



المملكة العربية السعودية  
وزارة التعليم  
جَامِعَةُ أُمِّ الْقُرَى



# Words in sign

AL-Basqat



# Project name: Words in a sign

---

"An Application Translation from spoken language to Sign Language"

## Group members:

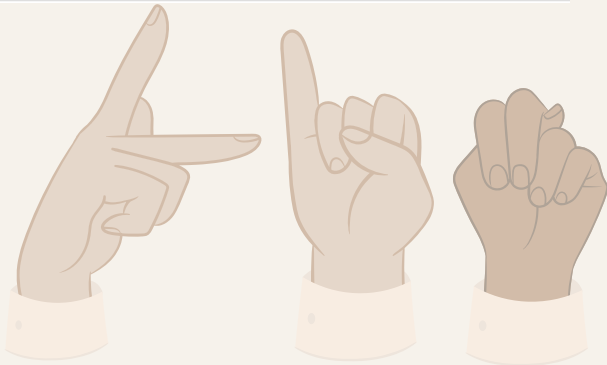
- Shahad Aboukazzana - 441003855
- Rahaf Murad - 441016924
- Alaa Alomayri - 441008331
- Jana Melebary - 441008982
- Rola Almadani - 441008941

Software Engineering Project Report

Supervision of  
Dr. Areej Alfriah

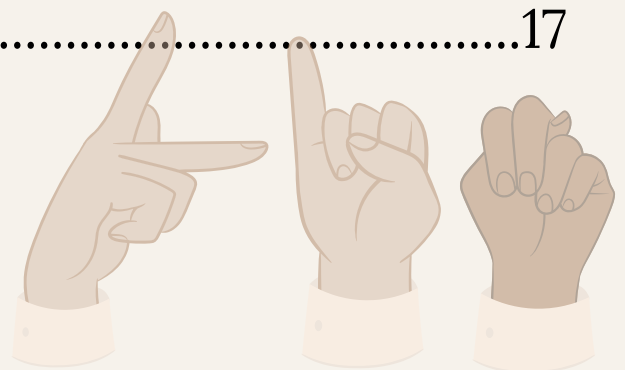
# Task Table

Task	Shahad	Alaa	Rahaf	Rola	Jana
The project Idea	●		●	●	●
The logo			●		
presentation					●
Problem definition				●	
Gathering information	●		●		
Background	●				
Aims and Objectives			●		
Solutions	●				
Functional requirement	●	●			●
Non-Functional requirement			●	●	
Scenarios	●	●	●	●	●
Use case		●			
Class Diagram	●		●	●	
prototype	●	●	●	●	●



# Table Of Contents

1-Introduction.....	1
1.1 Background.....	1
1.2 Problem Definition .....	1
1.3 Sloution.....	2
1.4 Aims and Objectives.....	3
2- System Analysis.....	4
2.1 Information Acquiring.....	4
2.1.1 Gathering information.....	4
2.2 System Requirements.....	5
2.2.1 Functional requirements.....	5
2.2.2 Non-Functional requirements.....	9
3- System Design.....	10
3.1 Use Case Diagram.....	10
3.2 Scenarios.....	11
3.3 Class Diagram.....	16
3.4 Prototype.....	17



# **1- Introduction**

## **1.1 Background**

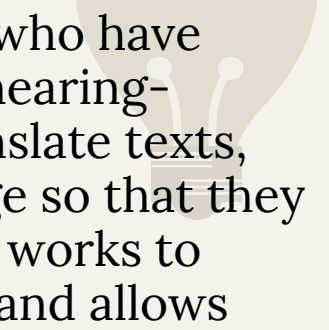
The language of the deaf is not just signs but feelings that must be present in everyone who deals with this group who find it difficult to communicate their needs. The problem of the deaf, which increases when they find themselves isolated from society “the society of normal people” and feel alienated, the first goal of our software is to take care of the deaf and how they integrate into society so that they are able to express their feelings and needs that only sign interpreters can understand. A deaf person is a person who is unable to hear while a mute person is a person who is unable to speak and as for the hearing-impaired, the person who has residual hearing can, through the use of hearing aids, successfully process linguistic information through the sense of hearing.

## **1.2 Problem Definition**

Deaf people cannot speak because they are unable to hear others and learn language from them, so the inability to speak clearly is a direct result of deafness. Therefore, the problem is not only with deafness that prevents the deaf from hearing things, but rather with the loss of information and communication that hearing provides.

"Finger spelling" is the sign language used by the deaf and mute by using the fingers to express the alphabet and words and is used for the names of people, cities, streets and places. It is a visual language that has its own vocabulary and grammar.

## 1.3 Solution



This software is provided to the helpless people, who have difficulty speaking, who are deaf, deaf-mute and hearing-impaired people. This software helps users to translate texts, educational videos, record voice into sign language so that they can understand and learn in a smooth way. It also works to create a community for users of these categories and allows participation in group chats to increase communication among them and share knowledge. The software also provides additional services for speaking people who do not suffer from hearing problems. This service aims to help people who want to learn sign language with the motive of volunteering and helping relatives and for education, where they can use translation and provide simplified educational content that helps in enhancing understanding and find confidence in their participation and knowing that they are heard.

