StudyBucks: Student Finance, Simplified

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***Abstract*—For college and university students to successfully navigate the complexities of student life, they must learn effective money management techniques. To address the particular financial challenges this demographic encounters, we provide 'StudyBucks,' an innovative money management and budgeting tool designed with students in mind. StudyBucks provides a comprehensive suite of tools for tracking spending, making budgets, and gaining insight into students' spending habits, giving them the financial management tools they need. StudyBucks offers personalized solutions for both financial and academic achievement, going beyond traditional budgeting tools. Offering local student discounts and deals, integrating with the academic calendar, offering emergency fund building, and integrating part-time job income integration are few examples of innovative features. The best tool for tracking daily spending, creating a college budget, or making plans is StudyBucks.**

I. Introduction

With the help of a strong database architecture, StudyBucks uses data to enhance and customize student financial management. Its comprehensive database, which allows for the smooth integration and exploitation of student-specific information, is hidden behind its intuitive interface. StudyBucks uses this database to customize its features to meet the needs of each user, providing recommendations and insights based on user behavior and financial trends.The foundation of several important StudyBucks features is the database. Through the collection and analysis of financial data, it enables students to effectively monitor their spending and obtain a thorough understanding of their spending patterns. It also makes it easier to create personalized budgets that take into account each student's particular situation, schedule of classes, and sources of money. The flexibility of StudyBucks' database integration to smoothly include money from part-time jobs is one of its most notable features. The software seamlessly integrates income from several sources through intelligent data management, giving students a comprehensive understanding of their financial situation. Additionally, the Emergency Fund Builder function, which allows students to methodically set aside funds based on customized parameters and goals, is powered by the database. This guarantees that students may plan ahead for unanticipated financial difficulties without interfering with their academic endeavors. Likewise, StudyBucks uses the database to sync with academic calendars in order to provide students with timely reminders and financial planning insights that are in line with their timetables. This timing guarantees that their academic obligations and financial plans will continue to coexist. Essentially, StudyBucks' database-driven design gives students more power by using data to provide individualized money management solutions. It increases college and university students' overall efficacy in managing their finances by converting unprocessed financial data into insights that can be put into practice.

II. Significance to the Real World

The "StudyBucks" project's practical importance stems from its potential to improve college and university students success, responsibility, and financial well-being. Through a careful examination of the unique financial requirements and obstacles encountered by this group, "StudyBucks" provides a customized solution that surpasses conventional financial management tools. With features catered to the particular lifestyle and limitations of student life, the application offers students a full range of tools to help with tracking expenses, understanding spending patterns, and creating budgets. With the help of this focused approach, students will be better equipped to manage their money, experience less financial stress, and build a solid basis for future financial success.By doing this, "StudyBucks" makes a substantial positive impact on the general standard of student life and plays a crucial role in fostering financial responsibility and literacy in young adults who are still developing.

III. Project Motivation

Students frequently have difficulty with money management when they move into independence for the first time. The project's primary goal is to provide students with the knowledge, tools, and abilities they need to manage their finances and make prudent financial decisions. Managing financial stress can be a significant diversion for students, affecting not only their overall health but also their academic performance. The project's goal is to help students manage their money wisely, which will reduce their financial stress and promote academic success. There are a variety of financial demands and challenges faced by students, such as balancing inconsistent income from part-time work, managing tuition payments, and allocating funds for textbooks. In order to address these specific needs, this project recognizes them and provides tailored solutions. The project's motivation extends beyond immediate financial gain. By imparting sound financial

habits and providing tools for long-term financial planning, it aids students in building a solid financial foundation for the future.

IV. LITERATURE SURVEY

Managing income, spending habits, savings, and investments is the act of managing money [1]. Through controlling overspending, lowering the chance of being duped about money, and managing debt, it has a significant impact on a person's quality of life, social connections, and mental fitness [2] [3]. According to research, having a high degree of financial literacy helps people make wise financial decisions [1] [4] [5] [6]. Nonetheless, financial literacy is not the only element that influences how individuals handle their money; economic, social, and psychological aspects of life all have a significant role. Good money management abilities help people become more self-assured, adopt more responsible financial behaviors, and make careful financial decisions [7]. These actions ultimately lead to financial well-being and satisfaction. Furthermore, good money management is crucial for people as their financial circumstances and resources can negatively impact their social life and quality of life. The closest social supports and sources of assistance for university students include their families, friends, and significant others. They are consequently heavily impacted by these social actors when it comes to asking for guidance and making decisions, particularly financial ones [9]. Additionally, the lifestyles of students are stressful.

