   | Deaf-mute, Learner, Guest.  |  |
| <b>Description:</b>      | The system reads the text-embedded in images to generate a sentence and produces the voice using speech reader. |  |
| <b>Precondition:</b>     | 1. The user selects a collection of words.  |  |
| <b>Postcondition:</b>    | 1. The system converts text-embedded in image to voice in a correct order.                                      |  |
| <b>Main Flow:</b>        | Actor Action  | System Response  |
|                          | 1. The user selects a collection of images.<br><br>3. The user click “play” button.                             | 2. The system organizes the words to create meaningful sentences.<br><br>4. The system converts the text to voice. |
| <b>Alternative Flow:</b> | None  |  |

*Table 14 Convert text to voice.*

## PREVIEW CATEGORY



*Figure 24: Use Case Preview category*

| <b>Use Case description</b>         |   |              |                 |                                     |                                       |
|-------------------------------------|---|--------------|-----------------|-------------------------------------|---------------------------------------|
| <b>Use Case Name:</b>               | Preview category.   |              |                 |                                     |                                       |
| <b>Primary Actors:</b>              | Deaf-mute, Learner, Guest.  |              |                 |                                     |                                       |
| <b>Description:</b>                 | This use case allows users to show the category in the system.<br>The system shall separate the main categories in the home page.   |              |                 |                                     |                                       |
| <b>Precondition:</b>                | None.   |              |                 |                                     |                                       |
| <b>Postcondition:</b>               | 1. The system allows the user to show all categories.   |              |                 |                                     |                                       |
| <b>Main Flow:</b>                   | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #d9c3e4;"> <th style="text-align: center; padding: 2px;">Actor Action</th><th style="text-align: center; padding: 2px;">System Response</th></tr> </thead> <tbody> <tr> <td style="padding: 2px;">1. The user clicks on the homepage.</td><td style="padding: 2px;">2.The system displays all categories.</td></tr> </tbody> </table> | Actor Action | System Response | 1. The user clicks on the homepage. | 2.The system displays all categories. |
| Actor Action                        | System Response   |              |                 |                                     |                                       |
| 1. The user clicks on the homepage. | 2.The system displays all categories.   |              |                 |                                     |                                       |
| <b>Alternative Flow:</b>            | None.   |              |                 |                                     |                                       |

*Table 15 Preview category.*

## CREATE SENTENCES

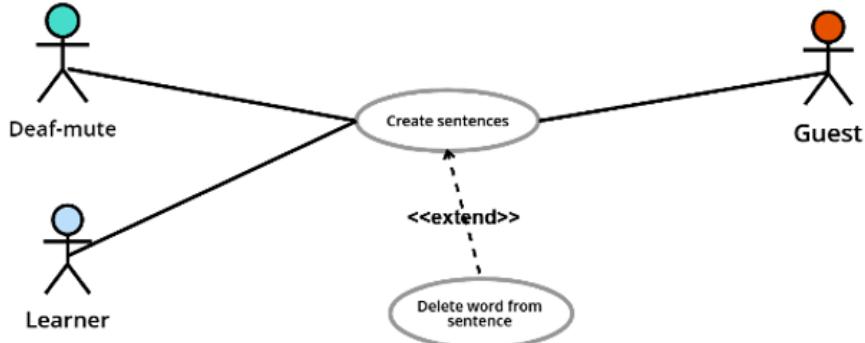


Figure 25: Use Case Create sentences

| Use Case description |   |   |
|----------------------|---|---|
| Use Case Name:       | Create sentences.   |   |
| Primary Actors:      | Deaf-mute, Learner, Guest.  |   |
| Description:         | This use case allows the users to create meaningful sentences from a collection of words.           |   |
| Extend Use Case:     | 1. Delete word from Sentence.   |   |
| Precondition:        | 1. The user must select required words.   |   |
| Postcondition:       | 1. The system must make the sentence as created by the user without word conflicting or rearranged. |   |
| Main Flow:           | Actor Action  | System Response   |
|                      | 1.The user selects required words from specific category.   | 2.The system organizes the words to create meaningful sentence. |
| Alternative Flow:    | None.   |   |

Table 16 Create sentences.

## SAVE SENTENCE FOR DAILY USE

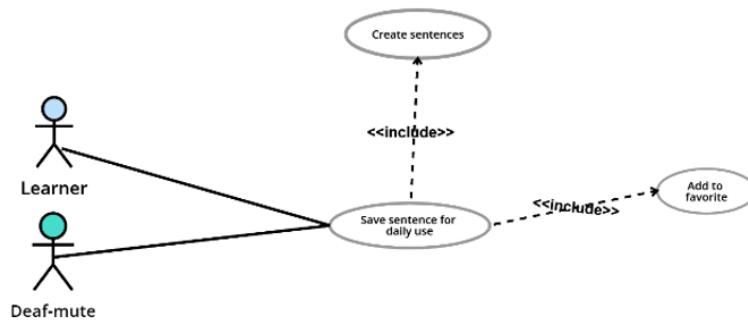


Figure 26: Use Case Save sentence for daily use

| <b>Use Case description</b> |  |   |
|-----------------------------|--|---|
| <b>Use Case Name:</b>       | Save sentence for daily use.   |   |
| <b>Primary Actors:</b>      | Deaf-mute, Learner.  |   |
| <b>Description:</b>         | This use case allows you to save sentence in favorite for daily use.                 |   |
| <b>Include use case</b>     | 1. Create sentence.<br>2. Add to favorite.   |   |
| <b>Precondition:</b>        | 1. The user logged into account.   |   |
| <b>Postcondition:</b>       | 1. The saved sentence appears in favorite.   |   |
| <b>Main Flow:</b>           | <b>Actor Action</b>  | <b>System Response</b>  |
|                             | 1.The user selects multiple words from images.<br>3. The user click Favorite button. | 2. The system shows the sentence in correct way.<br>4.The system save the sentence for daily use. |
| <b>Alternative Flow:</b>    | None .   |   |

Table 17 Save sentence for daily use.

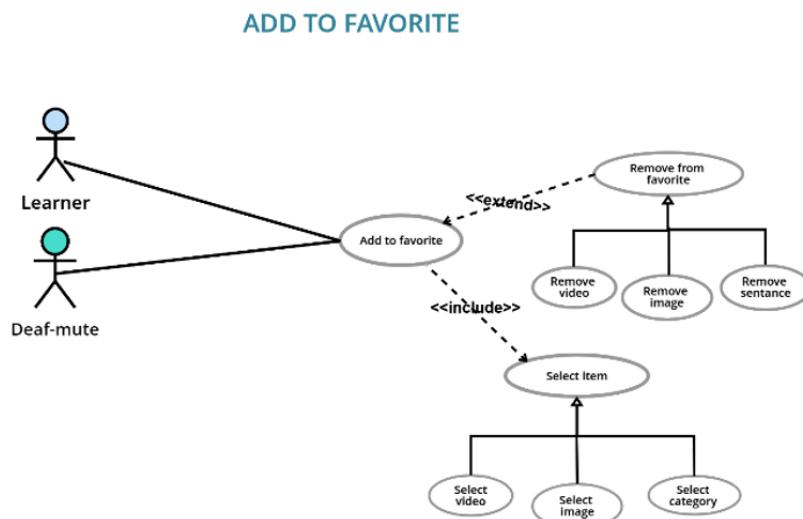


Figure 27: Use Case Add to favorite

| Use Case description     |   |  |
|--------------------------|---|--|
| <b>Use Case Name:</b>    | Add to Favorite.  |  |
| <b>Primary Actors:</b>   | Deaf- mute, Learner.  |  |
| <b>Description:</b>      | This use case allows users to add favorites to the system and the system must show the item that has been added to favorites. |  |
| <b>Extend use case</b>   | 1. Remove from favorite.  |  |
| <b>Include use case</b>  | 1. Select item.   |  |
| <b>Precondition:</b>     | 1. The users must have an account.  |  |
| <b>Postcondition:</b>    | 1. The system shows the item that has been added to favorites.  |  |
|                          |   |  |
| <b>Main Flow:</b>        | <b>Actor Action</b>   | <b>System Response</b>   |
|                          | 1.The user selects an item to add it into the Favorite.   | 2.The system saves the item that added to Favorite.<br><br>3.The system shows the user's item in Favorite. |
| <b>Alternative Flow:</b> | None.   |  |

Table 18 Add to Favorite.

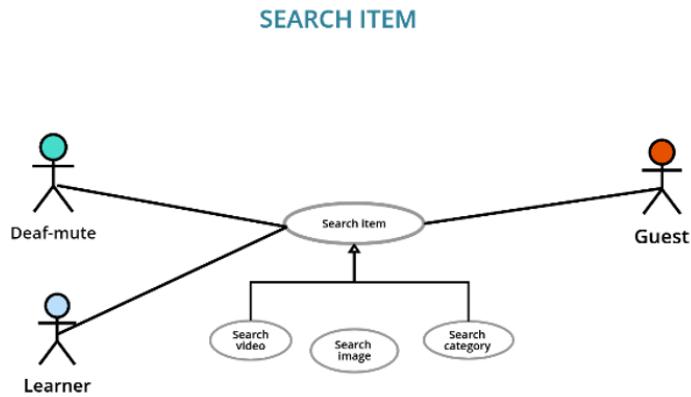


Figure 28: Use Case Search item

| <b>Use Case description</b> |  |   |
|-----------------------------|--|---|
| <b>Use Case Name:</b>       | Search item (Search video, Search image, Search category).   |   |
| <b>Primary Actors:</b>      | Deaf-mute, Learner, Guest.   |   |
| <b>Description:</b>         | This use case allows the user to search for a specific item (Search video, Search image, Search category). |   |
| <b>Precondition:</b>        | None.  |   |
| <b>Postcondition:</b>       | 1. The system shows the image or video or category the user wants.   |   |
| <b>Main Flow:</b>           | <b>Actor Action</b>  | <b>System Response</b>  |
|                             | 1. The user clicks the search button.<br><br>3. The user types the name of the item.                       | 2. The system displays search page.<br><br>4. The system displays matched item. |
| <b>Alternative Flow:</b>    | <b>Step3:</b> incorrect search format; error message displayed.  |   |

Table 19 Search item.

## RETURN TO PTEVIOUS PAGE

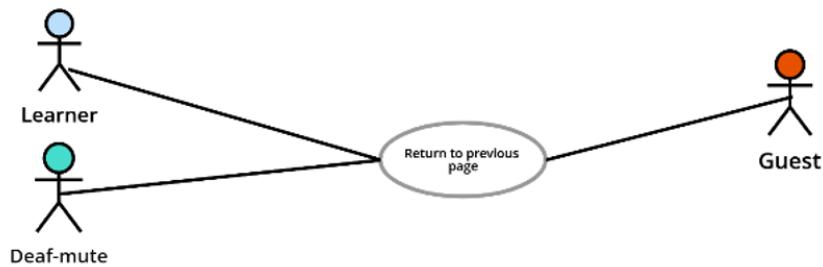


Figure 29: Use Case Return to the previous page

| Use Case description                          |   |              |                 |   |  |
|---|---|--------------|-----------------|---|--|
| <b>Use Case Name:</b>                         | Return to the previous page.  |              |                 |   |  |
| <b>Primary Actors:</b>                        | deaf-mute, learner, Guest.  |              |                 |   |  |
| <b>Description:</b>                           | This use case allows users to able to use previous button "◀" to return the previous page.  |              |                 |   |  |
| <b>Precondition:</b>                          | None.   |              |                 |   |  |
| <b>Postcondition:</b>                         | 1. The system displays the previous page.   |              |                 |   |  |
| <b>Main Flow:</b>                             | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #d9e1f2; text-align: center;">Actor Action</th><th style="background-color: #d9e1f2; text-align: center;">System Response</th></tr> </thead> <tbody> <tr> <td style="text-align: center;">1.The user clicks on the previous button “◀”.</td><td style="text-align: center;">2.The system returns to previous page.</td></tr> </tbody> </table> | Actor Action | System Response | 1.The user clicks on the previous button “◀”. | 2.The system returns to previous page. |
| Actor Action                                  | System Response   |              |                 |   |  |
| 1.The user clicks on the previous button “◀”. | 2.The system returns to previous page.  |              |                 |   |  |
| <b>Alternative Flow:</b>                      | None.   |              |                 |   |  |

Table 20 Return to the previous page.

## CREATE USER ACCOUNT

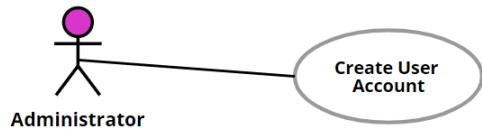
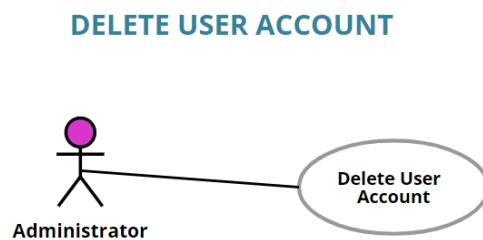


Figure 30: Use Case Create user account

| Use Case description     |  |
|--------------------------|--|
| <b>Use Case Name:</b>    | Create User Account.   |
| <b>Primary Actors:</b>   | Administrator.   |
| <b>Description:</b>      | This use case allows administrator to create user account from the database. |
| <b>Alternative Flow:</b> | None.  |

Table 21 Create User Account.



*Figure 31: Use Case delete user account*

| Use Case description     |  |
|--------------------------|--|
| <b>Use Case Name:</b>    | Delete User Account.   |
| <b>Primary Actors:</b>   | Administrator.   |
| <b>Description:</b>      | This use case allows administrator to delete user account from the database. |
| <b>Alternative Flow:</b> | None.  |

*Table 22 Delete User Account.*

## UPDATE USER ACCOUNT

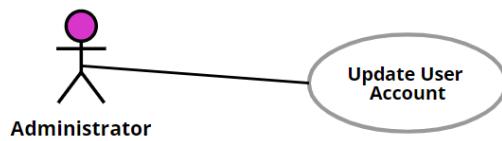
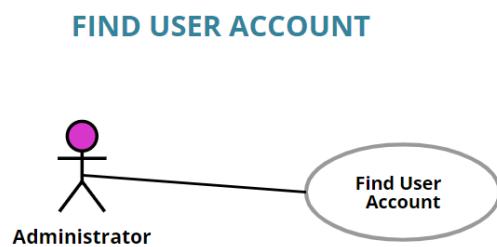


Figure 32: Use Case update user account

| Use Case description     |  |
|--------------------------|--|
| <b>Use Case Name:</b>    | Update User Account.   |
| <b>Primary Actors:</b>   | Administrator.   |
| <b>Description:</b>      | This use case allows administrator to update user account from the database. |
| <b>Alternative Flow:</b> | None.  |

Table 23 Update User Account.



*Figure 33: Use Case find user account*

| Use Case description     |  |
|--------------------------|--|
| <b>Use Case Name:</b>    | Find User Account.   |
| <b>Primary Actors:</b>   | Administrator.   |
| <b>Description:</b>      | This use case allows administrator to find user account from the database. |
| <b>Alternative Flow:</b> | None.  |

*Table 24 Find User Account.*

## 4.3 Class diagram

Class diagrams describe systems by illustrating attributes, operations, and relationships between classes. Unified Modeling Language (UML) calls them structure diagrams. They work according to the principles of object orientation. This orientation describes how objects interact with each other.

