Al Assisted Online Learning Platform

Team A3

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Github repository:

https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/tree/main

Final Design

Overall, there are no significant differences between our final design and our intended initial design.

Tech stack:

There are no deviations, and our core functionalities (Personalized Recommendations, Streamlined Content Access, Interactive Quizzes) are on track to be delivered by the deadline.

Functional Requirements:

There are no deviations from Part A, and B.

<u>User Interface:</u>

We are adding a couple of front end pages extra: an initial landing, and a privacy policy / about us section.

Epics / Stories:

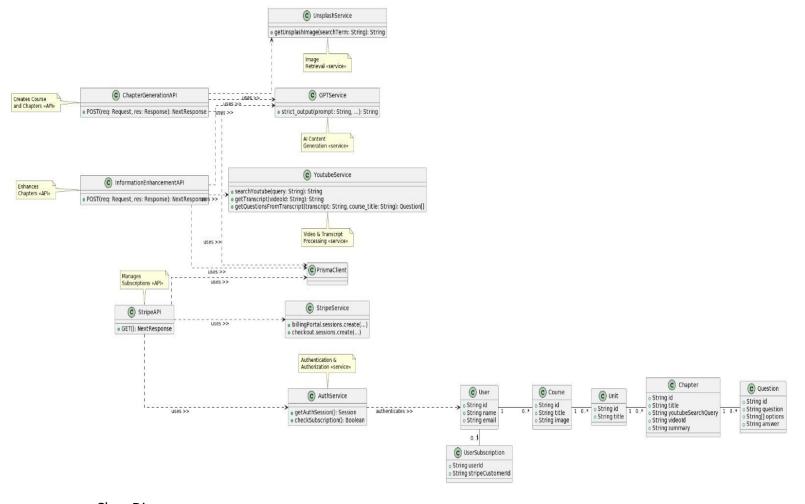
We've added more stories, and they do not affect the main functionality. Their main purpose is to tack on to the scrum process, and help us streamline/organize our development processes.

Software Architecture:

Our User-Interface (front end) pattern remains as <u>MVC</u>. Our Architecture pattern remains as <u>N-</u><u>Tier</u>.

For the full list of libraries and frameworks employed, please refer to our previous reports, as there are no changes, and we've managed to implement <u>ALL</u> technical aspects and utilities we planned on implementing.

Final Class Diagram:

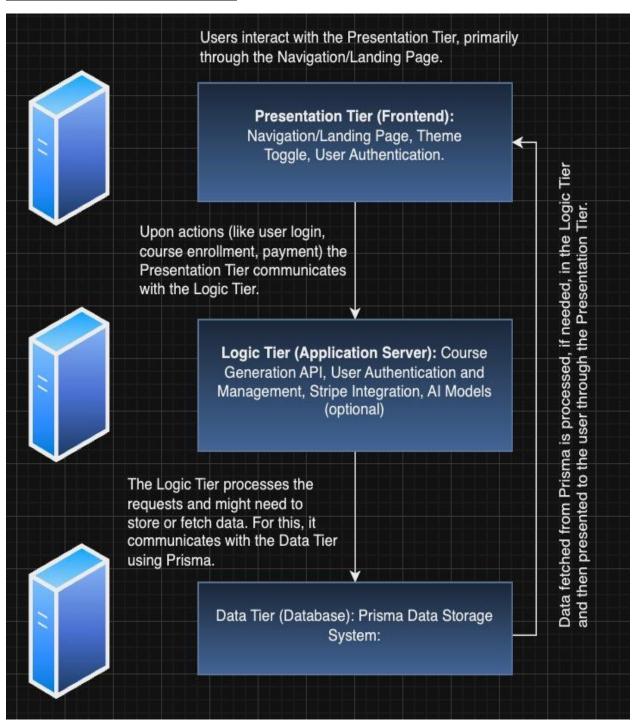


Class Diagram:

Purpose: This represents the system statical structure – classes, attributes, methods, and relationships.

How the diagram corresponds: Provision of user, session, course, unit, and chapter entities. Shows relationships (associations, aggregations, compositions). Ensures implementation of entities and guides developers through the process of coding.

Final Architecture Diagram (N-Tier):



Purpose: This represents the architecture of our system.

API Documentation

We have generated the API documentation for our core features:

- 1. The chapter creation, using OpenAI's API and Youtube search query.
- 2. Receiving the chapter information, which gives us the information to generate quiz questions, Youtube transcripts, and summaries.