V. PROJECT OVERVIEW AND ARCHITECTURE

A. Methodology

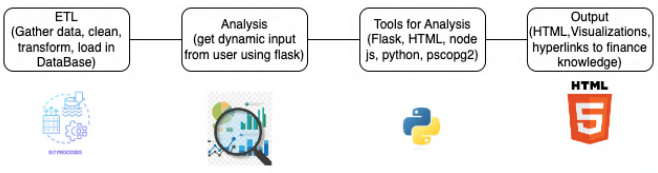


Fig. 1. Project Workflow.

Innovative analytical techniques were combined with a comprehensive Extract, Transform, Load (ETL) process as the core of the methodology used for the "StudyBucks" project. We started by collecting a wide variety of data (Extract phase), such as student details, budget data, expense data, and student preferences. The accuracy and relevance of the data were then thoroughly cleaned (Transform phase), which was necessary in order to carry out insightful exploratory data analysis. The cleaned and organized data was then used for additional analysis and application functionalities after being loaded (load phase) into a PostgreSQL database. Our methodology included four novel analyses that were specially designed to meet the needs of college and university students. Creating an emergency fund, integrating part-time job income, integrating with the academic calendar, and integrating local student discounts and deals were all included in these analyses. Each of these elements was thoughtfully created to improve the "StudyBucks" application's financial management features and give students useful, personalized tools to raise their financial standing. This methodological approach demonstrates our dedication to using cutting-edge data management strategies and creative analysis to create a solution that specifically addresses the particular financial difficulties that students encounter.

B. Architecture

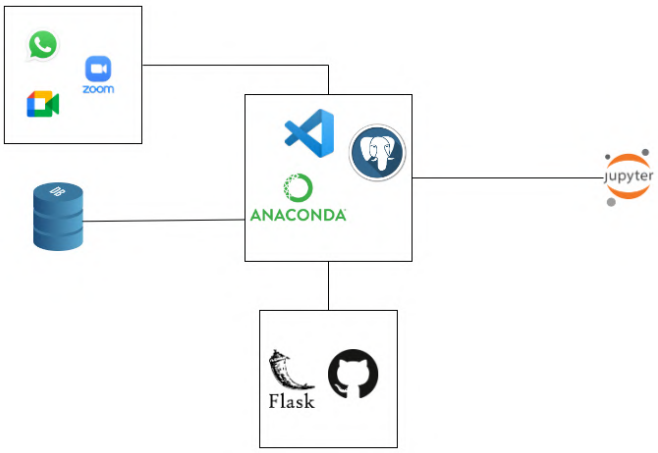


Fig. 2. Our technology stack for this project.

Data Storage - PostgreSQL Database: The architecture is based on the data storage layer. Usually, a distributed database system or reliable, scalable storage options like Amazon S3 are used to implement it. User ratings, metadata, raw movie data, and any other data needed by the system are all stored in this layer. In order to accommodate the frequent read and write operations by following components, the storage must offer high-throughput and low-latency activities.

Flask User Interface Development: The Flask framework is used in the development of the "StudyBucks" application's user interface. The seamless and interactive user experience is achieved by utilizing Flask, a lightweight and versatile Python web framework. We can process user input from the user interface (UI) and retrieve dynamic data from the PostgreSQL database using it. The outcomes are then re-presented on the user interface (UI), guaranteeing a responsive and user-friendly interface that meets our users' needs.

Utilization of Python Libraries:

- **Matplotlib and Plotly**: When used for data visualization, these libraries let us make a wide range of graphs and charts that make interpreting data easier and more aesthetically pleasing.
- **Folium**: Utilized to effectively integrate and display location-based data through the use of geospatial data visualization.
- **SQLAlchemy**: Serves as an ORM (Object Relational Mapper) tool, making it easier for Python programs to communicate with PostgreSQL databases.