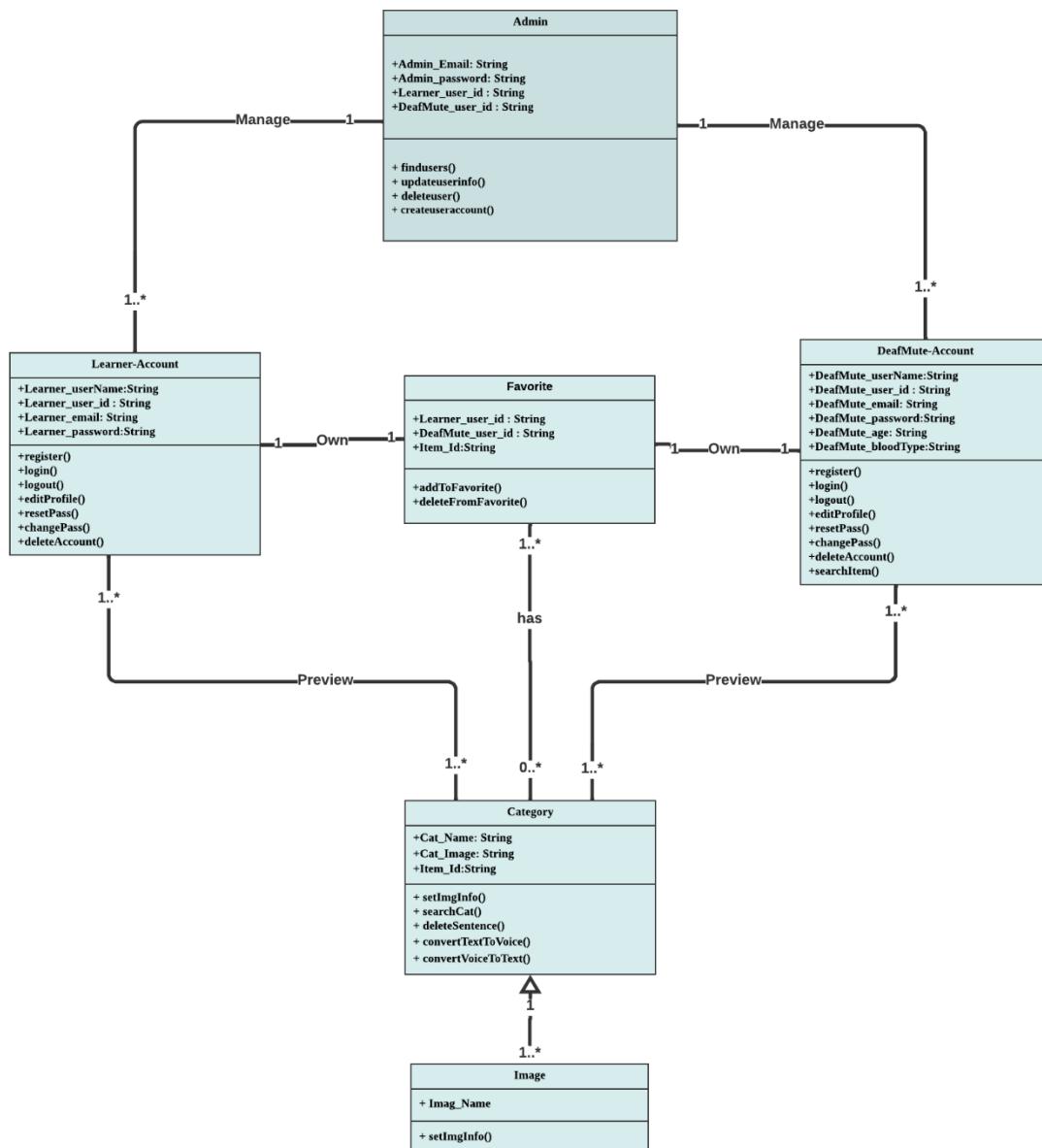


Figure 34: Class diagram

## 4.4 Sequence Diagrams

A sequence diagram simply depicts interaction between objects in a sequential order i.e., the order in which these interactions take place. We can also use the terms event diagrams or event scenarios to refer to a sequence diagram. Sequence diagrams describe how and in what order the objects in a system function. These diagrams are widely used by businessmen and software developers to document and understand requirements for new and existing systems.