Learning sign language helps to build a stronger connection with people. In addition to facilitating communication with hearing-impaired individuals, learning sign language can improve your listening skills. This is because the person hearing should focus more attention on the person speaking.

## **Target groups:**

- 1- The deaf or speech-impaired.
- 2-The hearing-impaired.
- 3-People who want to learn sign language.

## **Services provided by our software:**

- 1- Alphabet letters dictionary
- 2- Words dictionary
- 3- Translation of text in English to sign language.
- 4- Translation of a record file to sign language.
- 5- Translation of video files to sign language.
- 6- A video calls room.
- 7- View the profile and the ability to edit.

## **1.4 Aims and Objectives**

- Extends your knowledge and understanding of the software development lifecycle and fundamental software engineering concepts.
- Developing the transferable skills in logical analysis, communication and project management necessary for working within team-based environment.
- Gain the ability to select tools and methodologies that are fit for specific purposes.

## 2- System Analysis

### 2.1 Information Acquiring



#### **Gathering information and inferring services**

We have studied the services in our software after we contacted (Al-Basqat) Charity Association and concluded their need for an application that serves the deaf, and hearing-impaired people category, so we did a survey that include these questions to know the services that will help them as much as possible and which they are facing difficulties in receiving these days.

#### **Questions of the survey:**

1- Does the person with special needs (deaf, speech-impaired and hearing-impaired) have problems explaining their requirements to other people? what is it?

From your point of view, do you think that learning sign language for non-deaf people will help in solving their problems?

2- Does learning sign language become simple and available nowadays?

3- If you want to learn sign language, do you find it difficult to learn and practice it with people who are fluent in it?

4- Are there enough applications that help people with special needs (deaf, speech-impaired and hearing-impaired)?

5- What are the services that they need ?

6- Do they have difficulties in receiving audio media (such as audiobooks, General audio ads ,educational videos, podcasts, etc.)?



## **2.2 System Requirements**

### **2.2.1 Functional Requirements**

- 1.** A user shall be able to create a new account.
  - 1.1** The system shall provide in the registration form the following information (First Name, Last Name, email, gender, Age, password)
  - 1.2** The system shall ask the user to choose from two modules (Spoken, Deaf person)
  - 1.3** The system shall verify the email by sending a verification code to their emails.
  - 1.4** The system shall verify that the user password must contain at least one lowercase letter, one uppercase letter, and one digit.
  - 1.5** The system shall store the user information to the database.
- 2.** A user shall be able to log in using their emails and passwords.
  - 2.1** The system should check if the given email is stored in the database or not.
  - 2.2** The system shall notify the user if the email is not register in database to create a new account.
  - 2.3** The system shall verify the password if it matches the one in the database.
  - 2.4** The system shall allow the users to log in if the given input matches the one stored in the database.

**3.** A user shall be able to choose among many services the system offers.

**3.1** The system shall provide the following services (The alphabet letters dictionary, words dictionary, upload a record, upload videos, translate text, Video calls room).

**3.2** The system shall direct the user to the chosen service.

**4.** The user shall be able to view alphabetic character from the list of English characters.

**4.1** The system shall be able to display a list of the English alphabet.

**4.2** The system shall be able to display the hand shape in sign language of all characters.

**5.** The user shall be able to view words from the English words dictionary.

**5.1** The system shall be able to display a list of English words.

**5.2** The system shall be able to display the hand shape in sign language of all words.

**6.** The user shall be able to translate English text.

**6.1** The system shall be able to display a text area for the user to write.

**6.2** The system shall be able to display a button for translation.

**6.3** The system shall be able to translate the English text entered by the user to sign language

**6.4** The system shall be able to display the translated text as hands shape in sign language.

**7. The user shall be able to record a voice.**

- 7.1** The system shall be able to display a record icon for the user.
- 7.2** The system shall be able to store the voice file that the user input to the database.
- 7.3** The system shall be providing a voice-recognizing tool.
- 7.4** The system shall be able to translate the letters and words that it processes from the file to sign language.
- 7.5** The system shall be able to display the translated file as hands shape in sign language.

**8. The user shall be able to upload videos.**

- 8.1** The system shall be able to display a button for the user to upload a video file.
- 8.2** The system shall be storing the file that the user input to the database.
- 8.3** The system shall be providing a voice-recognizing tool.
- 8.4** The system shall be able to displays the hand shape in sign language of the letters and words that it processes from the video.

- 9.** The user shall be able to join to other users through video call room.
  - 9.1** The system shall be able to provide a button to enter a video call room.
  - 9.2** The system shall be able to provide a video display screen.
  - 9.3** The system shall be able to verify that the user is connected to the Internet.
  - 9.4** The system shall be able to verify that the user has access to the camera.
  - 9.5** The system shall be able to verify that the user has access to the microphone.
  - 9.6** the system must provide an error message if the connection lost.
- 10.** The user shall be able to view his profile information
  - 10.1** The system shall be able to display the user's information from database.
- 11.** The user shall be able to edit his profile information
  - 11.1** The system shall be able to display the user's information from database.
  - 11.2** The system shall be able to allow the user to update his information
  - 11.3** The system shall be able to store the updated information to the database.
- 12.** The user shall be able to log out.
  - 12.1** The system shall provide a button option to logout.
  - 12.2** The system shall redirect the user to the Home Page.