- **Pandas**: Pandas is an essential library for manipulating and analyzing data. It is used to handle and process dataframes, which are essential for tasks involving data analysis.
- **Psycopg2**: Database operations are made easier by connecting the Flask application to the PostgreSQL database using this PostgreSQL adapter for Python.

C. Tools

- **Trello (Agile project life-cycle management)**: Trello is used to manage the project life-cycle while keeping Agile in mind. Every weekend, we usually get together for an hour to work on assignments and class projects.
- **Python**: A flexible programming language that can be used for scripting, data analysis, and backend development, among other project-related tasks. Python is perfect for a variety of applications within the project because of its large library and frameworks.
- **Visual Studio Code (VS Code)**: Code can be written and edited using an open-source code editor. Its powerful features, which include support for extensions, syntax highlighting, and debugging, make it a great option for software development.
- **pgAdmin**: A web-based PostgreSQL administration tool. It makes managing the PostgreSQL database easier by offering an intuitive user interface for operations like query execution, database configuration, and monitoring.
- **PostgreSQL**: An open-source relational database system with advanced features that is used because of its strong data management capabilities. Effective data management, retrieval, and storage for the project are achieved with PostgreSQL.
- **Jupyter Notebook**: An interactive computer environment where documents with live code, equations, graphics, and narrative text can be created and shared. It facilitates the easier interpretation and presentation of data findings through data analysis and visualization.
- **Git**: A version control system that keeps track of source code modifications made during development. Git makes it easier to collaborate and aids in efficient development process management.
- **Grammarly**:A writing assistant driven by artificial intelligence that evaluates and enhances project documentation. Grammarly helps to guarantee that the text is well-written, grammatically sound, and professionally expressed.
- **LaTeX**:A system for preparing documents that produces documents with a professional and high quality format; particularly helpful for handling technical and scientific documentation.
- **Flask**: A Python microweb framework that was used to create the web application for the project. With Flask, you can create a web application that is both powerful and lightweight, perfect for meeting the demands of the project.

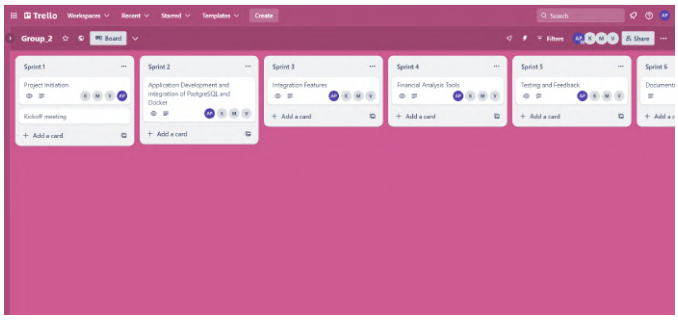


Fig. 3. Trello for project management.

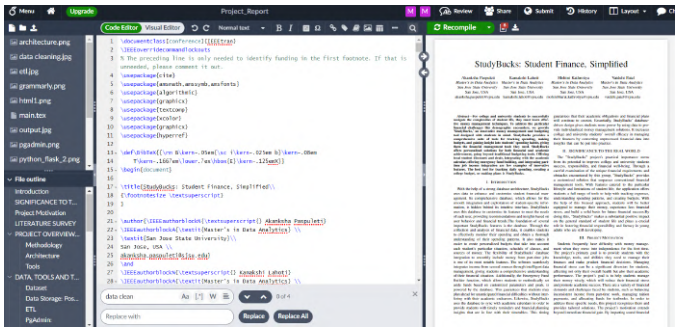


Fig. 4. Latex for Report

VI. DATA, TOOLS AND TECHNOLOGIES

A. Dataset

Name - studybucks dataset.