### 4.4.1 Register sequence diagram

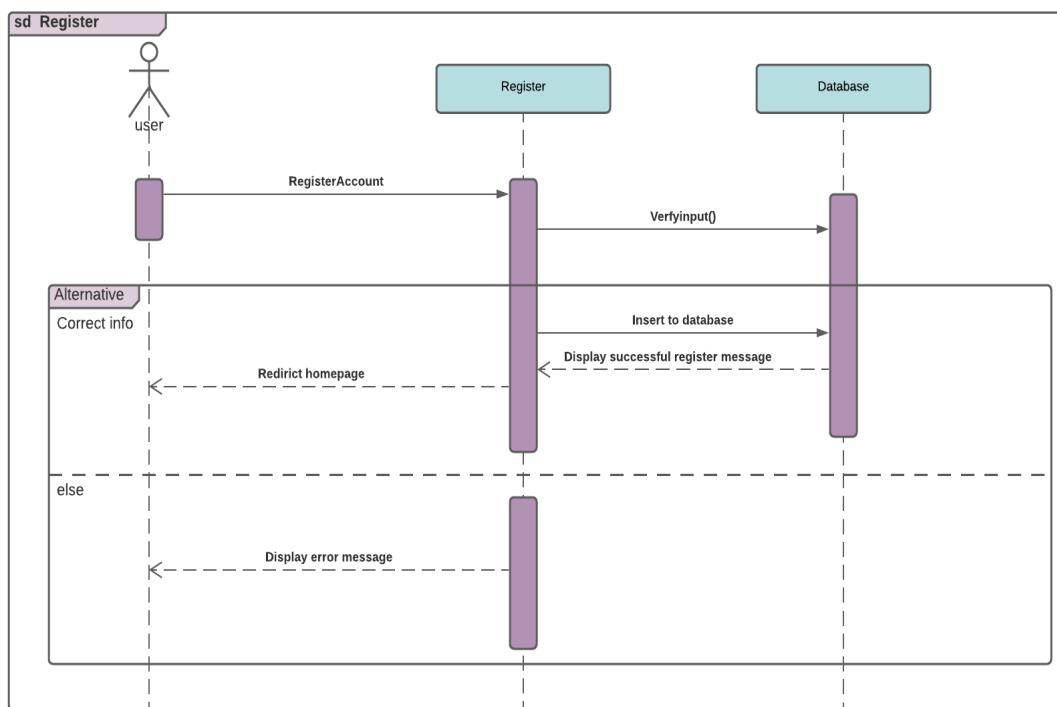


Figure 35: Register sequence diagram

#### 4.4.2 Login sequence diagram

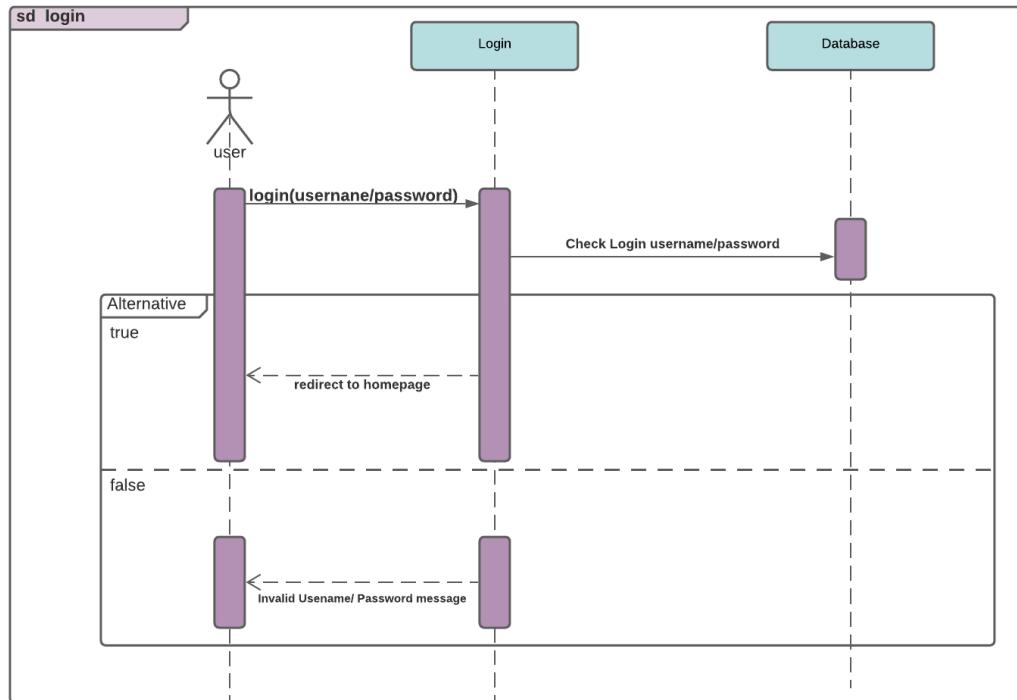


Figure 36: Login sequence diagram

#### 4.4.3 Logout sequence diagram

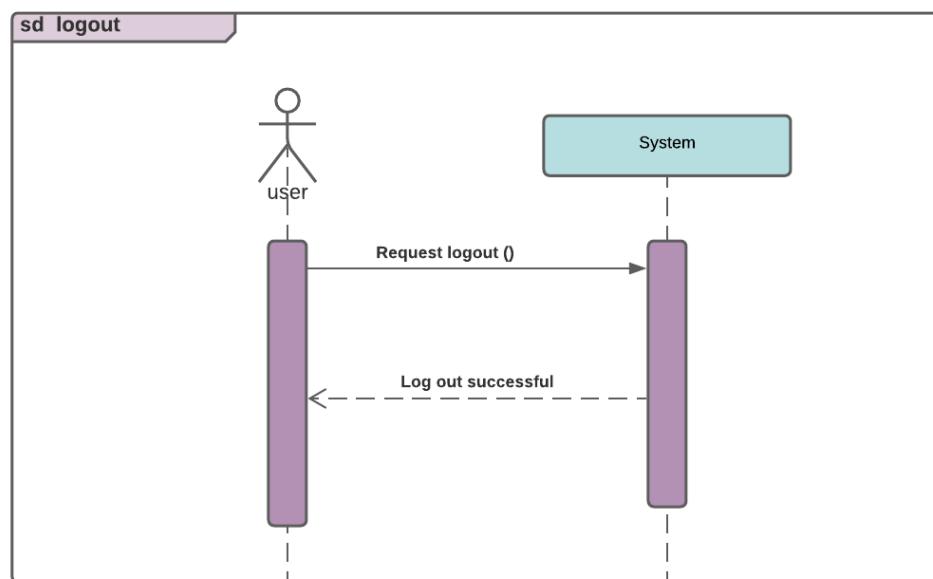


Figure 37: Logout sequence diagram

#### 4.4.4 Reset password sequence diagram

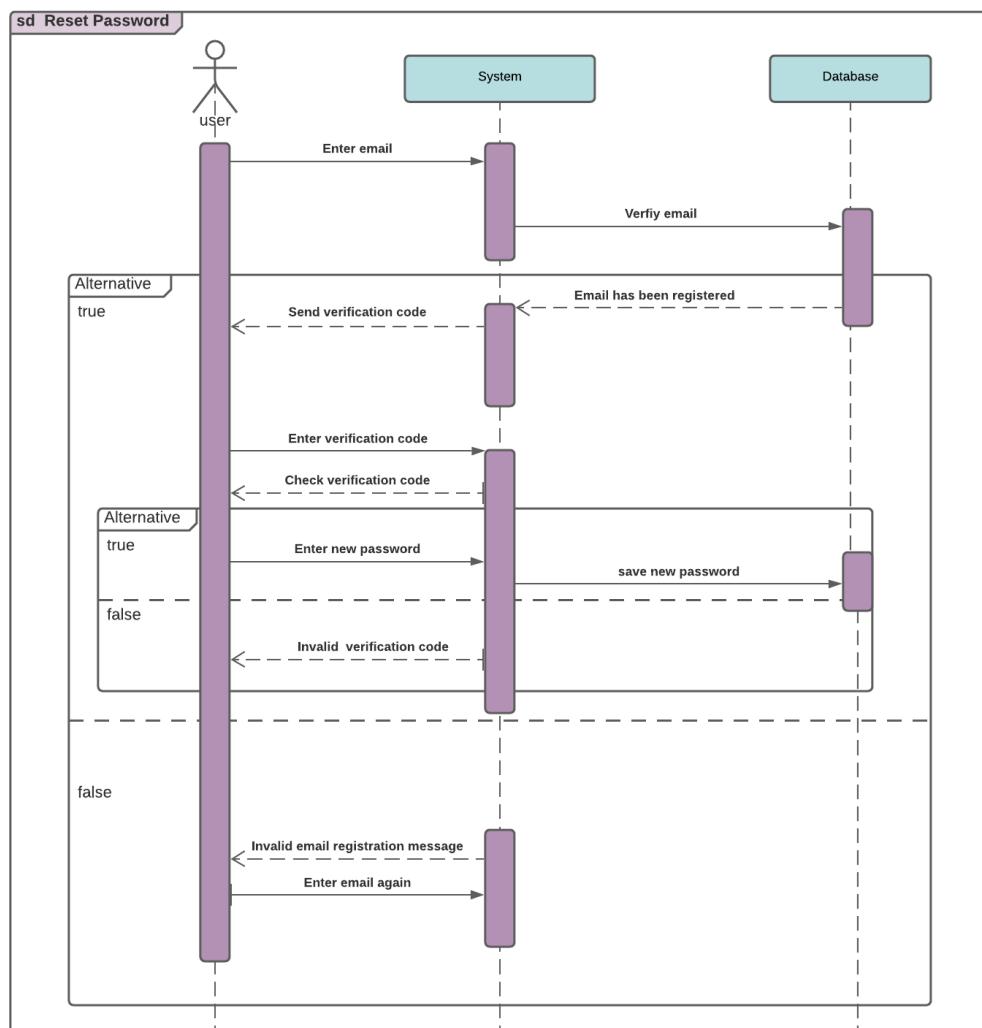


Figure 38: Reset password sequence diagram

#### 4.4.5 Delete Account sequence diagram

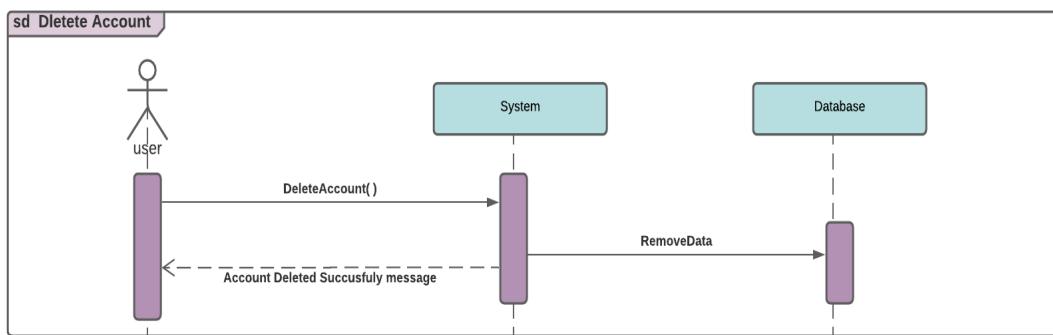


Figure 40: Delete Account sequence diagram

#### 4.4.6 Edit profile sequence diagram

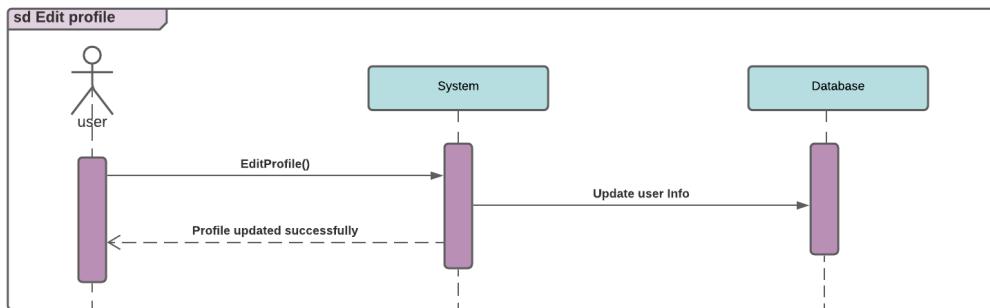


Figure 39: Edit profile sequence diagram

#### 4.4.7 Convert text to voice sequence diagram

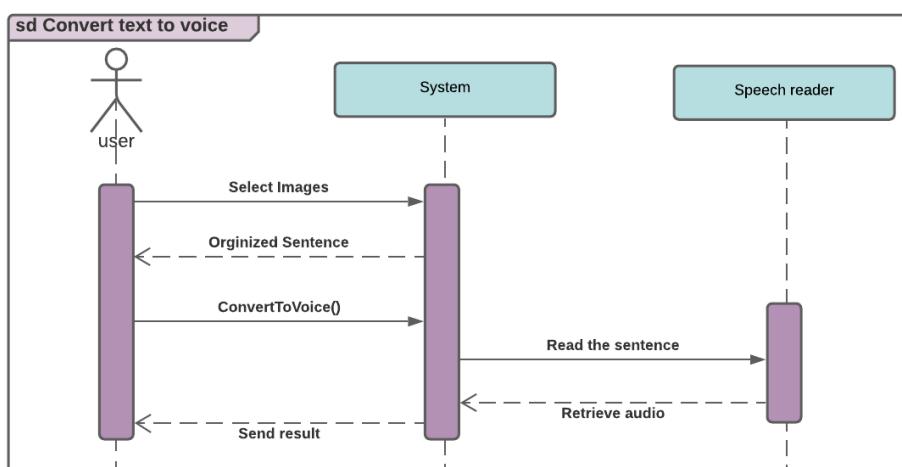


Figure 41: Convert text to voice sequence diagram

#### 4.4.8 Preview category sequence diagram

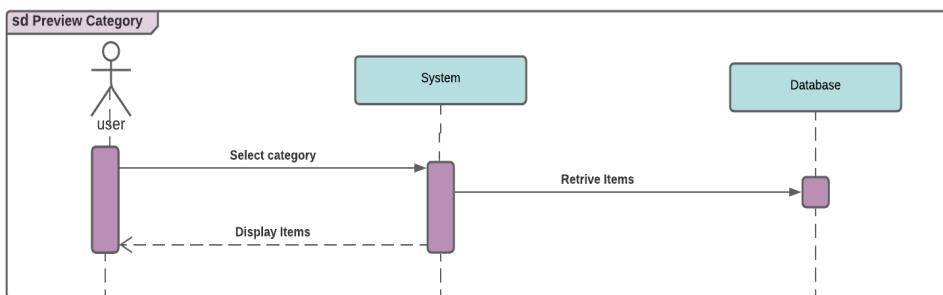


Figure 42: Preview category diagram

#### 4.4.9 Create sentences sequence diagram

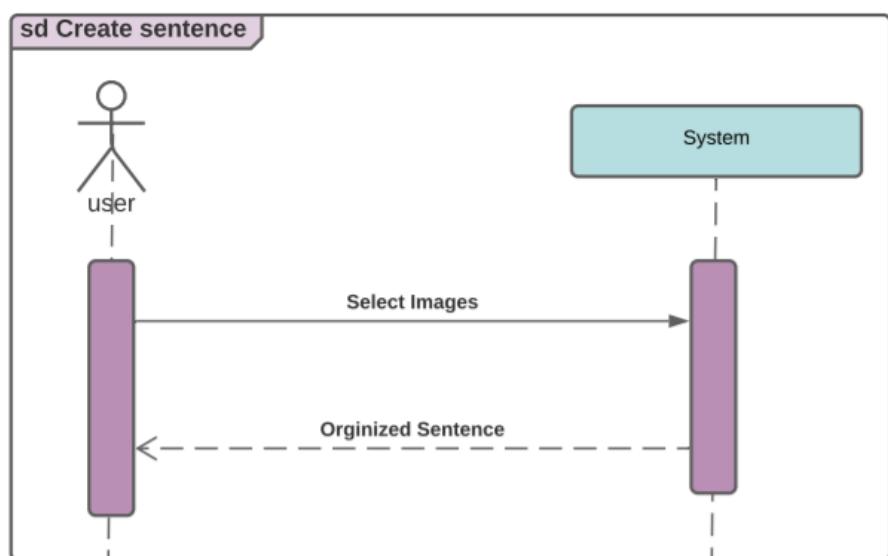


Figure 43: Create sentences sequence diagram

#### 4.4.10 Save sentences for daily use sequence diagram

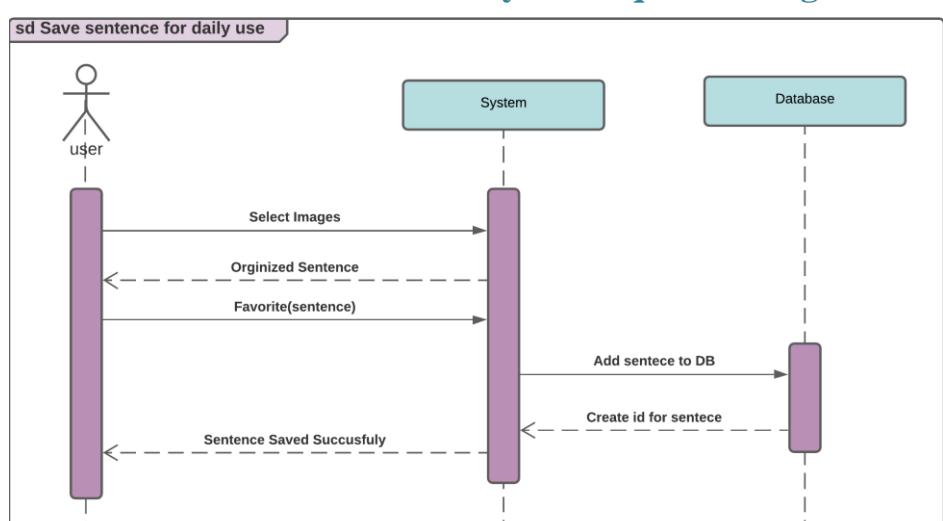


Figure 44: Save sentences for daily use sequence diagram

#### 4.4.11 Delete word sequence diagram

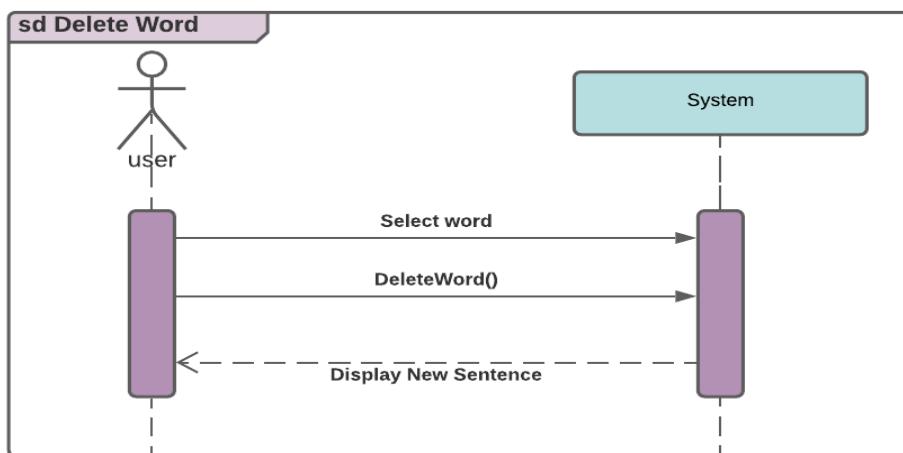


Figure 44: Delete word sequence diagram

#### 4.4.12 Add favorite sequence diagram

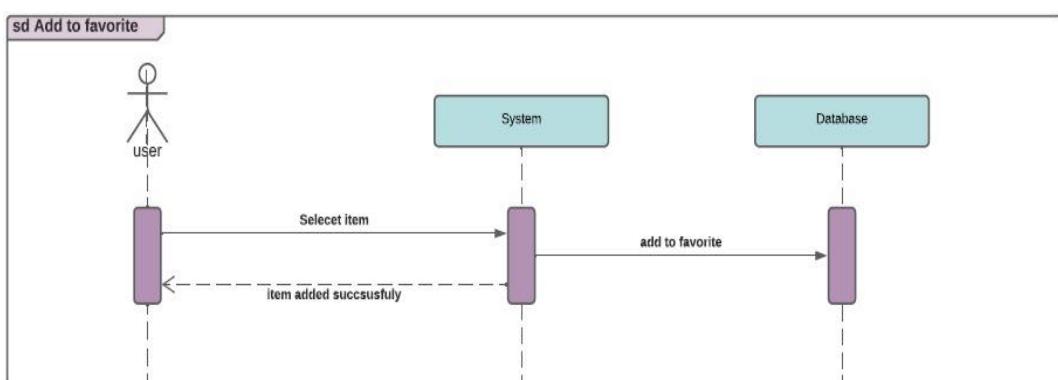


Figure 45: Add favorite sequence diagram

#### 4.4.13 Remove favorite sequence diagram

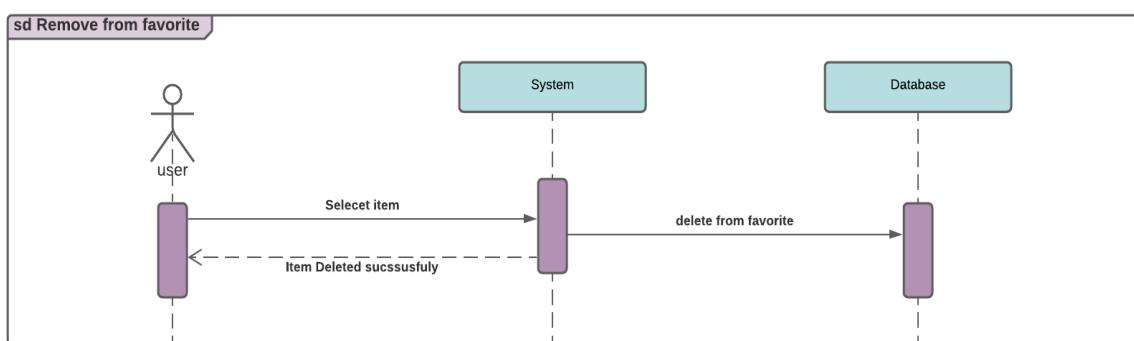


Figure 46: Remove favorite sequence diagram

#### 4.4.14 Search sequence diagram

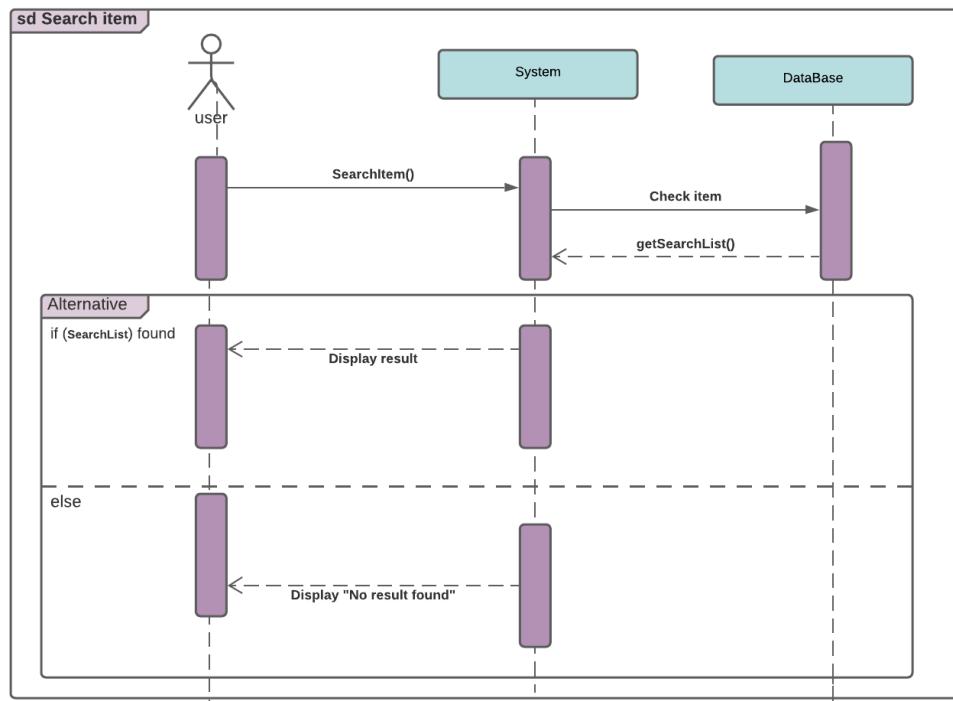


Figure 47: Search sequence diagram

#### 4.4.15 Create user account sequence diagram

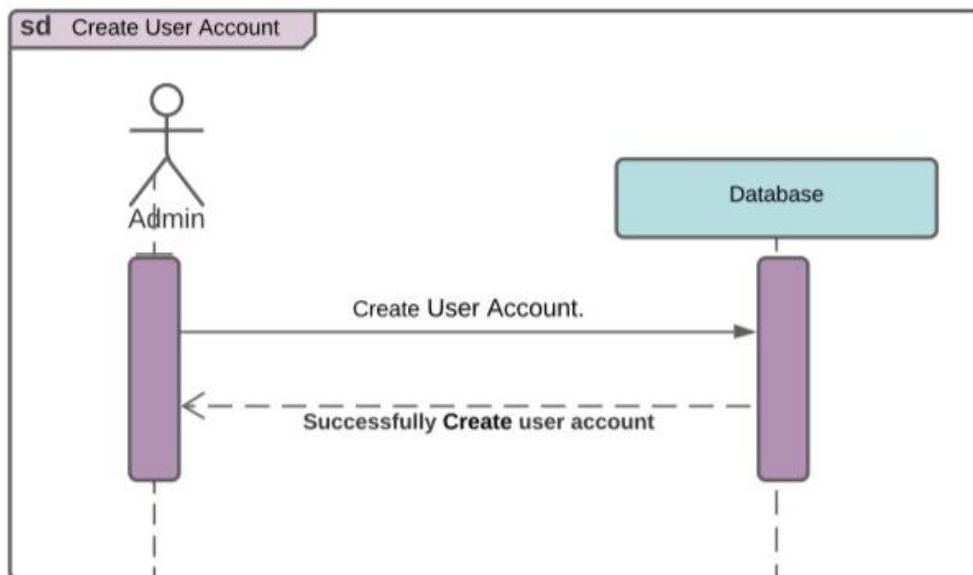


Figure 48: Create user account sequence diagram

#### 4.4.16 Delete user account sequence diagram

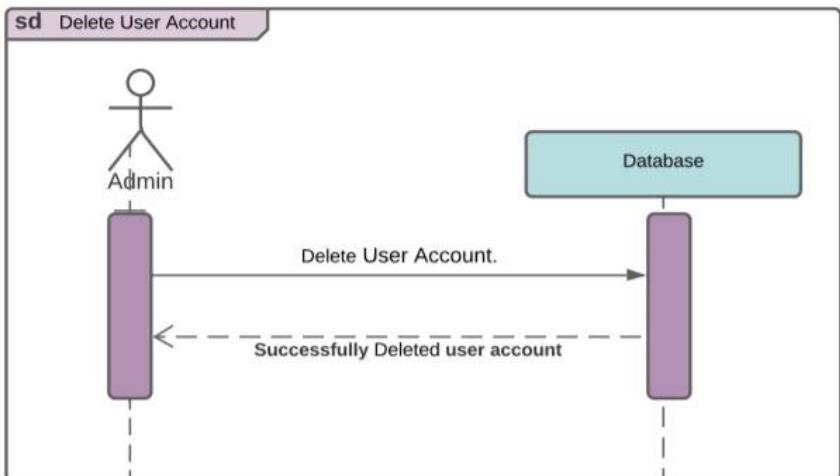


Figure 49: Delete user account sequence diagram

#### 4.4.17 Update user account sequence diagram

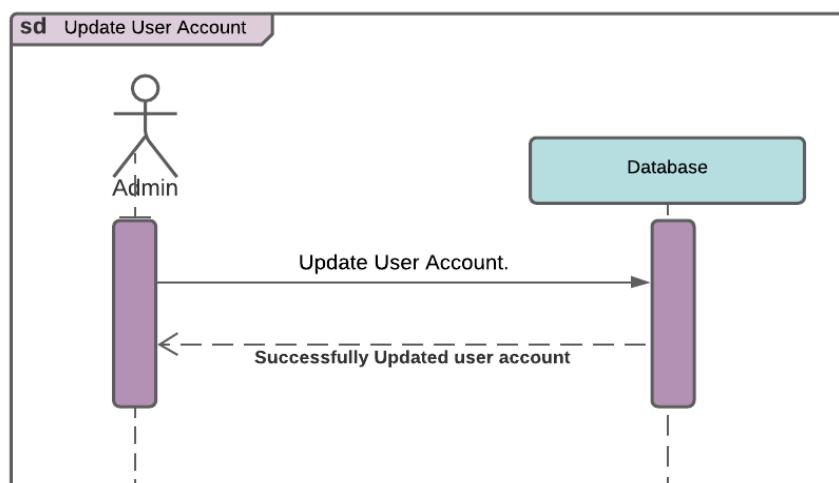


Figure 50: Update user account sequence diagram

#### 4.4.18 Find user account sequence diagram

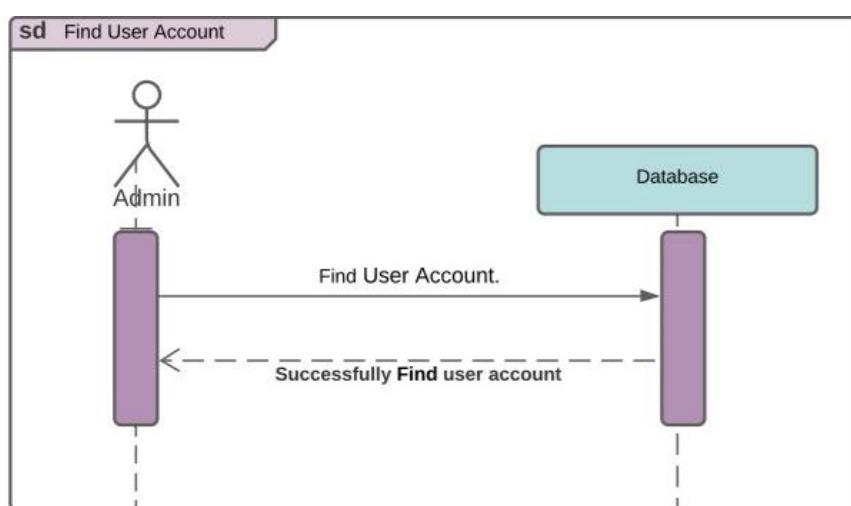


Figure 51: Find user account sequence diagram

## 4.5 Entity Relation Diagram (ERD)

An entity relationship diagram (ERD) shows the relationships of entity sets stored in a database. An entity in this context is an object, a component of data. An entity set is a collection of similar entities. These entities can have attributes that define its properties.

By defining the entities, their attributes, and showing the relationships between them, an ER diagram illustrates the logical structure of databases

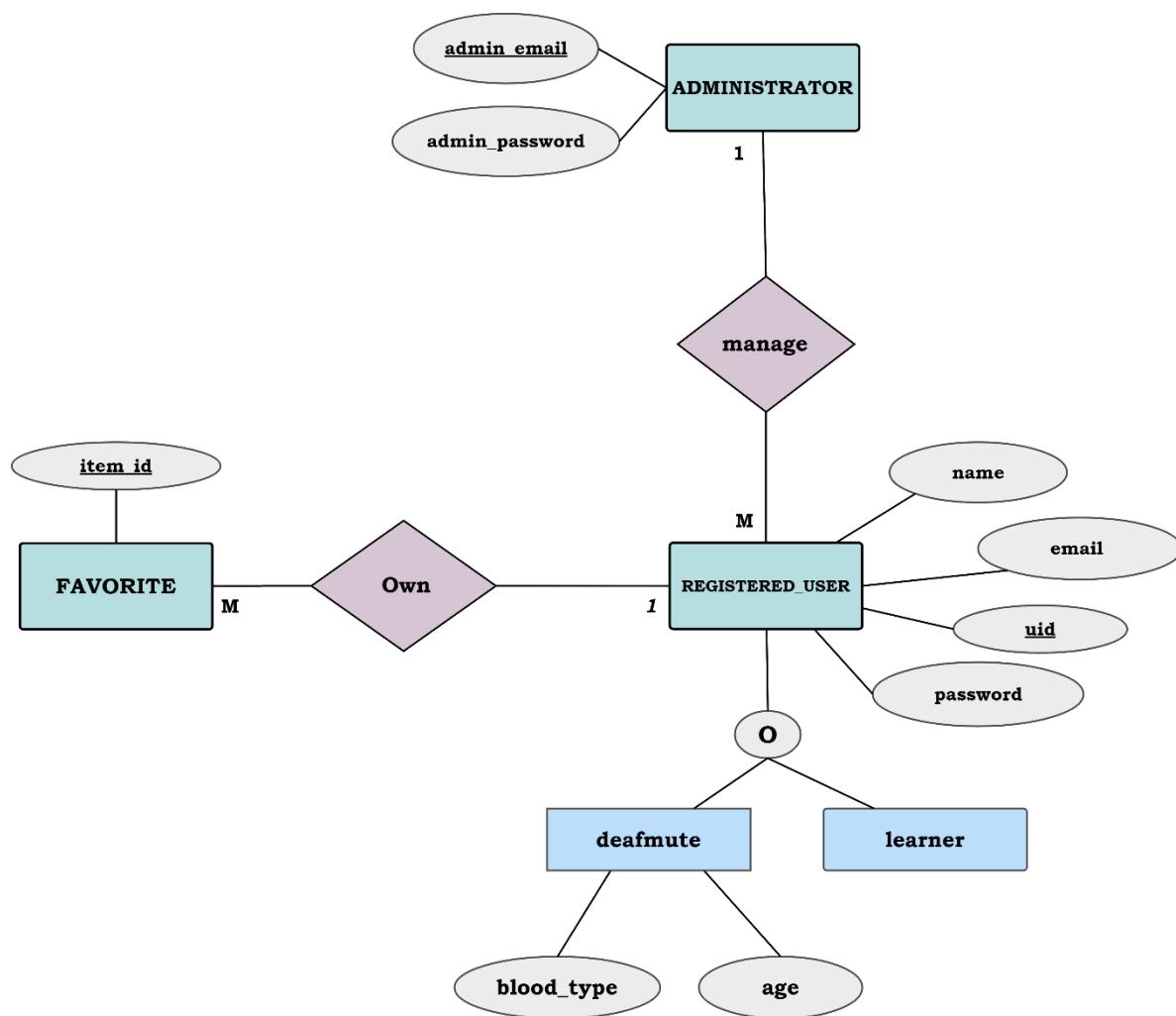


Figure 52: Entity Relation Diagram

## 4.6 Database Schema

**REGISTERED\_USER** (uid, name, email, password).

**DEAFMUTE** (blood\_type, age).

**FAVORITE** (item\_id).

**ADMINISTRATOR** (admin\_email, admin\_password).

## 4.7 Relational Schema(mapping)

**REGISTERED\_USER** (uid, name, email, password, admin\_email).

**SUB\_USER** (uid, age, blood\_type, deafmute Flag, learner Flag)

**FAVORITE** (item\_id, uid).

**ADMINISTRATOR** (admin\_email, admin\_password).

## 4.8 Database Description

| Entity          | Attribute          | Description                      | Data type | Length | Null | Default | PK  | FK  |
|-----------------|--------------------|----------------------------------|-----------|--------|------|---------|-----|-----|
| REGISTERED_USER | <b>uid</b>         | Unique ID for each user.         | String    | 30     | No   | -       | Yes | No  |
|                 | <b>email</b>       | Email address for each user.     | String    | 30     | No   | -       | No  | No  |
