Multi-Language Flashcard and Summarization Tool

Shashank Narayan R 2022115134
Varshitha R 2022115098
Bavishyaa Sriraman 2022115130

Introduction

- Cardsum empowers students, educators, and lifelong learners by combining flashcards and summarization tools.
- Built with Flutter, Django, and Python’s NLTK for interactive, automated study support.
- Simplifies learning by reducing the need for manual prep, enhancing focus on retention and comprehension.
- Includes features like customizable flashcards, multilingual support, and MCQs for practice.

Problem Statement

- Traditional study methods are time-consuming and mentally exhausting, limiting focus and retention.
- Manual flashcard creation, keyword extraction, and MCQ prep reduce study time and increase cognitive fatigue.
- Lack of accessible, multilingual study tools limits opportunities for a diverse global audience.

Objective

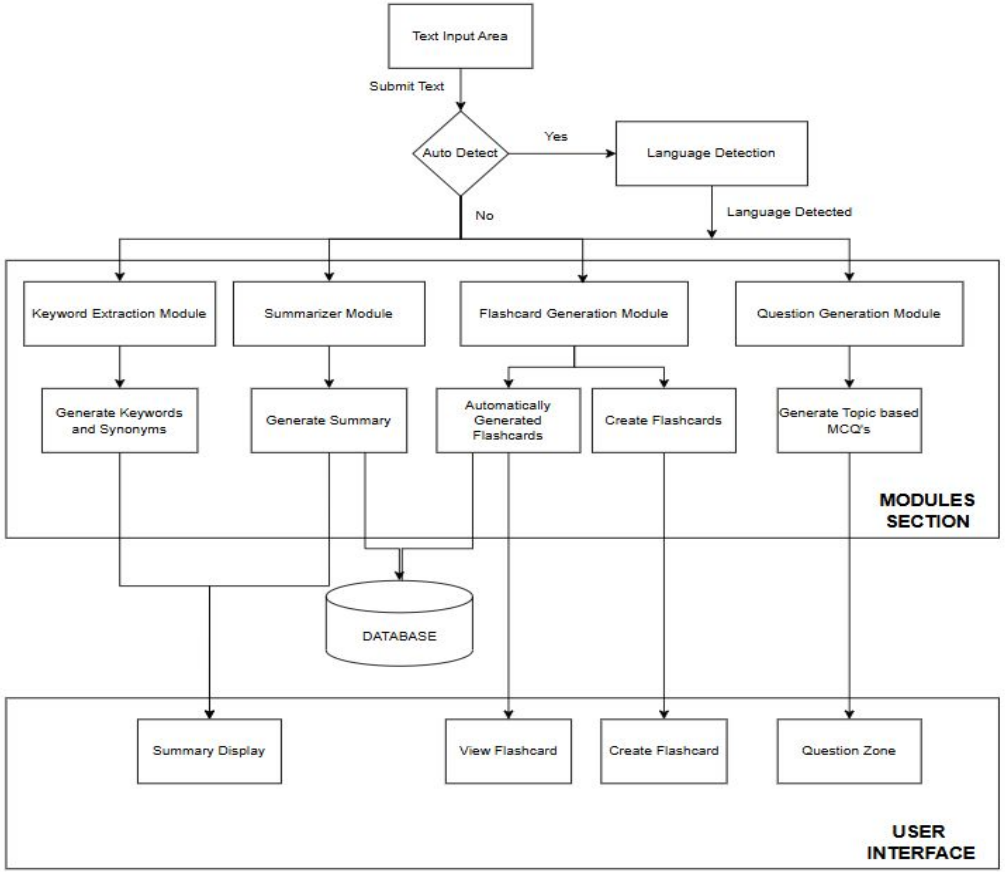
The main goal of our project is to create a seamless platform where users can:

- Generate concise summaries from longer texts.
- Extract keywords and synonyms for better understanding and improve vocabulary.
- Create interactive flashcards which can be customised.
- Generate MCQs for practice.
- Multilingual support
- Enhance understanding and memory retention

Idea

- **Beyond Summarization:** Simple summaries don't fully address student needs.
- **Retention Difficulties:** Summarized information can be easily forgotten.
- **Engaging Study Tools:**
  - **Flashcards:** Automatically created or tailored for personalized learning.
  - **MCQs:** Assess knowledge after each topic for better retention.
- **Inclusive Access:** Supports multiple languages for broader user reach.
- **Efficient Learning:** Summaries and keywords enhance comprehension and speed up study sessions.