About the dataset - A basis for creating and assessing StudyBucks The dataset, Student Finance, Simplified, is supplied. In order to improve the analytic process, we created a Google Form and ran a survey among students enrolled in different colleges to gather data. The information offered is a fundamental tool for examining and comprehending the financial preferences and behaviors of students. Email addresses, student names, gender, age, universities attended, monthly budget allocations, a variety of expenses (rent, grocery, transportation, personal, miscellaneous), knowledge of emergency funds, savings goals, hourly wage, dates for tuition and insurance payments, spending priorities (Subway, Starbucks,

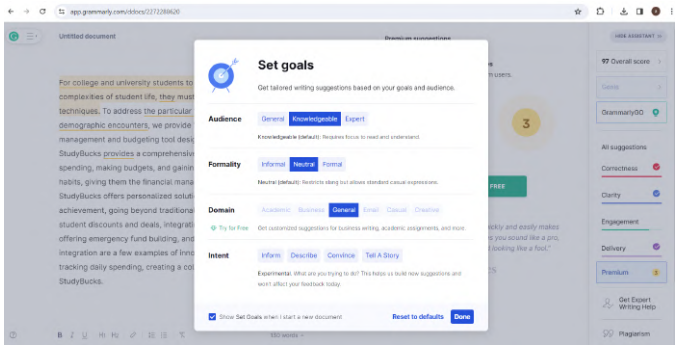


Fig. 5. Grammarly for grammar correction.

Taco Bell, Walmart), and notification preferences are just a few of the varied attributes that are included in it. This dataset provides a solid basis for carrying out in-depth research in the field of student financial management. It makes it possible to investigate spending patterns, budget distributions among various colleges and localities, relationships between age and gender and financial behavior, and trends in emergency fund awareness and savings goals. The many properties of the information allow for comprehensive investigation into temporal assessments of financial patterns, algorithmic creation for optimal budgeting techniques, benchmarking studies, and individualized financial suggestions. Researchers and analysts can further the field of student financial management by using this dataset to develop data-driven strategies that improve financial literacy, streamline budgeting processes, and offer individualized financial advice to college and university students. It is positioned as a due to its abundance of characteristics and capacity for various studies.

B. Data Storage: Postgre SQL

Managing databases, tables, schemas, and related data on a PostgreSQL database server is the main focus of PgAdmin's dataset storage feature.

PgAdmin Datasets: Databases PostgreSQL databases provide as storage for several types of datasets. Using PgAdmin, you may manage, add, and remove databases on a PostgreSQL server.

Tables: Structured data is kept in a database using tables. A graphical interface for creating, editing, and deleting tables is offered by PgAdmin. For every table, you may specify the columns, data types, constraints, and indexes.

Within a database, schemas serve as logical containers that facilitate the grouping and organization of related tables, views, functions, and other objects. Better organization and access control are made possible by PgAdmin, which enables the construction and maintenance of schemas.

C. ETL

1. Extract: For Data extraction we have gathered the dataset by creating a survey form. Retrieving raw data from the source systems without changing its content or structure is known as raw data retrieval.

2. Transform: Data Transformation: This step includes preparing the raw data for analysis or storage by cleaning, verifying, and changing it into an appropriate format. Data cleaning: In this the process we have eliminated or fixed mistakes, duplication, and inconsistencies from the data. Data validation: In this the process we are confirming that the data is accurate and reliable and that it complies with established guidelines. Data enrichment: This is the process of improving unprocessed data by filling in blanks, combining disparate data points, or summarizing them. Data standardization: This is the process of transforming data into a uniform structure or format to make analysis and integration easier.