|                 | <b>name</b>        | The user name.                   | String    | 30     | No   | -       | No  | No  |
|                 | <b>password</b>    | Password for each user.          | String    | 20     | No   | -       | No  | No  |
|                 | <b>admin_email</b> | Email address for administrator. | String    | 30     | No   | -       | No  | Yes |
| SUB_USER        | <b>uid</b>         | Unique ID Number for each user.  | String    | 30     | No   | -       | Yes | No  |
|                 | <b>blood_type</b>  | Blood-type for the Deaf-Mute.    | String    | 3      | No   | -       | No  | No  |
|                 | <b>age</b>         | The age of the Deaf-Mute user.   | String    | 2      | No   | -       | No  | No  |

|               |                    |                                  |        |    |    |   |     |     |
|---------------|--------------------|----------------------------------|--------|----|----|---|-----|-----|
| FAVORITE      | <u>item_id</u>     | Unique ID for specific item.     | String | 30 | No | - | Yes | No  |
|               | uid                | Unique ID for each user.         | String | 30 | No | - | No  | Yes |
| ADMINISTRATOR | <u>admin_email</u> | Email address for administrator. | String | 30 | No | - | Yes | No  |
|               | admin_password     | Password for the administrator.  | String | 20 | No | - | No  | No  |

Table 25 Database description.

# CHAPTER 5

## 5. SYSTEM IMPLEMENTATION

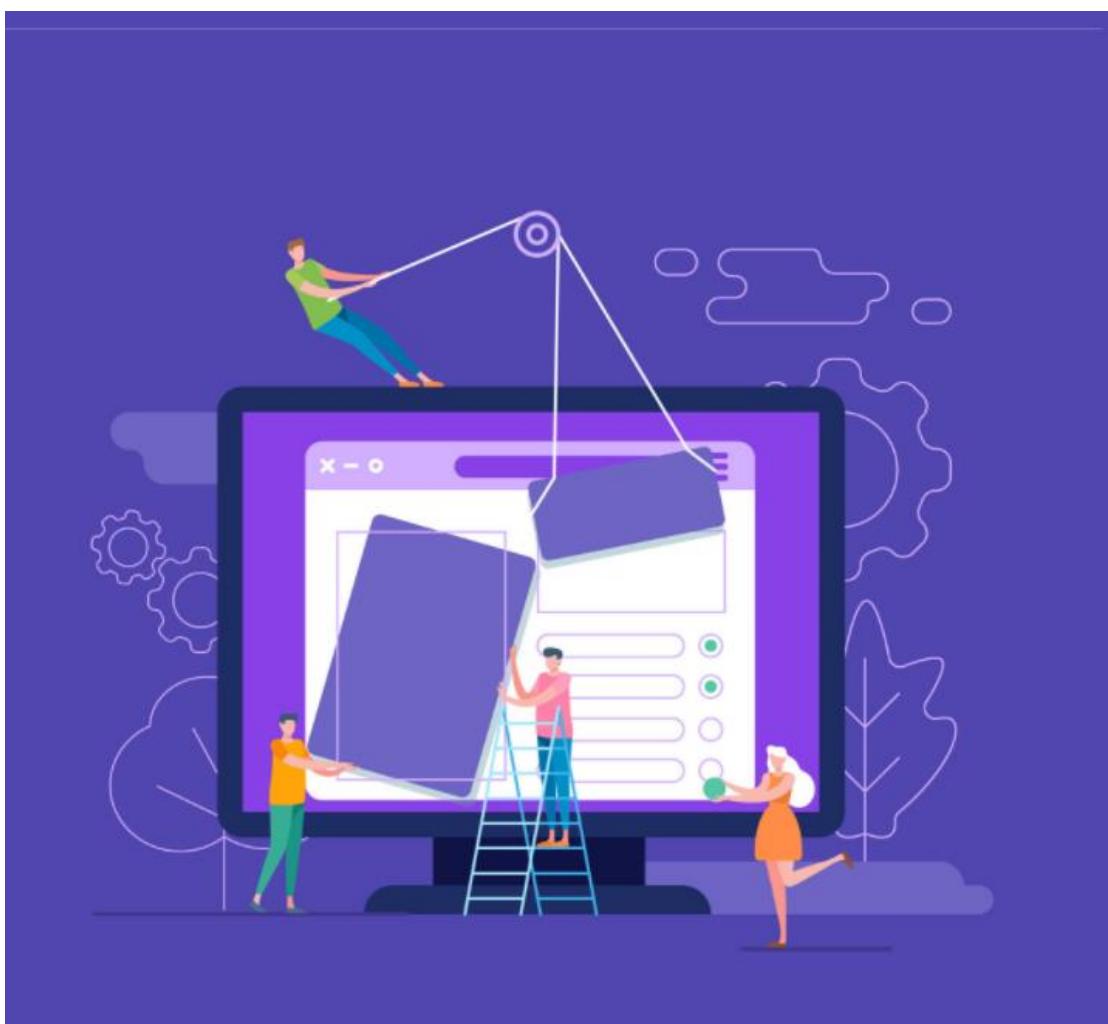


Figure 53: System Implementation

## 5.1 Hardware & Software tools

| Software                               | Description   |
|--|---|
| <b>Android Studio 2020.3.1.</b>        | Android Studio provides the fastest tools for building apps on every type of Android device   |
| <b>Adobe XD 22.0.1.</b>                | Is a vector-based UI and UX design tool for web apps and mobile apps,   |
| <b>Google Chrome</b>                   | Web browser   |
| <b>Java SE Development Kit 16.0.2.</b> | Development environment for building applications using the Java programming language.  |
| <b>Cacoo Website</b>                   | Website that allow to create and securely share flowcharts, wireframes, UML models, network diagrams and more   |
| <b>Microsoft Windows 10</b>            | Operating system for personal computers   |
| <b>Firebase</b>                        | Is a Backend-as-a-Service (BaaS). It provides developers with a variety of tools and services to help them develop quality apps, grow their user base, and earn profit. It is built on Google's infrastructure. |
| <b>Google Docs</b>                     | Web-based application in which documents and spreadsheets can be created, edited and stored   |
| <b>Google Meet</b>                     | Video conferencing app, It is the business-oriented version developed by Google.  |

|                   |  |
|-------------------|--|
| <b>Canva</b>      | Is a graphic design platform, used to create social media graphics, presentations, posters, documents and other visual content.                                    |
| <b>Lucidchart</b> | Is a visual workspace that combines diagramming, data visualization, and collaboration to accelerate understanding and drive innovation.                           |
| <b>PowerPoint</b> | A software package designed to create electronic presentations consisting of a series of separate pages or slides.   |
| <b>Pinterest</b>  | is an image-based social media network where users and businesses can promote and explore their interests by pinning images and videos on virtual bulletin boards. |

*Table 26 Hardware & Software tools.*

## 5.2 System Interfaces in Detail

The user interface (UI) is important to any software product. When the user interface is poorly designed, users cannot work with it and will start looking for another UI.