System Architecture



Detailed Design

Summarization Module:

- User enters any text.
- **NLP** techniques (tokenization, POS tagging, NER) with **spaCy** and **nltk** break down the content.
- **KeyBERT** helps pick out key points to generate a flashcard.
- It also finds synonyms for better understanding.

Keyword Extraction Module:

- Using the summarized text generated.
- **KeyBERT** extracts main keywords.
- List of important keywords and related terms.

Detailed Design

Flashcard Generation Module:

- Using the summarized text
- Use **KeyBert** with conjunction with **OpenAI's API** to generate keywords and generate flashcards for each keyword
- Store the flashcards in the database
- View and edit the flashcards as needed.

Question Generation Module:

- The system takes the summarized text and uses OpenAI's API to create multiple-choice questions (MCQs) based on the summary.
- Each question is generated in the language of the text and stored in the database.
- The questions can be viewed or customized by the user for self-testing.

Detailed Design

Language Detection Module:

- The user enters any text.
- The system uses a dataset to find patterns and match the language.
- A pre-trained model identifies the language accurately.
- Based on the detected language, the system processes summarization, flashcards, and questions.
- The system supports three languages using the dataset and model.

User Interface (UI):

- **Built using:** Flutter and Dart for a smooth, cross-platform experience.
- **Features:**
  - Upload text, view summaries, generate flashcards.
  - Users can edit, modify, and save flashcards.
  - Keywords are shown with the summary to highlight key ideas.
- **Interactive Experience:** Easy-to-use interface to manage flashcards and content.

Detailed Design

DATABASE MODELS

Flashcard Model:

- Stores flashcards made by each user which they can view and edit..

Post Model

- Contains the summaries generated by the summarizer for each user.

Profile Model

- Keeps information about users, like their profile picture.