3. Load: Data Loading: Data that has been transformed is put into a target database which is PgAdmin that we have used.

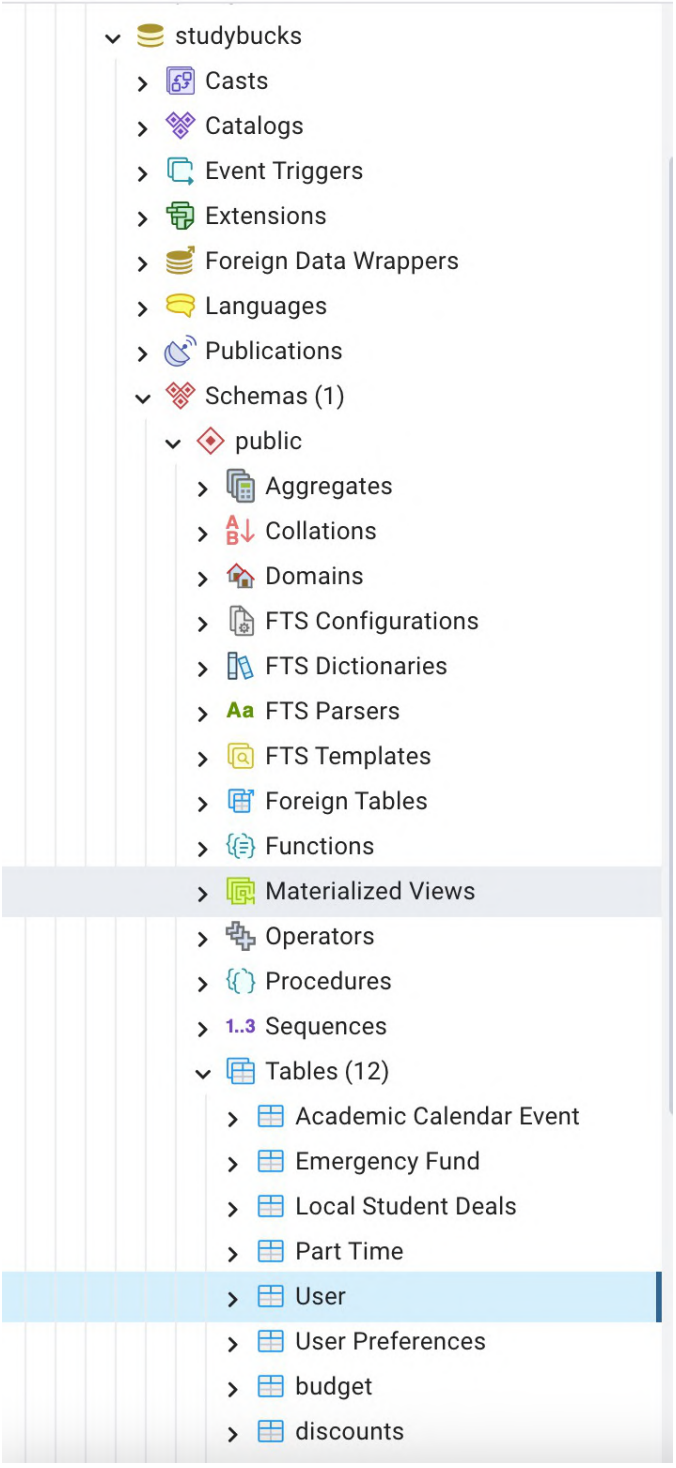
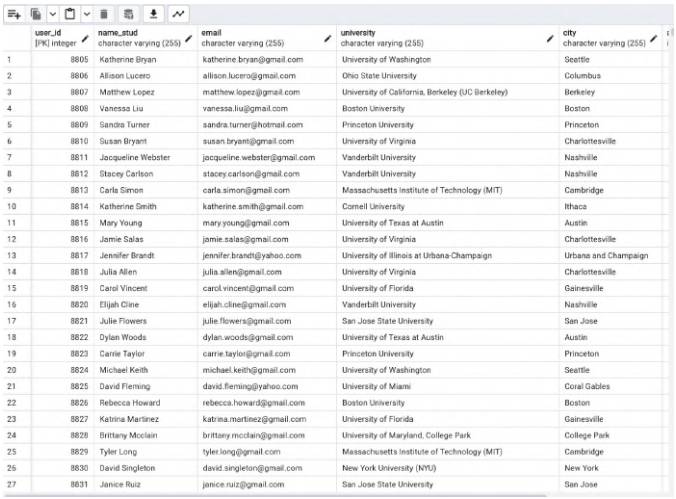


Fig. 6. Database storage: postgres.