## **2.2.2 Non- Functional Requirements**

### **Efficiency**

The landing page supporting 2,000 users per hour must provide 6 second or less response time.

The screen refresh time rate should be up to 2 second,

The latency of the video call doesn't exceed 150ms

### **Usability**

The error rate to be fixed mustn't exceed 10 sec.

The user can understand how to use the system in a half an hour.

### **Dependability**

the duration time between failure and recovery doesn't exceed 20 sec.

The system should be available to all users all the time.

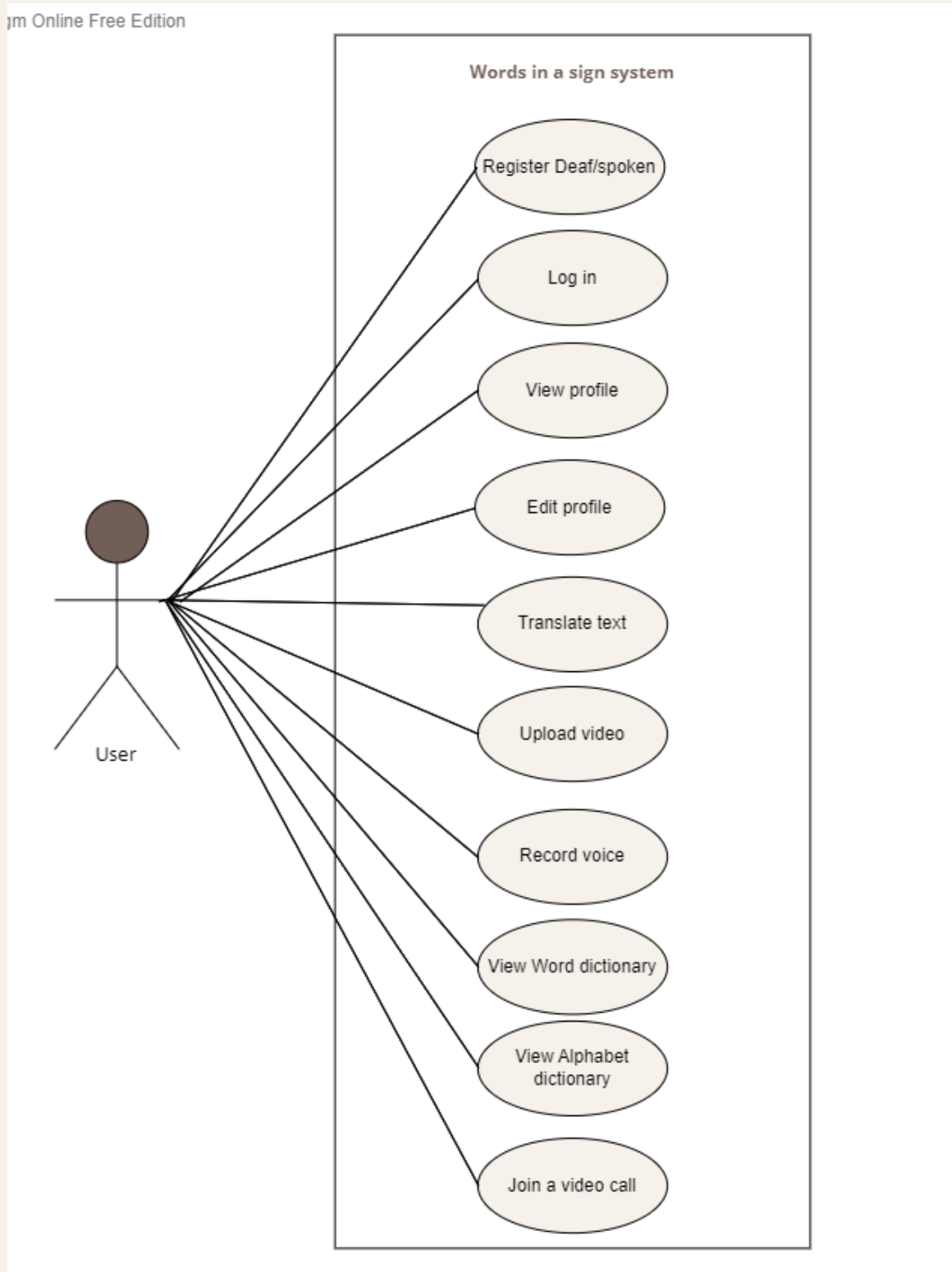
### **Security**

The user information should be encrypted.

The video calls between users should be end-to-end encrypted.

# 3- System Design

## 3.1 Use Case Diagram



## 3.2 Scenarios

### Registration

<b>Actors</b>	Deaf/ Spoken user
<b>Description</b>	<p>The user can create an account include following information:</p> <p>(First Name, Last Name, email, <u>gender</u>, <b>Age</b> , <b>Password</b></p> <p>then choose from two modules (Spoken, Deaf person)</p> <p>The system shall verify the email by sending a verification code to user email then information will store in the database.</p>
<b>Data</b>	<b>User first name , last name , email,gender, Age,password</b>
<b>Stimulus</b>	User command issued by Deaf/ Spoken user
<b>Response</b>	<b>redirect the user to the home page</b>
<b>Comments</b>	The password must contain at least one lowercase letter, one uppercase letter, and one digit.

