DyslexAI

Software Design Specification

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06/17/2024	Version 1.1	Saba Begum Mahbubur Khan Aaron Perel Ishmael Gonzales	Second Draft
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1. Introduction:

1.1 Purpose

The purpose of the DyslexAI web application is to provide a comprehensive, accessible reading and learning tool designed specifically for individuals with dyslexia. The application aims to enhance the reading experience through a customizable and user-friendly interface that allows users to adjust text settings such as font type, size, color, and spacing. Additionally, DyslexAI incorporates advanced features like AI-powered book recommendations, specialized modes for users with visual or hearing impairments, and seamless integration with e-book libraries to ensure an inclusive and supportive learning environment. By addressing the unique needs of dyslexic users, DyslexAI seeks to improve reading comprehension, retention, and overall learning outcomes.

1.2 Audience

The primary audience for DyslexAI includes individuals with dyslexia, encompassing users of all ages who require a personalized and accessible reading interface. This group benefits from adaptive text displays and assistive technologies that cater to their specific needs. Additionally, educators and therapists use DyslexAI to track progress, customize reading experiences, and provide targeted interventions. Parents and guardians of dyslexic children also find value in the platform as it offers tools to support their child's reading and learning at home in a user-friendly manner. Lastly, administrators play a crucial role in managing user accounts, maintaining system settings, and ensuring the platform's smooth operation, reliability, security, and compliance with data protection regulations.

2. General Overview and Design Guidelines & Approach:

2.1 Design Philosophy

To ensure DyslexAI operates efficiently, we developed the DyslexAI web application utilizing a user-centric design philosophy, also known as user-friendly design. By adhering to the principles of user-centric design, we have successfully created a web application that is tailored to the users’ preferences and usages patterns.

2.2 Design guidelines

The design guidelines for DyslexAI are based on the user-centric design philosophy. To utilize the principles of user-centric design we include it common practices such as:

- Accessibility
- Responsive-flexible design
- Personalization

- Consistency and simplicity

To serve as a design guideline criterion.

2.3 Assumptions

- The user creates a DyslexiAI account to access DyslexiAI's reading features and preference settings
- The user has access to a stable internet connection to access DyslexiAI web application
- Familiarity in the context of search and importing eBooks
- Users are one of the three categories: individual with dyslexia, educators, and administrators.

2.4 Technical constraints

- React 5.0.0 and above must be used with Tailwind CSS v2.0.
- Firebase JS SDK v1.8 must be used with React 5.0.0 and above.
- OpenAI API v1.2 and above must be used with React 5.0.0 and above
- Google Custom Search API v1.1 must be used with React 5.0.0
- Axios for requests must be version 1.3 and above to work with React

2.5 Design Constraint

- Easy to read button by implementing them with a padding on the y of 2 (py-2) and a padding of the x axis of 4 (px-4) with a hover over bg-secondary color change
- Easy to navigate, by grouping the website pages in the nav-bar
- Consistent color schemes for webpage background color combinations

2.6 Standards

To make DyslexAi more robust and efficient, we follow multiple types of standards.

- British Dyslexia Association (BDA) - standards to ensure easier reading for individual with dyslexia
- Web Wide Web Consortium (W3C) - standard developing protocol
- Web content accessibility guidelines (WCAG) – accessibility standards

3. Architecture Design:

3.1 Hardware

For our DyslexAI system, we have 3 types of devices interacting with the system: the user touch screen device, the central API server, and the laptop or desktop used by a standard user. The user device is a touch screen interface to ensure ease of use and accessibility. The users's workstations or laptops will have mouse and keyboard input and do not typically have touch

screen capabilities. Both the user touch screen device and the user's computer are connected to the central API server through the internet.

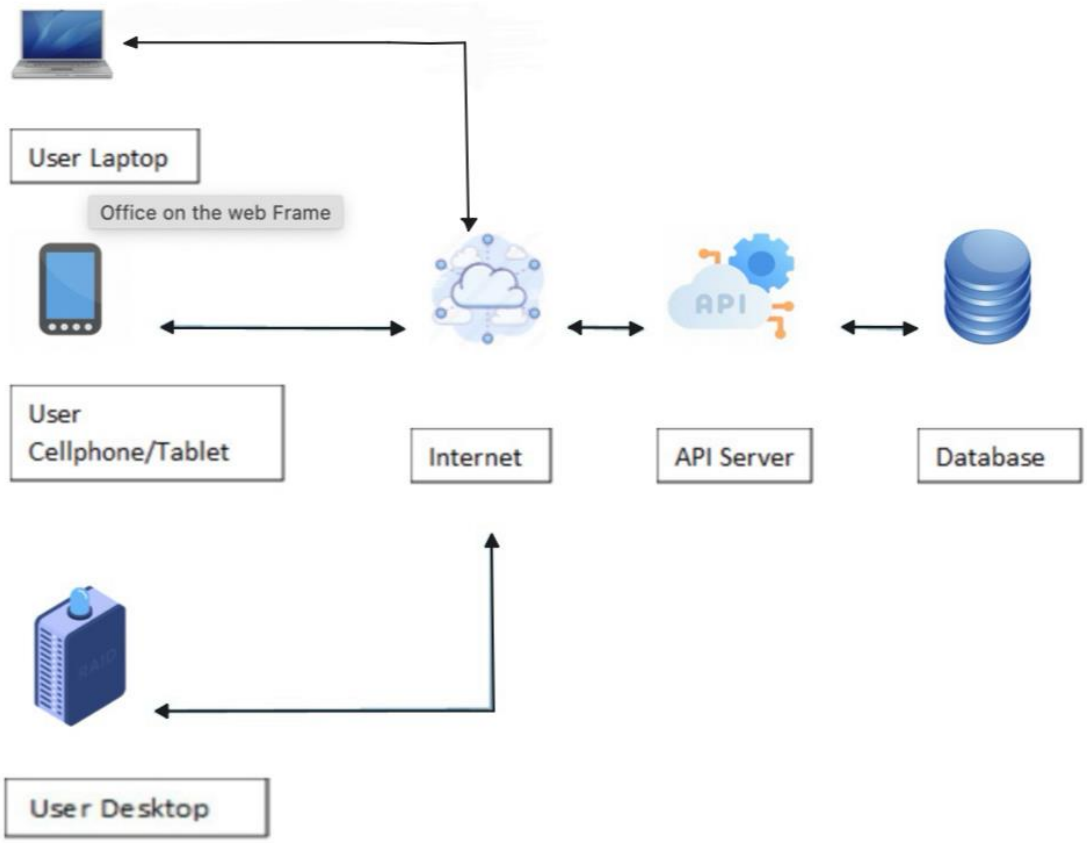


Figure 3.1.1 - Hardware architecture layout

The DyslexAI system requires specific hardware configurations for optimal performance. The user-facing application requires a minimum of a 4-core Intel Core i5 processor from within the last 10 years, 8 gigabytes of memory, and 1 gigabyte of free storage space, with a screen resolution of at least 1280x720 recommended. The API server requires a minimum of a 6-core processor, 16 gigabytes of memory, and 100 gigabytes of free storage space, as it relies on cloud-based services for extensive data storage. These hardware specifications ensure that DyslexAI operates efficiently and reliably.

3.2 Software

Our software development is separated into two groups using two different software architectures.

Our front-end will use the model-view-controller (MVC) architecture for both the user-facing web application and the administrative application. Our back-end will use the microservices architecture.

The front-end of DyslexAI is built using modern web technologies such as React.js, which suits the MVC architecture well. First, the user interacts with the view, which is our main page featuring the user interface. The controller handles the functionality selected by the user. These are custom components that manage data flow in the front-end, including features like user authentication, preference settings, e-book searches, and accessibility modes. These components have built-in functions that operate on the data. Finally, we have our model, which sends changes made in the front-end to the back-end through API calls.

The back-end of DyslexAI is built using the microservices architecture. Each microservice is designed to handle specific functionalities, such as authentication, database management via Firebase, AI processing with OpenAI, and text-to-speech with ResponsiveVoice. This approach allows for scalability and independent deployment of each service, ensuring that the system can handle high loads and be maintained efficiently.

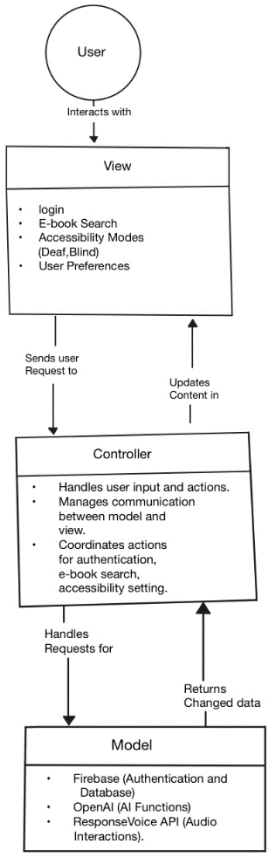


Figure 3.2.1-MVC Image

The communication between the front-end and back-end is secured with HTTPS. The front-end applications send API requests to the server, where the requests are validated using web token authorization, processed, and then either a database query is performed or an external service is

called. The API responds with the requested data in JSON format, ensuring a smooth and secure interaction between all components of the DyslexAI system.

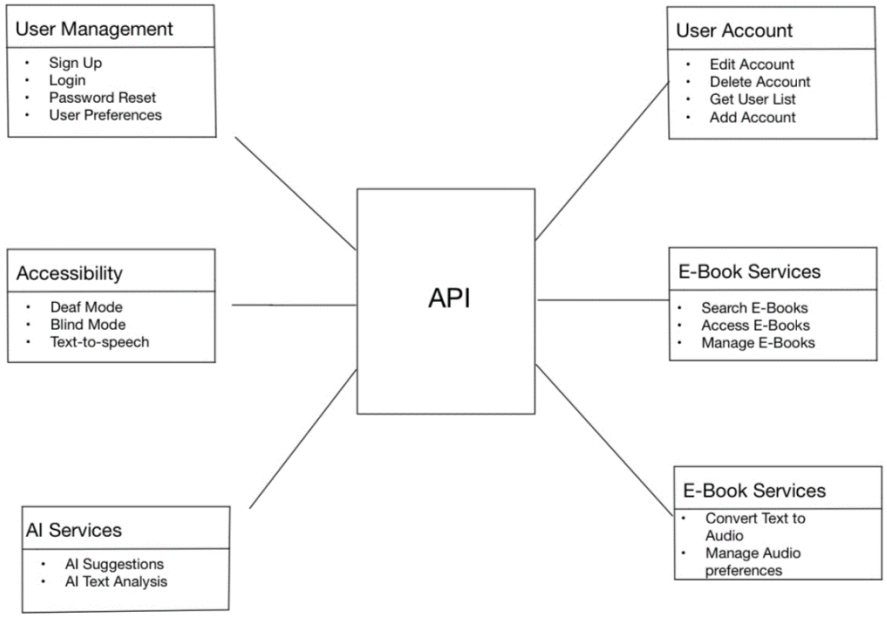


Figure 3.2.2 - Microservice Image

These two architectures combine to make an efficient and scalable application. The controllers in the front-end allow for the easy addition of new UI elements and functions. The microservice in the back end allows for the creation of new endpoints without the possibility of conflict.