Tools and Technologies Used

Frontend: Flutter

Backend: Django

API: OpenAI’s API

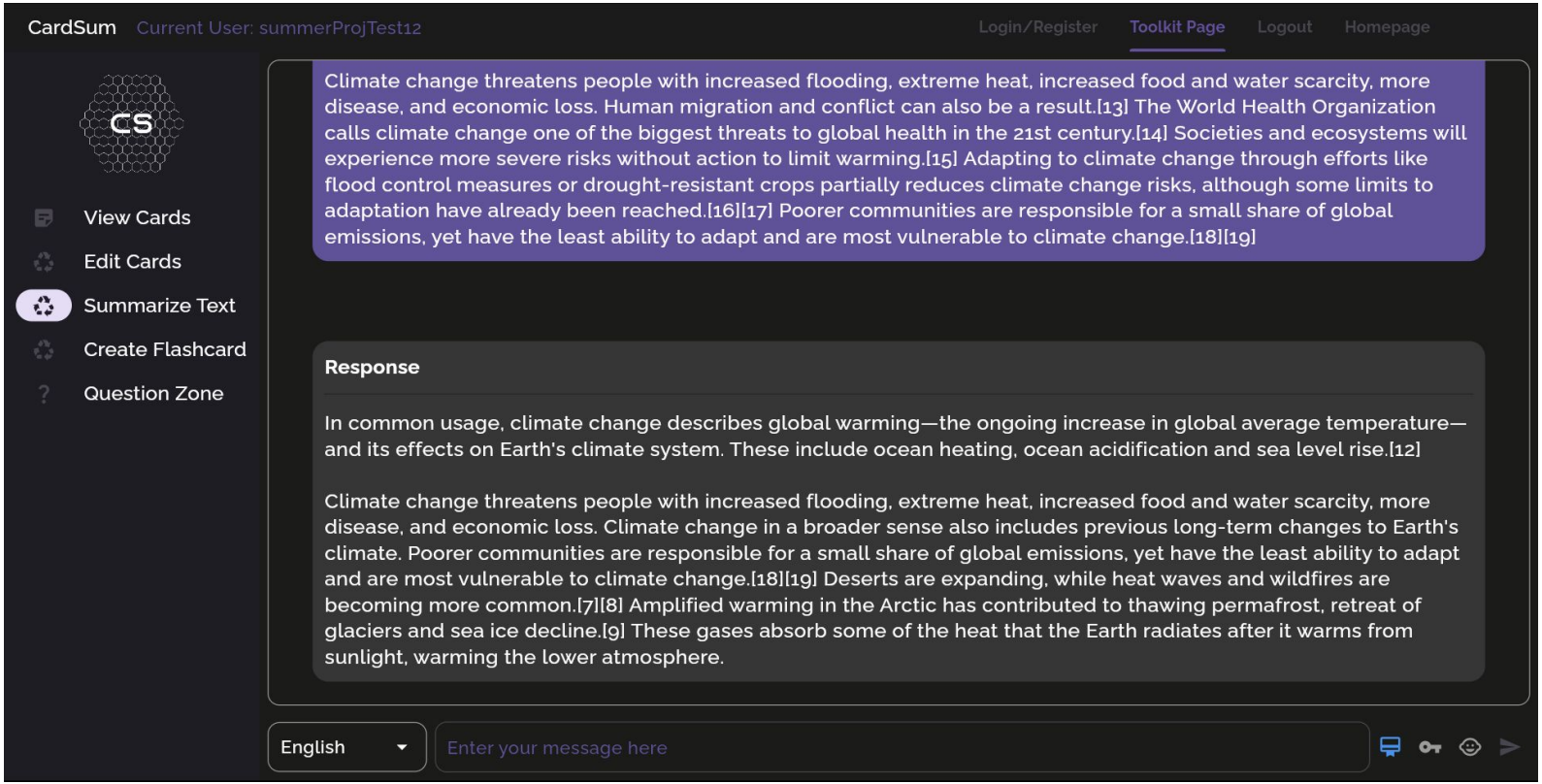
Python Libraries: spaCy, KeyBERT

Natural Language Processing: Python NLTK

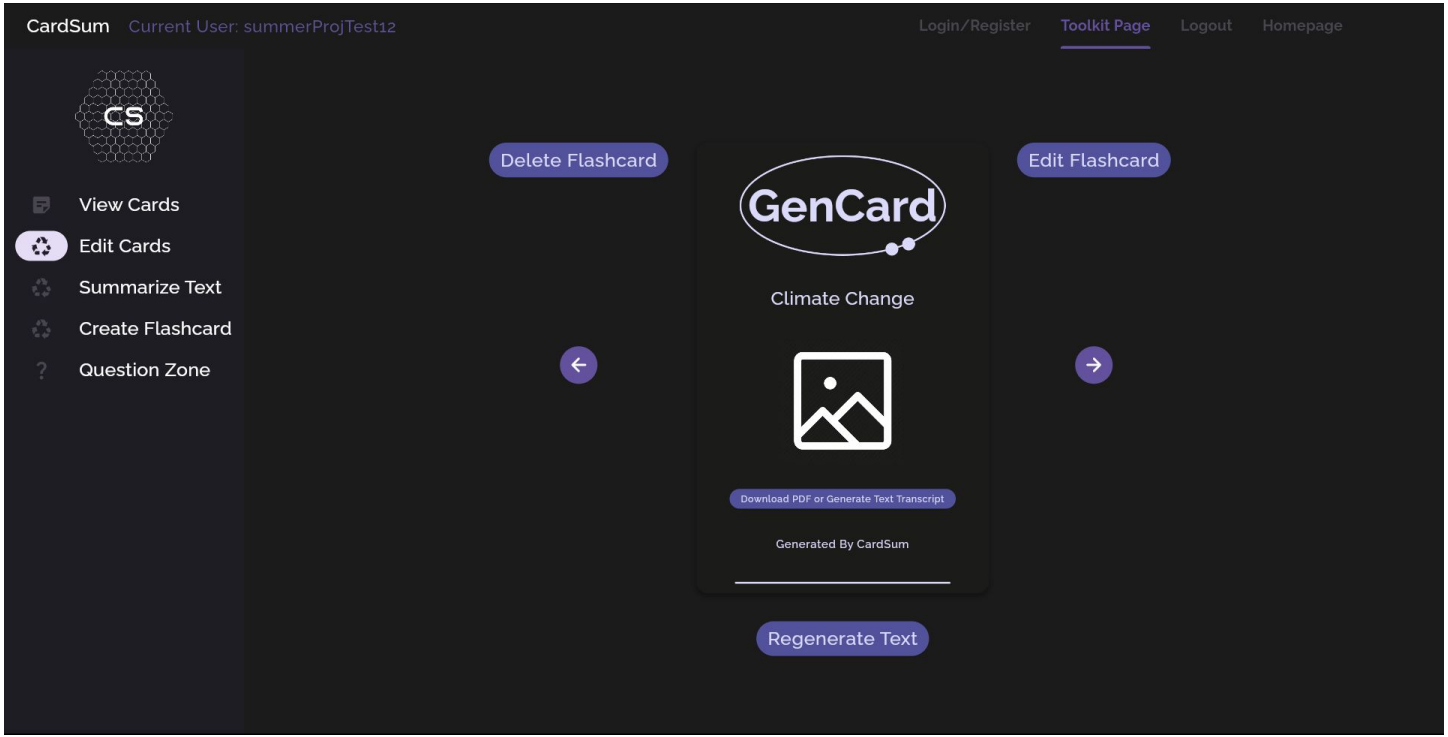
Database: PostgreSQL (or SQLite for simplicity)

