
# SOFTWARE ENGINEERING

## PROJECT DOCUMENTATION

Sign Language Dictionary

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Date of submission
20 June 2023

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# 1. Introduction

The website examines a user-centered sign language technology that improves accessibility and communication. User registration, profile management, a thorough sign language dictionary, sign language information, stored signs, user feedback, and customer assistance are just a few of the services it offers.

Users of the tool website can register for accounts and access materials. Users may customize their experience by editing their profile information. An vast number of terms and expressions are provided in the sign language dictionary, aiding in efficient communication. Understanding is enhanced by knowledge of the syntax and history of sign language. User will be able to add his own dictionary items as well.

Quick access is made possible via saved signs, and user input and reporting promote ongoing development. A positive user experience is guaranteed through customer service.

The tool's website overall goal is to promote inclusion in sign language communication and close the gap in communication.

## 1.1. About the Project

I've worked on sign language website that improves accessibility and communication for both hearing and deaf people. Vercel was used in order to deploy the frontend for the website and heroku for the php backend.

Users may set up accounts, customize their profiles, and securely access the functionalities of the service. There is a substantial selection of sign language terms and phrases in the dictionary. The history, syntax, and cultural relevance of sign language are all covered in informative materials. Users can save their preferred indicators for easy access.

To continually enhance its services, the app invites user input. The application guarantees a flawless user experience when deployed on Vercel.

## 1.2. Project Functionalities and Screenshots

Some of the feature that we decide to implement for this project are:

- **Registration**

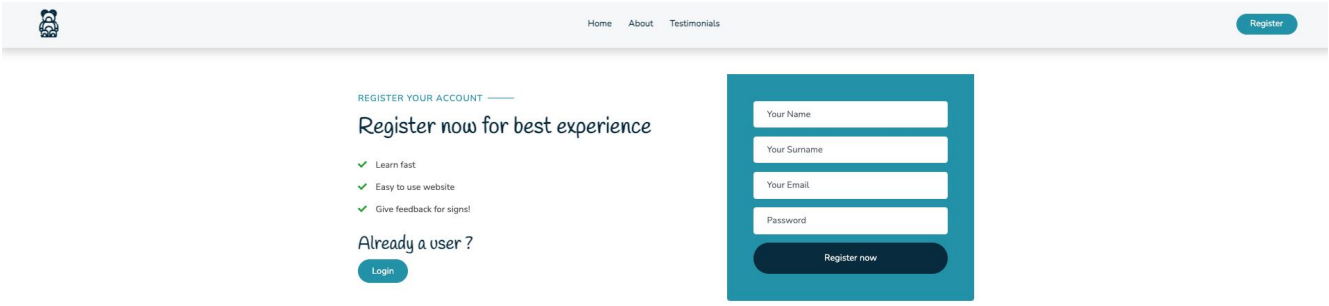
To register for an account, click on the "Register" button located in the navigation bar. This will take you to the registration page where you will find a registration form.

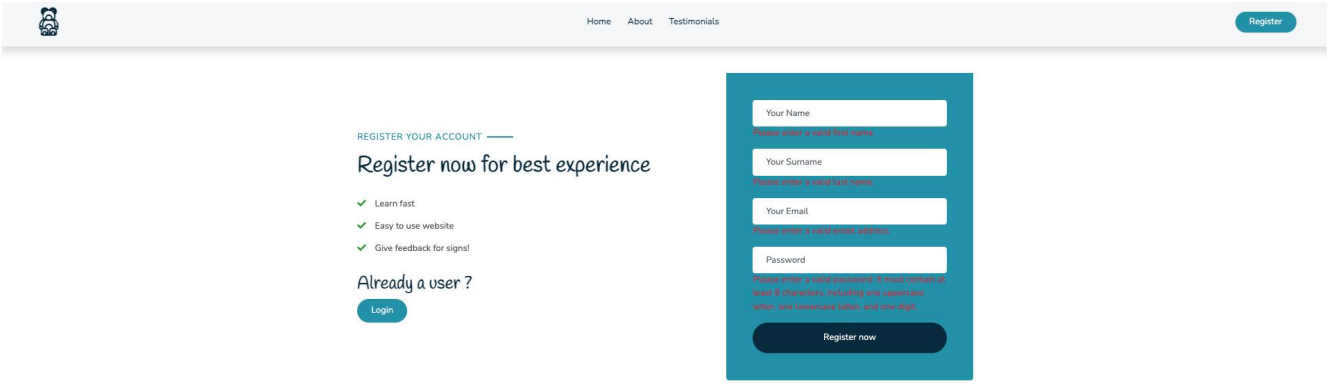
Fill in the required fields such as first name, last name, email address, and password.

If you try to submit the form without providing any credentials, a validaton message will appear indicating that no first name , last name . email and password provided (Fields are required).

In case the email address you entered is already registered in the database, a pop-up message will inform you that the user already exists.

To successfully register, ensure all fields are filled correctly and there are no conflicts. Click on the "Register" button to submit the form. Upon successful registration, you will redirect to the login screen.



- **Login**

After sucesful registration users can login to the website.

When the user clicks the login button on the registration screen, he/she will be able to enter their email and password.
The user may access the login page and fill out the appropriate boxes with their email and password to log in.