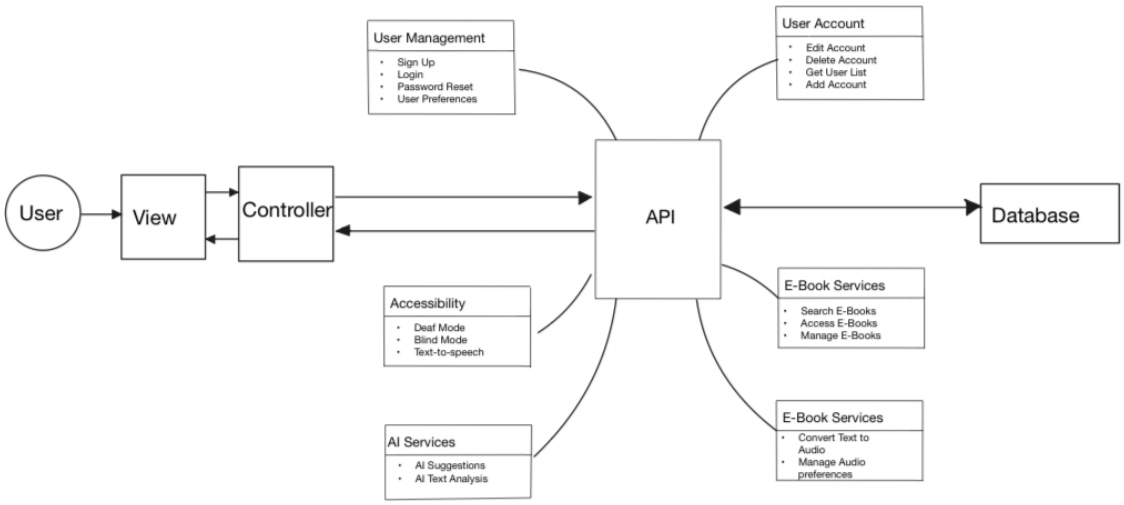


Figure 3.2.3 - Combined Software Architecture

3.3 Security

Our application will include several different security features to ensure that the data used in our database and our UI is safe and secure. We will use HTTPS to facilitate the security data transfer between front-end application and back-end system, this way, when unauthorized personnel try to packet sniff our data traveling over a network, the data will be encrypted to ensure security.

When a user needs to use our application, they must log in with their own credentials. Once they have entered their credentials, the data will be sent to our back end to authenticate that the credentials are valid. When the user credentials are saved in our database, firebase authentication implements strong hashing algorithms such as bcrypt, scrypt, or Argon2 on the password so none are being saved in plain text. This is in case there's a data breach, the infiltrators do not gain access to administrative accounts.

3.4 Communication

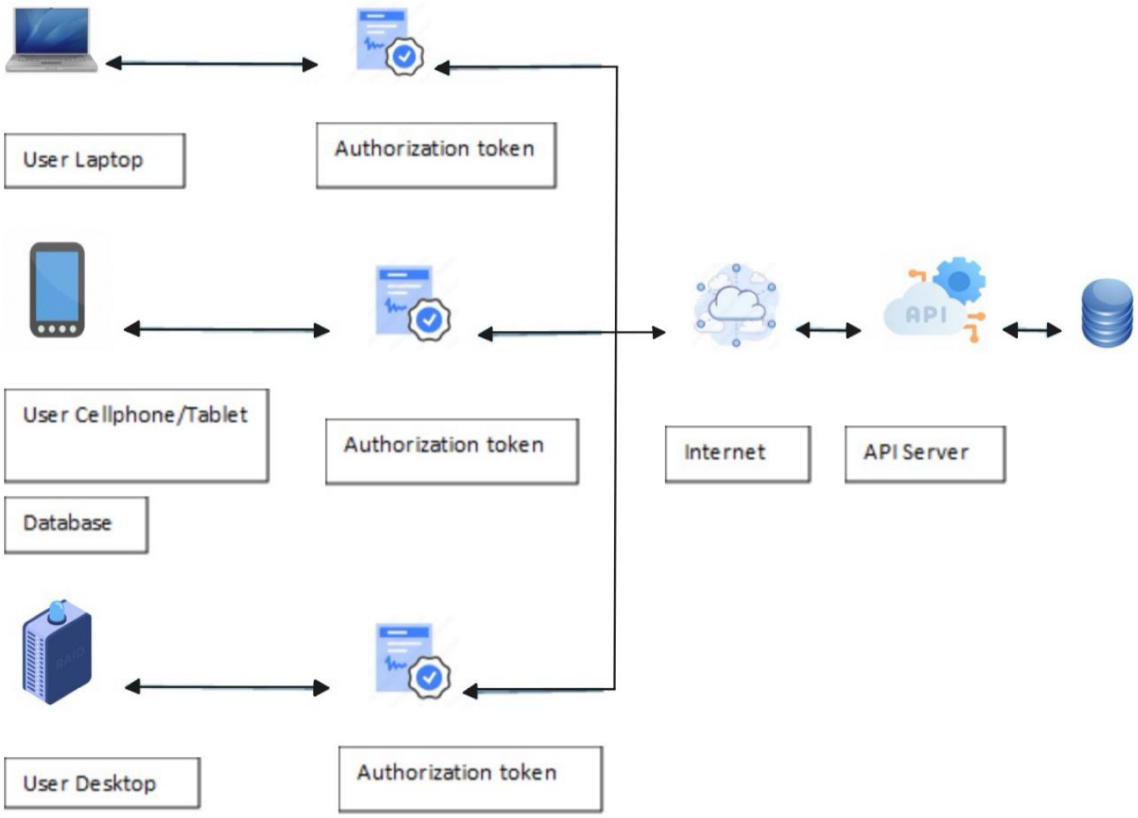


Figure 3.4.1 - Communication architecture for the DyslexAI web application

The communication architecture of the DyslexAI system relies on an internet connection between the user-facing web application and the administrative application running on laptops, and our API server hosted on Vercel. This internet connection is essential for facilitatig communication between the user interfaces and the API. Secure communication is ensured via

HTTPS. Routing is managed by Vercel's infrastructure, and the connection between the API and the Firebase database is handled by Firebase's real-time database capabilities. The communication flow starts with the user-facing or administrative application sending an API request to the server. The server receives the request, validates it using web token authorization, processes it, and may query the database or interact with external services like OpenAI for AI processing or ResponsiveVoice for text-to-speech functionality. Finally, the API responds with the requested data in JSON format to the user-facing or administrative application. This architecture ensures secure, efficient, and real-time communication between all components of the DyslexAI system.

3.5 Performance

Our application is designed for high performance and scalability. We will use Vercel for horizontal scaling to manage increased loads, while load balancing will ensure even traffic distribution. Our objective is to return all user and administrative information within one second after a request is made. Another objective is to authenticate users within two seconds of their requests. We aim for the application to start up within 45 seconds after the executable file is launched. When a user makes any changes to their preferences, our goal is to have the edits saved to the database within three seconds. Additionally, we aim to begin the text-to-speech feature within three seconds after the user enables it.

To achieve all our objectives, we need to ensure that the application performs as efficiently as possible. Our code will be optimized to eliminate any unnecessary functions, ensuring streamlined performance. We will also make sure that all our software interfaces are up to date and do not negatively impact performance. Load balancing will be implemented to distribute traffic evenly, preventing the server from becoming overwhelmed by handling too much traffic at once. Our server will be designed to work concurrently, allowing multiple tasks to be completed simultaneously.

4. System Design:

4.1 Use Cases

ID	SW4.1.1	Title	Disabling Blind Mode (TTS)
Created By:	Aaron Perel	Last Updated By	Aaron Perel
Date Created:	6/25/2024	Last Revision Date:	6/25/2024
Actors		Standard User	

Description	User Disables Blind Mode / TTS on website load.
Trigger	A standard user loads onto the website.
Normal Flow	1. A user loads the website from a web browser. 2. A prompt appears for the user asking if they would like to disable Blind Mode / TTS as a voice begins the introductory notice to users. 3. The user then disables Blind mode using the button in the popup
Alternative Flow	1. A user loads the website from a web browser. 2. A prompt appears for the user asking if they would like to disable Blind Mode / TTS as a voice begins the introductory notice to users. 3. The user leaves Blind Mode on and the popup disappears after the introductory notice is complete.
Exception	If Blind Mode is under maintenance, a display message will appear on the home page, indicating the maintenance and TTS / Blind mode will not do any announcing.
Assumption	N/A

ID	SW4.1.2	Title	Standard User Account Creation	
	Created BY:	Ishmael Gonzales	Last Updated By:	Ishmael Gonzales
	Date Created:	06/18/2024	Last Revision Date:	06/24/2024
Actors			Standard Users	

Description	Creating an account for standard users on dyslexAI web application.
Trigger	Clicking on the login button on the homepage.
preconditions	The user is on the homepage.
postconditions	The user views the navigation bar, to locate the login button.
Normal Flow	1. The user is on the homepage. 2. The user clicks on the login in button. 3. The user will be given the option to select “continue with google” to create an account or select “I don’t have an account” to create an account with an email and password. 4. If the user clicks on the “I don’t have an account”, a pop-up box will appear and t 5. User fill in the text fields in the pop-up box. 6. After filling in all the text fields, the user will then click on “Sign up” to complete the sign-up process. 7. After clicking on sign-up, the user will be redirected back to the homepage, but this time sign in.
Alternative Flow	1. If the user clicks in the “continue with google”, a google sign in pop-up box will appear. 2. Users will enter in their google credential info to create an account. 3. After entering in their credentials, and completing the google sign in process, their account will be created, and they will be redirected back to the home page but time tome sign in.

Exception	
Assumptions	The user has a google account beforehand when choosing the “continue with google” option before

ID	SW4.1.3	Title	Standard User Logging in to an Account	
	Created BY:	Ishmael Gonzales	Last Updated By:	Ishmael Gonzales
	Date Created:	06/18/2024	Last Revision Data:	06/24/2024
Actors			Standard User	
description			User login into their account to access DyslexAI’s preferences and features	
Trigger			Clicking on the login button on the homepage.	
Precondition			The user is on the homepage.	
postcondition			The user views the navigation bar, to locate the login button.	
Normal Flow			1. The user is on the homepage. 2. The user clicks on the login in button. 3. The user will be given the option to select “continue with google” to log in or enter in their password and email to login to their account if they created their account with the email and password option. 4. If a user created their account with email and password, they would enter their email and password in the text field.	

	5. After filling in the text field, click on the login button to complete the login process. 6. Login finish processing, the user will be redirected back to the homepage, but this time log in
Alternative Flow	1. If the user clicks in the “continue with google”, a google sign in pop-up box will appear. 2. Users will enter in their google credential info to create an account. 3. After entering in their credentials, and completing the google sign in process, they will be redirected back to the home page but time log in.
Assumptions	The user has a google account beforehand when choosing the “continue with google” option before.

ID	SW4.1.4	Title	User Login with Google
Created By:	Mahbubur Khan	Last Updated By	Mahbubur Khan
Date Created:	06/26/2024	Last Revision Date:	06/24/2024
Actors		Standard User	
Description		This use case describes the situation where a standard user signs into their DyslexAI account using their Google credentials.	
Trigger		Clicking on the login button on the homepage and selecting the Continue with Google option.	
Precondition		The standard user must have a Google account.	

Postcondition	The user is successfully signed into their DyslexAI account and redirected to the homepage.
Normal Flow	1. The user is on the DyslexAI homepage. 2. The user clicks on the "Login" button in the navigation bar. 3. The user selects the "Continue with Google" option. 4. A Google sign-in pop-up appears. 5. The user enters their Google credentials and clicks the "Sign In" button. 6. Google authenticates the user and redirects back to DyslexAI. 7. The user is now signed into their DyslexAI account. 8. The user is redirected to the DyslexAI homepage, now logged in.
Alternative Flow	1. If there is an error during Google authentication, an error message is displayed. 2. The user can try to sign in again or use another login method.
Exception	User Lacks Google Account: If the user does not have a Google account, they are prompted to create one on the Google sign-in page. If the user chooses not to create a Google account, they can return to DyslexAI and select another login method. Network Issues: If there is a network issue preventing communication with Google's servers, an error message is displayed. The user is prompted to check their internet connection and try again later. Google Account Locked If the user’s Google account is locked or has security issues, a message is displayed indicating that the user needs to resolve these issues with Google before attempting to sign in again.

Assumption	1. The user has an existing Google account. 2. The user's Google account is in good standing and capable of authentication.

ID	SW4.1.5	Title	User Accessibility Mode
Created By:	Mahbubur Khan	Last Updated By	Mahbubur Khan
Date Created:	06/19/2024	Last Revision Date:	06/24/2024
Actors		Standard User	
Description		This use case describes the situation where a standard user enables and customizes accessibility modes (Deaf Mode, Blind Mode, Text to Speech) in DyslexAI.	
Trigger		The standard user logs into their account and navigates to the accessibility settings.	
Precondition		The standard user must have an account and be logged in.	
Postcondition		The selected accessibility mode is enabled and customized according to the user’s preferences.	
Normal Flow		1. From the home page, the standard user selects the login button. 2. Upon clicking the login button, the user will be prompted to enter their credentials. 3. After entering the credentials, the user will have access to the settings page. 4. The user selects the "Accessibility Settings" option. 5. The user chooses the desired mode (Deaf Mode, Blind Mode, Text to Speech). 6. The user customizes the mode settings (e.g., adjusting speech speed, visual adjustments). 7. The user saves the changes. 8. The selected accessibility mode is now active and applied to the reading interface.	

