FLASH CARD APPLICATION

Prakhar Bansal [1], Prachi Jain [2]

[1] *Student, School of Computer Science and Engineering, Galgotias University, Uttar Pradesh, India*
[2] *Student, School of Computer Science and Engineering, Galgotias University, Uttar Pradesh, India*

ABSTRACT

Traditional flashcards, which are often pieces of paper or notecards with a term written on one side and a definition on the other, are a common study technique. When studying using flashcards, users frequently gaze at one side while trying to recollect information from the other. Flashcards have the benefit of being portable and easy to utilize in a variety of settings. Students used to construct their own flashcards, but textbooks have recently begun to make flashcards available on their websites. These programs require internet access, and the user may be required to log in each time they use them. Smartphone apps offer the benefit of being self-contained and available without the need for internet access. Many flashcard apps also allow users to make their flashcards available for public use or sharing.

Keyword: - *flashcard, notecard, internet*

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1. INTRODUCTION

Traditional flashcards are pieces of paper or notecards with a phrase printed on one side and a definition on the other. When using flashcards to learn, users often look to one side while trying to recall information from the other. Flashcards have the advantage of being portable and versatile in their use.

At least 80% of college mobile phone users are predicted to have a smart phone, and nearly 90% of college students will have one. As the use of smartphones has increased, so has the number of apps aimed to aid students in their studies. Programs that allow you to make and utilise flashcards include Study Blue, Quizlet, and Flashcards Plus. Because many students carry their smartphones with them all the time, app-based flashcards offer the benefit of being more portable than large stacks of traditional flashcards.

75% of college students claim they use their cellphones during breaks, meetings, and other activities, 55% while waiting in line, and 45% for school-related reasons. This pattern of use brings up the prospect of increasing study time if students use a flashcard app at these opportunities.

Smartphone flashcards have the advantages of being available anytime the smartphone is in use, the capacity to carry as many cards as necessary for various classes, and the possibility to interact with other students to create large collections of flashcards. Students can also set study reminders on their smartphones. The practically ubiquitous availability of mobile technology might lead to an increase in the usage of computer flashcards.

Students used to generate their own flashcards, but textbook publishers have recently begun to offer flashcards on their websites. These programmes require internet connectivity and may require the user to log in each time they use them. Smartphone applications have the benefit of being self-contained and accessible without the use of the internet. Many flashcard apps also allow users to share or share their flashcards with others. As a result, flashcards for numerous classes are already accessible.

The purpose of this study was to see how traditional flashcards and a flashcard app fared in a basic psychology class with college students. The relationship between flashcard performance and total class average was also investigated.

So in this research paper we are going to see how the flash card application is made on web technology and tools that are required to make the applications with its features.

1.1 Why we need this

A classic study tool, flashcards are one of the best ways to help our brains learn more efficiently. They not only assist learners in memorizing data fast, but they also facilitate long-term knowledge retention in the human brain. Nothing compares to the efficiency of flashcards when it comes to reviewing ideas.

A flashcard may keep employees engaged considerably longer than typical learning methods, as it can be both educational and entertaining. Not to mention the fact that market attrition remains a brutal reality, and the typical human attention span is becoming progressively limited. In this instance, using flashcards as a learning tool might keep employees more engaged for longer, resulting in measurable business effect in the long run.

1.2 Tools, Frameworks to be used

1. Python
2. SQLAlchemy
3. Flask
4. Jinja2 templates
5. Bootstrap
6. SQLite
7. Redis
8. Celery

1.3 Core Functionality

*   User login, where all user can login with the help of username and password. It should contain a cookie-based authentication.
*   User Signup, where a user can create and account by putting email, username, password.
*   Dashboard, where user can see list of decks, last reviewed decks, score, time of last review, can update or delete deck, add deck, export deck, print report etc.
*   Deck management, where user can create new deck, add cards in deck, update cards in deck, delete card, export deck etc.
*   Reminder jobs, where automatically mail will be sent to user to remind the task that user has to do.
*   Progress report, where the system will automatically send monthly reports of progress in the application.