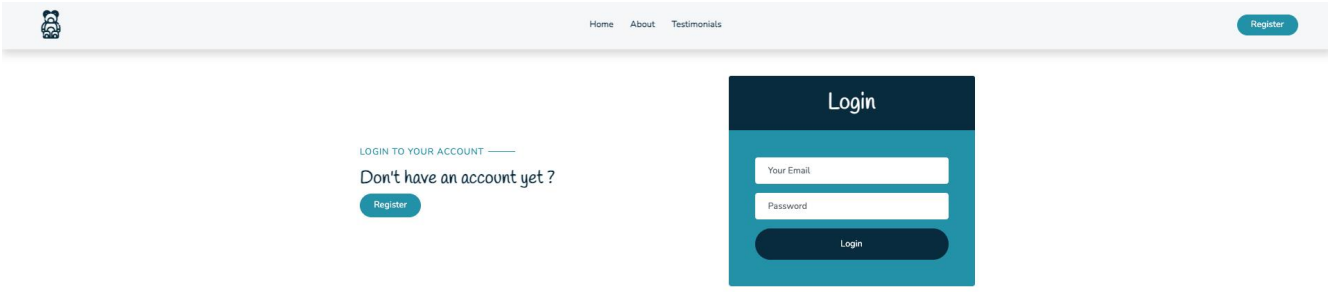
A validation notice informing the user that they must enter both their email address and password will show if they attempt to log in without supplying any credentials.

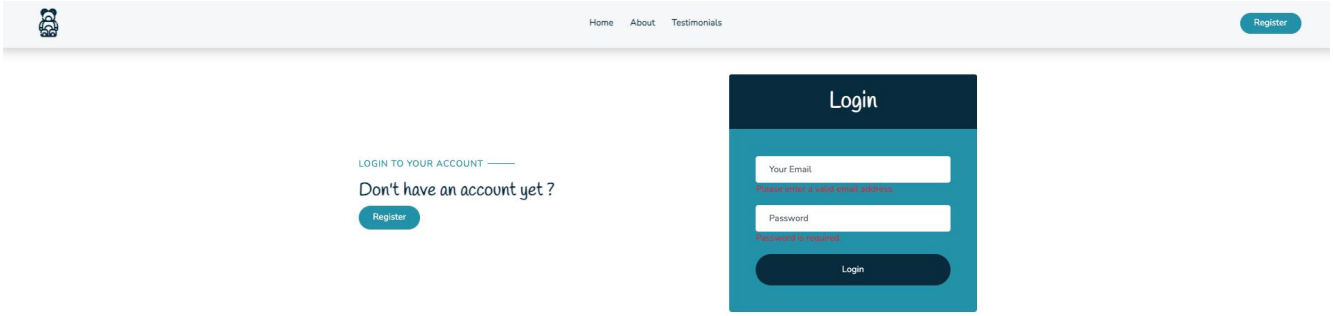
The user is then prompted to try again using the proper credentials.

The user's data will be uploaded to the database if all prerequisites have been satisfied.

As a result, they may access their account by logging in using their registered credentials.

The userID will be read from the database and stored in localStorage up until when the user clicks on logout.



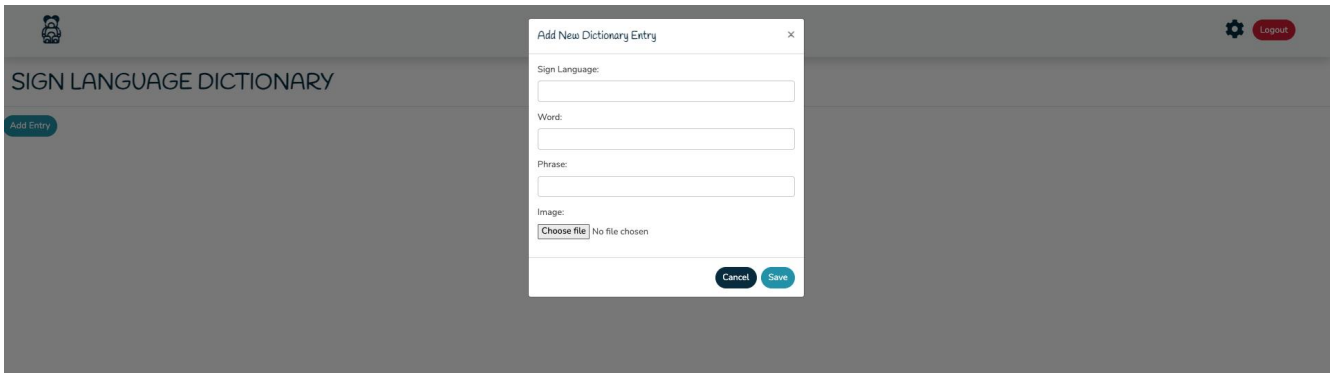
- **Add New Entry**

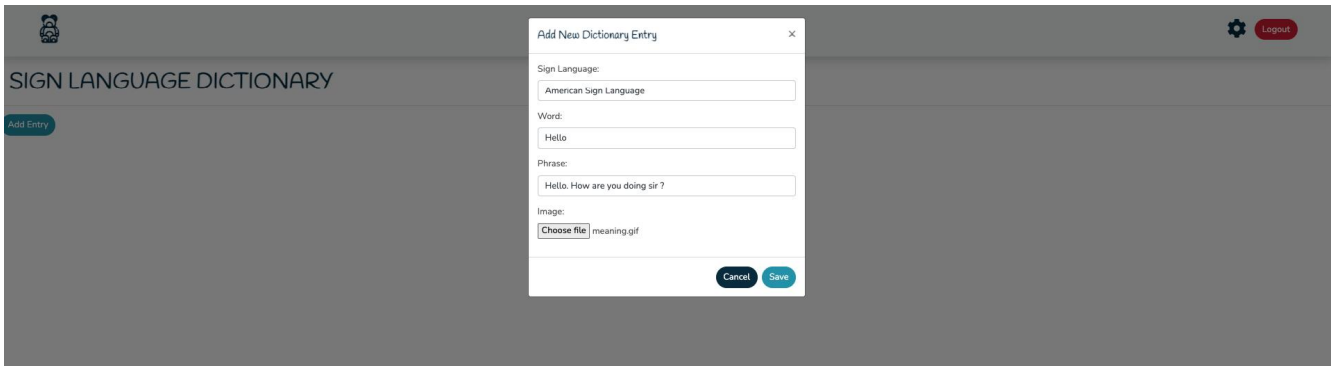
Users will be able to upload new sign language-based entries, including words, phrases, and related pictures. Users can access the related part or feature inside the program and create a new entry there.