Alternative Flow	N/A
Exception	If the accessibility feature is under maintenance, a display message will appear on the settings page, indicating the maintenance.
Assumptions	The standard user has an account in DyslexAI's database before accessing accessibility settings.

ID	SW4.1.6	Title	User Preference
Created By:	Mahbubur Khan	Last Updated By	Mahbubur Khan
Date Created:	06/19/2024	Last Revision Date:	06/24/2024
Actors		Standard User	
Description		This use case describes how a standard user customizes their reading preferences (Font Size, Contrast, Line Length, etc.) in DyslexAI.	
Trigger		The standard user logs into their account and navigates to the preferences settings.	
Precondition		The standard user must have an account and be logged in.	
Postcondition		The user's reading preferences are saved and applied to the reading interface.	
Normal Flow		1. From the home page, the standard user selects the login button. 2. Upon clicking the login button, the user will be prompted to enter their credentials. 3. After entering the credentials, the user will have access to the settings page. 4. The user selects the "Reading Preferences" option.	

	5. The user customizes their preferences (Font Size, Contrast, Line Length, Paragraph Spacing, etc.). 6. The user saves the changes. 7. The customized preferences are applied to the reading interface.
Alternative Flow	N/A
Exception	If the preferences feature is under maintenance, a display message will appear on the settings page, indicating the maintenance.
Assumptions	The standard user has an account in DyslexAI's database before accessing preferences settings.

ID	SW4.1.7	Title	Importing Books
Created By:	Mahbubur Khan	Last Updated By	Aaron Perel
Date Created:	06/19/2024	Last Revision Date:	06/25/2024
Actors		Standard User	
Description		This use case describes the situation where a standard user imports an e-book into DyslexAI's database.	
Trigger		The standard user logs into their account and selects the option to import a book on the navbar.	
Precondition		1. The standard user must have an account. 2. The user must be logged in. 3. The user navigates to the import e-book page.	
Postcondition		The e-book is successfully imported and available in the user's library.	
Normal Flow		1. From the home page, the standard user selects the login button.	

	2. Upon clicking the login button, the user will be prompted to enter their credentials. 3. After entering the credentials, the user will have access to the features available after login on the navbar. 4. The user selects the "Import E-Book" option. 5. The user inputs the name of a book into the search bar to import. 6. The user clicks on the available e-book. 7. A popup containing the e-book information appears and prompts the user to close or import. 8. If import is selected, then the e-book is processed while a popup containing a loading spinner is displayed. 9. A success notification is displayed for the user and the user is notified the book is at the top of the list in the library page. 10. The user has the option to automatically open the newly imported e-book from the popup.
Alternative Flow	1. The user clicks on the available e-book. 2. A popup containing the e-book information appears and prompts the user to close or import. 3. The user clicks close and closes the popup containing the e-book information.
Exception	1. If the system is under maintenance, a display message will appear, indicating the maintenance. 2. If a network error occurs during e book import a message will appear stating the e-book has not been imported including an error message.
Assumption	The standard user has an account in DyslexAI's database.

ID	SW4.1.8	Title	Reading Page

Created By:	Mahbubur Khan	Last Updated By	Aaron Perel
Date Created:	06/19/2024	Last Revision Date:	06/25/2024
Actors		Standard User	
Description		This use case describes the situation where a standard user accesses and uses the reading page of DyslexAI.	
Trigger		The standard user logs into their account and navigates to the reading page.	
Precondition		The standard user must have an account and be logged in.	
Postcondition		The user can read the selected e-book with their customized settings.	
Normal Flow		1. From the home page, the standard user selects the login button. 2. Upon clicking the login button, the user will be prompted to enter their credentials. 3. After entering the credentials, the user will have access to the library page. 4. The user selects an e-book to read. 5. The user is directed to the reading page. 6. The reading interface displays the e-book with the user's customized preferences. 7. The user reads the e-book, utilizing features like font adjustments, etc.	
Alternative Flow		N/A	
Exception		If the reading page is under maintenance, a display message will appear, indicating the maintenance.	
Assumption		The standard user has an account in DyslexAI's database before accessing the reading page.	

ID	SW4.1.9	Title	User Blind Mode
Created By:	Mahbubur Khan	Last Updated By	Aaron Perel
Date Created:	06/19/2024	Last Revision Date:	06/25/2024
Actors		Blind User	
Description		This use case describes the situation where a standard user utilizes Blind Mode to customize their reading experience in DyslexAI.	
Trigger		Opening the website will automatically induce Blind mode, or user navigates to the reading page.	
Precondition		The standard user must have an account and be logged in.	
Postcondition		Blind Mode is enabled and applied to the reading interface, enhancing accessibility for visually impaired users.	
Normal Flow		1. On the homepage upon load the user does not disable blind mode. 2. Via sound the user will be guided to the nearest button and all text on screen will be read. 3. The user is guided through the login pop up on screen once prompted to login. 4. Upon login the user is told of the options on the navbar and guided to the navbar. 5. The user is guided through the options on the navbar. 6. The page that is clicked on is then announced and the user is told they have navigated to the page. 7. If on the library page, the audio will announce all visible books and tell the user to click on one. 8. If a book is clicked on then the audio announces that it will begin reading	

	the book, then proceeds with reading the currently visible page. 9. Pages will automatically switched once fully read 10. After 3 pages being read the audio will prompt the user to decide if they would like to continue reading or not.
Alternative Flow	1. After the user is guided to the import e book page the audio describes the page to the user. 2. The page is described to the user via the audio. 3. The user is guided through searching for an e book to import, i.e. typing in the search bar to create a query 4. The results of the search query are announced to the user. 5. The user is guided via noise to the nearest result on screen 6. The user is then read the details pop up that appears containing the book information 7. The audio announces that to import the book they must click “import” or click “close” to move on to the next book. 8. If a book is imported a user is then asked if they would like to read it right away. 9. The user is then transferred to the reading page and the audio reading of the book begins.
Exception	If Blind Mode is under maintenance, a display message will appear on the settings page, indicating the maintenance.
Assumption	The standard user has an account in DyslexAI’s database before accessing the feature.

ID	SW4.1.10	Title	User Deaf Mode

Created By:	Mahbubur Khan	Last Updated By	Aaron Perel
Date Created:	06/19/2024	Last Revision Date:	06/25/2024
Actors		Deaf User	
Description		User utilizes Deaf Mode to customize their reading experience in DyslexAI.	
Trigger		User logs into their account and selects the option to enable Deaf Mode.	
Normal Flow		1. From the home page, the standard user selects the login button. 2. Upon clicking the login button, the user will be prompted to enter their credentials. 3. After entering the credentials, the user will have access to the library page and the switch on the navbar to switch modes. 4. The user switches the current mode to Deaf mode via the slider switch. 5. The user navigates to the library page by clicking on the “Library” option on the navbar. 6. Once in the library the user selects an e-book of their choice to read. 7. Once an e-book is selected the e-book text is displayed on the user’s screen with a button stating “Generate Images”	
Alternative Flow		N/A	
Exception		If Deaf Mode is under maintenance, a display message will appear, indicating the maintenance.	
Assumption		The standard user has an account in DyslexAI’s database before accessing the feature.	

ID	SW4.1.11	Title	Generating Images

Created By:	Aaron Perel	Last Updated By	Aaron Perel
Date Created:	06/25/2024	Last Revision Date:	06/25/2024
Actors		Deaf User	
Description		User utilizes Deaf Mode to generate images for the current e-book.	
Trigger		User logs into their account, navigates to the reading page, and clicks “Generate Images.”	
Normal Flow		1. The user is in Deaf Mode and is ready to generate images. 2. After clicking the “Generate Images” button a loading animation appears on the bottom of the screen. 3. Sentence by sentence images are generated to represent the images. 4. Images are cached and locally stored so that while the user is logged in images will still appear if leaving and re-navigating to the reading page for the selected e-book.	
Alternative Flow		N/A	
Exception		If Deaf Mode is under maintenance, a display message will appear on the settings page, indicating the maintenance.	
Assumption		The standard user has an account in DyslexAI’s database and is in Deaf Mode.	

ID	SW4.1.12	Title	Recommendations
Created By:	Aaron Perel	Last Updated By	Aaron Perel
Date Created:	06/25/2024	Last Revision Date:	06/25/2024
Actors		Standard User	
Description		User uses the recommendations function to recommend a book based on their reading history.	

Trigger	User logs into their account and navigates to the recommendations page.
Normal Flow	1. The user is on the recommendations page. 2. After clicking the "Get recommendations" button a loading animation appears on the bottom of the screen. 3. All book recommendations appear on screen similarly to the library page as clickable cards. 4. The user clicks one of the available options to read. 5. The user is navigated to the reading page for that specific book.
Alternative Flow	N/A
Exception	If Deaf Mode is under maintenance, a display message will appear on the settings page, indicating the maintenance.
Assumption	The standard user has an account in DyslexAI's database and is in Deaf Mode.

ID	SW4.1.13	Title	Homepage button	
	Created BY:	Ishmael Gonzale	Last Updated By:	Ishmael Gonzales
	Date Created:	06/17/2024	Last Revision Date:	06/18/2024
Actors			Standard User	
description			The homepage button redirects users back to the homepage as known as the starting point	
Trigger			Clicking on the Home button on the homepage.	

Precondition	The user is on any of the DylesxAI pages
postcondition	The user views the navigation bar, to locate the home button.
Normal Flow	1. The user is on another page. 2. The user clicks on the home button located in the navigation bar. 3. After clicking on the home button, the user will be redirected back to the home page.
Alternative Flow	N/A
Assumptions	The user is not on the homepage

ID	SW4.1.14	Title	Settings Page
Created By:	Mahbubur Khan	Last Updated By	Mahbubur Khan
Date Created:	06/19/2024	Last Revision Date:	06/19/2024
Actors		Standard User	
Description		This use case describes the situation where a standard user navigates and makes changes in the settings page of DyslexAI.	
Trigger		The standard user logs into their account and accesses the settings page.	
Precondition		The standard user must have an account and be logged in.	
Postcondition		Changes made in the settings page are saved and applied.	
Normal Flow		1. From the home page, the standard user selects the login button. 2. Upon clicking the login button, the user will be prompted to enter their credentials.	

	3. After entering the credentials, the user will have access to the settings page. 4. The user navigates through various settings options (Accessibility, Reading Preferences, Account Settings). 5. The user makes the desired changes. 6. The user saves the changes. 7. The changes are now applied to the user's account.
Alternative Flow	N/A
Exception	If the settings page is under maintenance, a display message will appear, indicating the maintenance.
Assumption	The standard user has an account in DyslexAI's database before accessing the settings page.

ID	SW4.1.15	Title	User Account Deletion	
	Created BY:	Ishmael Gonzales	Last Updated By:	Ishmael Gonzales
	Date Created:	06/18/2024	Last Revision Date:	06/18/2024
Actors			Standard User.	
Description			His use case describes the situation of a standard user who decided to delete their account from DyslexAI's database.	
Trigger			The standard user logs into the account they wish to delete and presses the delete button.	

Preconditions	The standard user must have an account, and they must be logged in, to proceed in the deletion process.
Postconditions	The Standard user account will be removed from DyslexAI's database.
Normal Flow	1. From the home page the standard user selects the log in button. 2. Upon clicking the login button, the user will be prompted to enter in his credentials. 3. After entering in the credentials, the user will then have to select login to proceed with the deletion process. 4. After logging in the user will be redirected back to the homepage but this time logged in. 5. Next. The user must select the setting page, and from the setting page they must click on the "delete account" button. 6. After clicking on the button, a pop-up box will appear, with the message about the deletion and with a confirmation. 7. The user will then select Delete if choice to proceed with the deletion or exist if the user decided to keep their account. 8. After choosing one of the two options the user will then be redirected back to the homepage.
Alternative Flows	N/A
Exceptions	If the website is under maintenance a display message will appear on the homepage, stating the info about the maintenance.