### Log-in

<b>Actors</b>	Deaf/ Spoken user
<b>Description</b>	<p>1-The user will enter the email and password they register in the system.</p> <p>2-The system should check if the given email is stored in the database or not.</p> <p>3- If the email is not register in database the system shall notify the user to create a new account.</p> <p>4- If the email stored in the system, then the system shall verify the password if it matches the one in the database.</p> <p>5- The system shall allow the users to log in if the given input matches the one stored in the database.</p>
<b>Data</b>	Email and password
<b>Stimulus</b>	User command issued by Deaf/ Spoken user
<b>Response</b>	Login to home page
<b>Comments</b>	Non

## View Profile

<b>Actors</b>	Deaf/ Spoken user
<b>Description</b>	1-The user will select the profile view button from the home page. 2-the system should display all the user information (first/last name, age, gender, email, password, deaf or spoken).
<b>Data</b>	User's personal information
<b>Stimulus</b>	User command issued by Deaf/ Spoken user
<b>Response</b>	Display the user information's
<b>Comments</b>	Non

## Edit Profile

<b>Actors</b>	Deaf/ Spoken user
<b>Description</b>	1-The user will select the profile view button from the home page. 2-the system should display all the user information (first/last name, age, gender, email, password, deaf or spoken). 3-The user can update the information 4-The system should store the updated information to the database.
<b>Data</b>	User's personal information
<b>Stimulus</b>	User command issued by Deaf/ Spoken user
<b>Response</b>	Confirmation that information has been updated
<b>Comments</b>	Non



## Translate Text

<b>Actors</b>	Deaf/ Spoken user
<b>Description</b>	The user should type a text in English language in the text area in order to translate it, the system should process the text and matches the letters and words to its corresponding letter in sign language and finally, display the translated text as hands shape in sign language.
<b>Data</b>	User's input text
<b>Stimulus</b>	User command issued by Deaf/ Spoken user
<b>Response</b>	The hand shapes images in sign language
<b>Comments</b>	The user should input a text only in English language to be translated and no symbols allowed only letters and digits.

## Upload video

<b>Actors</b>	Deaf/ Spoken user
<b>Description</b>	display a button for the user to upload a video and storing the file in database process the file by voice-recognizing tool to translate it to sign language and then display letters and words that it processes from the video in hand shape
<b>Data</b>	User's uploaded video
<b>Stimulus</b>	User command issued by Deaf/ Spoken user (upload video button)
<b>Response</b>	Display hand shapes images in sign language
<b>Comments</b>	The video must be in mp4, ogg, webm and doesn't exceed 10 kb

## View Word dictionary

<b>Actors</b>	Deaf/ Spoken user
<b>Description</b>	The user shall be able to view alphabetic character from the list of English characters. The system shall be able to display a list of the English alphabet. and the hand shape in sign language of all characters.
<b>Data</b>	Non
<b>Stimulus</b>	User command issued by Deaf/ Spoken user (Word dictionary button)
<b>Response</b>	display the hand shape images in sign language of all words.
<b>Comments</b>	Non

## Record Voice

<b>Actors</b>	Deaf/ Spoken user
<b>Description</b>	<ol style="list-style-type: none"> <li>1. The system shall be able to display a record icon for the user.</li> <li>2. The system shall be able to store the voice file that the user input to the database.</li> <li>3. The system shall be providing a voice-recognizing tool.</li> <li>4. The system shall be able to translate the letters and words that it processes from the file to sign language.</li> <li>5. The system shall be able to display the translated file as hands shape in sign language.</li> </ol>
<b>Data</b>	User's Record voice .
<b>Stimulus</b>	User command issued by Deaf/ Spoken user (Record voice button)
<b>Response</b>	display the hand shape images in sign language.
<b>Comments</b>	users are required to have valid account.

