Echos

"One place to learn and translate American Sign Language"

System Requirements Specification

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1. Introduction

1.1 Purpose

The purpose of this document is to present a detailed description of the functional, non-functional and other requirements for the android application 'Echos'. This application will serve as a learning platform for users that desire to learn the American Sign Language (ASL) and it also provides a sign-language to text translator.

This document will explain the purpose and features of the system. The document is intended for both the developers and the users to get the complete understanding of the features and requirements of the application.

1.2 System Scope

The application is envisioned to provide the following three parts [i] An ASL teaching platform that provides the users with video tutorials, reading materials and quizzes. [ii] An ASL to text translator that uses the video feed from the device camera [iii]A Community section that allows the user to interact with other users.

The tutorials part of the application will provide the users with interactive study materials and also track the user's progress over time. The tutorials would be designed for an absolute beginner to expert level difficulties. The translator part of the application will provide the real time ASL to text translation using the video feed from the camera.

2. Proposed System

2.1 Overview

A sign language interpreter is a medium to convey a message by the people who are deaf or cannot speak to other people. A sign language employs signs made with the hands and other movements, including facial expressions and postures of the body. There are many different sign languages in the world like British sign language(BSL), Chinese Sign Language (CSL), French Sign Language (LSF), American sign language, etc. This application can only convert American sign language(ASL) to Text and visa versa.

This application is a platform to learn ASL, you can learn through two routes, one being providing users with video tutorials, reading materials, and quizzes and the other is that the application will translate ASL to text using your device camera.

2.2 Functional features and requirements

2.2.1 User Accounts

- SignUp
  Allow the user to sign up for the application on entering personal details.
- SignIn
  Allow the user to sign in to the application on entering login credentials.
- SignOut
  Allow the user to sign out of the application.
- User Statistics
  Display the statistics related to the quizzes given by the user, chapters completed by the user, etc.
- Edit Profile
  Allow the user to edit their name, username and email id whenever they need to.
- Change Password
  Allow the user to change their password.
- Reset all progress
  Resets all the user's progress including their quiz scores and chapters compilation status.
- View Personal Information
  Allow the user to see all the personal information that they added during the SignUp process.

2.2.2 Tutorial Feature

- Difficulty selection
  Allow the user to choose the difficulty of the lesson. Difficulty ranges from Easy to Hard, giving various users with different levels of knowledge to easily learn from the platform.
- Chapter List
  Shows the list of chapters in a particular difficulty. Each chapter contains a video, reading material and quiz. Rendered dynamically according to the data from the database.

- **Video Learning**

  Shows the chapter content in video form to aid visual learning.
- **Reading Material**

  Shows the chapter content in written form to support the visual learning process.
- **Quiz Section**

  Questions from the content taught in that chapter to check the knowledge gained by the user.
- **Score Page**

  To display the marks obtained by the user in the quiz.
- **Show Progress**

  Acknowledge the user that they have completed a component like video, reading material and quiz section by giving that section a green border and making the corresponding progress marker green.
- **Track last completed**

  Store the data of the last completed section by the user to display it in the user profile section.

2.2.3 Community Feature

- **View community posts**

  A page where an user can view posts made by other users which updates in real time.
- **Like/Unlike posts**

  Users can like/unlike the posts of other users which updates in real time.
- **Add posts**

  Users can create and add their own posts that are added in real time to the feed.
- **Add comments**

  Users can create and add comments on any post which updates in real time.
- **View comments**

  Users can view comments added by other users on any post, these comments are updated in real time.

2.2.4 ASL to text translator Feature

- **Translator page**

  A page where an user can use their device camera to translate ASL to text.
- **Machine learning model**

A machine learning model that processes and translates the video feed from the camera to text.

2.3 Non-Functional Requirements

Usability:
The app is useful for the people who would like to learn Sign Language. This app can also help us translate the Sign Language using the device's camera.

Availability:
This app would be available 24/7 to each and every user. Maintenance for this app is not required, bugs would be fixed and users can update the app and the changes will be reflected immediately.

Performance:
The response time after a user enters a particular input should not exceed more than a few seconds.

Compatibility:
The application should be compatible across all the android devices.

2.4 Requirements Traceability Matrix

Initial requirements traceability matrix

id	Requirement Name	Requirement Description	Priority	Assigned to	Design Status	Coding Status	Testing Status	Integration Status
1.1	SignUp	Allow the user to sign up for the application on entering personal details.	High					
1.2	SignIn	Allow the user to sign in to the application on entering login credentials.	High					
1.3	SignOut	Allow the user to sign out of the application.	Medium					
1.4	User Statistics	Display the statistics related to the quizzes given by the user, chapters completed by the user, etc.	Low					
1.5	Edit Profile	Allow the user to edit their name, username and email id whenever they need to.	Medium					
1.6	Change Password	Allow the user to change their password.	Low					
1.7	Reset all progress	Resets all the user's progress including their quiz scores and chapters compilation status.	Low					
1.8	View Personal Information	Allow the user to see all the personal information that they added during the SignUp process.	Low					
2.1	Difficulty selection	Allow the user to choose the difficulty of the lesson. Difficulty ranges from Easy to Hard, giving various users with different levels of knowledge to easily learn from the platform.	High					
2.2	Chapter List	Shows the list of chapters in a particular difficulty. Each chapter contains a video, reading material and quiz. Rendered dynamically according to the data from the database.	High					
2.3	Video Learning	Shows the chapter content in video form to aid visual learning.	High					
2.4	Reading Material	Shows the chapter content in written form to support the visual learning process.	High					
2.5	Quiz Section	Questions from the content taught in that chapter to check the knowledge gained by the user.	High					
2.6	Score Page	To display the marks obtained by the user in the quiz.	High					
2.7	Show Progress	Acknowledge the user that they have completed a component like video, reading material and quiz section by giving that section a green border and making the corresponding progress marker green.	Medium					
2.8	Track last completed	Store the data of the last completed section by the user to display it in the user profile section.	Low					

18	3.1	View community posts	A page where an user can view posts made by other users which updates in real time.	High					
19	3.2	Like/Unlike posts	Users can like/unlike the posts of other users which updates in real time.	Low					
20	3.3	Add posts	Users can create and add their own posts that are added in real time to the feed.	High					
21	3.4	Add comments	Users can create and add comments on any post which updates in real time.	Medium					
22	3.5	View comments	Users can view comments added by other users on any post, these comments are updated in real time.	Medium					
23	4.1	Translator page	A page where an user can use their device camera to translate ASL to text.	High					
24	4.2	Machine learning model	A machine learning model that processes and translates the video feed from the camera to text.	High					

25	5.1(Non technical)	Creating video tutorial conter	Film videos for teaching A to Z alphabets in ASL	Medium					
26	5.2(Non technical)	Creating reading material co	Write content for teaching A to Z alphabets in ASL	Medium					
27	5.2(Non technical)	Creating quiz content	Create quiz questions for A to Z alphabets in ASL	Medium					