To generate the documentations, we've only used <u>typedoc</u>, as our entire application is built using Typescript. We've put the generated documents under the /docs folder of our repository, and we've hosted it in GitHub Pages. The respective URL's are as follows:

- 1. Chapters: https://anirudhvijayaraghavan.github.io/CSYE7230-Software-Engineering-Project A3/docs/Chapters/index.html
- 2. getInfoRoute: https://anirudhvijayaraghavan.github.io/CSYE7230-Software-Engineering-Project A3/docs/getInfoRoute/index.html

Test Cases

Front end:

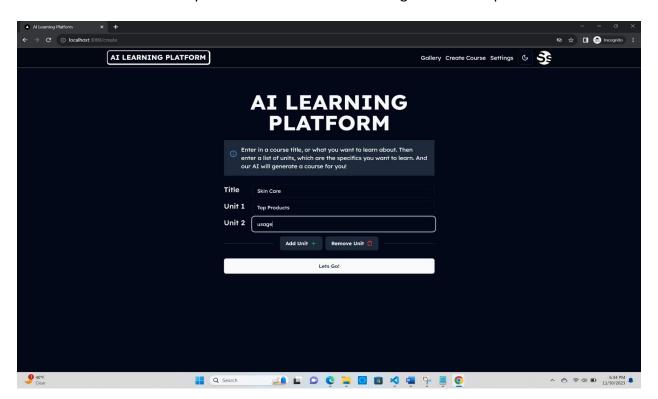
For the front end, we've opted to NOT use any automated test cases, and we are only testing our components / functions manually. The front end is a relatively straightforward UI, and all we must check is if the information we are fetching and processing is being displayed.

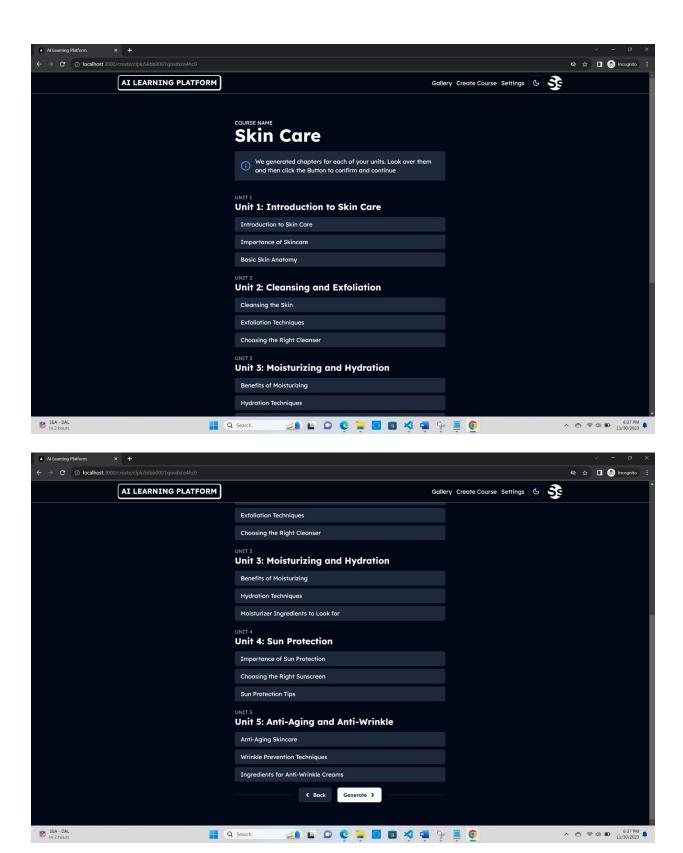
Manual Testing:

Apart from the look and feel of our web application, which includes the responsiveness, richness of the UI, theme switching (dark and light mode), as well as general interactivity (dead links / irrelevant texts / broken CSS), we have the following manual testing sequences that we perform before we create a Pull Request.

1. Course Creation

- Steps to Test:
 - 1. Navigate to the course creation section.
 - 2. Enter a title for the new course.
 - 3. Add various units and content.
 - 4. Submit the course for creation.
- What to Verify:
 - 1. Confirm the course appears correctly in the list of available courses.
 - 2. Check for any errors or issues in the UI during the creation process.