	user_id [FK] integer	name_stud character varying (255)	email character varying (255)	university character varying (255)	city character varying (255)
1	8805	Katherine Bryan	katherine.bryan@gmail.com	University of Washington	Seattle
2	8806	Allison Lucero	allison.lucero@gmail.com	Ohio State University	Columbus
3	8807	Matthew Lopez	matthew.lopez@gmail.com	University of California, Berkeley (UC Berkeley)	Berkeley
4	8808	Vanessa Liu	vanessa.liu@gmail.com	Boston University	Boston
5	8809	Sandra Turner	sandra.turner@hotmail.com	Princeton University	Princeton
6	8810	Susan Bryant	susan.bryant@gmail.com	University of Virginia	Charlottesville
7	8811	Jacqueline Webster	jacqueline.webster@gmail.com	Vanderbilt University	Nashville
8	8812	Stacey Carlson	stacey.carlson@gmail.com	Vanderbilt University	Nashville
9	8813	Carla Simon	carla.simon@gmail.com	Massachusetts Institute of Technology (MIT)	Cambridge
10	8814	Katherine Smith	katherine.smith@gmail.com	Cornell University	Ithaca
11	8815	Mary Young	mary.young@gmail.com	University of Texas at Austin	Austin
12	8816	Jamie Salas	jamie.salas@gmail.com	University of Virginia	Charlottesville
13	8817	Jennifer Brandt	jennifer.brandt@yahoo.com	University of Illinois at Urbana-Champaign	Urbana and Champaign
14	8818	Julia Allen	julia.allen@gmail.com	University of Virginia	Charlottesville
15	8819	Carol Vincent	carol.vincent@gmail.com	University of Florida	Gainesville
16	8820	Elijah Cline	elijah.cline@gmail.com	Vanderbilt University	Nashville
17	8821	Julie Flowers	julie.flowers@gmail.com	San Jose State University	San Jose
18	8822	Dylan Woods	dylan.woods@gmail.com	University of Texas at Austin	Austin
19	8823	Carrie Taylor	carrie.taylor@gmail.com	Princeton University	Princeton
20	8824	Michael Keith	michael.keith@gmail.com	University of Washington	Seattle
21	8825	David Fleming	david.fleming@yahoo.com	University of Miami	Coral Gables
22	8826	Rebecca Howard	rebecca.howard@gmail.com	Boston University	Boston
23	8827	Katrina Martinez	katrina.martinez@gmail.com	University of Florida	Gainesville
24	8828	Brittany Mcclain	brittany.mcclain@gmail.com	University of Maryland, College Park	College Park
25	8829	Tyler Long	tyler.long@gmail.com	Massachusetts Institute of Technology (MIT)	Cambridge
26	8830	David Singleton	david.singleton@gmail.com	New York University (NYU)	New York
27	8831	Janice Ruiz	janice.ruiz@gmail.com	San Jose State University	San Jose

Fig. 7. ETL Configuration.

Before being fed into the target system, transformed data is temporarily stored in a staging area. Data Loading Strategies: Data loading techniques include incremental updates, complete refreshes, and merges of new and old data. Database or data warehouse: The converted data is kept in an organized manner that may be used for reporting and analysis.

D. PgAdmin:

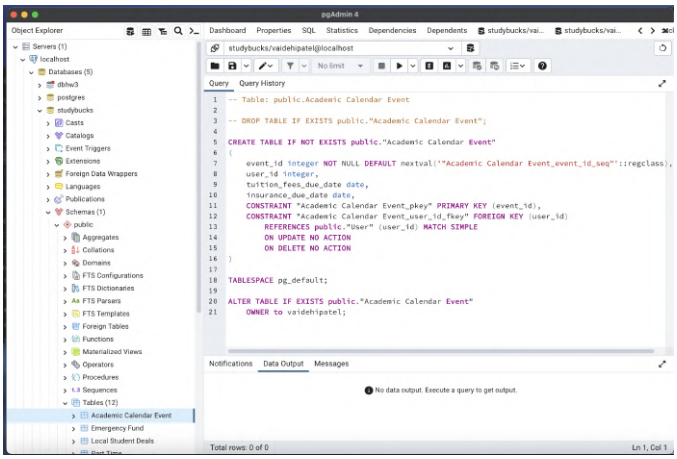


Fig. 8. pgAdmin

An indispensable open-source tool for PostgreSQL database management and interaction, PgAdmin makes a variety of database-related activities easier and allows efficient data processing and administration. Regarding the dataset that has been supplied:

PgAdmin provides a strong interface for managing student and financial data effectively. The dataset consists of detailed student records with attributes like email, name, gender, age, university, city, monthly budget, expenses breakdown (rent, grocery, transportation, personal, misc), knowledge about emergency funds, target savings, wage per hour, tuition fee and insurance due dates, spending priorities (subway, Starbucks, Taco Bell, Walmart), and notification preferences. It provides a comprehensive platform to navigate, query, and administer the dataset's PostgreSQL database.