Assumptions	The standard user already has an account in dyslexAI's database before trying to use deletion process

ID	SW4.1.16	Title	User Logout
Created By:	Mahbubur Khan	Last Updated By	Mahbubur Khan
Date Created:	06/24/2024	Last Revision Date:	06/24/2024
Actors		Standard User	
Description		This use case describes the situation where a standard user logs out of their DyslexAI account.	
Trigger		Clicking on the logout button on the navigation bar.	
Precondition		The user must be logged in before they can logout.	
Postcondition		The user is successfully logged out of their account and redirected to the homepage.	
Normal Flow		1. The user is logged into their DyslexAI account. 2. The user clicks on the "Logout" button in the navigation bar. 3. The system processes the logout request. 4. The user is logged out of their account. 5. The user is redirected to the DyslexAI homepage.	
Alternative Flow		1. If the user's session times out due to inactivity, the system automatically logs the user out. 2. The user is redirected to the login page with a message indicating that the session has expired.	
Exception		If there is a network issue preventing the logout request from being processed, an error	

	message is displayed. The user is prompted to try logging out again.
Assumption	1. The user is currently logged into their DyslexAI account. 2. The system is functioning correctly and capable of processing logout requests.

ID	SW4.1.17	Title	Search for e-Books
Created By:	Mahbubur Khan	Last Updated By	Mahbubur Khan
Date Created:	06/24/2024	Last Revision Date:	06/25/2024
Actors		Standard User	
Description		This use case describes the situation where a standard user searches for eBooks within the DyslexAI application.	
Trigger		The user enters a search query in the search bar and clicks the search button.	
Precondition		The user must be logged into the DyslexAI account.	
Postcondition		The user is presented with a list of e-books based on the search result.	
Normal Flow		1. The user is logged into their DyslexAI account. 2. The user navigates to the library page. 3. The user enters a search query into the search bar. 4. The user clicks the "Search" button. 5. The system processes the search query and retrieves matching eBooks from the database. 6. The system displays the search results to the user.	

Alternative Flow	1. If no eBooks match the search query, the system displays a message indicating that no results were found. 2. The user can modify the search query and try again.
Exception	If there is a network issue preventing the search request from being processed, an error message is displayed. The user is prompted to check their internet connection and try again.
Assumption	1. The user is currently logged into their DyslexAI account. 2. The system is functioning correctly and capable of processing search queries.

ID	SW4.1.18	Title	Library Page
Created By:	Mahbubur Khan	Last Updated By	Mahbubur Khan
Date Created:	06/24/2024	Last Revision Date:	06/25/2024
Actors		Standard User	
Description		This use case describes the situation where a standard user can find all the available e-books.	
Trigger		The user clicks the “Library” option on the navbar.	
Normal Flow		1. The user is logged into their DyslexAI account. 2. The user navigates to the library page. 3. The library page is open and displays all available e-books with the most recently user imported ones first in the list.	
Alternative Flow		If no eBooks are available a message stating “no e-books available” appears.	

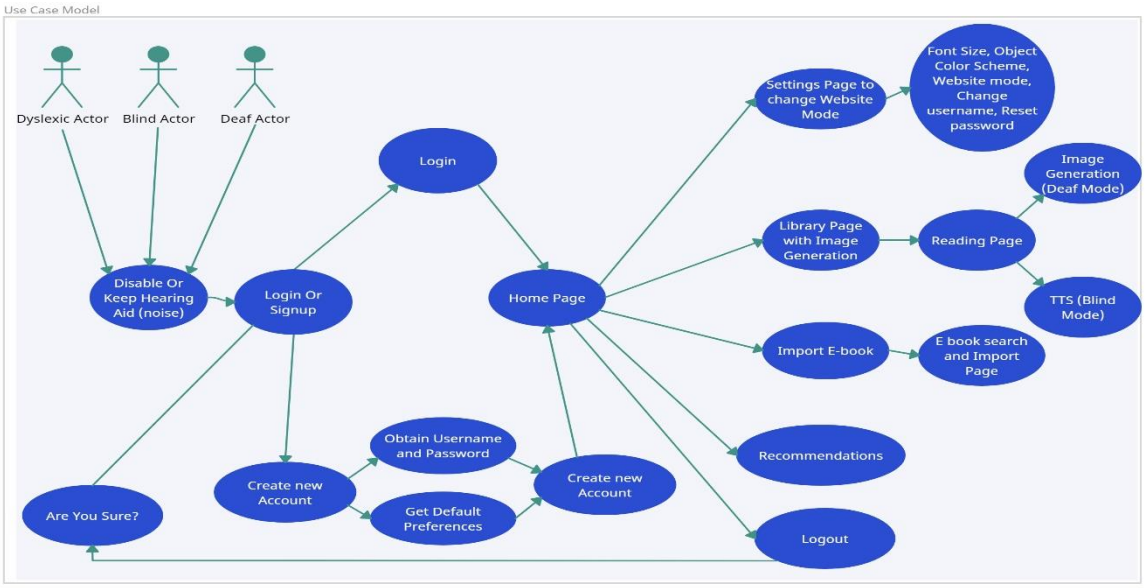
Exception	If there is a network issue preventing the search request from being processed, an error message is displayed. The user is prompted to check their internet connection and try again.
Assumption	1. The user is currently logged into their DyslexAI account. 2. The system is functioning correctly and capable of displaying e-books from the database.

ID	SW4.1.19	Title	Close Login Dialog
Created By:	Mahbubur Khan	Last Updated By	Mahbubur Khan
Date Created:	06/24/2024	Last Revision Date:	06/25/2024
Actors		Standard User	
Description		This use case describes the situation where a standard user closes login dialog without logging in.	
Trigger		Clicking on the Close button on the login dialog.	
Precondition		The login dialog must be open	
Postcondition		The login dialog is close, and the user remains on the current page.	
Normal Flow		1. The login dialog is open. 2. The user clicks on the Close button. 3. The system processes the request to close the dialog. 4. The login dialog is closed. 5. The user can stay on the current page without even logging in.	
Alternative Flow		N/A	
Exception		If there is a network issue, error messages may be displayed. However, closing a dialog	

	does not require network, so it should work fine.
Assumption	1. The user is viewing the login dialog. 2. The system is functioning correctly and capable of closing the dialog.

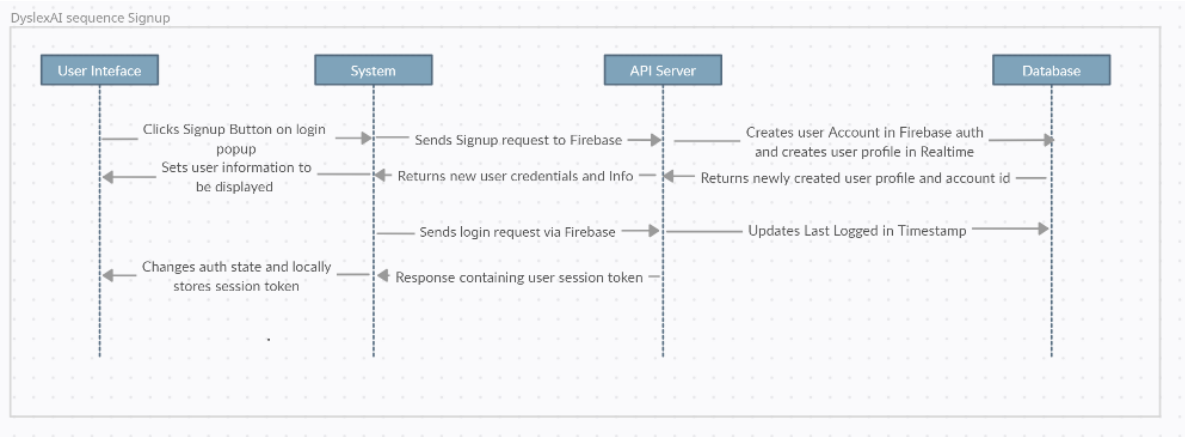
ID	SW4.1.20	Title	Close Other Dialog
Created By:	Aaron Perel	Last Updated By	Aaron Perel
Date Created:	06/25/2024	Last Revision Date:	06/25/2024
Actors		Standard User	
Description		This use case describes the situation where a standard user closes an error or message dialog.	
Trigger		Clicking on the Close button on the dialog.	
Precondition		The error or message dialog must be open	
Postcondition		The dialog is closed, and the user remains on the current page.	
Normal Flow		6. The error or message dialog is open. 7. The user clicks on the Close button. 8. The system processes the request to close the dialog. 9. The error or message dialog is closed. 10. The user can stay on the current page .	
Alternative Flow		N/A	
Exception		N/A.	
Assumption		3. The user is viewing the message or error dialog. 4. The system is functioning correctly and capable of closing the dialog.	