2. YouTube API Interaction

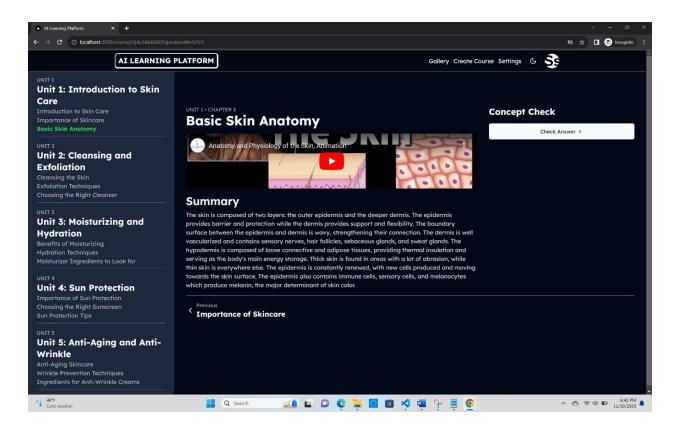
- Steps to Test:
 - 1. Select a course to add YouTube content.
 - 2. Use the platform's feature to fetch video transcripts from YouTube.
 - 3. Generate guiz guestions based on the video content.
 - 4. Save the questions and associate them with the course.
- What to Verify:
 - 1. Verify the accuracy and relevance of the fetched transcripts and generated quiz questions.
 - 2. Check the integration's responsiveness and error handling (e.g., with invalid video IDs).

3. Pro User Upgrade

- · Steps to Test:
 - 1. Navigate to the account upgrade section.
 - 2. Select the option to upgrade to a pro account.
 - 3. Complete the payment process.
- What to Verify:
 - 1. Confirm the payment process is smooth and secure.
 - 2. Verify the account status is updated to pro after payment.
 - 3. Test for appropriate error handling during payment failures.

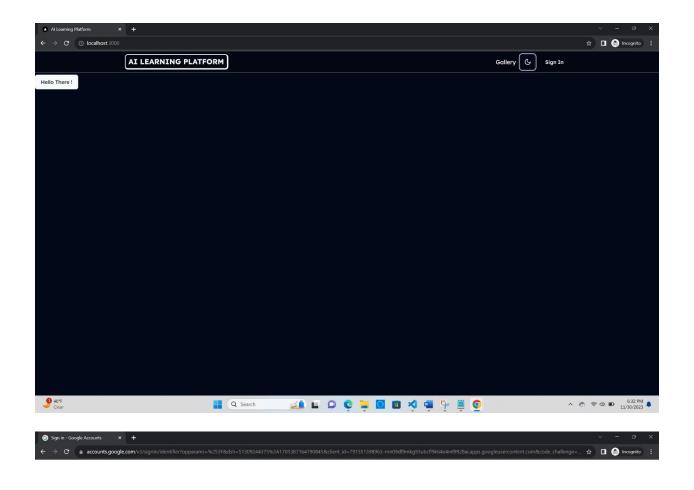
4. Course Viewing and Quiz Interaction

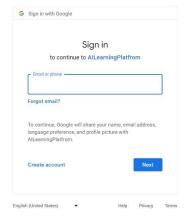
- Steps to Test:
 - 1. Access a course and navigate through its chapters.
 - 2. Interact with the guiz cards embedded in the course.
 - 3. Submit answers to the quiz questions.
- What to Verify:
 - 1. Ensure course content and guizzes load correctly and are accessible.
 - 2. Verify that user interactions with quizzes are recorded and evaluated accurately.