2. TOOLS TO BE USED

We have to develop the application with these tools and frameworks.

*   Python:

    Python is a programming language that is high-level, object-oriented language.

    With the help of python, we will extract data from our backend database using SQLAlchemy and render the webpages my processing the data, creating tables, writing queries etc.

    Python contains the libraries that are used for this project with which we can perform actions on data.

*   API calls:

    API stands for application programming interface (API). An API is a piece of software that enables two programs or software to connect with one another. In our application we use API to perform CRUD operations. CRUD stands for CREATE READ UPDATE DELETE. This means we can create data, read data, update data, delete data.

*   SQLite

The SQLite file format is robust, cross-platform, and backwards compatible, and its creators promise that it will remain so until 2050. SQLite database files are widely used as containers for transferring rich material across computers and as a long-term data archiving method. There are over 1 trillion SQLite databases in active use. We use SQLite for storing our data in the form of tables.

- Celery

Celery is a Python task queue solution for asynchronously executing tasks outside of the HTTP request-response cycle. We use celery to generate emails. In our application the user will request the email and that task will be send to celery which will first generate the email, attach the pdf then send it to user asynchronously.

- Redis

Redis is an open source in memory data stores used as database, caching, streaming engine and message broker. Redis is used by million of users. We use redis for catching which will improve the performance and for storing data of tasks performed by celery.

- Bootstrap

Bootstrap is a free open source framework for CSS which is used for generating responsive front end for website. It contains HTML, CSS, JavaScript based design templates, buttons, forms, navigation and other interface components.

3. LIBRARIES

In the simple words the libraries are the collection of books that are stored in a room or any place similarly in programming world the library is the collection of precompiled code that are used in the code to make the code easy to write for the programmer, in python the libraries are used by the help of 'import' command.

Some libraries are inbuild in the computer but some are not, to install the libraries in the python we generally use 'pip' command.

Pip is generally a package manager for python packages or modules.

- SQLAlchemy

SQLAlchemy is a Python SQL toolkit that provides complete SQL capability and flexibility to application developers. With the help of SQLAlchemy we can read our SQLite database where all the data of users, decks, cards are stored. Also we can run intelligent queries with the help of SQLAlchemy.

- Flask

Flask is the python web framework commonly used to render webpages. We use flask to render the webpages using data generated in python, render emails that are to be send It use jinja2 templates to render the data.

- Flask login

User session management is provided via Flask-Login. It takes care of the usual responsibilities of logging in, logging out, and remembering your users' sessions over time. We use flask login for generating cookie-based authentication and used SHA-256 which stands for Secure Hash Algorithm 256-bit and is used for Cryptographic security to encrypt the passwords.

- Werkzeug Security

It contains tools to encrypt and decrypt passwords. We used werkzeug security to hash the passwords and checking the hashed passwords.

- Flask mail

Sending emails to your users is one of the most basic operations of a web application.

The Flask-Mail extension makes it easy to configure SMTP in your Flask application and send mails from your views and scripts. We use flask mail to generate mails using the data generated in python and generating pdf reports and attaching that into the mail and sending the mail to the user.

- Flask caching

Flask-Caching is a Flask extension that adds support for caching for a variety of backends to any Flask application. We use Redis for backend for flask caching. Caching is useful for improving the performance of website as it will reduce the time of processing and give the result faster to the user. Caching is done for generating pdf report and rendering dashboard in our application.

4. WORKING OF PROJECT

Our project uses 3 tables in SQLite database named as (user, decks, cards)

User- To store user information

Table Structure User(id, username, email, password, lastlogin)

Decks- To store deck information of the user

Table structure - Decks(id, username, deckname)

Cards- To store card information of a deck for a user

Table structure - Cards(id, username, deckname, cardname, cardvalue, lastreview, rating, markforreview)

When the user sign-up its data will be stored in the user table. It contains id which is automatically generated, email provided by user, password which is encrypted using SHA-256, and last login as none. Last login is used to check the last login date time of user used to send the reminder messages if user does not login.