Because the choice of color is important in the design of the user interface, as colors speak in powerful ways such as language, and the effect of color is greater than other elements, especially the mood effect on the viewer; So, we made sure to choose the colors of the user interface carefully, We chose the color Purple the main color for the user interface, as the color Purple is considered the color of emotional balance, inner peace and wisdom, and the color of humanity is considered as it combines strength, wisdom, humility and sensitivity.

Since Cyan is one of the colors related to Purple and it blends well with it, so Cyan has been included in the user interface, Cyan is a restful, calming color that symbolizes relaxation, Cyan is associated with optimism making someone feel better and protected.

### 5.2.1 Welcome page



| Described UI: Welcome page |  |
|----------------------------|--|
| No.                        | Description  |
| 1                          | The user will see this page when he/she open the app for the first time.               |
| 2                          | This page contains a "welcome video" for the app users.                                |
| 3                          | The user will be able to skip this video and go to the homepage by clicking on "Skip". |

Table 27 Welcome page.

Figure 54: Welcome page

### 5.2.2 Categories Page



| Described UI: Categories Page |   |
|-------------------------------|---|
| No.                           | Description   |
| 1                             | In this page, the user can preview all categories in the application, like (hospital, restaurant).        |
| 2                             | Allows the user to preview his/her favorite.  |
| 3                             | Allows the user to search for specific item and display the data corresponding to the data in search box. |

Table 28 Categories Page.

Figure 55: Categories Page

### 5.2.3 Navigation bar page



Figure 56: Navigation bar page

| Described UI: Navigation bar page |  |
|-----------------------------------|--|
| No.                               | Description  |
| 1                                 | This item in tool bar redirects the user to home page.   |
| 2                                 | This menu item allows the user to edit his/her data.   |
| 3                                 | This menu item allows the user to create an account or login if he/she already has an account. |
| 4                                 | This menu item allows the user to learn sign language.   |
| 5                                 | This menu item allows the user to log out from his/her account.                                |

Table 29 Navigation bar page.

#### 5.2.4 Sign-Up page for Deaf-mute

1

اسم كامل

فسيلة الاسم

العمر

البريد الإلكتروني

كلمة المرور

تأكيد كلمة المرور

إنشاء حساب

تسجيل دخول

8

9

Figure 57: Sign-Up page for Deaf-mute

| Described UI: Sign-Up page for Deaf-mute |   |
|--|---|
| No.                                      | Description   |
| 1  | In this page the deaf-mute can create an account.         |
| 2  | Allow the user to enter his/her full name.                |
| 3  | Allow the user to enter his/her blood type.               |
| 4  | Allow the user to enter his/her age.                      |
| 5  | Allow the user to enter his/her email.                    |
| 6  | Allow the user to enter his/her password.                 |
| 7  | Allow the user to enter his/her confirm password.         |
| 8  | Submit data successfully So, user account is created.     |
| 9  | Allow the user to login if he/she already has an account. |

Table 30 Sign-Up page for Deaf-mute.

### 5.2.5 Sign-Up page for learner



Figure 58: Sign-Up page for learner

| Described UI: Sign-Up page for learner |   |
|--|---|
| No.                                    | Description   |
| 1                                      | In this page the learner can create an account.           |
| 2                                      | Allow the user to enter his/her name.                     |
| 3                                      | Allow the user to enter his/her email.                    |
| 4                                      | Allow the user to enter his/her password.                 |
| 5                                      | Allow the user to enter the confirmed password.           |
| 6                                      | Submit data successfully So, user account is created.     |
| 7                                      | Allow the user to login if he/she already has an account. |

Table 31 Sign-Up page for learner.

## 5.2.6 Login page



| Described UI: Login page |   |
|--------------------------|---|
| No.                      | Description   |
| 1                        | Allow the user to enter his/her email.                      |
| 2                        | Allow the user to enter his/her password.                   |
| 3                        | Allow the user to login in with he/she an account.          |
| 4                        | Allow the user to reset password when he/she forgot it.     |
| 5                        | Allow users to create an account if he/she do not have one. |

Table 32 Login page.

Figure 59: Login page

### 5.2.7 Edit page for Deaf-mute

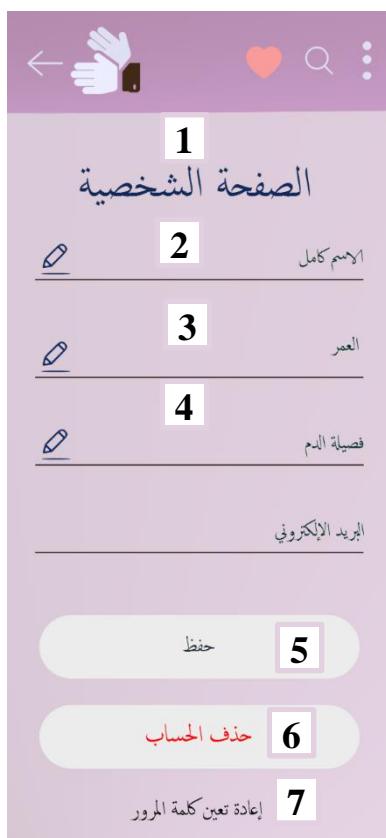


Figure 60: Edit page for Deaf-mute

| Described UI: Edit page for Deaf-mute page |  |
|--|--|
| No.  | Description  |
| 1  | This field allows the user to edit his/her profile.                        |
| 2  | This field allows the user to edit his/her full name.                      |
| 3  | This field allows the user to edit his/ her age.                           |
| 4  | This field allows the user to edit his/ her blood type.                    |
| 5  | This button allows the user to save the data after editing.                |
| 6  | This button allows the user to delete his/her account.                     |
| 7  | This field redirects the user to the reset page to reset his/her password. |

Table 33 Edit page for Deaf-mute .

## 5.2.8 Edit page for Learner

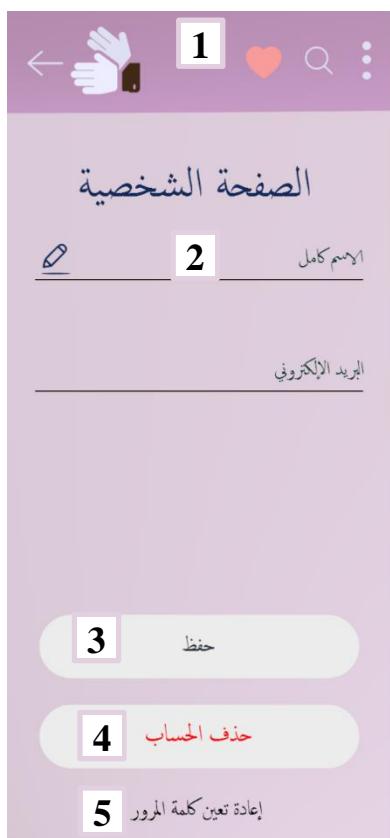
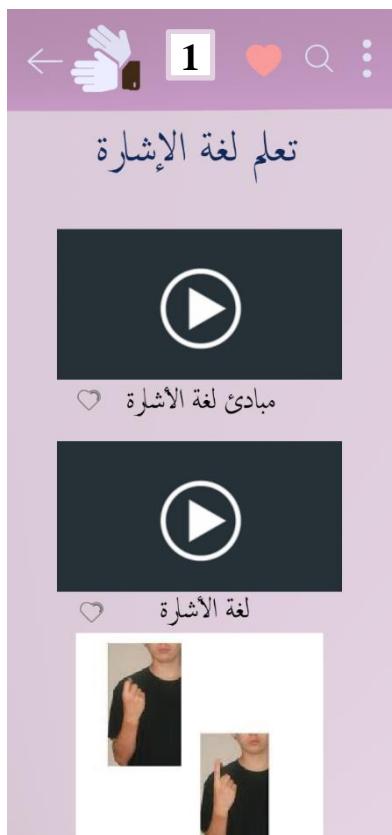


Figure 61: Edit page for Learner

| Described UI: Edit page for Learner |  |
|-------------------------------------|--|
| No.                                 | Description  |
| 1                                   | This page allows the user to edit his/her profile.                         |
| 2                                   | This field allows the user to edit his/her full name.                      |
| 3                                   | This button allows the user to save the data after editing.                |
| 4                                   | This button allows the user to delete his/her account.                     |
| 5                                   | This field redirects the user to the reset page to reset his/her password. |

Table 34 Edit page for Learner.

### 5.2.9 Learn sign language page



| Described UI: Learn sign language page |  |
|--|--|
| No.                                    | Description                                    |
| 1                                      | In this page the user can learn sign language. |

Table 35 Learn sign language page.

Figure 62: learn sign language page

### 5.2.10 Favorite page



| Described UI: Favourite page |   |
|------------------------------|---|
| No.                          | Description                                     |
| 1                            | Allow the user to add an item to a favourite.   |
| 2                            | Allow the user to add an image to a favourite.  |
| 3                            | Allow the user to add sentences to a favourite. |

Table 36 Favorite page.

Figure 63: Favorite page

### 5.2.11 Restaurant page



| Described UI: Restaurant page |  |
|-------------------------------|--|
| No.                           | Description  |
| 1                             | In this page, the user previews all restaurant page related words.                 |
| 2                             | In this button, the user can add a specific word or sentence to his/her favourite. |

Table 37 Restaurant page .

Figure 64: Restaurant page

### 5.2.12 who are you page



| Described UI: who are you page |   |
|--------------------------------|---|
| No.                            | Description   |
| 1                              | In this page the system asks the user if he/she deaf mute or learner before creating account. |
| 2                              | The user chose to create deaf-mute account.   |
| 3                              | The user chose to create learner account.   |
| 4                              | The user can log into if he /she have an account already.                                     |

Table 38 who are you page.