4.2 Use Cases Diagram:

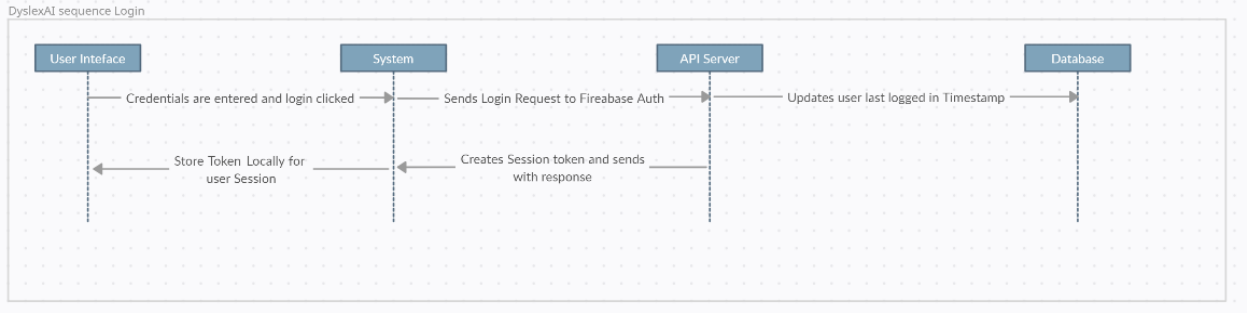


4.3 Sequence Diagrams:

4.3.1 Signup:

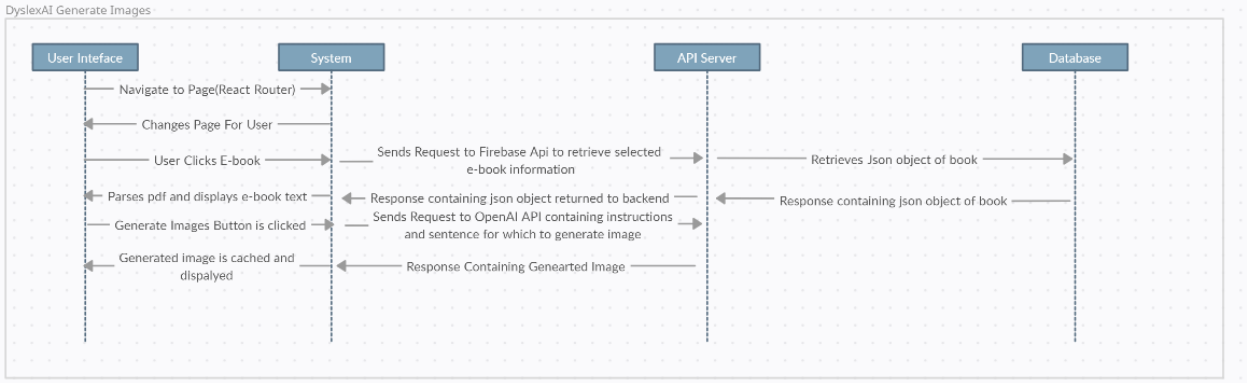


4.3.2 Login:

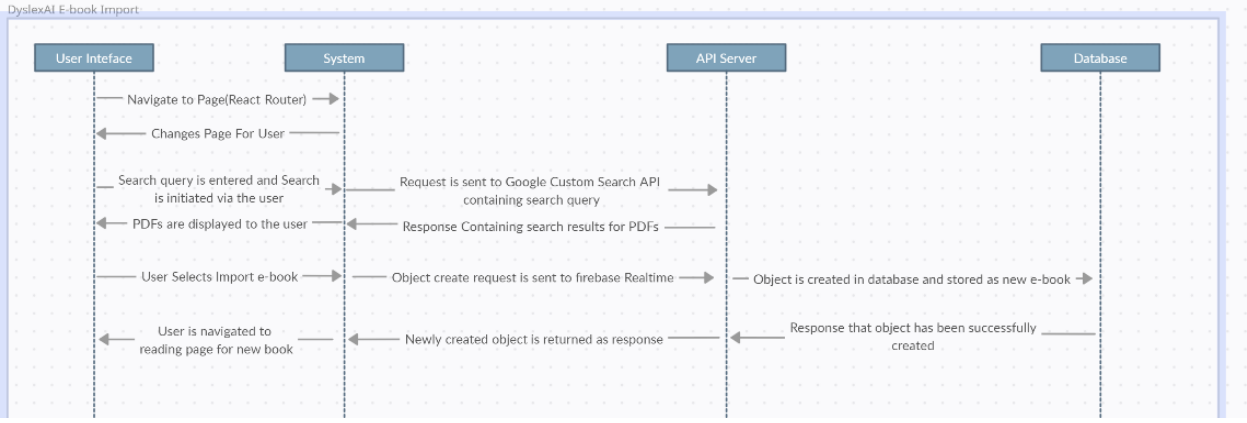


4.3.3 Logout:

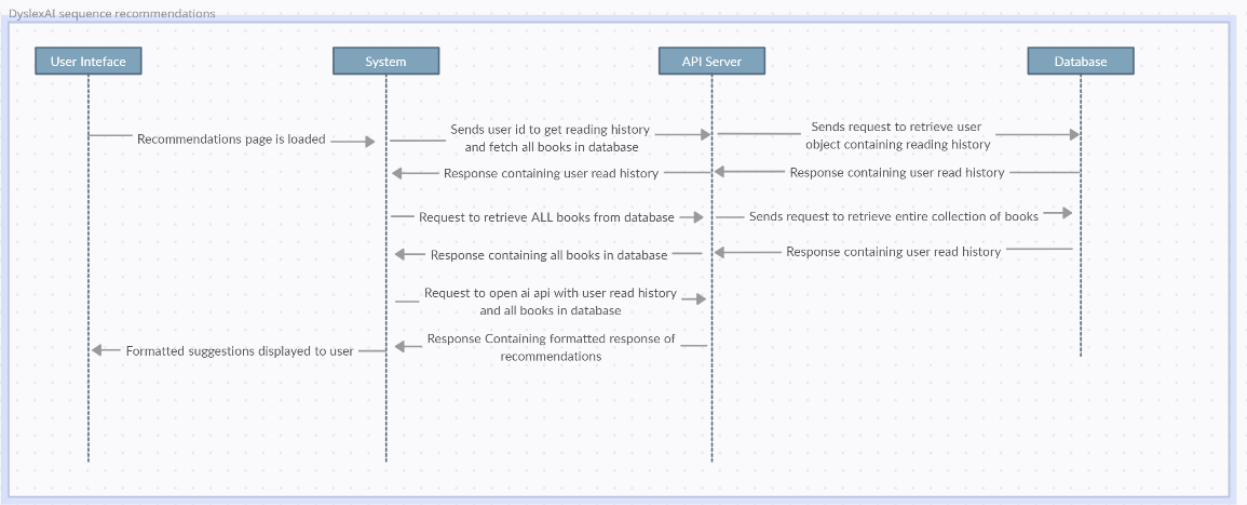
4.3.4 Generate Images:



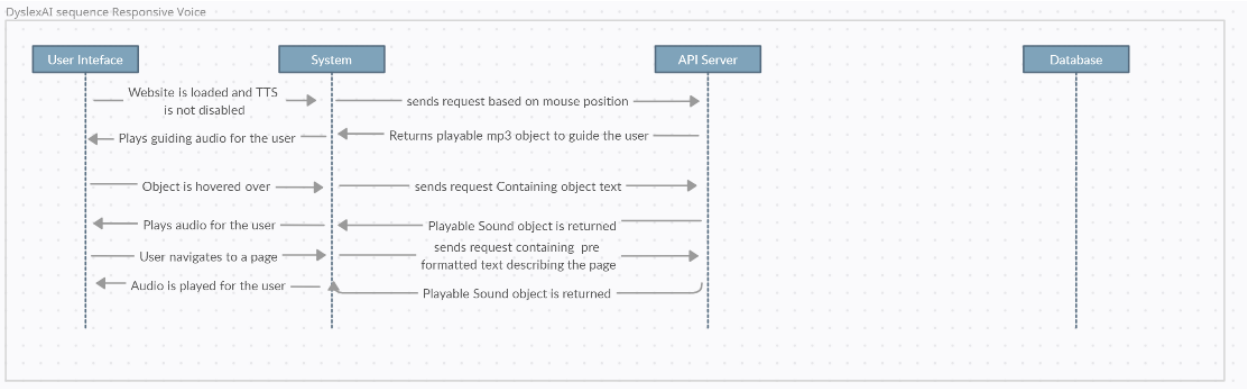
4.3.5 E-book Import:



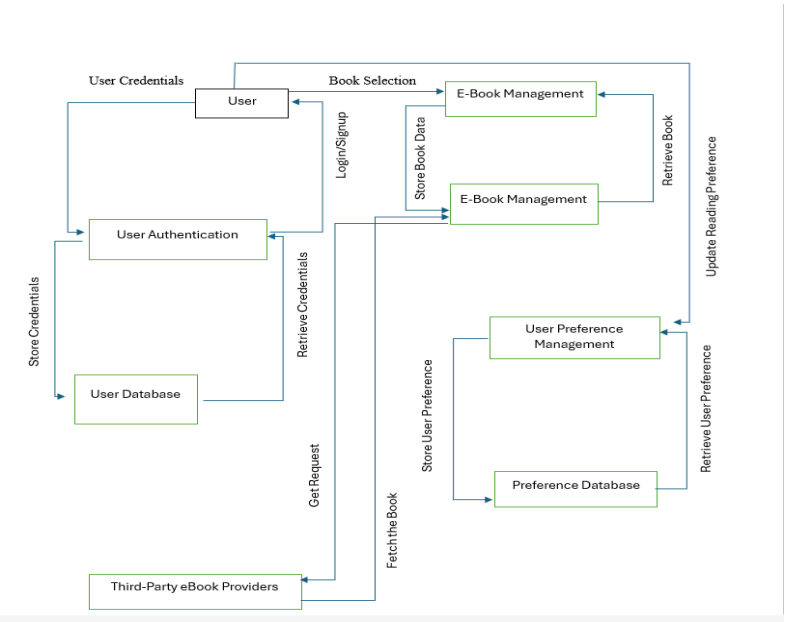
4.3.6 Reading Recommendations:



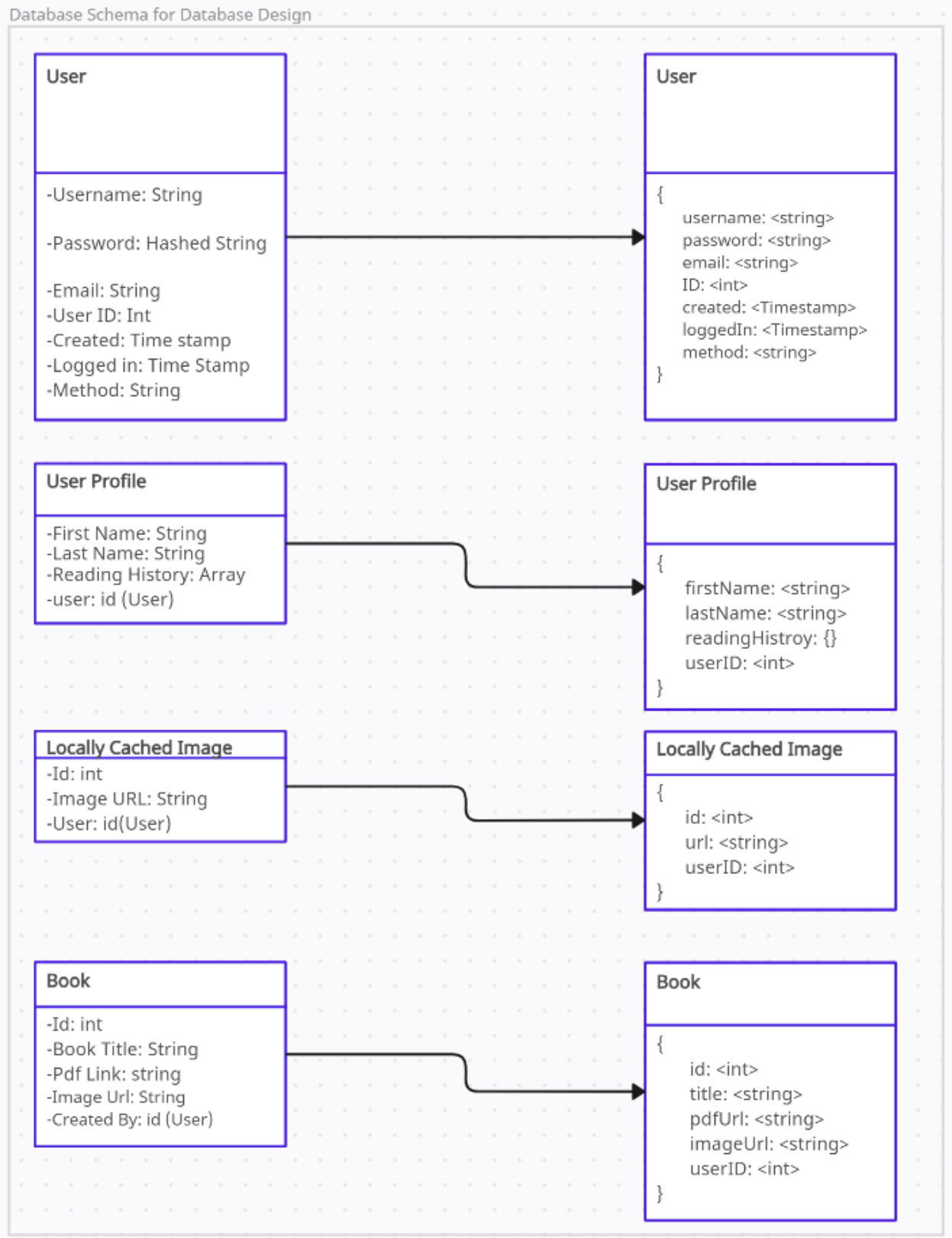
4.3.7 Responsive Voice:



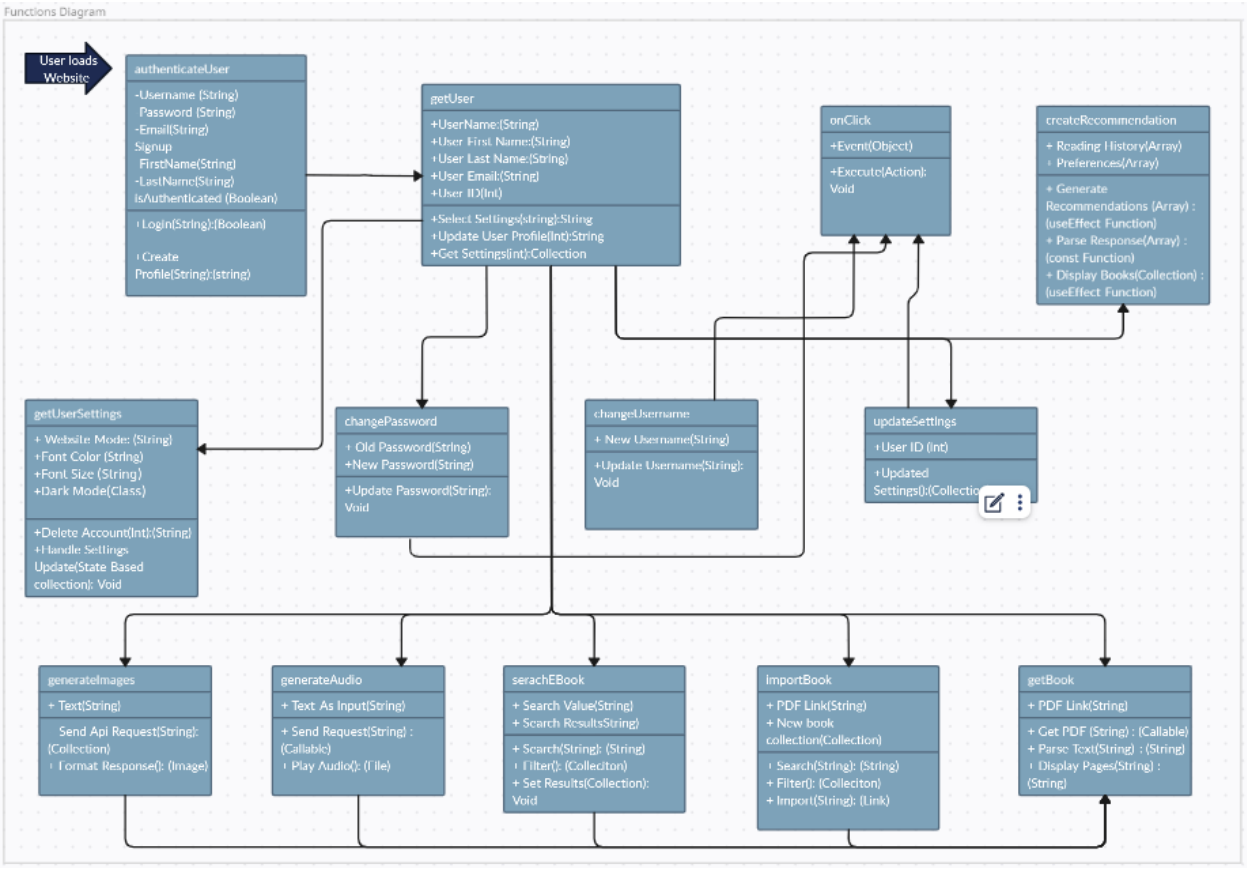
4.4 Data Flow Diagram:



4.5 Database Design:



4.6 Class Diagram:



4.7 Application Program Interfaces (APIs):

4.7.1 Responsive Voice:

The Responsive Voice API will be used to create auditory cues for the user. This includes a “blipping” noise that guides the user to the nearest on-screen object and once hovered over announces it. It will also be used to read off any E-Book contained on the site if the user is in blind mode. Functions such as speak(), and voices() will be used.

4.7.2 OpenAI API:

The OpenAI API will be used for recommendations and image generation via DALL-E. The images will be an option when the user selects Deaf Mode or in the based Dyslexic Mode. Images are generated sentence by sentence from the current book displayed on the website. For recommendations the API will be used for text generation, via a dynamic prompt in which the user's reading history and preferences are included, ChatGPT 3.5 Turbo will create a list of E-Books that we then display from our database.

4.7.3 Firebase JS SDK:

The Firebase API or otherwise known as the Firebase JS SDK will be used for all backend functions. This includes authentication, object creation, object storage, user profile creation, and user profile storage.

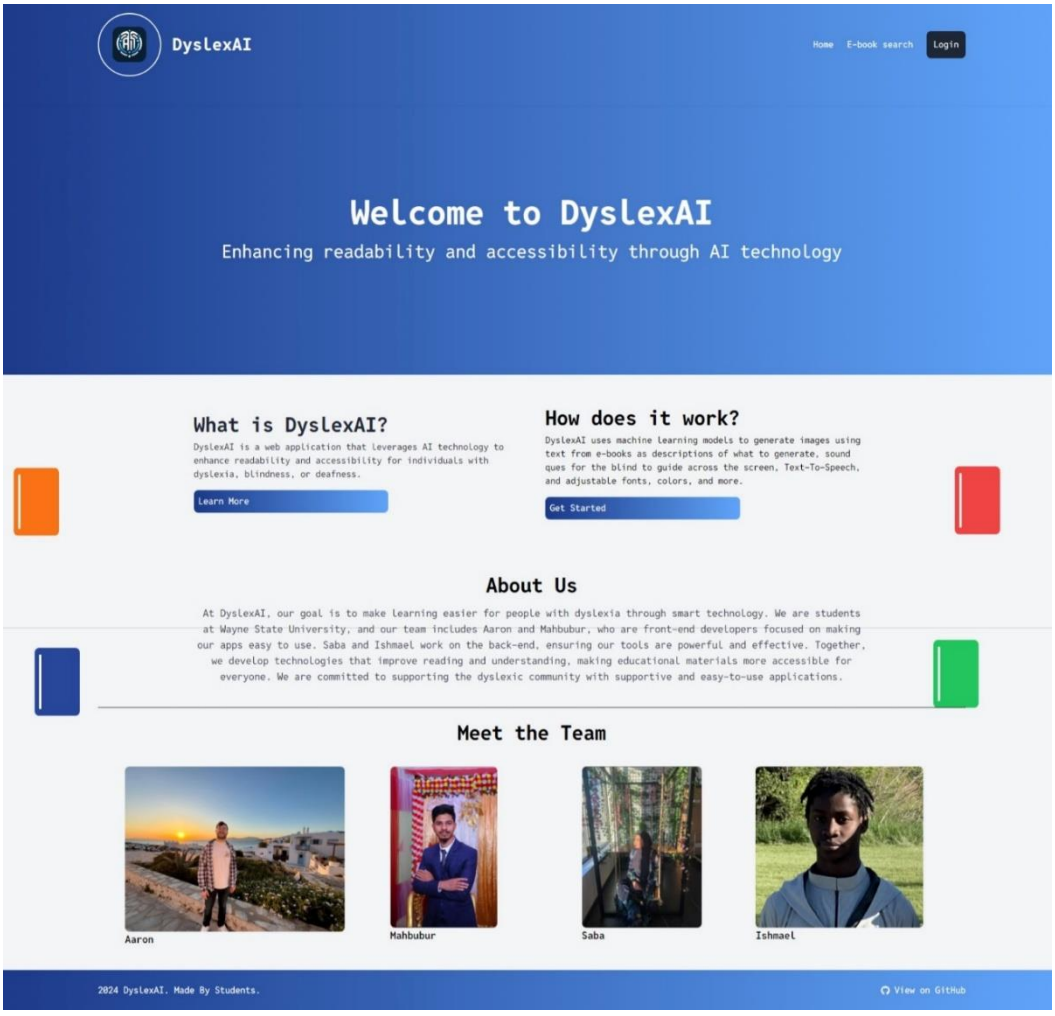
4.7.4 Google Custom Search API:

The Google custom search API uses a programmable search engine via google. This allows the web application and the user to search the web for importable pdfs onto the website.

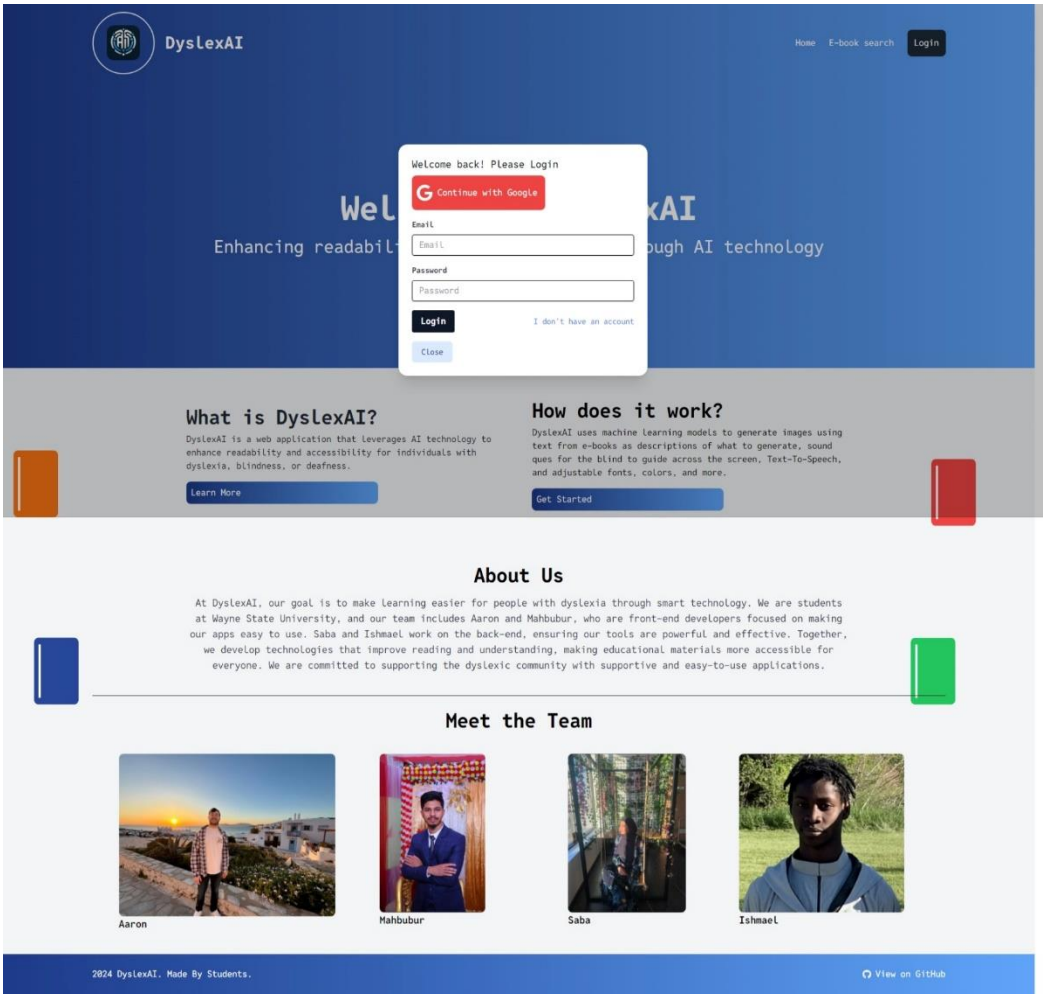
4.8 User Interface Diagram

This selection is a showcase up-to-date screenshot of the DyslexAI web application User interface (UI). This UI is subjected to change in the future if a more efficient design is brought to our attention.