Users will be asked to enter the desired word or phrase's sign language representation, such as hand gestures or motions, within the entry creation screen. Additionally, they can offer the appropriate written character or phrase in the relevant language.

Users will also have the opportunity to contribute a picture that depicts the notice or offers information visually.

Other users can successfully learn and comprehend the sign language input with the aid of this graphic.



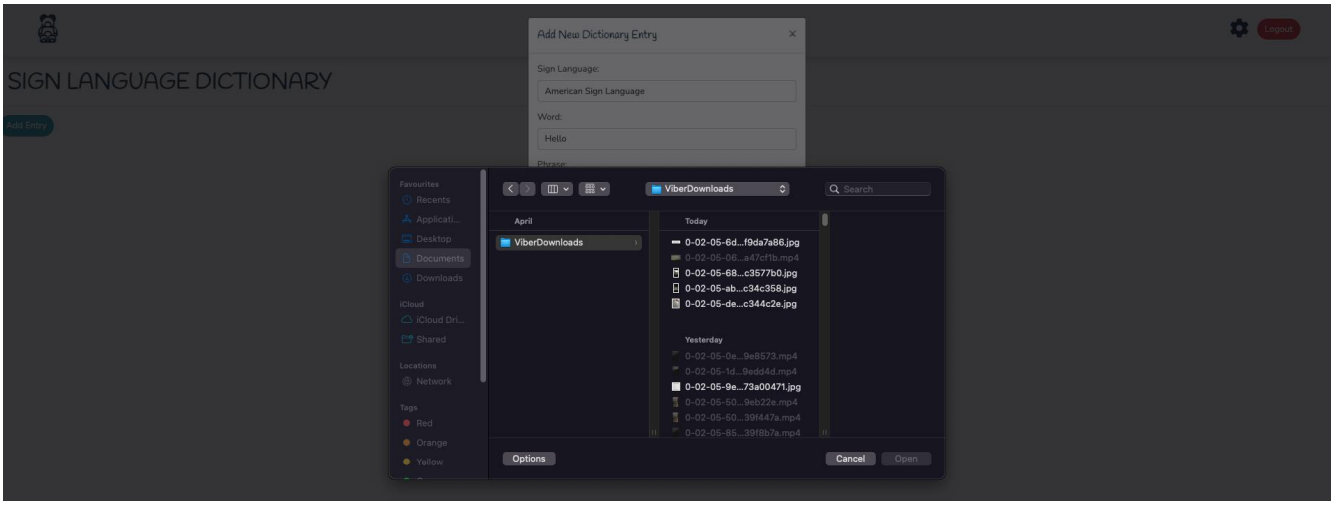
- **Add Entry Image**

The website allows users to create new items by uploading a picture as well.

Users can provide a picture that depicts the sign language motion, word, or phrase they want to contribute when they create an entry.

Users can improve the comprehension and clarity of the sign language entry for those who will access and learn from the program by attaching a picture.

By sharing their expertise and increasing the resources available, individuals may contribute to the sign language database using this capability. The image will be saved in database.