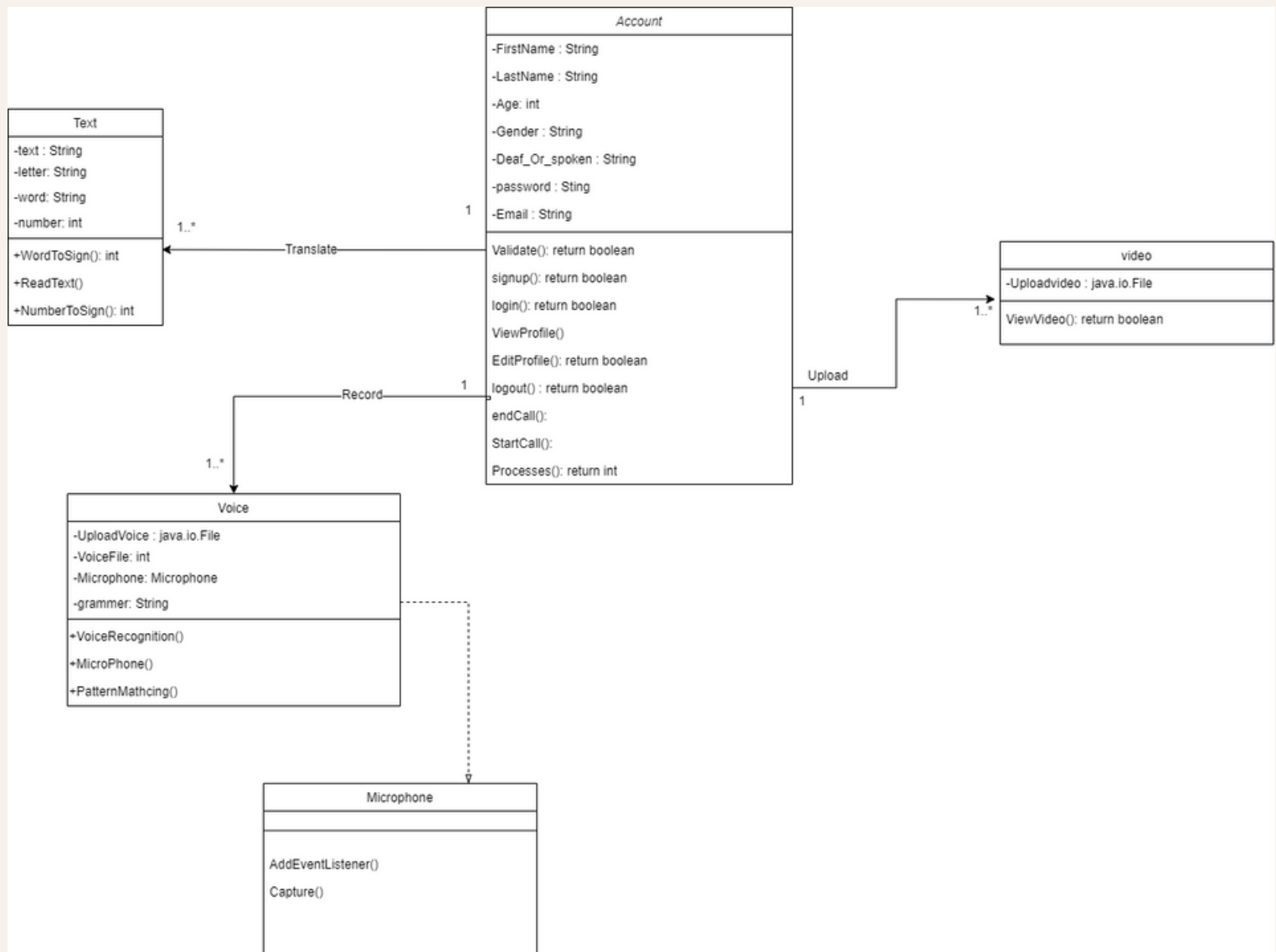
## View Alphabet dictionary

<b>Actors</b>	Deaf/ Spoken user
<b>Description</b>	<p>The user shall be able to view alphabetic character from the list of English characters. The system shall be able to display a list of the English alphabet and the hand shape in sign language of all characters.</p>
<b>Data</b>	Non
<b>Stimulus</b>	User command issued by Deaf/ Spoken user
<b>Response</b>	Display hand shapes images in sign language
<b>Comments</b>	Non

## Join a video call

<b>Actors</b>	Deaf/ Spoken user
<b>Description</b>	visual connection between two or more remote parties over the internet that simulates a face-to-face meeting. The host has total control of the meeting
<b>Data</b>	User account and username
<b>Stimulus</b>	User command issued by Deaf/ Spoken user
<b>Response</b>	Confirmation that the call is active, Response from the other user camera and microphone
<b>Comments</b>	Users are required to have valid accounts.