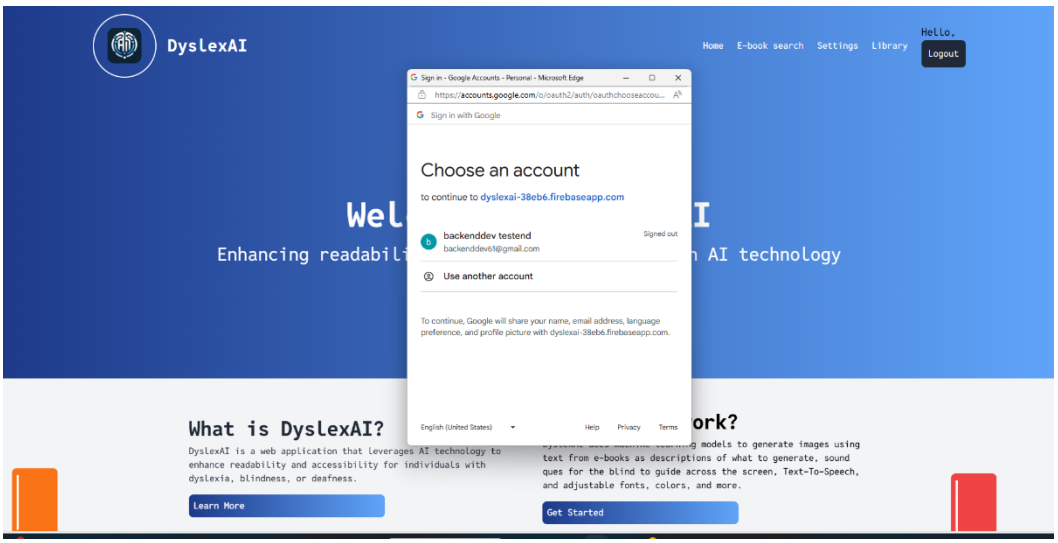
4.8.1 Home page



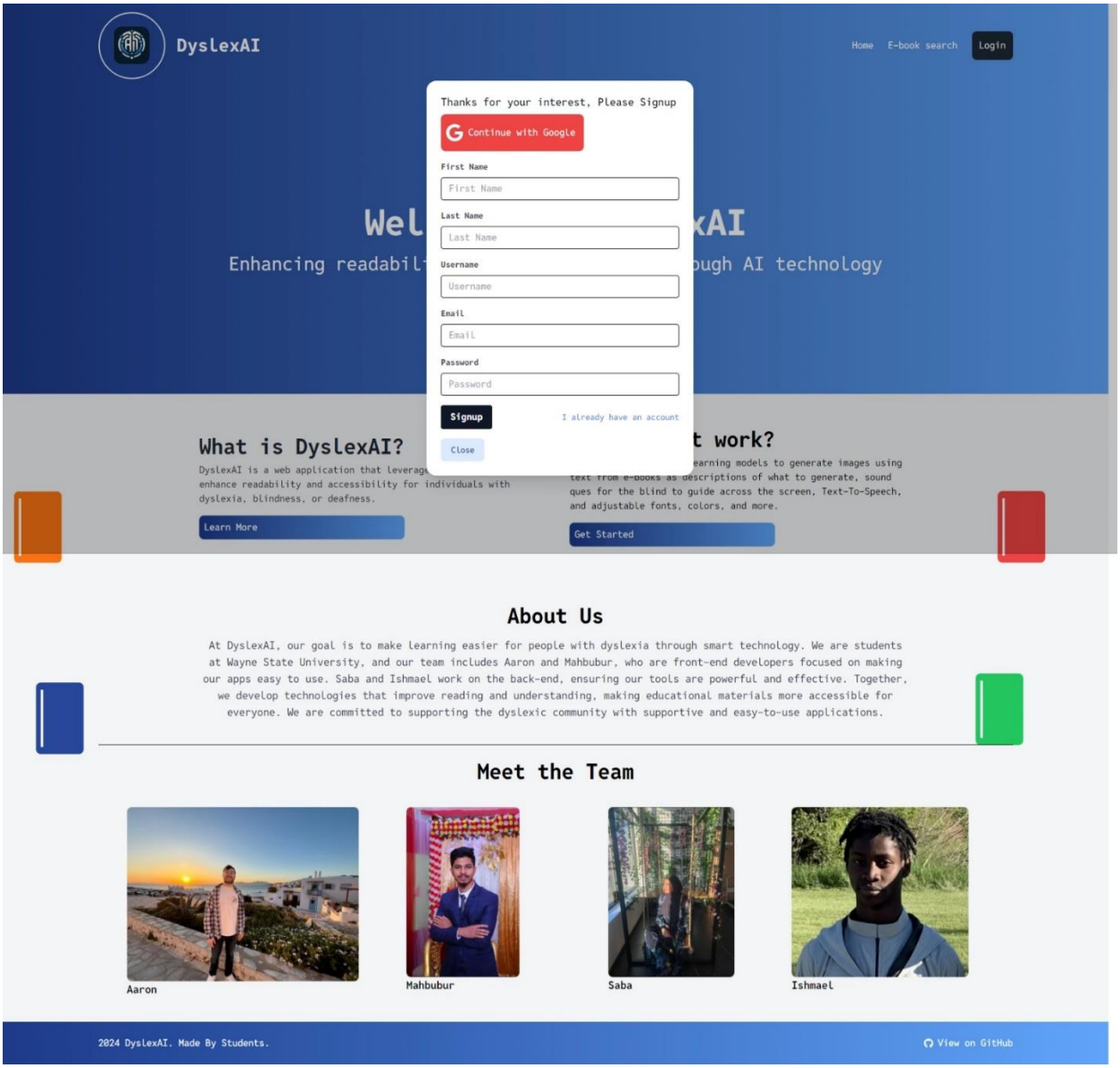
4.8.2 Login



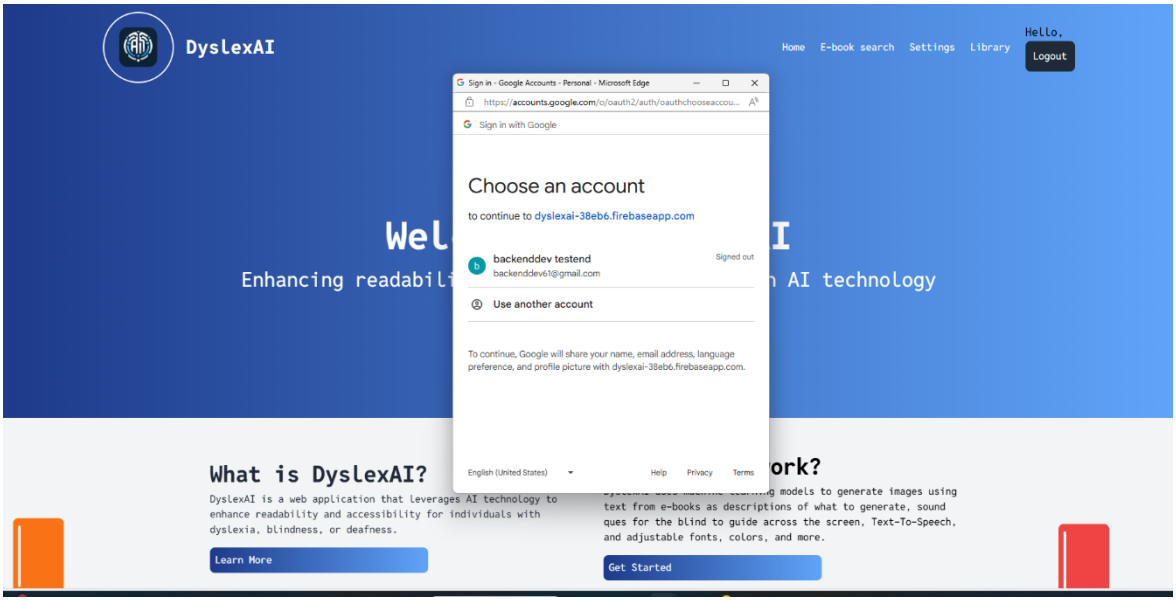
4.8.3 Login Continue with google pop up



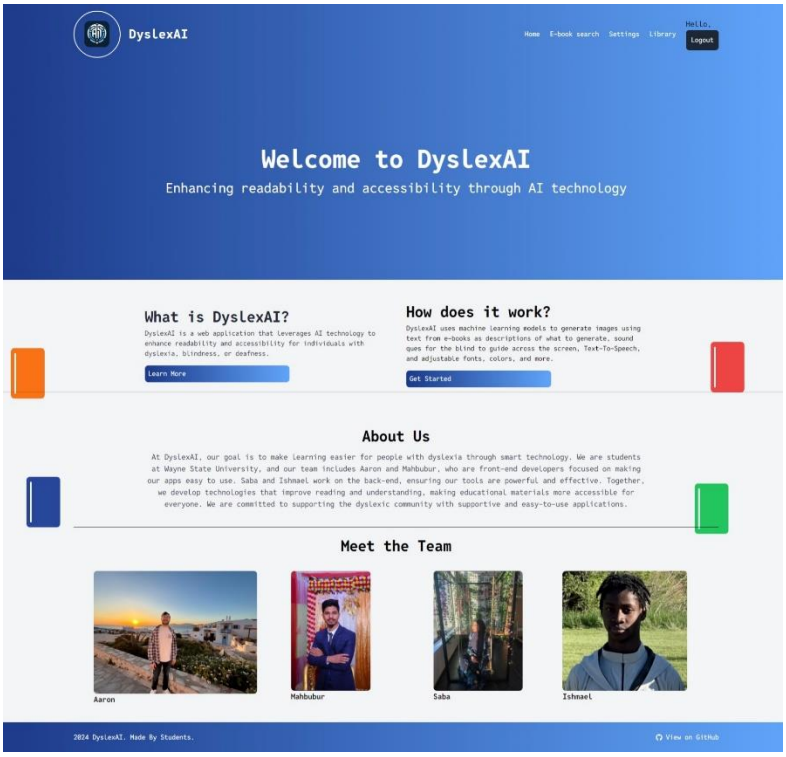
4.8.4 Create an account page



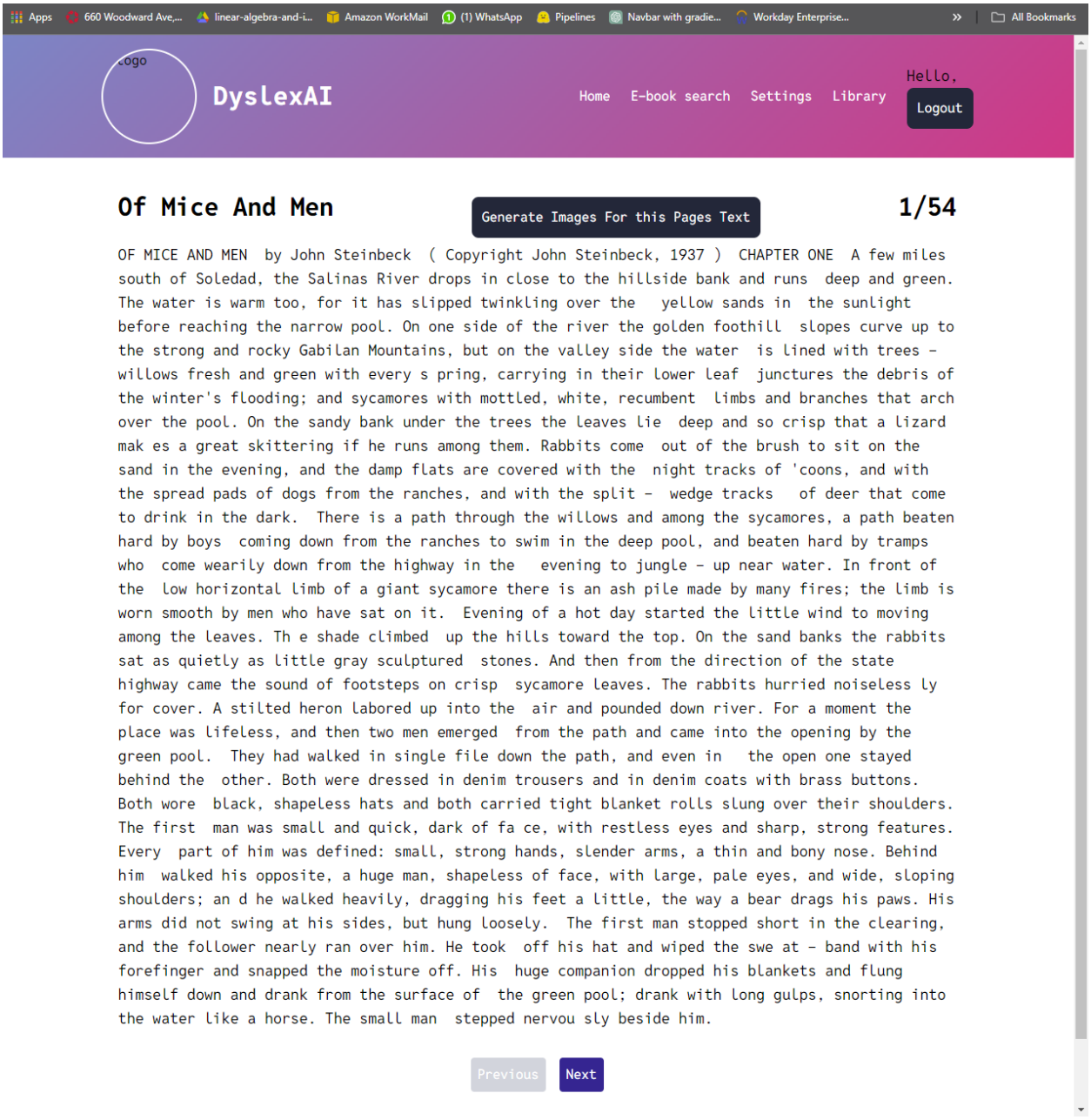
4.8.5 Create an account using Google pop-up