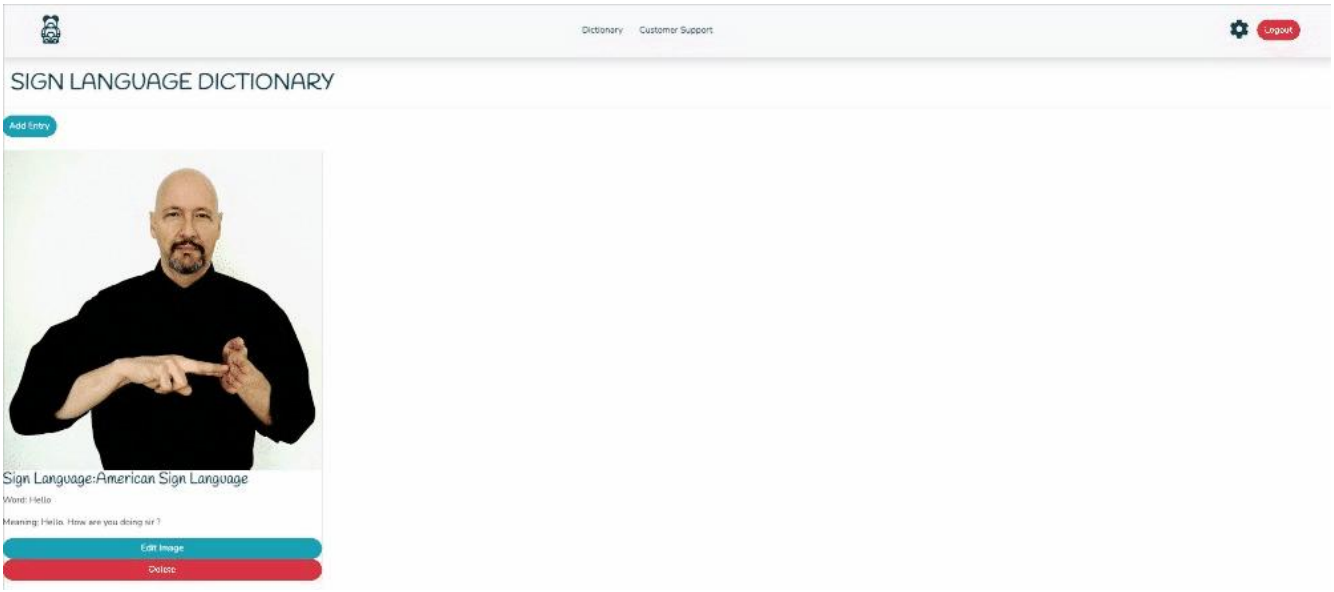


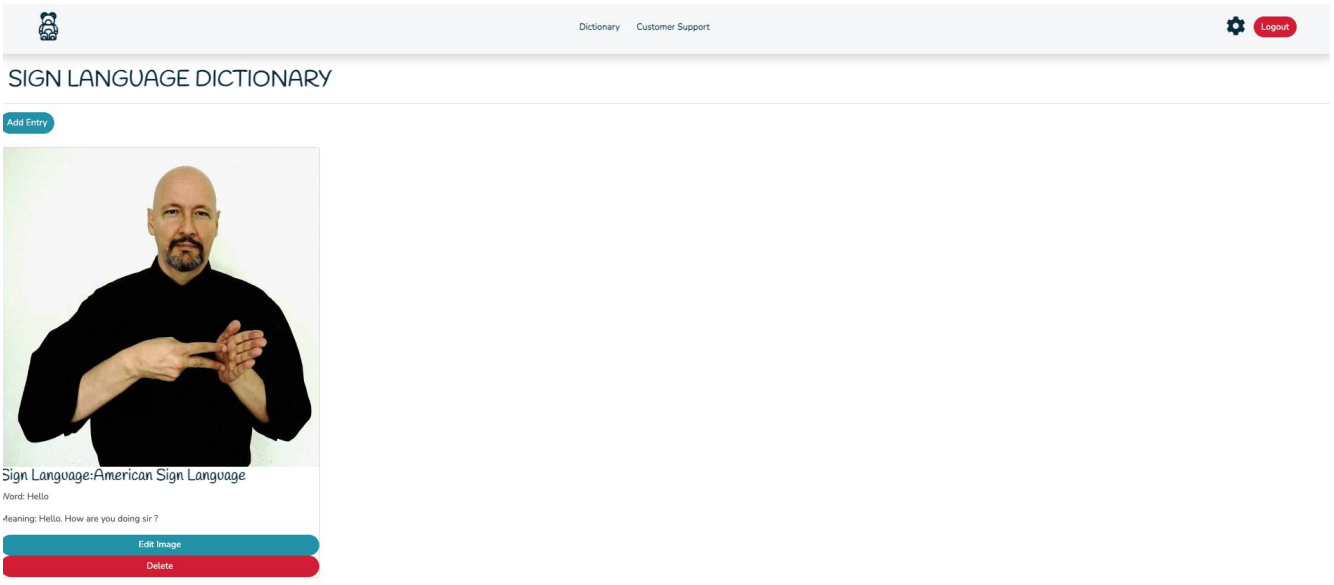
- **Homepage of dictionary**

Users will be able to browse and explore the things they have contributed to the application's sign language lexicon once they have done so.

The sign's meaning, use, and any further text descriptions are all covered in-depth in each dictionary item.

The website will play the GIF if an entry includes one to display the sign language gesture in action. Users can see the sign's movement and fluidity thanks to its dynamic depiction, which gives the educational process an interactive component.