Figure 65: who are you page

## 5.3 The dataflow of the App's function:

### 5.3.1 Create an account using the navigation bar for Deaf mute:

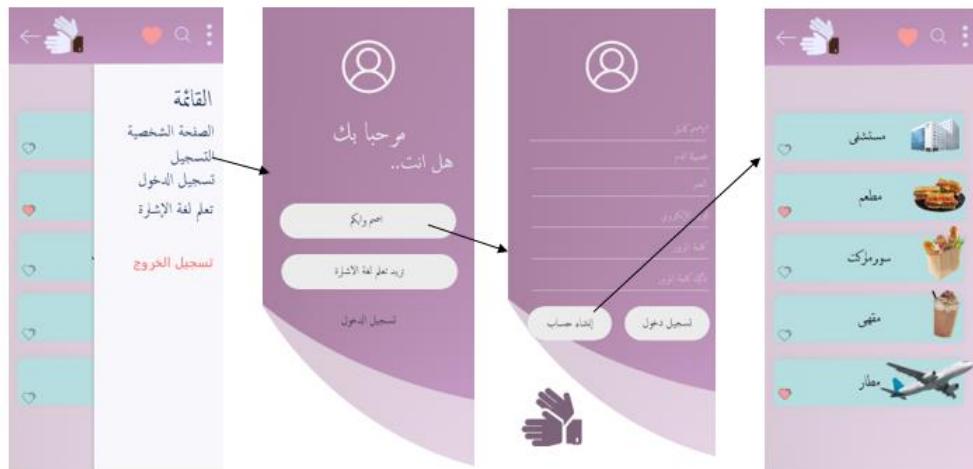


Figure 66: Create an account using the navigation bar for Deaf mute

### 5.3.2 Create an account using the navigation bar for learner:

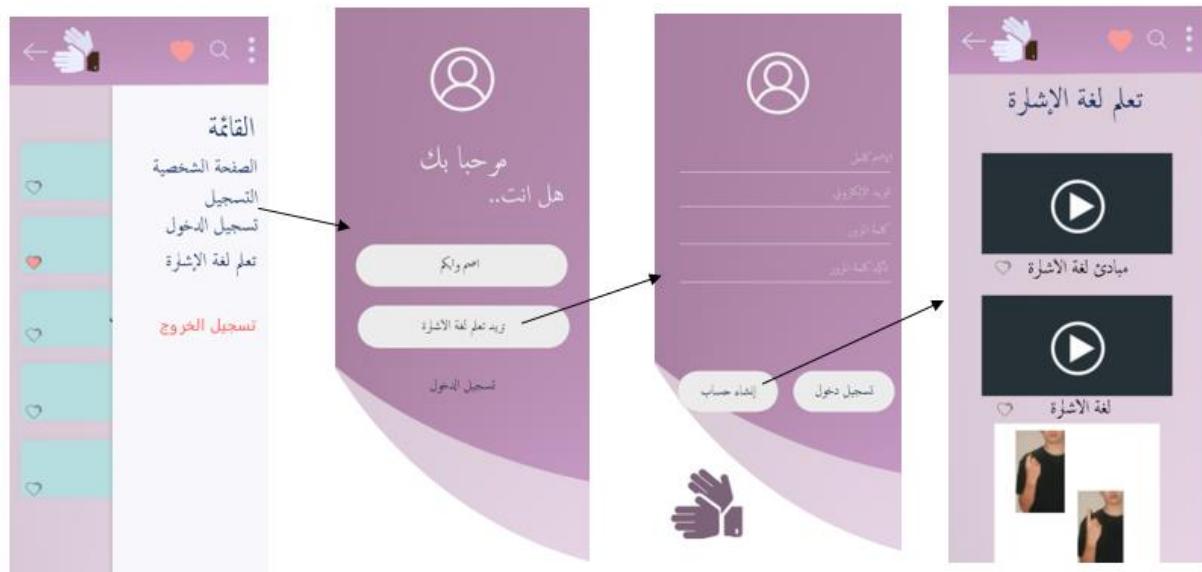


Figure 67: Create an account using the navigation bar for learner

### 5.3.3 Login using create account page:



Figure 68: Login using create account page

### 5.3.4 Login page:



Figure 69: Login page

### 5.3.5 Reset the password using login page:



Figure 70: Reset the password using login page

### 5.3.6 Create an account using login page for Deaf-mute:

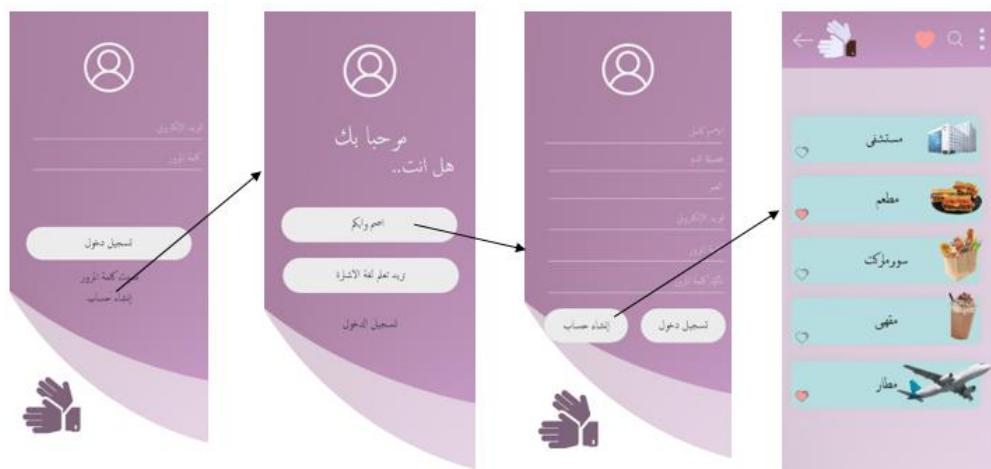


Figure 71: Create an account using login page for Deaf-mute

### 5.3.7 Create an account using login page for Learner:



Figure 72: Create an account using login page for Learner

### 5.3.8 Go to learner page using menu bar:

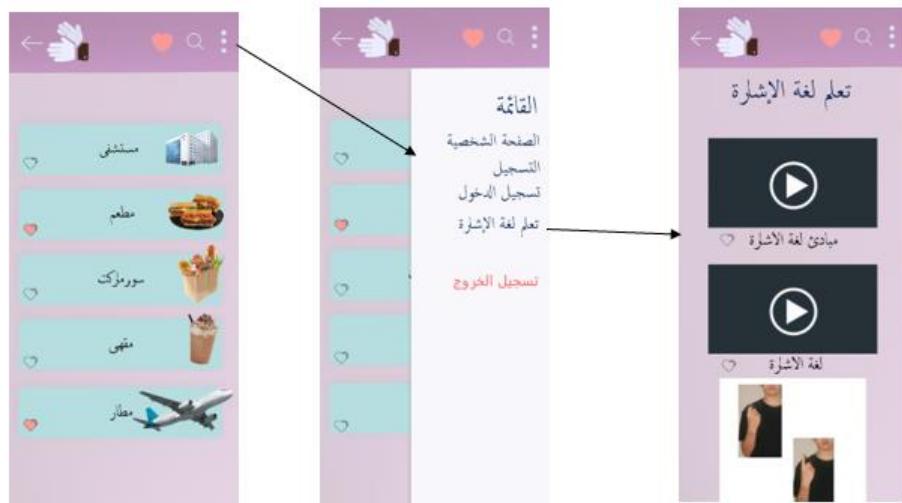


Figure 73: Go to learner page using menu bar

### 5.3.9 Edit profile for Deaf-mute:



Figure 74: Edit profile for Deaf-mute

### 5.3.10 Edit profile for Learner:

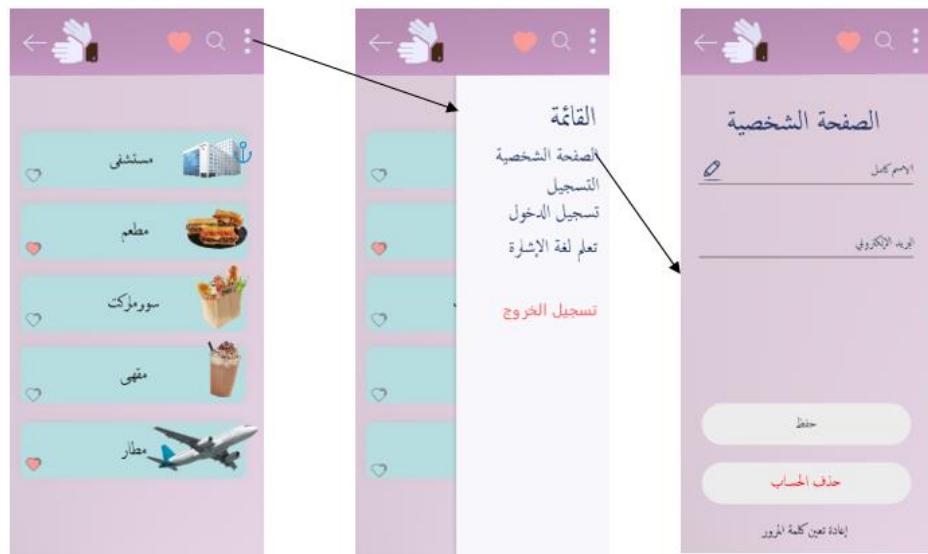


Figure 75: Edit profile for Learner

### 5.3.11 Redirect to homepage after edit and save profile info:



Figure 76: Redirect to homepage after edit and save profile info

### 5.3.12 Delete an account using edit profile page:



Figure 77: Delete an account using edit profile page

### 5.3.13 Reset the password using edit profile page:

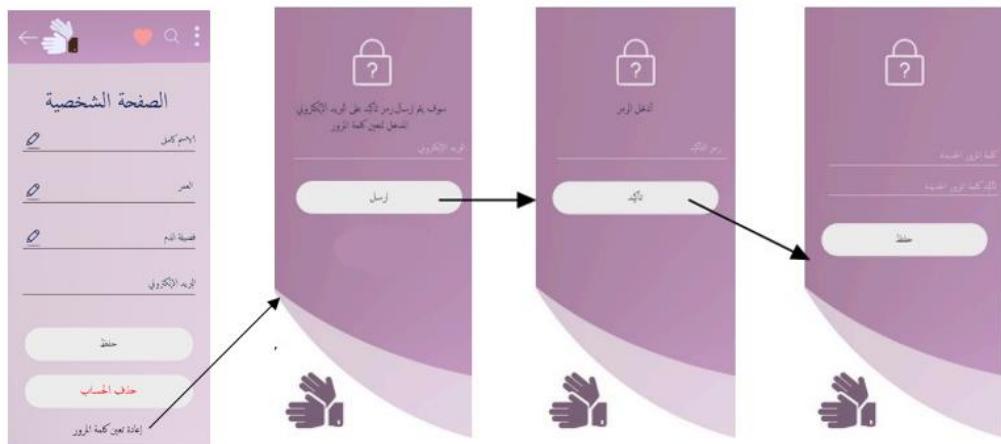


Figure 78: Reset the password using edit profile page

### 5.3.14 Go to favorite page using menu bar:

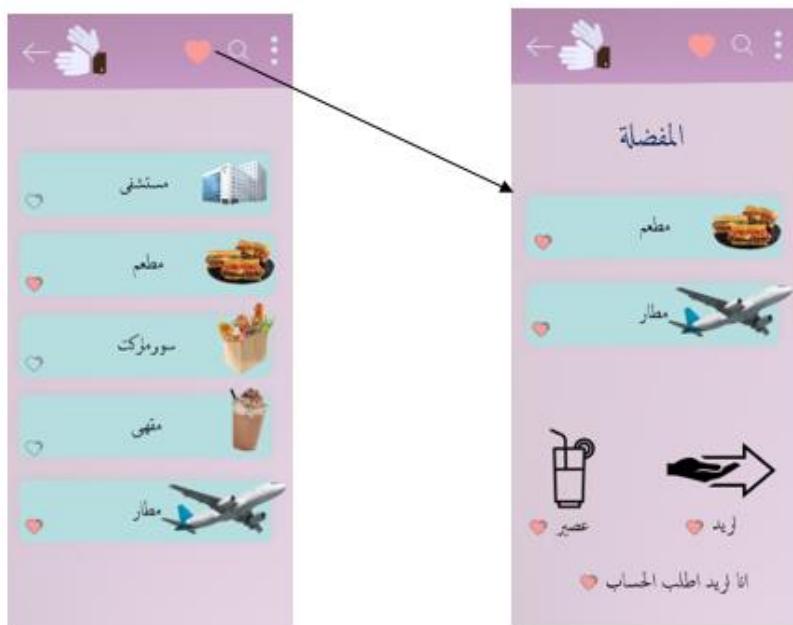


Figure 79: Go to favorite page using menu bar

### 5.3.15 Choose specific category:



Figure 80: Choose specific category

### 5.3.16 Go to search bar using tool bar:

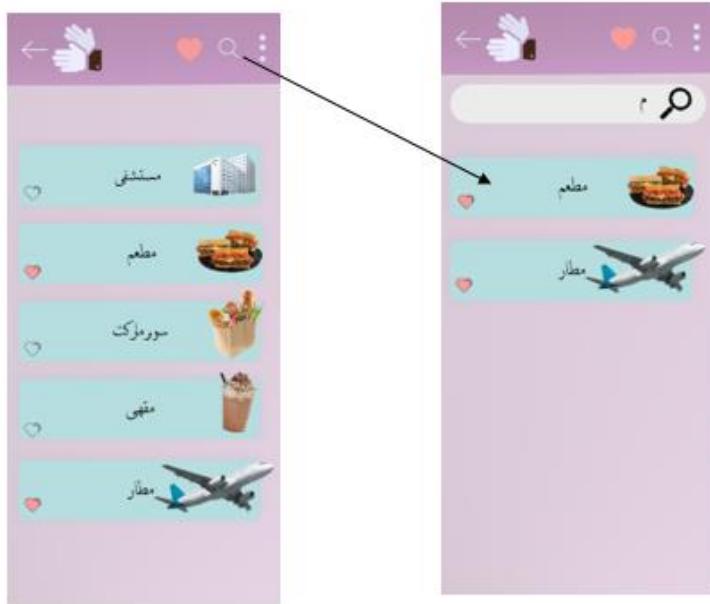


Figure 81: Go to search bar using tool bar

### 5.3.17 Access homepage (category page) using app icon:

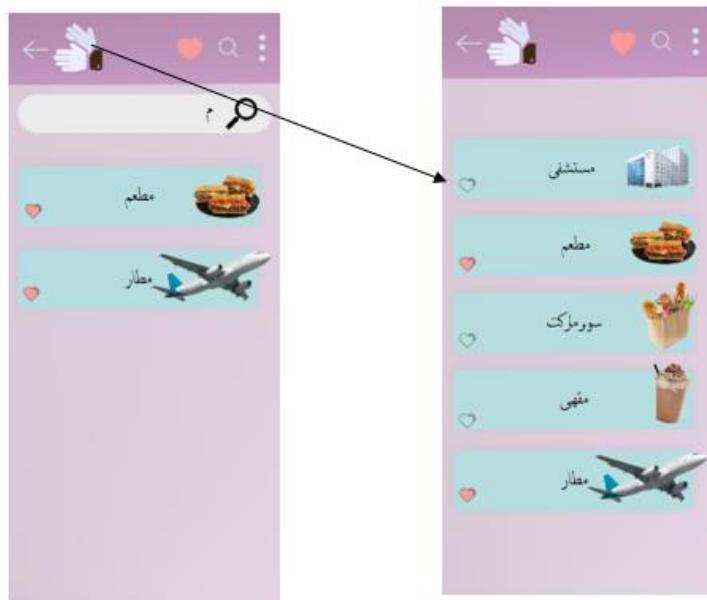


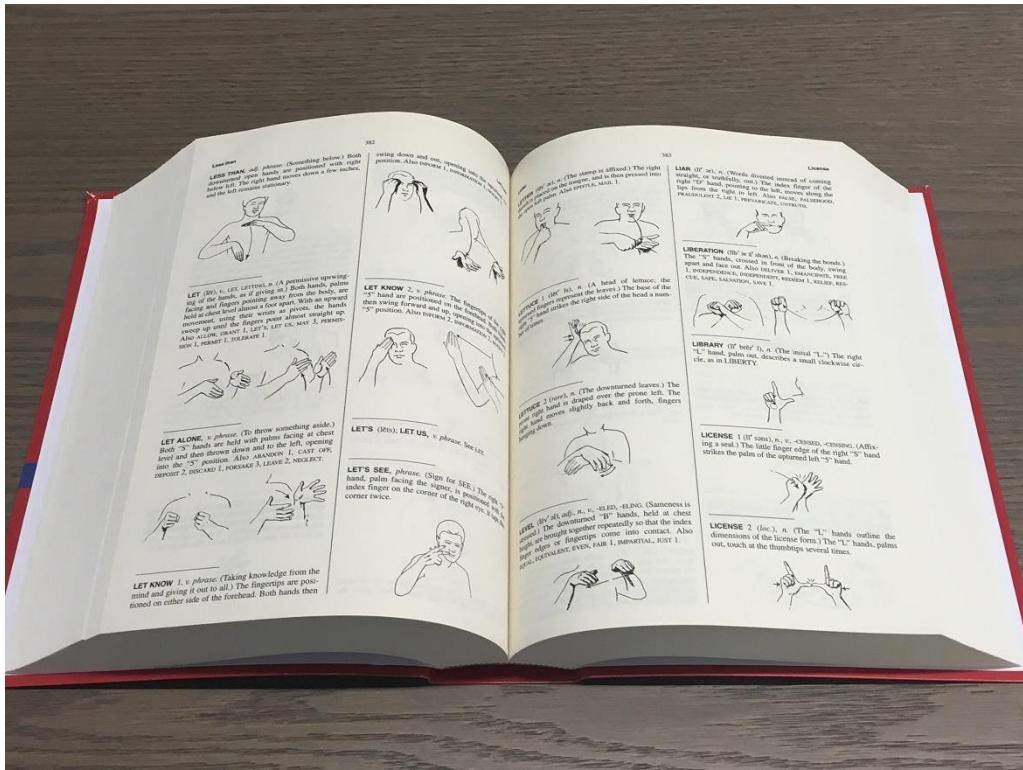
Figure 82: Access homepage (category page) using app icon

### 5.3.18 Logout:



Figure 83: Logout

# APPLICATION DICTIONARY



*Figure 84: Application Dictionary*

## Type of users:



Figure 85: Type of users:

|  |  |  |
|--|--|--|
| A blue icon showing a stylized ear with a slash through it, indicating deafness. | A black silhouette icon of a person standing and holding a small globe, with two circular icons above them showing a person's head and another person holding a globe. | A green rounded square icon featuring a white stylized human figure and the word "GUEST" in white capital letters. |
| الصم البكم   | متعلم  | ضيف  |

Table 39 Type of users.

## Deaf-mute data:



Figure 86: Deaf-mute data

|               |                   |                   |
|---------------|-------------------|-------------------|
| NAME<br>الاسم | البريد الإلكتروني |                   |
| AGE<br>العمر  | فصيلة الدم        | ****<br>كلمة السر |

Table 40 Deaf-mute data.

## Learner data:



Figure 87: Learner data

|                      |                   |                         |
|----------------------|-------------------|-------------------------|
| NAME<br><i>الاسم</i> | البريد الإلكتروني | **** <i>كلمة المرور</i> |
|----------------------|-------------------|-------------------------|

Table 41 Learner data.

## Learner category:



Figure 88: Learner category

Inside this category:

| صور | فيديو   |
|-----|---|
|     | <p>تعليم الحروف الهجائية بلغة الإشارة</p>                               |
|     | <p>لغة الإشارة<br/>Sign Language</p> <p>الحروف العربية بلغة الإشارة</p> |

Table 42 Learner category.

## Restaurant Category:



Figure 89: Restaurant Category

### Inside this category:



برجر دجاج



برجر لحم



بىسى



سوشي



أطلب



أنا



سلطة



بيتزا



معكرونة



قائمة الطعام



الدفع



أريد



عصير برتقال



كوكا كولا



ميرندا برتقال

Table 43 Restaurant Category.