## 3.3 Class Diagram

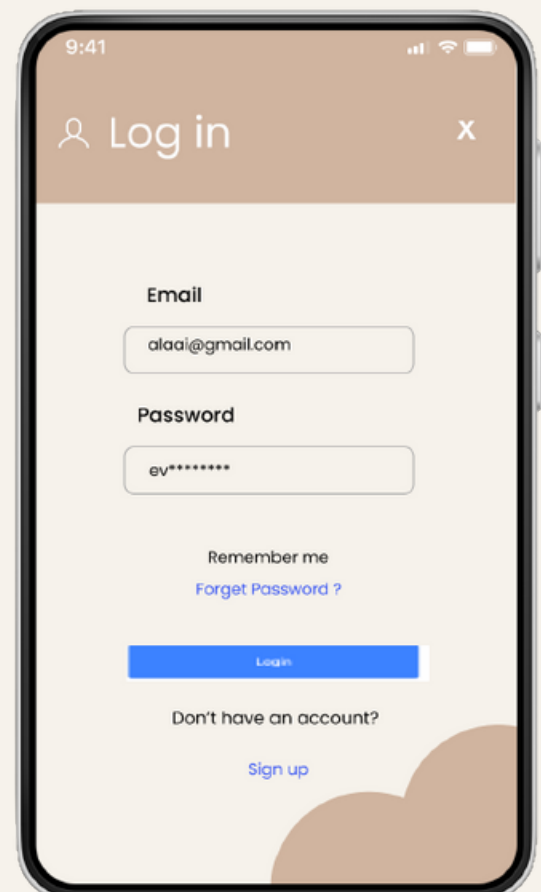


### 3.4 Prototype

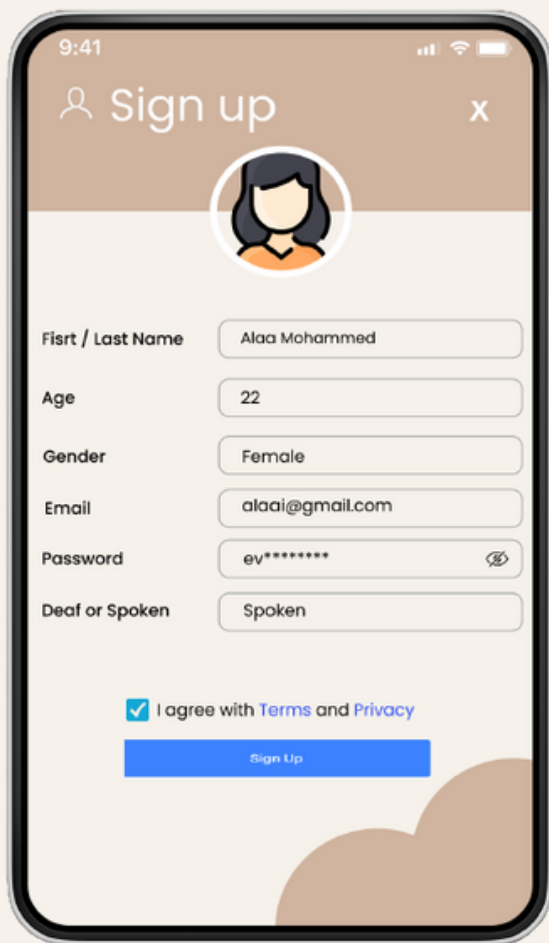


Welcome Page

Log in Page




### 3.4 Trust prototype



9:41

Sign up




First / Last Name

Age

Gender

Email

Password  

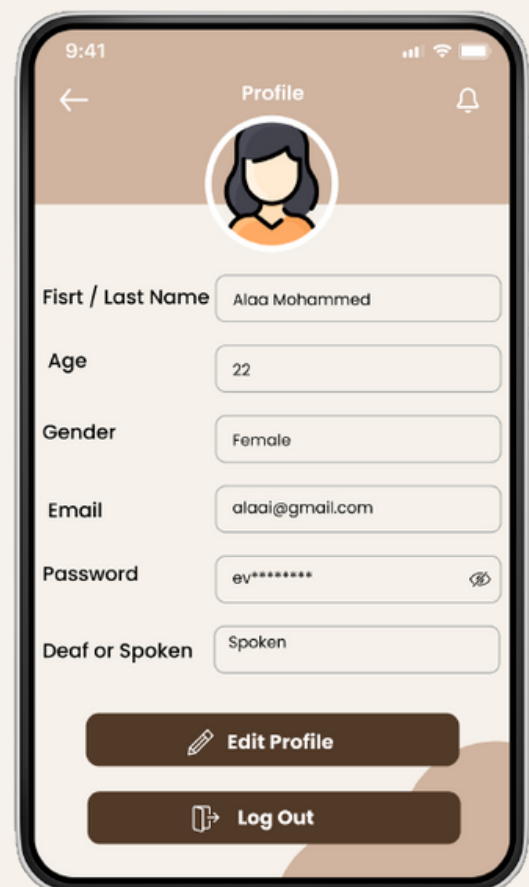
Deaf or Spoken

☒ I agree with [Terms](#) and [Privacy](#)

[Sign Up](#)