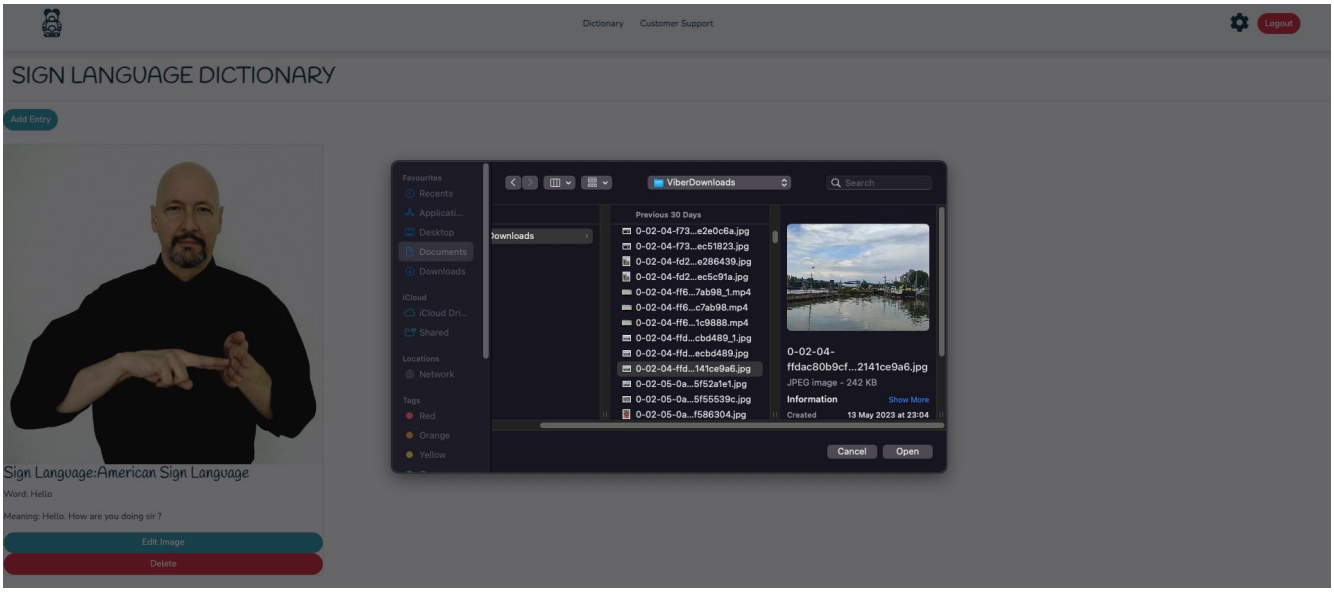
- **Edit Image**

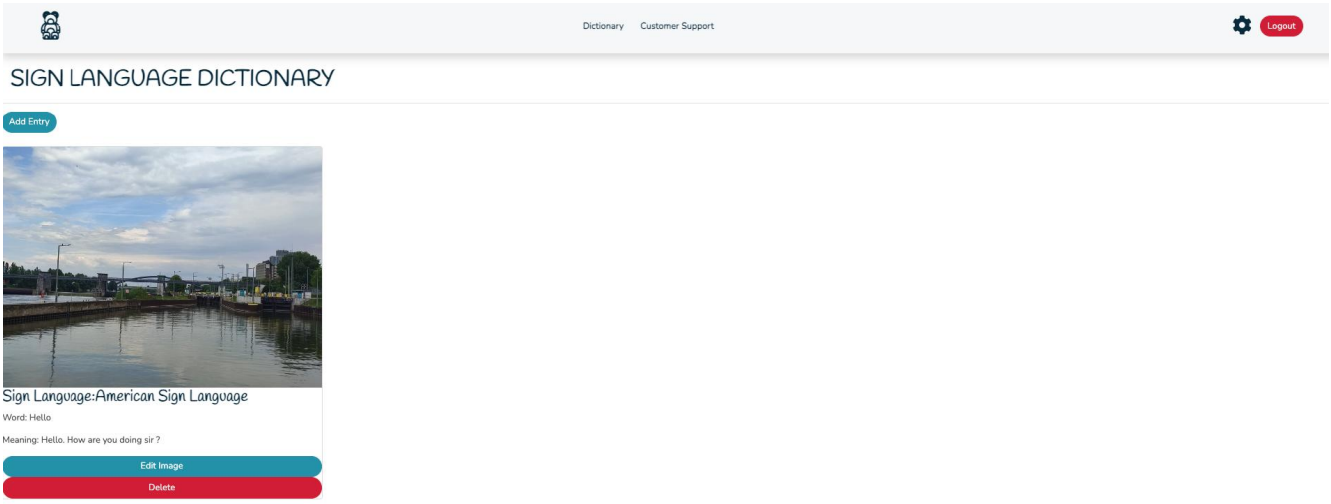
The user will also have the option to change the picture after adding an item to the sign language dictionary and including an accompanying image.

Users can edit or improve the image that goes with the sign language entry using this function. Users may access a selection of editing tools and features by choosing the "Edit Image" option within the program.

After the image is edited it will be stored in database. In case that one of the images failes in future there will be a text saying “Dictionary Image”.

The image from website below just indicates example of uploading image.



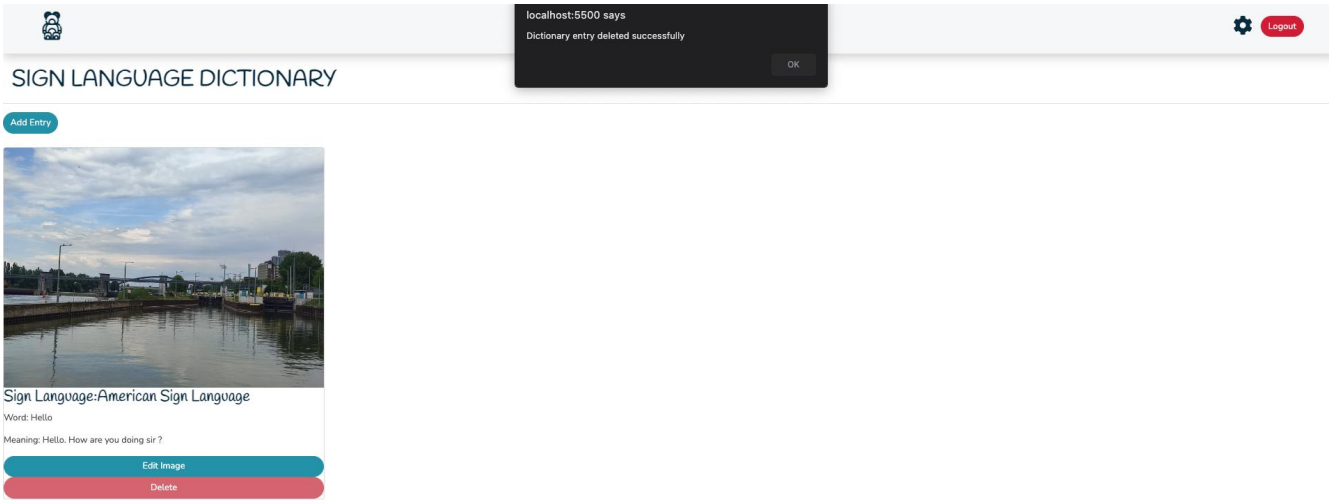
- **Delete Dictionary**

Users have the option to delete entries from the sign language dictionary as needed in addition to adding and updating images.

An entry can be deleted and will be removed from the dictionary, making it inaccessible to other users.

Users can browse to the particular entry they want to delete and use the "Delete" option.

The given dictionary then will be deleted from the database and alert will be shown saying. “Dictioary entry Deleted successfully.”