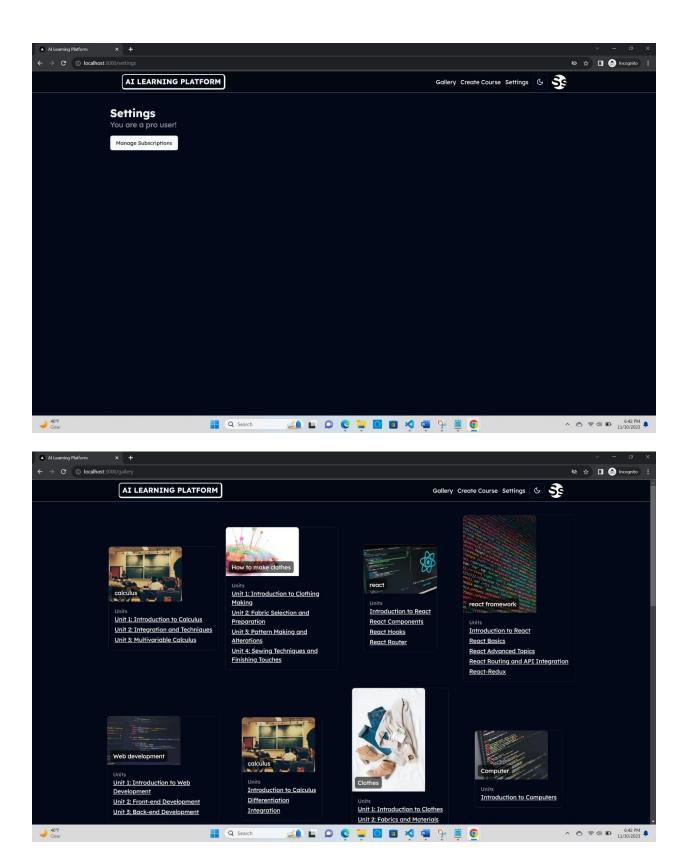
5. User Authentication

- Steps to Test:
 - 1. Log out of the platform if currently logged in.
 - 2. Attempt to log in using valid credentials.
 - 3. Attempt to log in using invalid credentials.
- What to Verify:
 - 1. Confirm that the login process is secure and efficient.
 - 2. Ensure proper error messages are displayed for incorrect logins.
 - 3. Verify that the session is maintained across different sections of the platform after login.









Back end:

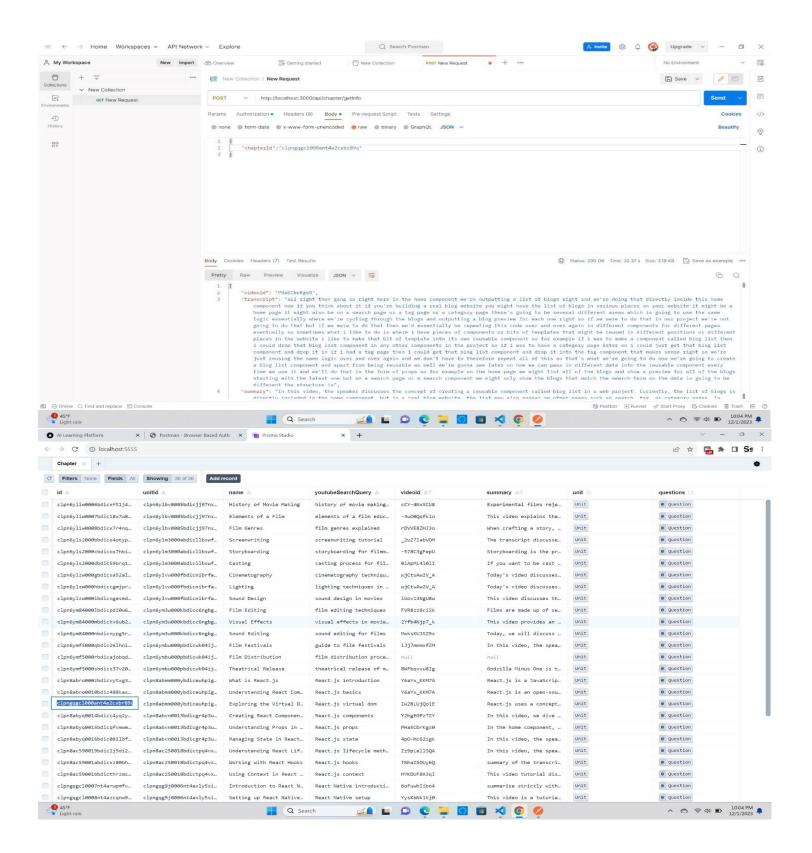
For the back end, we are using a combination of manual, as well as automated testing, using Mocha (testing package / framework for TypeScript / Javascript).