Development Environment: Visual Studio Code

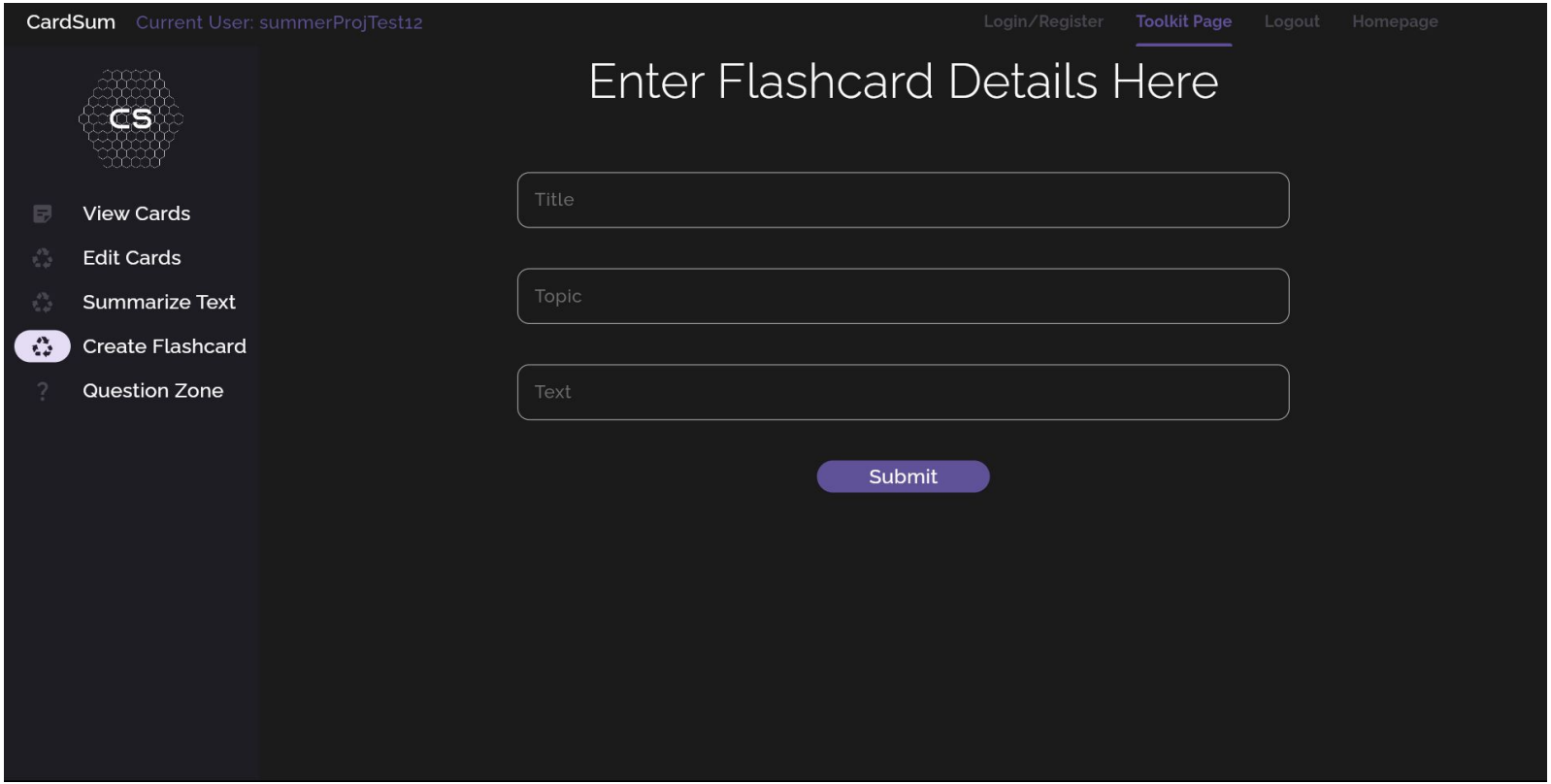
Screenshots of the output



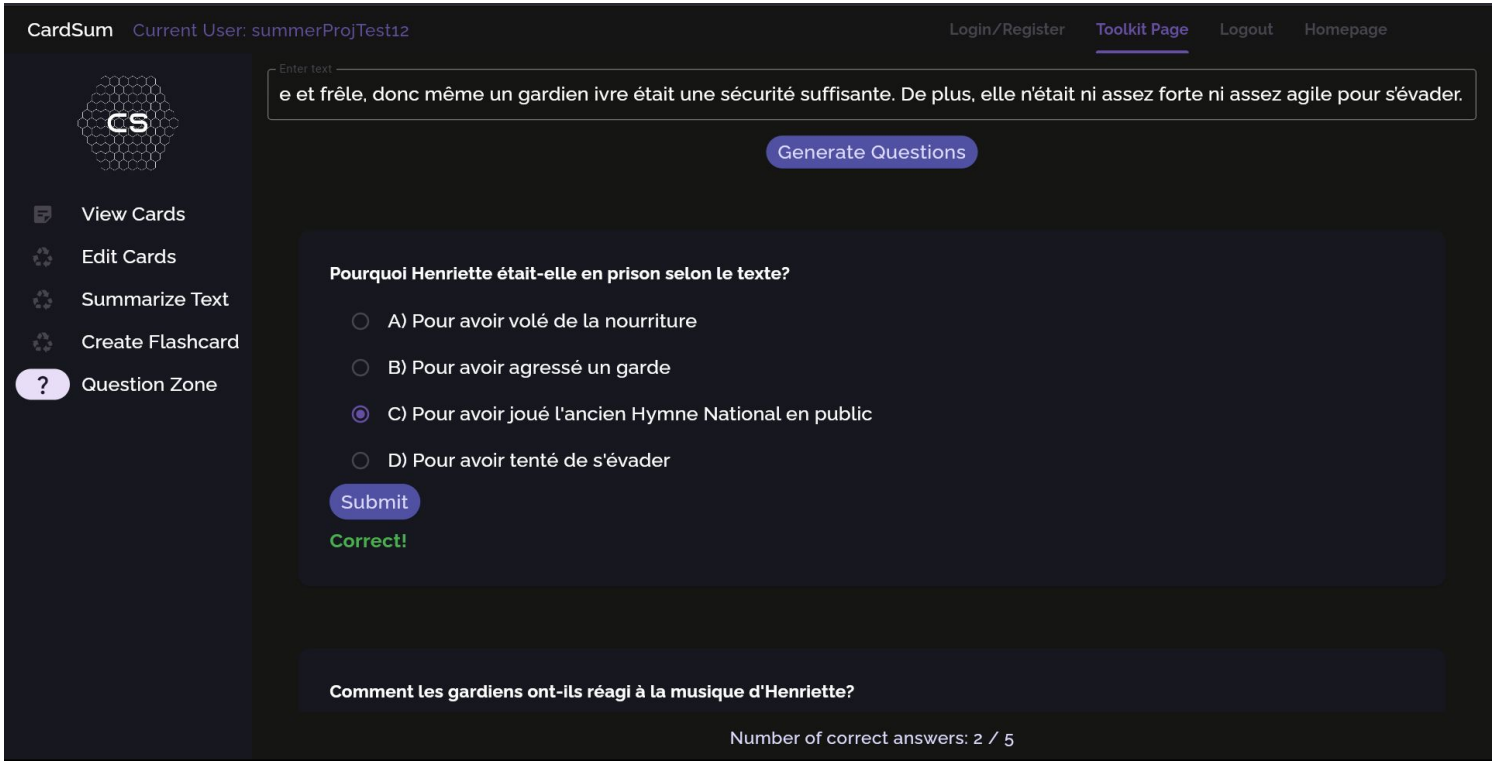
Screenshots of the output



Screenshots of the output



Screenshots of the output



Results and Discussions

- **Summarization:** Successfully converts text into a condensed form.
- **Keyword Extraction:**
  - Extracts important keywords from the text.
  - Provides a variety of synonyms for enhanced understanding.
- **Flashcard Generation:** Creates flashcards with relevant topics and summaries.
- **Question Generation:** Generates multiple-choice questions (MCQs) to encourage self-learning.
- **Multi-Language Support:**
  - Currently facilitates features in 3 languages.
  - Future plans to expand to worldwide and regional languages for inclusivity.
- **Time Efficiency:**
  - Studies suggest that summarizers save around 30% to 80% of study time.
  - CardSum is estimated to save approximately 50% to 90% of study time with its comprehensive features.