- **Customer Support**

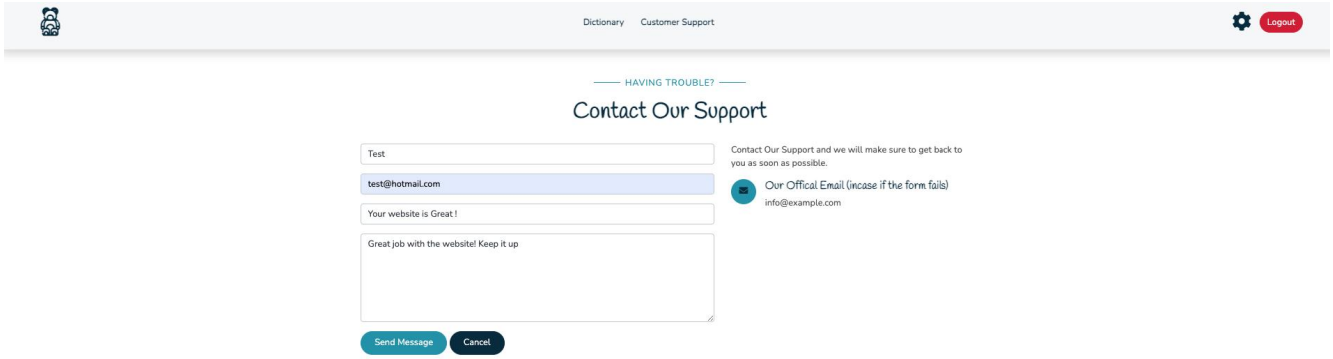
By selecting the "Customer Support" option from the platform's navigation menu, users may simply access the customer support function.

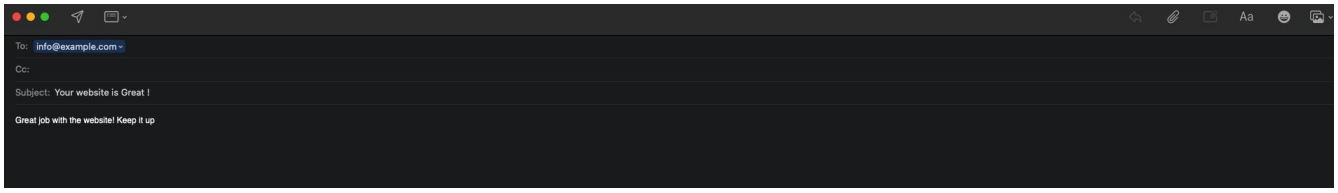
When they click, they will be sent to a website where they may ask for help or offer comments.

Users may fill out a simple form with their name, email address, subject, and message on the customer care page. They can submit their inquiry by clicking the "Send Message" button after providing the necessary information.

By securely storing the message in the database when the button is clicked, the platform makes sure that it is recorded for further analysis and review by the support staff.

Additionally, users will receive a prompt to open a pre-populated email which they can send the e mail.



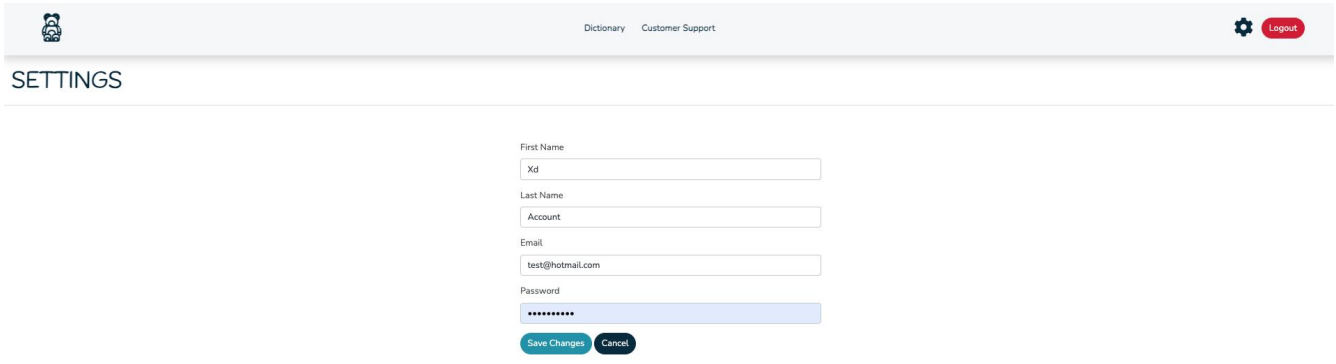

- **Settings Dashboard**

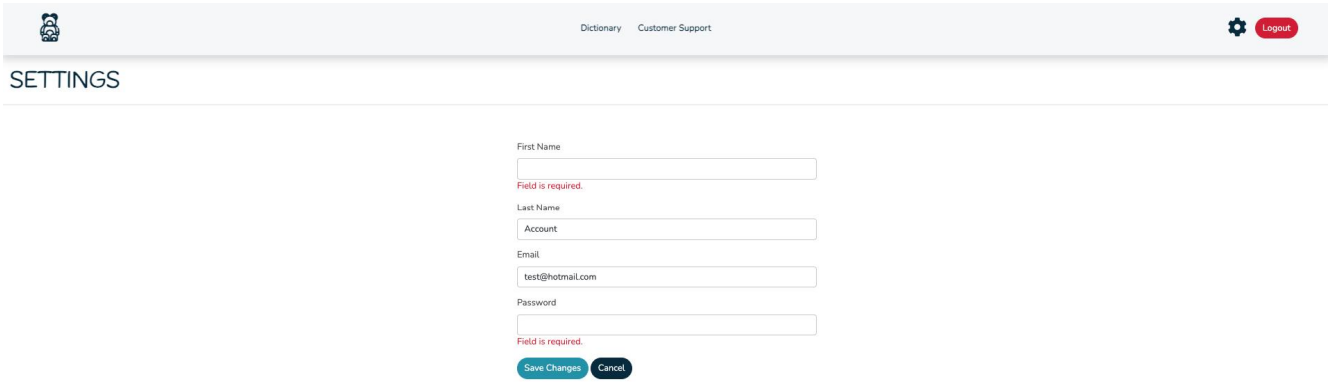
By going to the "Settings" area of their user account, users can alter their personal information.

They will discover an easy-to-use form in this part that enables users to change their first name, last name, email, and password.

The form has validation tests to avoid empty fields and impose certain requirements in order to guarantee data integrity.