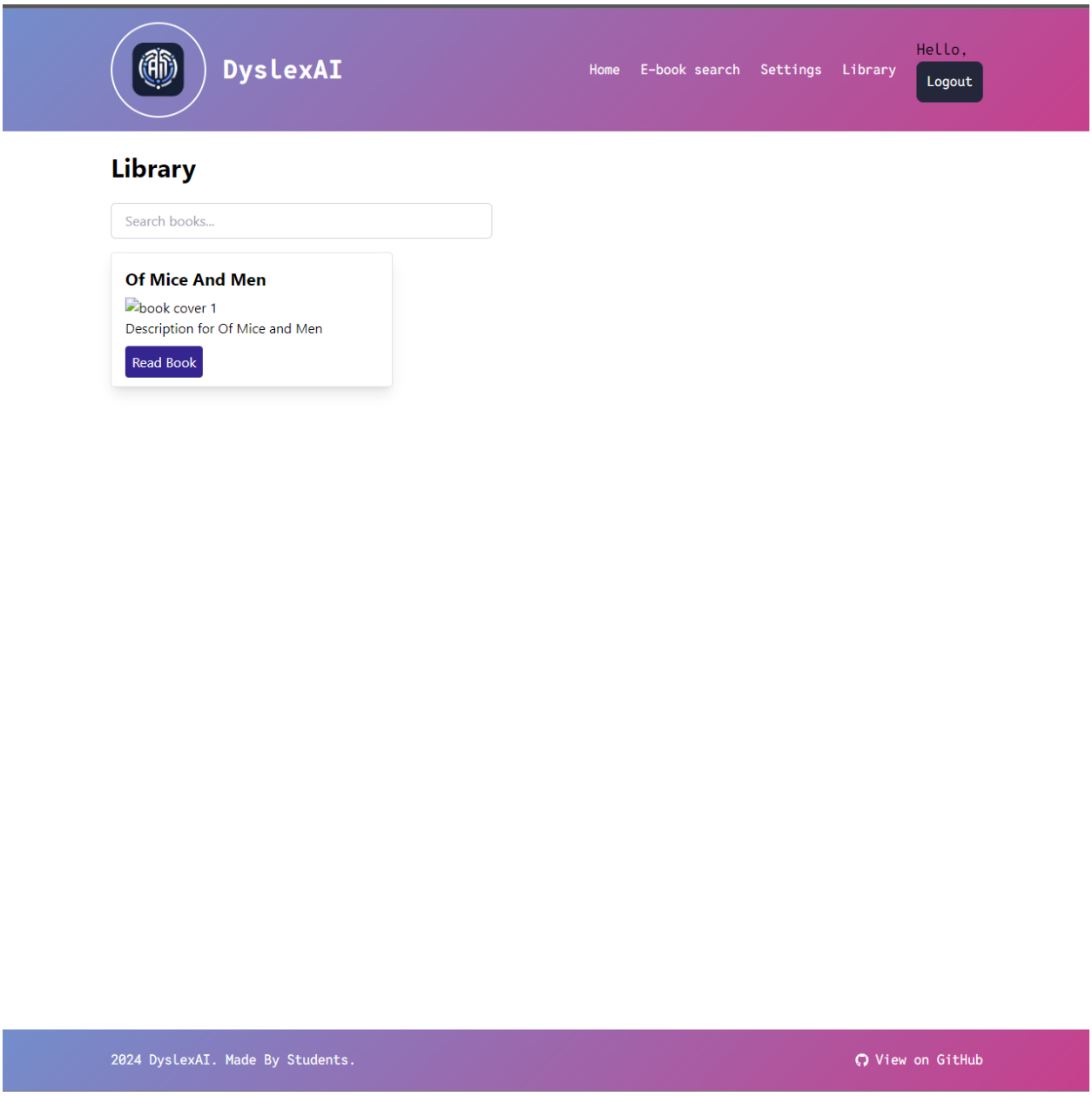
4.8.6 Home page after logging in



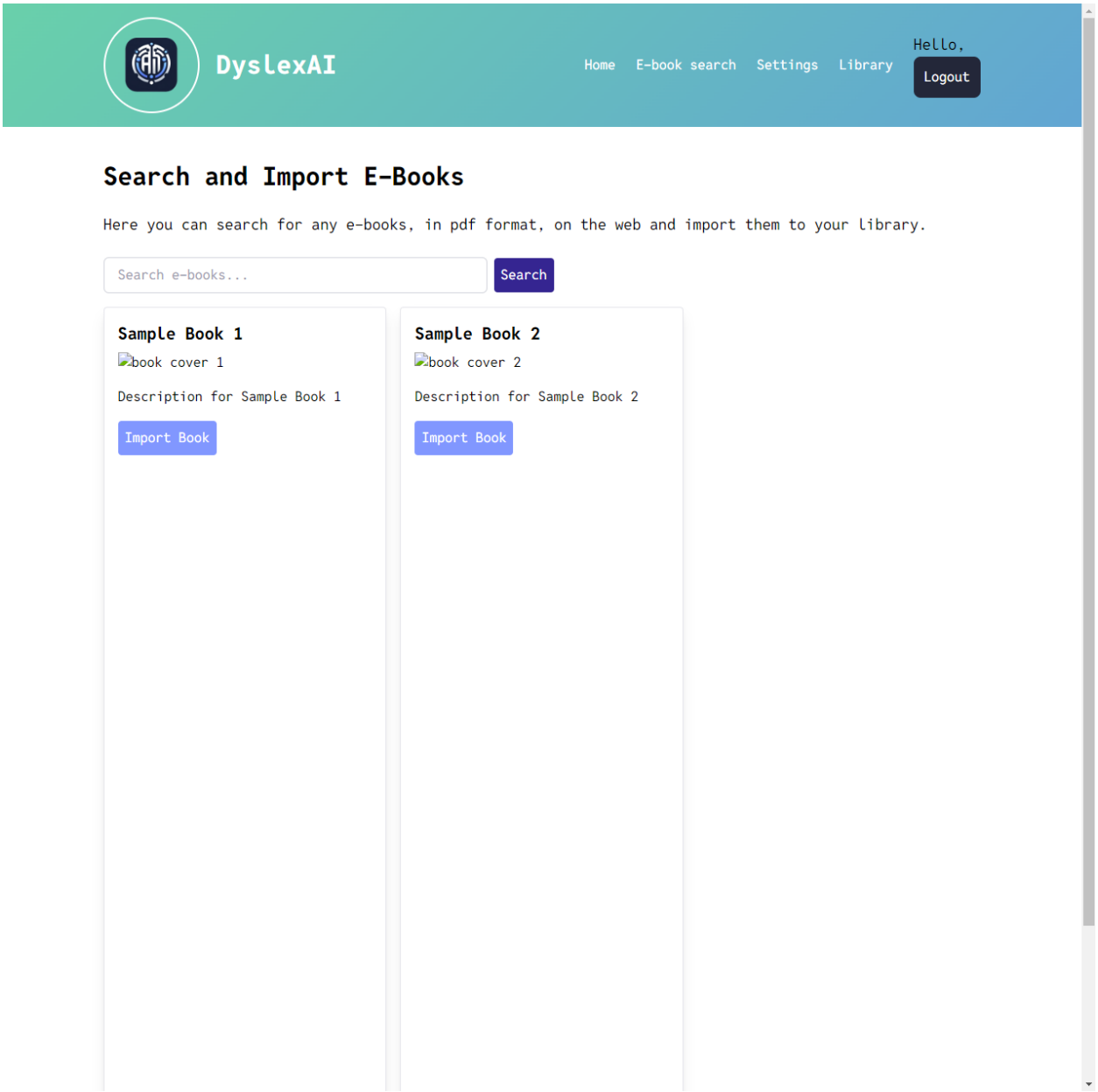
4.8.7 Reading Page:



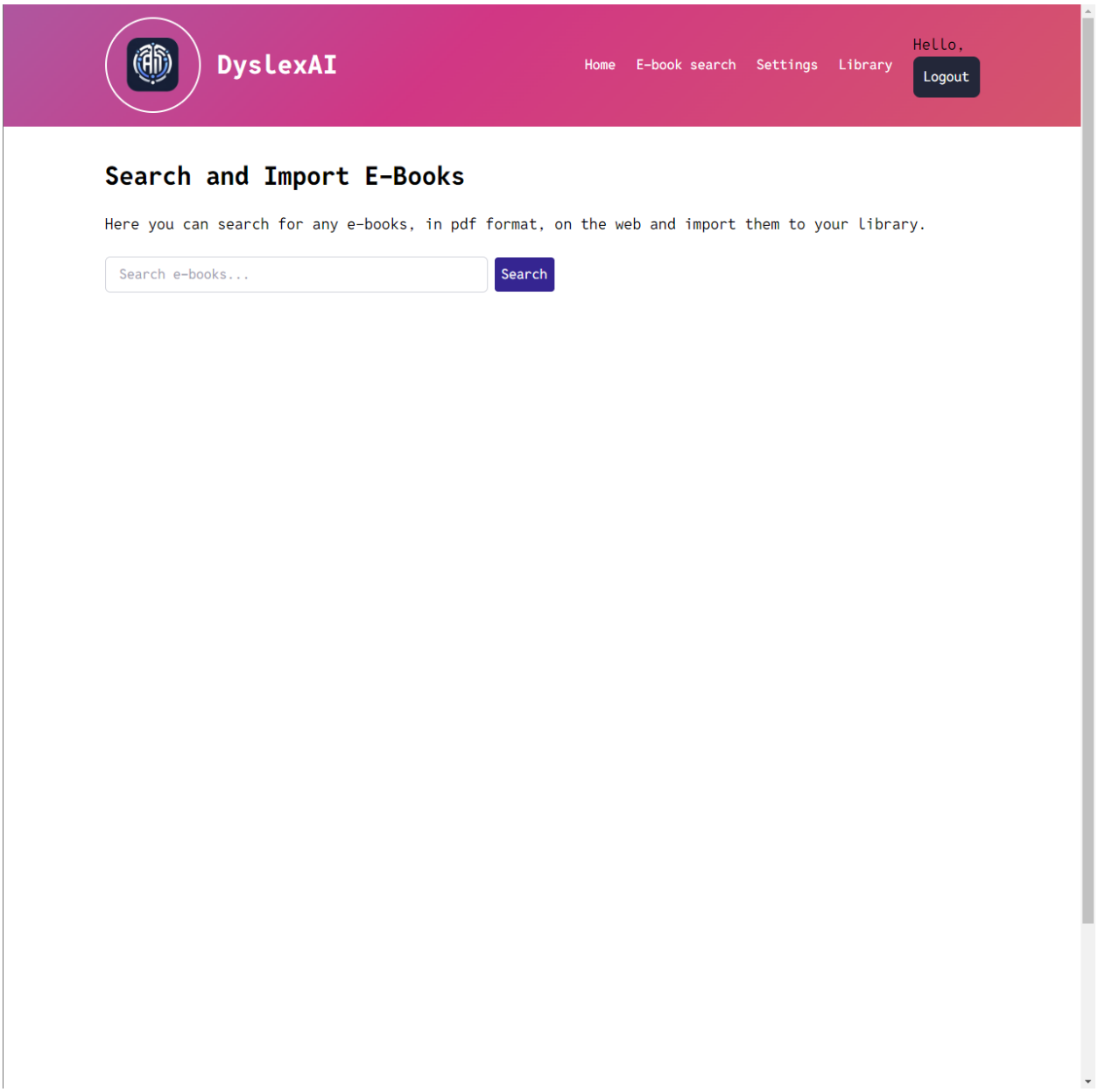
4.8.8 Library Page:



4.8.9 Library Page After search:



4.8.9 E-book Search:



Appendix A: References

"Home." *Dyslexie Font*, 24 May 2024, dyslexiefont.com/en/.

"API Endpoints." *Smartbear.Com*, smartbear.com/learn/performance-monitoring/api-endpoints/. Accessed 29 May 2024.

"User Interface (UI) Design." GeeksforGeeks, GeeksforGeeks, 13 May 2024, www.geeksforgeeks.org/user-interface-ui/.

Appendix B: Key Terms

Terms	Definition
Application Programming Interface (API)	Application Programming Interface is a set of rules that allows different software applications to communicate and share data with each other.

User Interface (UI)	User Interface defines the way humans interact with the Information systems.
Artificial Intelligence (AI)	Technology that enables computers and digital devices to learn, read, write, create and analyze.
DALL-E	DALL-E is a technology introduced by Open AI and it is a neural network-based picture-generating system. DALL-E is a technology that helps users create new images with their imagination only by using graphics prompts.
Response Voice API	An API that handles audio interactions, converting text to speech to assist users in Blind Mode.
Vercel	A web-based hosting platform designed for hosting web applications, providing features such as automatic deployment and version control.
Accessibility	The design and implementation of features that ensure the application is usable by people with various disabilities, including visual and hearing impairments.