After the user login, user will receive a welcome email which contains the information about how to use the application and basic features of application.

Decks table contains the deck id which is generated automatically, username of the user whom the deck belongs to and the name of the deck.

Cards table contain the card id generated automatically, username of user whom the card belongs to, deck name for the deck whom the card is to be inserted, card name that is the question of the card or the name of the card, card value that is the answer of the card or the data of card, last review which shows us the date time of when the user has last reviewed the card, rating provided by the user which is 0 for easy, 5 for medium and 10 for hard, mark for review that is either true or false.

After login the webpage is dashboard webpage which is rendered with the help of flask rendering and data is collected from SQLite database using python. Where there are decks where you can see the deck name, rating, and some actions like Delete, Edit, Play, update, add new deck, download pdf reports, import, export decks in CSV format and see the review cards. Export button will export the current deck in the form of CSV file and you can import the deck using the csv file.

The rating for each deck is calculated the average rating of all cards inside a deck (0 for easy, 5 for medium, 10 for hard).

User can also send the report from the dashboard to mail either in pdf of in form of html.

Play is used to play the flashcard game with the particular deck. It will pick a question randomly from that deck which is not set as mark for review and then it will show us the name of the card.

There will be 2 options.

1. Show answer
2. Mark for review

Show answer- It will show you the answer for that question and then it will ask for rating (easy, medium, hard) once you press any rating it will automatically pick another random card and show it to you.

Mark for review- It will mark that card for review and you can see that card from the dashboard from the hyperlink of See the review cards.

See the review cards- Here you can see all the cards from all the decks which you have marked as marked for review. You can click on play to see the question and then can see the answer. Then it will ask for rating and after rating it will remove that card from mark for review section.

Add card- User can add the card by giving its name and the card value. User can also import the cards using csv file.

Edit cards- User can also edit cards and change its name and its values.

Delete card- User can delete the card by clicking on delete card

Automatic reminder mails will be send to user at 10:00 UTC with the help of celery scheduler if the user does not login for more than 24 hours. This is done by creating functions for celery and taking Redis as backend. In this celery used flask mail, smtplib to generate mails and generate the pdf reports and attach the pdf reports to the mail and sent that to the user Automatic monthly reports are mailed to the users using celery and Redis which will show them the progress.

Dynamically generating of dashboard consumes a lot of time which will effect the performance of the application so caching is used in dashboard with the help of celery and Redis which will cache the dashboard and report generation so that if user once again visits the dashboard it will be shown to user without any delay as the rendered data is already stored in Redis server and the system will just send the content to the client. When the user performs any CRUD operation in the database the caching will be removed to that there is no inconsistency while showing the data to the user.

4. CONCLUSIONS
We examined the concept of flashcard, use of traditional flashcard, need of digital flashcard and implementation of the Flashcard application using web technology. The project has been built using open-source software program components like libraries, tools, frameworks that are readily available to all the users. Using all these frameworks and tools we have implemented an application which is very user friendly, with simple UI, safe, and performs basic operations properly. This project will help the user to improve the memory and training and learning new things.

5. REFERENCES

[1]"Use of traditional and smartphone app flashcards in an introductory psychology class" Stephen R. Burgess Southwestern Oklahoma State University, Ashley B. Murray Southwestern Oklahoma State University
[2]N. J. Cepeda, H. Pashler, E. Vul, J. T. Wixted, and D. Rohrer (2006). A review and quantitative synthesis of distributed practise in verbal recall problems. 354, 132(3), Psychological Bulletin
[3]J. Gikas and M. M. Grant (2013). Student Perspectives on Learning with Cellphones, Smartphones, and Social Media in Higher Education using Mobile Computing Devices Higher Education and the Internet, 19, 18-26.