An error warning will be shown and the user will be prompted to provide the necessary data if any of the fields are left blank. Similar to this, suitable validation messages will be displayed, instructing the user to remedy any problems, if the supplied email address is incorrect or the password does not fulfill the set requirements (e.g., at least 8 characters, The field is required).


Dictionary
Customer Support
Logout
SETTINGS
First Name
Xd
Last Name
Account
Email
test@hotmail.com
Password
Save Changes
Cancel


Dictionary
Customer Support
Logout
SETTINGS
First Name
Field is required.
Last Name
Account
Email
test@hotmail.com
Password
Field is required.
Save Changes
Cancel

- **Logout feature**

A quick and safe mechanism is in place when users choose to log out of their account to make sure their experience closes without incident.

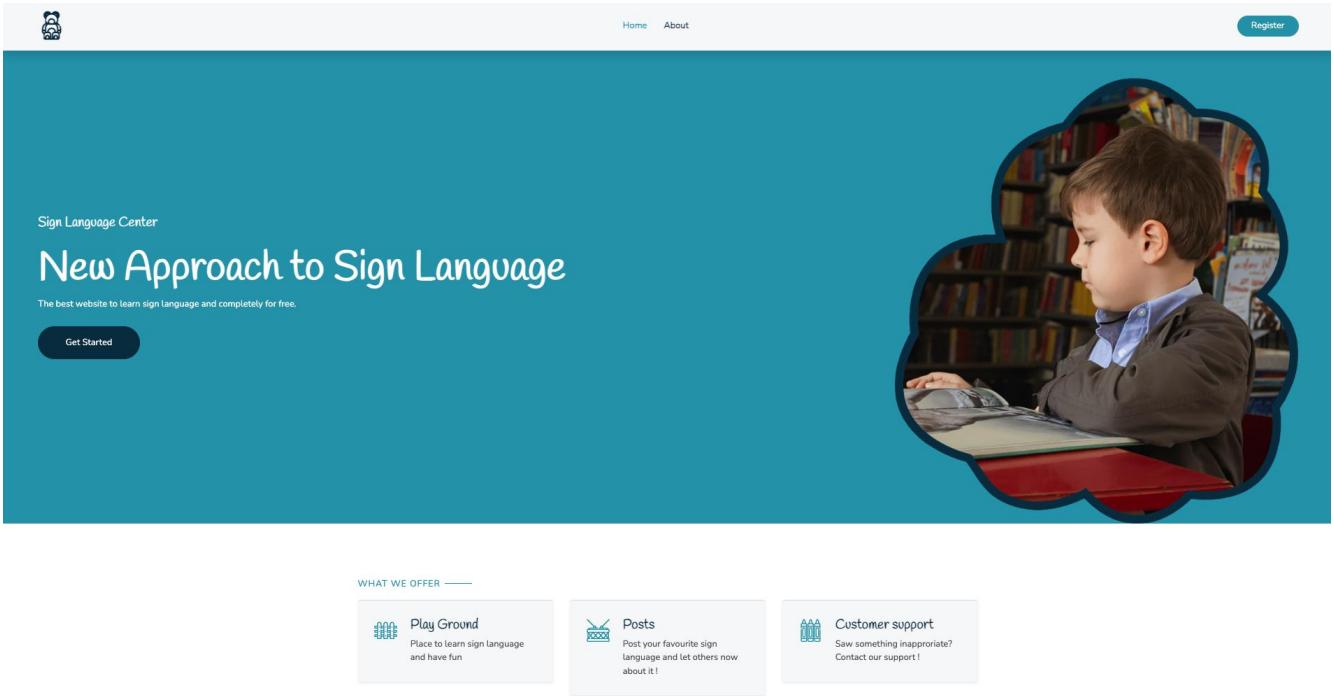
The website will carry out the following tasks once you click the "Log Out" button:

The local storage will be cleared of the user's special identification number, which was saved as userId in the browser's localStorage. This phase makes sure that the browser's memory is free of the user's identity data.

The user will be immediately routed to the application's home page when the userId has been removed.

The user may quickly return to the original page and check in again if they'd like thanks to this redirection, which also protects any sensitive or private information associated to their account.

Example image where the user will be redirected when logout is sucessful.



- **Encrypted password in database**

The application's encryption of user passwords kept in the database is one of its primary security features. Before being kept in the database, a safe encryption method is used when users establish accounts and choose passwords.

This makes sure that the users' real passwords are safe even if the database is hacked. Strong cryptographic algorithms and hashing methods are used throughout the encryption process.

Instead than keeping passwords in plain text, a one-way encryption method is used to convert them into hashes, which are strings of characters with a predetermined length.

The database then stores this hash.

| id | first_name | last_name | email | password |
|---|---|---|---|---|
| 11 | Novi | Account | ddd@hotmail.com | $2y$10$cPjzHsjCZKbhhRJqeInvh.nuFKvqWwT… |
| 13 | t | t | sadsada@hotmail.com | $2y$10$0GCd08mbYWjxFqZcSCAqKu4FB8rg… |
| 10 | Xd | Account | sadasdadadsada@hotmail.com | $2y$10$j7S8UvxwC.hLzrWpolZphu02vsloPjTE… |
| ▶ 6 | Test | Test | ado123@hotmail.com | $2y$10$xYHO/xzTGVUKu21LtkOEcuxv0l2OU5… |
| 22 | TT | TT | audi@hotmail.com | $2y$10$oQFUSNm4NjdQv4FCkU8pTufSPihon… |
| 2 | asd | kosarka | kosarka | $2y$10$6aZTCeerwwYzvfRrRzFF.OubUXdsqfl… |
| 15 | Test | Test | merima@hotmail.com | $2y$10$.z9p0lqf4uMQ7QYgLT4bMOuQk2/ENg… |
| 21 | Ne | Spavam | necu@hotmail.com | $2y$10$3ABFJbH9eIRq8ygCyUwJBOwpywveP… |
| 19 | Nije | Bitno | ovognema100@hotmail.com | $2y$10$MYcQp3UogeICZ06A34yvOOiX7iFYC… |

# 2. Project Structure

## 2.1. Technologies

I used a variety of programming languages, frameworks, and tools to create this project, covering the frontend and backend functions as well as the database integration. HTML, JavaScript (JS), AJAX, Bootstrap, and PHP are the technologies used.