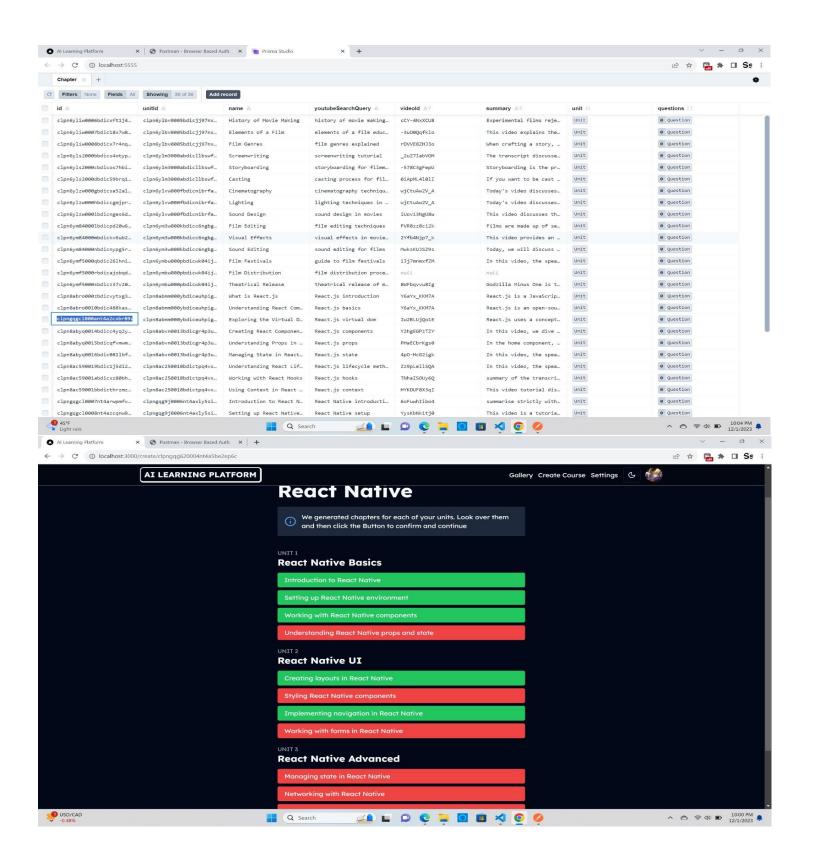
Automated Testing:

Currently, we only have our local scripts to run automated tests for a healthcheck endpoint. This endpoint will check if the connection to our backend database in Planetscale is up and running or not.

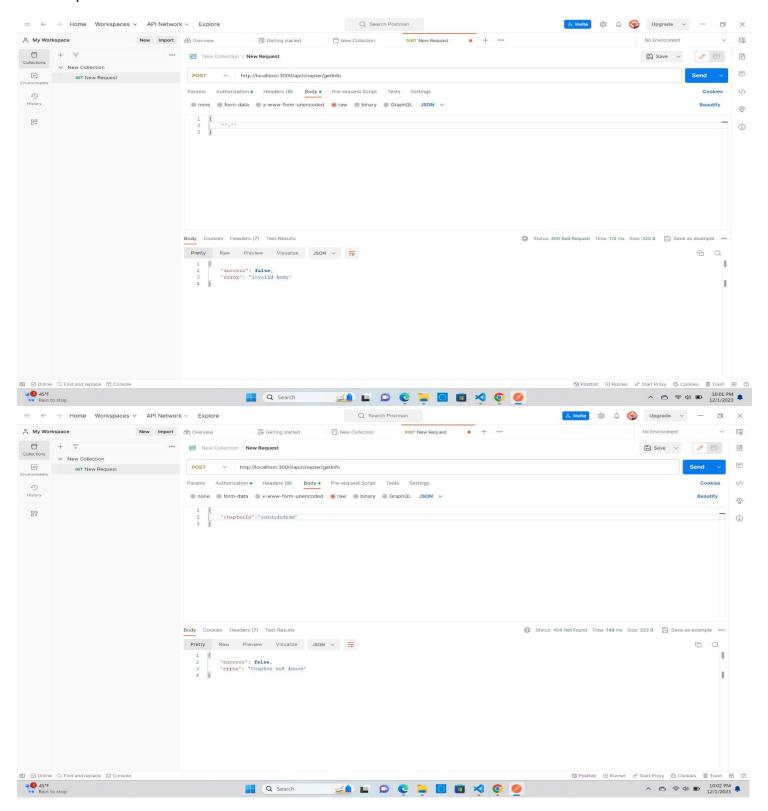
Manual Testing:

We are using Postman API hitter to check various endpoints and validations.





Invalid inputs:



CI/CD

Compilation / Testing / Packaging:

We've only built and run the application locally so far. To do this, we:

- 1. Install all the dependencies by giving: `npm install`.
- 2. Run the program using: `npm run dev`.

This starts a localhost server at the backend, at port 3000.

For testing, all we do is run 'npm test', and the custom test scripts should run, with the required results. For now we have implemented only a healthcheckAPI testing endpoint script, to check database connectivity. We will add more automated unit test cases as we see fit.