Registration Page

Profile Page



9:41

Profile




First / Last Name


Age


Gender

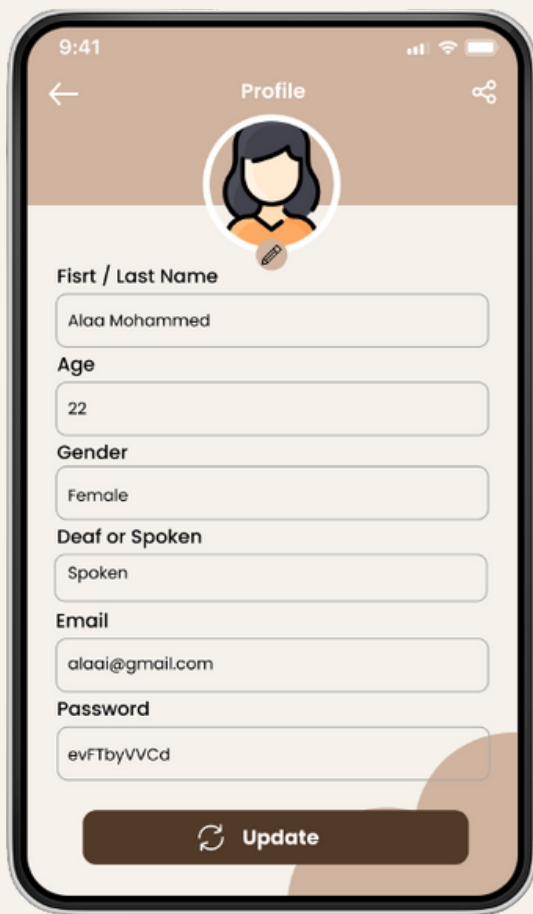
Email

Password  

Deaf or Spoken

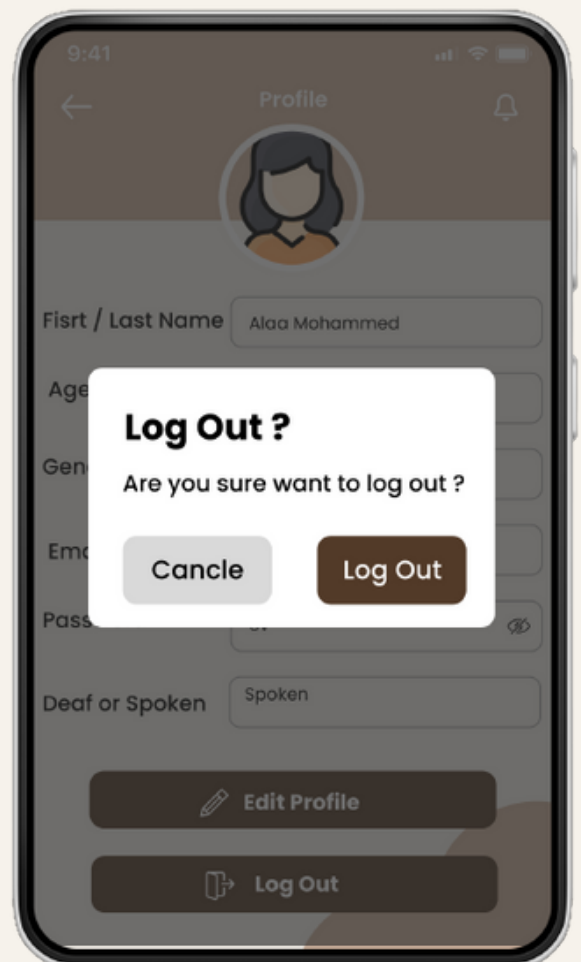
 [Edit Profile](#)

 [Log Out](#)