## Hospital Category:



Figure 90: Hospital Category

## Inside this category:

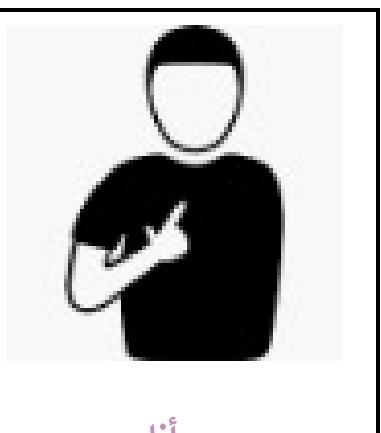




دكتور العيون



استفسر



أنا



دكتور العظام



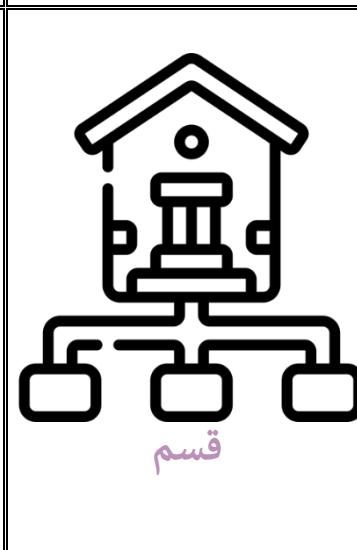
دكتور الباطنية



دكتور نفسي



دكتور الجلدية



قسم



طوارئ



أين

## Supermarket category:



Figure 91: Supermarket category

## Inside this category:

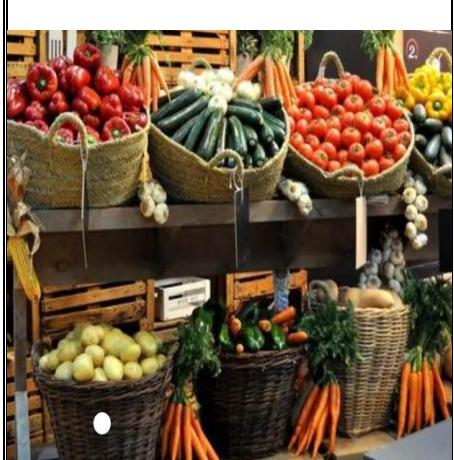
The diagram consists of three panels. The first panel on the left shows a black silhouette of a person with their hand raised, with the Arabic word "أنا" (I) written below it. The second panel in the middle shows a black silhouette of a hand holding another hand, with a large black arrow pointing to the right, and the Arabic word "أريد" (I want) written below it. The third panel on the right shows a photograph of a supermarket shelf stocked with various types of Silk milk alternatives, with the Arabic word "المشروبات" (drinks) written below it.



فواكه



المخبوزات



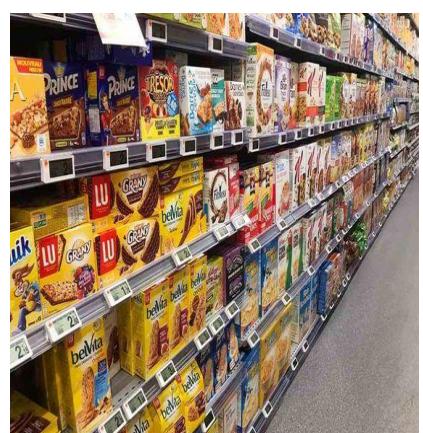
خضروات



اللحوم



المنظفات



حلويات

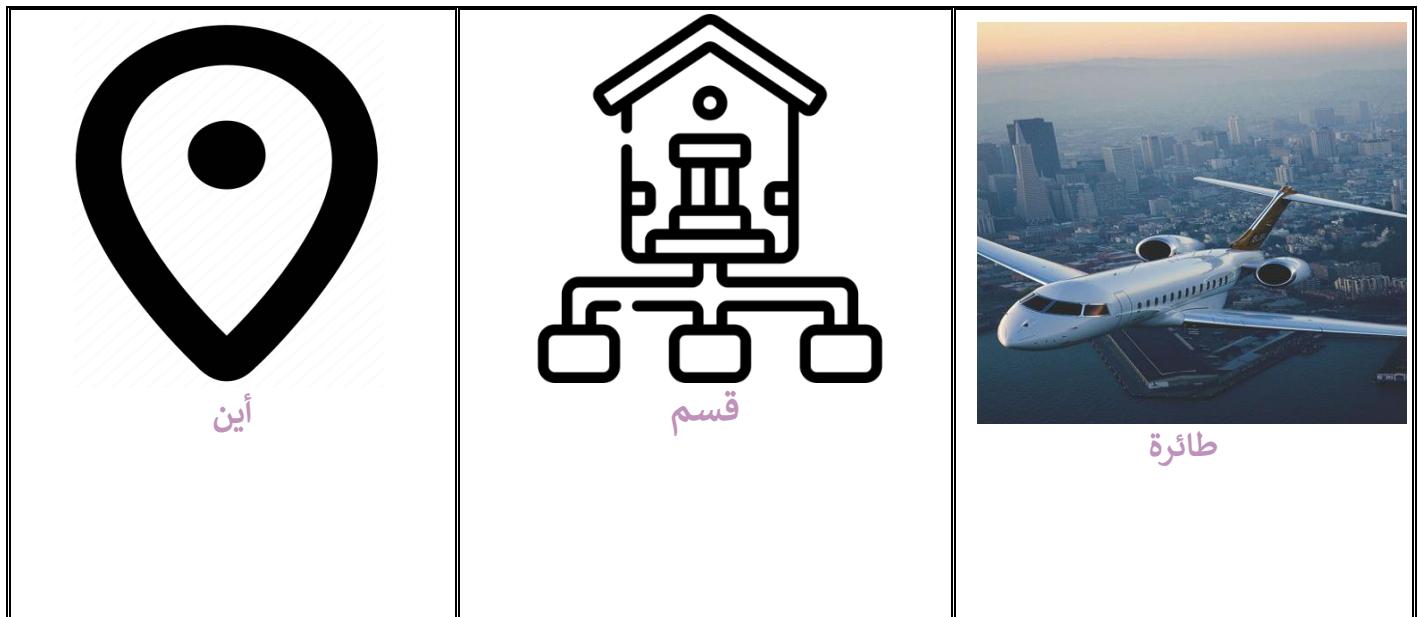
Table 45 Supermarket category.

## Airports Category:



Figure 92: Airports Category

Inside this category:

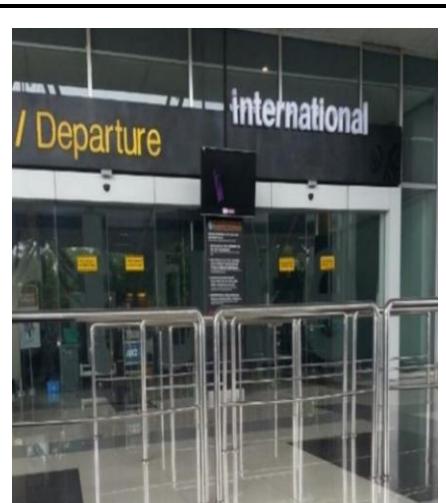




تذكرة



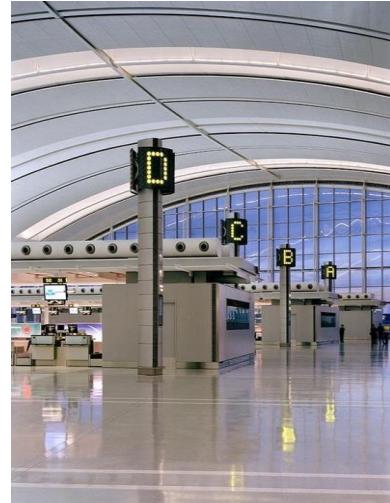
مقد



بواية



بطاقة الصعود



صالحة



جواز سفر

*Table 46 Airports Category.*

## Cafe Category:



Figure 93: Cafe Category

### Inside this category:



قهوة سوداء



كابتشينو



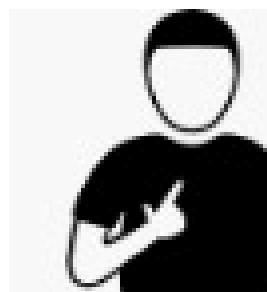
موكا



لاتيه



ساخن



أنا

|  |  |   |
|--|--|---|
|  <p>آيس موکا کراميل</p> |  <p>سبانش لاتيه</p> |  <p>فستق لاتيه</p>     |
|  <p>أريد</p>           |  <p>بارد</p>        |  <p>آيس وايت موکا</p> |
|  <p>تيشيرز كيك</p>    |  <p>براونيز</p>   |  <p>بان كيك</p>      |
|  <p>كريب</p>          |  <p>كيكة عسل</p>  |  <p>كراسون</p>       |

Table 47 Cafe Category.

# CHAPTER 6

## 6. SYSTEM TESTING



Figure 94 System Testing

## **6.1 Introduction**

System Testing is a type of software testing that is performed on a complete integrated system to evaluate the compliance of the system with the corresponding requirements.

In system testing, integration testing passed components are taken as input. The goal of integration testing is to detect any irregularity between the units that are integrated together. System testing detects defects within both the integrated units and the whole system. The result of system testing is the observed behavior of a component or a system when it is tested.

## **6.2 Unit Testing**

Unit testing is a type of software testing where individual units or components of a software are tested. The purpose is to validate that each unit of the software code performs as expected. Unit Testing is done during the development (coding phase) of an application by the developers. Unit Tests isolate a section of code and verify its correctness. A unit may be an individual function, method, procedure, module, or object.

### 6.2.1 Unit Testing Table:

| Function:                        | Description:  | Result: |
|----------------------------------|---|---------|
| 1. Deaf-mute Register.           | The deaf-mute can create an account.  | Passed  |
| 2. Learner Register.             | The learner can create an account.  | Passed  |
| 3. Login.                        | The users can login into the system to access the services that require creating an account like: “favorite”.   | Passed  |
| 4. Logout.                       | The user can logout from the account.   | Passed  |
| 5. Reset password.               | The users can reset his/her password.   | Passed  |
| 6. Change password.              | The users can change his/her password.  | Passed  |
| 7. Edit profile.                 | The users can modify his/her information.   | Passed  |
| 8. Preview welcome video.        | The users can show a welcome video when the user opens the application for the first time.                      | Passed  |
| 9. Navigate app page.            | The users can navigate app pages comfortably.   | Passed  |
| 10. Preview images.              | The users can preview images in each category.  | Passed  |
| 11. Convert text to voice.       | The system reads the text-embedded in images to generate a sentence and produces the voice using speech reader. | Passed  |
| 12. Preview category.            | The users can show the category in the system.  | Passed  |
| 13. Create sentences.            | The users can create meaningful sentences from a collection of words.   | Passed  |
| 14. Save sentence for daily use. | The users can save sentence in favorite for daily use.  | Passed  |

| <b>Function:</b>                        | <b>Description:</b>   | <b>Result:</b> |
|---|---|----------------|
| <b>15. Add to Favorite.</b>             | The users can add items to the system and the system must show the item that has been added to favorites. | Passed         |
| <b>16. Remove from Favorite.</b>        | The users can remove items from the system.   | Passed         |
| <b>17. Search item</b>                  | The users can search for a specific item.   | Passed         |
| <b>18. Return to the previous page.</b> | The users can use previous button "◀" to return the previous page.  | Passed         |
| <b>19. Create User Account.</b>         | The administrator can create user account from the database.  | Passed         |
| <b>20. Delete User Account.</b>         | The administrator can delete user account from the database.  | Passed         |
| <b>21. Update User Account.</b>         | The administrator can update user account from the database.  | Passed         |
| <b>22. Find User Account.</b>           | The administrator can find user account from the database.  | Passed         |

*Table 48 Unit Testing*

## 6.3 Test Cases

Test cases is a basic concept in software testing, define how to test a system, software or an application. A test case is a singular set of actions or instructions for a tester to perform that validates a specific aspect of a product or application functionality.

### 6.3.1 Deaf-mute Register.

**Function:** Register [Deaf-mute].

**Description:** Test the ability to create a new account.

**Test Input Data:** Name, Password, Email, Age, Blood type.

| # | Case Description  | Expected Result            | Actual Result |
|---|---|----------------------------|---------------|
| 1 | The user fills in the name, Password, Email, Age, blood type and then presses "Register". | The account is Registered. | Expected      |
| 2 | if there is missing information.  | Error message displayed.   | Expected      |
| 3 | if the email already exists.  | Error message displayed.   | Expected      |
| 4 | incorrect input format.   | Error message displayed.   | Expected      |

Table 49 Test case Deaf-mute Register

### 6.3.2 Learner Register

**Function:** Register [Learner].

**Description:** Test the ability to create a new account.

**Test Input Data:** Name, Password, Email.

| # | Case Description   | Expected Result            | Actual Result |
|---|--|----------------------------|---------------|
| 1 | The user fills in the name, Password, Email and then presses "Register". | The account is Registered. | Expected      |
| 2 | if there is missing information.   | Error message displayed    | Expected      |
| 3 | if the email already exists.   | Error message displayed.   | Expected      |
| 4 | incorrect input format.  | Error message displayed.   | Expected      |

Table 50 Test case Learner Register

### 6.3.3 Login.

**Function:** Login [Learner-Deaf-mute].

**Description:** Test the ability to Login to the account.

**Test Input Data:** Email, Password.

| # | Case Description  | Expected Result           | Actual Result |
|---|---|---------------------------|---------------|
| 1 | The user fills in the Email, Password and then presses "Login". | The account is logged in. | Expected      |
| 2 | if the email doesn't exist.                                     | Error message displayed.  | Expected      |
| 3 | email or password are missed.                                   | Error message displayed.  | Expected      |
| 4 | incorrect input format.   | Error message displayed.  | Expected      |

Table 51 Test case Login

### 6.3.4 Logout.

**Function:** Logout [Learner-Deaf-mute].

**Description:** Test the ability to logs out.

| # | Case Description                               | Expected Result                    | Actual Result |
|---|--|------------------------------------|---------------|
| 1 | The user clicks the logout button in the menu. | logs out the user from the system. | Expected      |

Table 52 Test case Logout

### 6.3.5 Reset password.

**Function:** Reset password [Learner-Deaf-mute].

**Description:** Test the ability to Reset password.

**Test Input Data:** Email, New password.

| # | Case Description               | Expected Result                    | Actual Result |
|---|--------------------------------|------------------------------------|---------------|
| 1 | The user click reset password. | The system saves the new password. | Expected      |
| 2 | if the email does not find.    | error message displayed.           | Expected      |

Table 53 Test case Reset Password

### 6.3.6 Change password.

**Function:** Change password [Learner-Deaf-mute].

**Description:** Test the ability to Change password.

**Test Input Data:** Old password, New password.

| # | Case Description                          | Expected Result                    | Actual Result |
|---|---|------------------------------------|---------------|
| 1 | The user click change password.           | The system saves the new password. | Expected      |
| 2 | If the old password is wrong.             | error message displayed.           | Expected      |
| 3 | If the new password matches old password. | error message displayed.           | Expected      |
| 4 | If the password doesn't match.            | error message displayed.           | Expected      |

Table 54 Test case Change Password

### 6.3.7 Edit profile.

**Function:** Edit profile [Learner-Deaf-mute].

**Description:** Test the ability to update user account.

| # | Case Description   | Expected Result         | Actual Result |
|---|--|-------------------------|---------------|
| 1 | The user could update the information of his/her account and then presses "Save" | The account is updated. | Expected      |
| 2 | If there is missing information.   | Error message displayed | Expected      |

Table 55 Test case Edit Profile

### 6.3.8 Preview welcome video

**Function:** Preview welcome video [Learner-Deaf-mute -Guest].

**Description:** Test the ability to Preview welcome video.

| # | Case Description                           | Expected Result                    | Actual Result |
|---|--|------------------------------------|---------------|
| 1 | The user opens the app for the first time. | The System displays welcome video. | Expected      |

Table 56 Test case Preview welcome video

### 6.3.9 Navigate app page.

**Function:** Navigate app page [Learner-Deaf-mute].

**Description:** Test the ability to Navigate app page.

| # | Case Description             | Expected Result                    | Actual Result |
|---|------------------------------|------------------------------------|---------------|
| 1 | The user opens the menu bar. | The System shows all page's names. | Expected      |

Table 57 Test case Navigate app page

### 6.3.10 Preview images.

**Function:** Preview images [Learner-Deaf-mute-Guest].

**Description:** Test the ability to Preview images.

| # | Case Description                     | Expected Result                            | Actual Result |
|---|--------------------------------------|--|---------------|
| 1 | The user clicks a specific category. | The system displays image inside category. | Expected      |