Continuous Integration:

Link to our CI script : https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/blob/rohitvarma/.github/workflows/nextjs.yml

For CI, we've used GitHub Actions. Inside the .github/workflows directory, we can see a nextjs.yml file, that consists of our CI script. It contains specifications on triggers, steps / jobs, and actions. They are triggered on Pull requests, as mentioned below.

<u>Trigger</u>: Any pull request that targets the main branch will also trigger the pipeline. This ensures that proposed changes are tested before they are merged into the main codebase.

Jobs and Steps:

- Runs-on: The job runs on the latest Ubuntu runner provided by GitHub Actions.
- Node.js Versions: The job tests the application against multiple Node.js versions (14.x, 16.x, and 18.x) to ensure compatibility.
- Checkout: The first step checks out the code from the repository so that it can be built and tested.
- Node.js Setup: This step sets up the Node.js environment based on the versions specified in the matrix.
- Install Dependencies: Executes npm install to install all necessary dependencies for the project.
- Build: Runs npm run build to create a production build of the Next.js application.

Actions:

actions/checkout@v2: Used for checking out the repository.

• actions/setup-node@v2: For setting up the Node.js environment.

Outputs:

• The primary outputs are the results of the build process, test execution, and linting. These results are visible directly on the GitHub Actions page.

Deploying:

We will be deploying this on DigitalOcean when ready. The pipelines are yet to be setup for DigitalOcean.

User Manual

You can refer to our wiki link given below, on how to get started with and use our AI assisted platform. Using a combination of description text and screenshots, users can expect how to generate the course list as well as check out the videos and quiz sections.

Github wiki link : Wiki Link.

Scrum Summary

We have designed a user-friendly navbar that simplifies navigation and access to various parts of the application. This navbar ensures easy traversal through different sections of the platform, making it effortless for users to explore and interact with our services.

Next, we created the User Interaction Form, a vital component for user-generated content. This form plays a crucial role in ensuring the accuracy and reliability of user input data. By parsing and validating the data provided by users, we guarantee that the information entered is error-free and meets our quality standards.

In addition to the user-facing components, we have developed a powerful Syllabus Fetching API Endpoint. This endpoint provides users with a convenient way to retrieve syllabus-related information. The data is returned in a structured format, typically JSON, making it straightforward for us to process and display this valuable content to our users.

To enhance security and maintain control over syllabus creation, we have implemented authentication checks. These checks ensure that only authorized users can create and modify the syllabus. This adds an extra layer of security to our platform, protecting sensitive educational content.

Currently, we are working on integrating Stripe payment services into our application. This integration will enable us to handle payments efficiently and securely, giving our users the option to upgrade to a pro account. This enhancement will further expand our platform's capabilities and provide valuable premium features to our users.

Epics and User Stories with sprints:

Sprint 1 - User Authentication And User Input Fetching

EPICS:

 https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/5

- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/11
- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/7
- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/12
- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/22

User Stories:

- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/20
- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/21
- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/14
- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/6
- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/13

 https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/4

Sprint 2 - Use user data - to create syllabus and extract information needed to generate videos

Epics:

 https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/17

User Stories:

- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/15
- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/16
- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/25
- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/24
- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/27

Sprint 3 - Fetch Summary, Transcript , Video ID and generate questions for the user with proper Front End display

Epics:

- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/33
- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/37 (In progress)

User Stories:

- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/30
- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/31
- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/32
- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/34 (In progress)
- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/35 (In progress)
- https://github.com/AnirudhVijayaraghavan/CSYE7230-Software-Engineering-Project A3/issues/36 (In progress)

In the front end, Kaushik has created the navbar component that provides options for user account actions, such as signing in and accessing account details. Users can also switch between light and dark modes using the theme toggle.

Arvind implemented the User interaction form which allows users to create courses by providing a title and specifying subtopics (units). The form enables users to dynamically add or remove units.

Anirudh and Devki generated chapter end point in backend which checks the user's authentication status and verifies if they are authorized. The end point facilitates the dynamic creation of course content and management of user interaction.

Sunil and Rohit worked on displaying the course information and generated chapters, fetching the data related to the course and its chapters, handles user authentication and presents the course details in a user-friendly interface.

We are actively working on the integration of Stripe into our application. Stripe integration will enable us to handle payments and subscriptions seamlessly, providing our users with a secure and efficient payment experience.