Edit Profile page

Log out Page



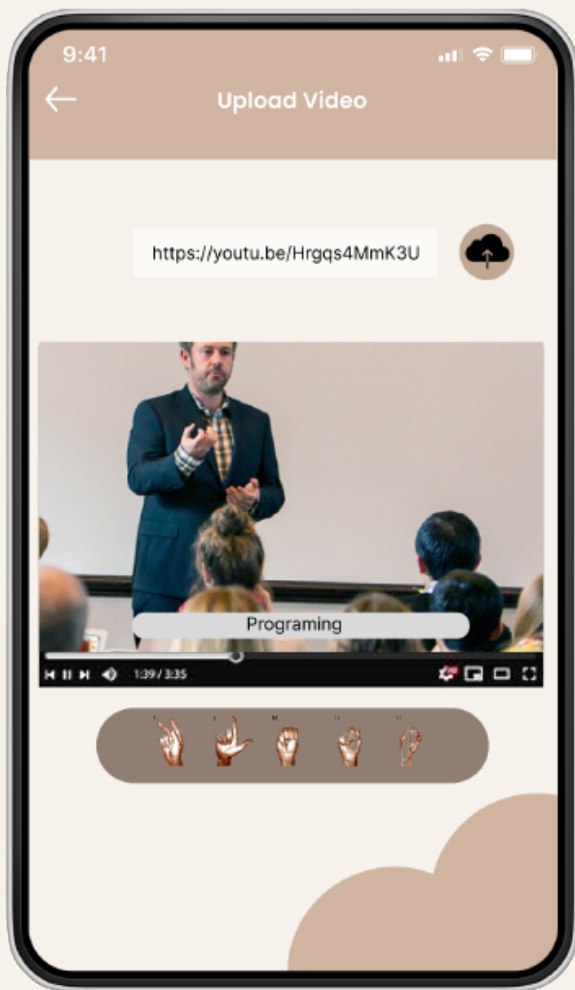


Servies Page

Translate Text Page



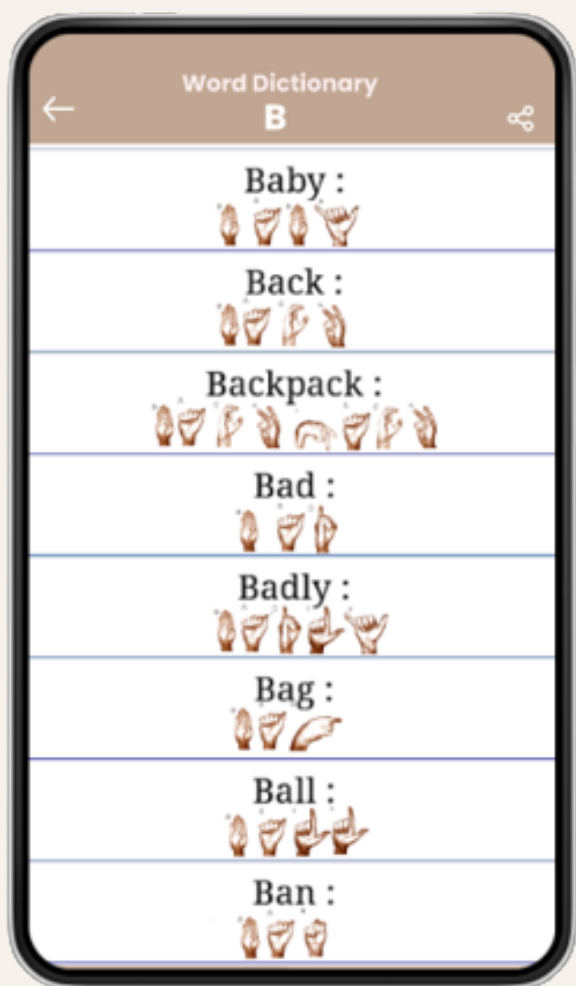




Upload Video Page

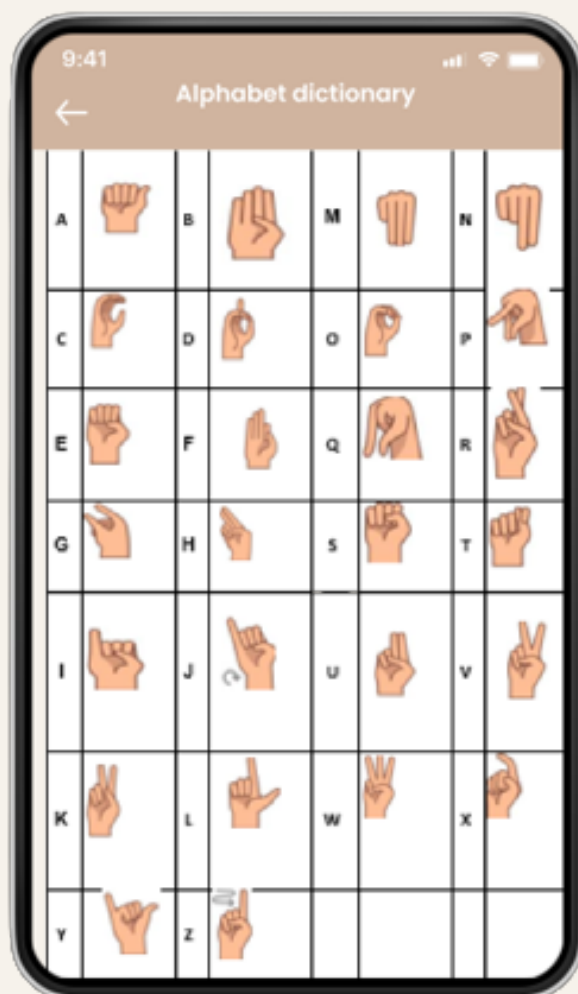
Record Voice Page

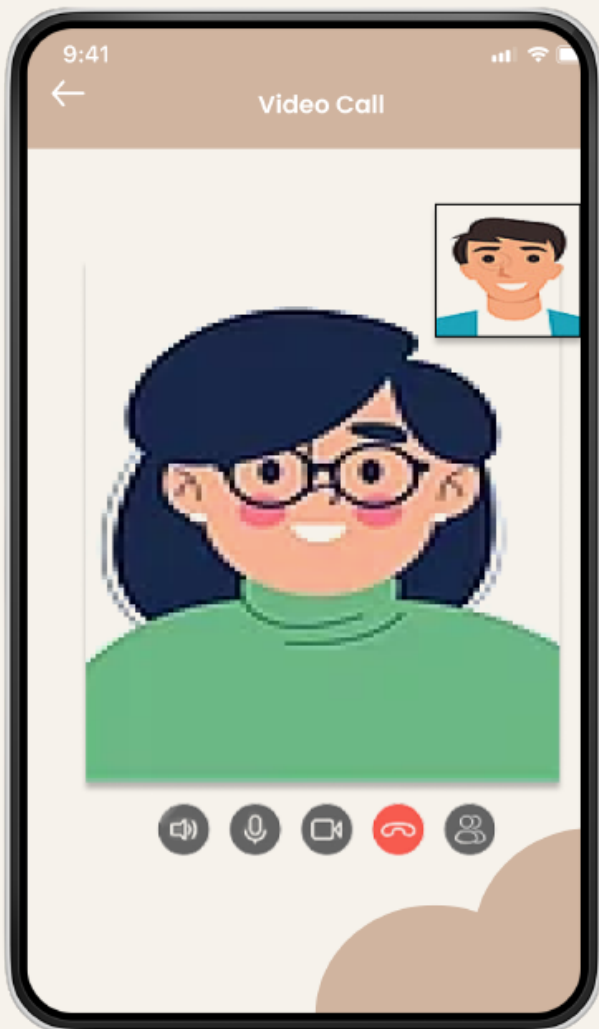




Word dictionary  
page

Alphabet  
dictionary





Video call