I used HTML to organise the information and design the application's user interface for the frontend. To incorporate interactive features, improve user experience, and manage client-side operations, JavaScript was used.

Asynchronous communication between the frontend and backend was made possible by the use of AJAX, enabling dynamic content changes without the need for page reloads. Using the well-known CSS framework Bootstrap, a responsive and aesthetically pleasing design was made possible.

PHP was selected as the main server-side programming language for the backend. PHP made it possible to create server-side logic, process data, and communicate with databases. It offered the features required to manage user identification, data storage, and retrieval.

Coding standards were followed throughout the project with respect to known conventions and best practices. This entails abiding by rules like writing clear and understandable code, properly commenting code, using consistent naming conventions, and organizing code into modules. These coding guidelines were followed when creating the project's frontend (HTML, JavaScript, and AJAX) and backend (PHP) components, assuring code maintainability and promoting teamwork.

## 2.2. Database Entities

In our project, we made three tables and we used all of them when creating our project.

The tables we have made are as follows:

- users(id, first_name, last_name, email, password)
- dictionary(id, sign_language, word , phrase , image)
- contact_messages (id, name, email, subject, message , created_at)

## 2.3. Design Patterns

We have chosen to follow the observer, singleton and observer pattern.

**Singleton pattern**

In order to offer a centralized and standardized method of displaying validation messages, the Singleton pattern was applied in the validation file. The ValidationMessage object makes use of this pattern to guarantee that there is only one instance across the application, enabling

effective and consistent handling of validation rules and error messages.

This design pattern encourages code reuse and maintainability while making it easier to access the validation functions. A dependable and efficient mechanism for validating form inputs is provided by the Singleton pattern, which organizes the validation messages.
The singleton can be found here :

*frontend / js / validations / settingsValidation.js -> whole file*
*frontend / js / validations / registrationValidation.js -> whole file*
*frontend / js / validations / loginValidation.js -> whole file*
*frontend / js / register.js -> whole file*
*backend / Database.class.php-> whole file*

**Observer pattern**

In one of the files we have used singleton and observer pattern in one file. The reason for that is callbacks are used to implement the Observer pattern during the AJAX request for managing errors and success. When an AJAX request succeeds or fails, the successHandler and errorHandler methods act as observers and provide notifications in accordance.

If registration is successful, the successHandler leads the user to the login page; if registration is unsuccessful, the errorHandler shows an alert with the relevant error message. The code encourages modularity and the separation of concerns by combining the Singleton pattern and the Observer paradigm.

It guarantees that the registerForm object only ever exists in a single instance and allows flexible handling of success and error events during the AJAX call.

*frontend / js / register.js -> whole file*

**Builder pattern**

The following justifications justify the employment of the Builder Pattern in this case:

The AJAX request in this code may have several properties and settings, including the request type, URL, data, success callback, and error callback. By building the request piece by piece using the Builder Pattern, wecan manage the complexity of building the request object.

Using the Builder Pattern, we can choose which AJAX request characteristics to establish or change based on our needs. It offers a more adaptable and simple method of configuring the request object. Without changing the primary code structure, characteristics may be added, removed, and their values readily changed.

*frontend / js / login.js -> whole file*
*frontend / js / logout.js -> whole file*

## 2.4 Tests

Selenium tests have been run on the application to verify its functionality and user interface behavior. The following situations are covered by the Selenium tests:

Login: Selenium tests that mimic the login process have been created. These tests involve inputting both legitimate and fraudulent login information, confirming successful login, and dealing with problem scenarios.

Registration: To test the registration process, Selenium tests have been created. These tests entail completing the registration form, submitting it, and confirming that a new user has successfully registered.

Add New Entry: These tests replicate the steps involved in filling out the form, sending it, and checking to see if the input was added successfully.

Delete: To test the delete feature, Selenium tests have been created. These tests mimic the procedure of choosing, removing, and then checking if a particular record is no longer existent in the system. Logout: Selenium tests have been created to confirm the operation of the logout feature. In these tests, the user must be successfully logged out after being logged in, before being sent to the proper sites.

First Name Change in Settings: Selenium tests have been built to examine how well the first name change in settings works. In these tests, a new first name is entered, modifications are saved, and it is checked to see if the system has updated the first name.

The test are located here :

*testings / src / tests.java -> whole file*

# 3. Conclusion

In conclusion, I am happy with how the project has been carried out in general. It effectively satisfies the specifications and functions listed during the planning stage. The project shows how numerous technologies and design patterns, including HTML, CSS, JavaScript, jQuery, AJAX, Bootstrap, PHP, and the Singleton, Builder, and Module patterns, may be used effectively.

There were a few difficulties that arose during the development process that need serious thought and problem-solving. Implementing the validation and error handling logic, making sure that user input was correctly verified and the right error messages were presented, was one major issue. To provide a seamless user experience, this requires careful attention to detail and thorough testing.

There are possible areas for improvement in the future, while looking ahead. Enhancing the project's security procedures, such as putting in place suitable authentication and authorisation systems to safeguard sensitive user data, is one thing to think about. Refactoring and optimizing the codebase can also help with better performance and maintainability.

Overall, the endeavor has been a worthwhile educational opportunity. It gave me the chance to put my expertise of software design principles, database administration, and web development to use. I developed practical expertise constructing a usable application from scratch while addressing numerous requirements and difficulties along the way. I can't wait to advance my knowledge and increase my development abilities in next projects.