Table 58 Test case Preview images and video

### 6.3.11 Convert text to voice.

**Function:** Convert text to voice. [Learner-Deaf-mute-Guest].

**Description:** Test the ability to Convert text to voice.

| # | Case Description  | Expected Result                        | Actual Result |
|---|---|--|---------------|
| 1 | The user selects a collection of images and then presses "Speaker button" | The system converts the text to voice. | Expected      |

Table 59 Test case Convert text to voice

### 6.3.12 Preview category.

**Function:** Preview category [Learner-Deaf-mute].

**Description:** Test the ability to show the category in the system.

| # | Case Description                 | Expected Result                     | Actual Result |
|---|----------------------------------|-------------------------------------|---------------|
| 1 | The user clicks on the homepage. | The system displays all categories. | Expected      |

Table 60 Test case Preview category

### 6.3.13 Create Sentence.

**Function:** Create Sentence [Learner-Deaf-mute -Guest].

**Description:** Test the ability to create meaningful sentences from a collection of words.

| # | Case Description  | Expected Result  | Actual Result |
|---|---|--|---------------|
| 1 | The user selects required words from specific category. | The system organizes the words to create meaningful sentence (according user selection). | Expected      |

Table 61 Test case Create sentence

### 6.3.14 Save sentence for daily use.

**Function:** Save sentence for daily use [Learner-Deaf-mute].

**Description:** Test the ability to save sentence in favorite for daily use.

| # | Case Description                             | Expected Result                               | Actual Result |
|---|--|---|---------------|
| 1 | The user selects multiple words from images. | The system shows the sentence in correct way. | Expected      |
| 2 | The user click Favorite button.              | The system save the sentence for daily use.   | Expected      |

Table 62 Test case Save sentence for daily use

### 6.3.15 Add to Favorite.

**Function:** Add to Favorite [Learner-Deaf-mute].

**Description:** Test the ability to add items to the system and the system must show the item that has been added to favorites.

| # | Case Description                                      | Expected Result  | Actual Result |
|---|---|--|---------------|
| 1 | The user selects an item to add it into the Favorite. | The system saves the item that added to Favorite then shows the user's item in Favorite. | Expected      |

Table 63 Test case Add to favorite

### 6.3.15 Remove from Favorite.

**Function:** Remove from Favorite [Learner-Deaf-mute].

**Description:** Test the ability to remove saved items from the system.

| # | Case Description   | Expected Result                                     | Actual Result |
|---|--|---|---------------|
| 1 | The user selects an item to remove it from the Favorite. | The system deletes the selected item from Favorite. | Expected      |

Table 64 Test case Remove from favorite

### 6.3.16 Search item

**Function:** Search item [Learner-Deaf-mute].

**Description:** Test the ability to search for a specific item.

**Test Input Data:** Name of the image or category to find matching items.

| # | Case Description                                  | Expected Result                       | Actual Result |
|---|---|---------------------------------------|---------------|
| 1 | The user clicks the search button.                | The system displays search interface. | Expected      |
| 2 | The user types the name of the image or category. | The system displays matched item.     | Expected      |
| 3 | incorrect search format; error message displayed. | Error message displayed.              | Expected      |

Table 65 Test case Search item

### 6.3.17 Return to the previous page.

**Function:** Return to the previous page [Learner-Deaf-mute-Guest].

**Description:** Test the ability to Return to the previous page.

| # | Case Description                            | Expected Result                      | Actual Result |
|---|---|--------------------------------------|---------------|
| 1 | The user clicks on the previous button “◀”. | The system returns to previous page. | Expected      |

Table 66 Test case Return to previous page

### 6.3.18 Create User Account by the Administrator.

**Function:** Create User Account [Administrator]

**Description:** Test the ability to Create User Account.

**Test Input Data:** Name, Password, Email, Age, Blood type.

| # | Case Description   | Expected Result                | Actual Result |
|---|--|--------------------------------|---------------|
| 1 | The Administrator can create user account from the database. | The system creates new account | Expected      |

Table 67 Test case Create user account by the administrator

### 6.3.19 Delete User Account by the Administrator.

**Function:** Delete User Account [Administrator].

**Description:** Test the ability to Delete User Account.

| # | Case Description   | Expected Result                 | Actual Result |
|---|--|---------------------------------|---------------|
| 1 | The Administrator can delete user account from the database. | The system deletes user account | Expected      |

Table 68 Test case Delete user account by the administrator

### 6.3.20 Update User Account by the Administrator.

**Function:** Update User Account [Administrator].

**Description:** Test the ability to Update User Account.

| # | Case Description   | Expected Result                 | Actual Result |
|---|--|---------------------------------|---------------|
| 1 | The Administrator can update user account from the database. | The system updates user account | Expected      |

Table 69 Test case Update user account by the administrator

### 6.3.21 Find User Account by the Administrator.

**Function:** Find User Account. [Administrator].

**Description:** Test the ability to Find User Account.

**Test Input Data:** user ID (UID) Or Email.

| # | Case Description   | Expected Result               | Actual Result |
|---|--|-------------------------------|---------------|
| 1 | The Administrator can find user account from the database. | The system finds user account | Expected      |

Table 70 Test case Find user account by the administrator

## CHAPTER 7

### 7. CONCLUSION



*Figure 95 Conclusion*

## **7.1 Conclusion**

We believe that this system will help facilitate the communication process between deaf-mutes and non-deaf-mutes people, giving an opportunity for none deaf-mute to learn sign language Which leads to promoting the use of sign language and strengthening ties in society.

This report describes all stages of our project, the begins with the application objectives and background of our project, which provides a detailed description of the application, then the analysis of the application, which provides a detailed analysis of the study of the application from all sides.

## **7.2 Challenges**

1. The lack of time and pressure we face with other subjects.
2. Difficulty expressing and describing how the system functions work.
3. There was a shortage in free resources since many reliable resources are expensive.
4. Lack of clear goals at the first because the idea was not completely clear to us at the beginning, the general idea of the application was present, but we did not know how to implement it, and we changed many ideas after we understood the application more clearly; To match our goals.

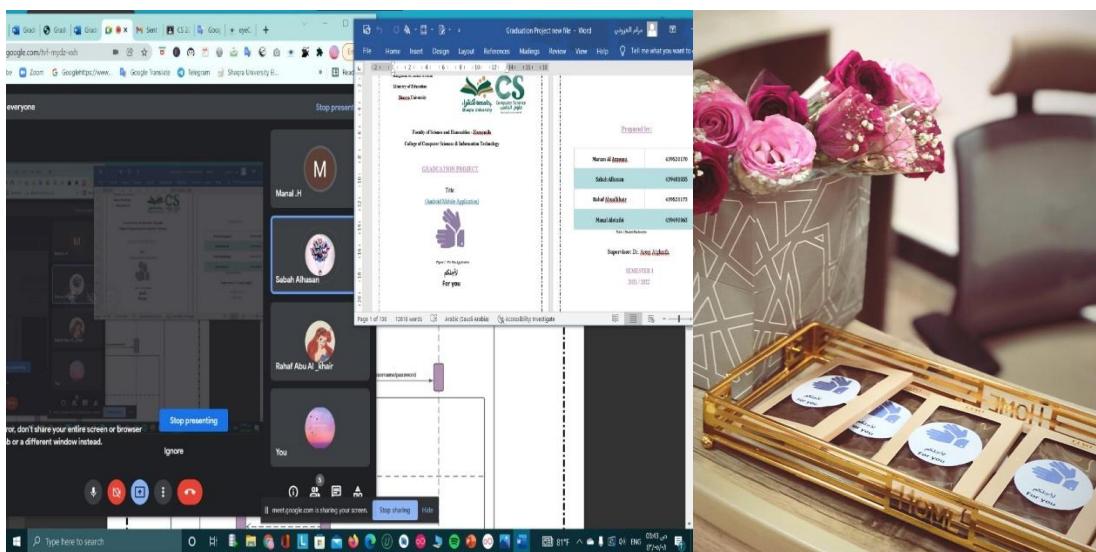
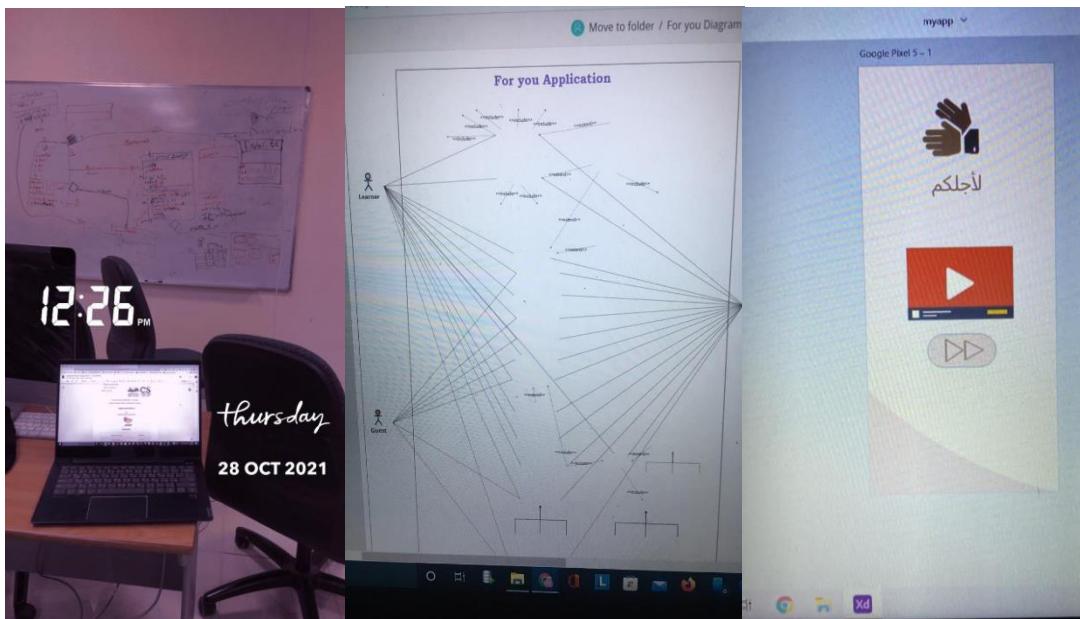
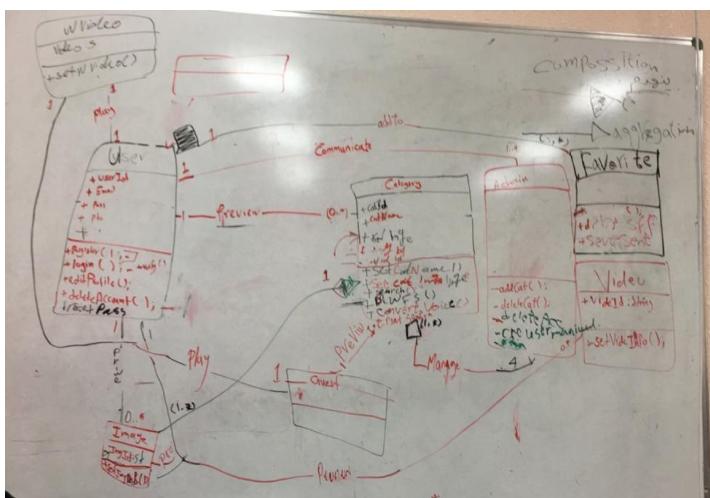
### **7.3 future work:**

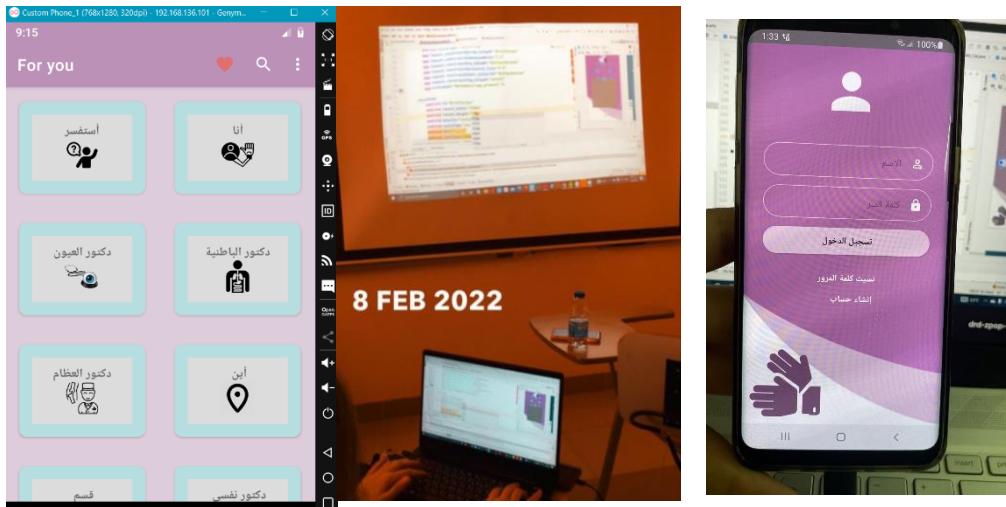
1. Add smart search.
2. Add new categories to the app
3. Add Administrators to the application for maintaining the program, ensuring that it functions well, and adding new features that make the application easier, more helpful, and provides everything the deaf-mute needs.
4. Add English version of the application to be developed.
5. Attempt to create a similar version that supports the iOS users.
6. Add some features like comments and rating the services.
7. Support online help.

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## APPENDING





File Edit View Navigate Code Analyze Behavior Build Run Tools VCS Window Help for you - Hospital\_Cat.java (For you)

```

@Override
public void onActivityResult(int requestCode, int resultCode, Intent data) {
    if (requestCode == TTS.ENGINE_REQUEST & resultCode == TextToSpeech.Engine.CHECK_VOICE_DATA_PASS) {
        textToSpeech = new TextToSpeech(this, this);
    } else {
        Intent install = new Intent();
        install.setAction(TextToSpeech.Engine.ACTION_INSTALL_TTS_DATA);
        startActivityForResult(install, 1);
    }
}

@Override
public void onBackPressed() {
    if (1 == TextToSpeech.SUCCESS) {
        Locale locale = new Locale("ar");
        int languageState = textToSpeech.setLanguage(locale);
        if (languageState == TextToSpeech.LANG_MISSING_DATA || languageState == TextToSpeech.LANG_NOT_SUPPORTED) {
            Toast.makeText(this, "Lang not available", Toast.LENGTH_LONG).show();
        }
        String voiceName = locale.getLanguageTags();
        Voice voice = new Voice(voiceName, locale, Voice.QUALITY_HIGH, Voice.LATENCY_HIGH, false, null);
        textToSpeech.setLanguage(locale.getLanguageTags("ar"));
        textToSpeech.setVoice(voice);
    }
}

public void settingInfo() {
    titles = new ArrayList();
    images = new ArrayList();
}

```



G:\11 Firebase console

newForYou - Firebase console

https://console.firebaseio.google.com/u/0/project/newforyou-882fa/database/newforyou-882fa-default-rtdb/data

Firebase Project: newForYou

Realtime Database

Data Rules Backups Usage

Protect your Realtime Database resources from abuse, such as billing fraud or phishing Configure App Check

newforYou

Go to docs

newforYou-882fa-default-rtdb.firebaseio.com/

```

newforYou-882fa-default-rtdb
  +-- Data Model Account
      +-- VwRmIgpcfX1K8UhX0K53jSs1
          +-- age: "1"
          +-- ageType: "2"
          +-- email: "maramalzenny@gmail.com"
          +-- passWord: "111111"
          +-- userNamed: "Maram Alazzeny"
      +-- "Learner Account"
          +-- UmD3KxNWh5eEiE1OHRQDXT53
              +-- email: "maramalzenny@gmail.com"
              +-- passWord: "111111"
              +-- userNamed: "vv"

```