Users can run SQL queries using PgAdmin to retrieve information on average monthly spending by university, distribution of expenses among age or gender groupings, or patterns in emergency fund knowledge among universities. Pie charts showing the distribution of priority expenditure categories among students or bar charts presenting comparative assessments of expenses might be used as graphical plots to portray this data visually.

PgAdmin gives users the ability to explore the dataset, run intricate SQL queries for in-depth research, and view results in the form of personalized reports or graphical displays. Its interface makes it possible to manage and explore the dataset's PostgreSQL database effectively, which facilitates analysis and decision-making about the financial preferences and behaviors of students.

E. Flask Connection

```python
from flask import Flask, render_template, request
import psycopg2

app = Flask(__name__)

def fetch_user_data(user_id):
    # Connect to the PostgreSQL database
    connection = psycopg2.connect(
        host="localhost",
        database="studybucks",
        user="root",
        password="root"
    )

    # Create a cursor object to execute SQL queries
    cursor = connection.cursor()

    # Fetch user details, budget, total expense, and discounts
    query = """
    SELECT u.user_id, u.name_stud, u.email, u.university, u.city, u.age, u.gender,
      b.budget_id, b.monthly_budget, b.target_saving,
      COALESCE(SUM(e.grocery), 0) AS grocery_expense,

@app.route('/', methods=['GET', 'POST'])
def index():
    if request.method == 'POST':
        user_id_to_fetch = request.form['user_id']
        result = fetch_user_data(user_id_to_fetch)
```

Fig. 9. Python Flask Connection

Our code establishes connection between a Flask web application and a PostgreSQL database using the psycopg2 library in Python.

@app.route('/', methods=['GET', 'POST']).

Main route is '/' (the index route). The index route handles both GET and POST requests. The 'index' function will handle user input processing, it will fetch data from the database using the aforementioned functions, and generate HTML templates containing the acquired data.

We have made use of the render template function to render HTML templates, passing data from the Python code to be displayed on the web pages in our flask application.

F. Data Cleaning, and Preprocessing:

```
In [9]: # Imputing missing values for 'grocery'
        mean_grocery = df['grocery'].mean()
        df['grocery'].fillna(mean_grocery, inplace = True)

In [10]: # Imputing missing values for 'transportation'
         mean_trans = df['transportation'].mean()
         df['transportation'].fillna(mean_trans, inplace = True)

In [11]: # Imputing missing values for 'personal'
         mean_personal = df['personal'].mean()
         df['personal'].fillna(mean_personal, inplace = True)

In [12]: # Imputing missing values for 'misc'
         mean_misc = df['misc'].mean()
         df['misc'].fillna(mean_misc, inplace = True)

In [13]: # Filling missing values for 'ef_knowledge'
         df['ef_knowledge'].fillna('No', inplace = True)

In [14]: # Imputing missing values for 'target_saving'
         mean_target = df['target_saving'].mean()
         df['target_saving'].fillna(mean_target, inplace =True)

In [15]: # Imputing missing values for 'tution_fees_due_date'
         df['tuition_fees_due_date'] = pd.to_datetime(df['tuition_fees_due_date'], errors = 'coerce')
         df['tuition_fees_due_date'].fillna(df['tuition_fees_due_date'].mean(), inplace = True)

In [16]: # Imputing missing values for 'insurance_due_date'
         df['insurance_due_date'] = pd.to_datetime(df['insurance_due_date'], errors = 'coerce')
         df['insurance_due_date'].fillna(df['insurance_due_date'].mean(), inplace = True)

In [17]: # Imputing missing values for 'Contact_Method'
         df['Contact_Method'].fillna('Email', inplace =True)
```

Fig. 10. Cleaning and Processing the Data.

Meticulous steps have been taken to prepare the dataset for StudyBucks: Student Finance, Simplified. To prevent errors, duplicate values were eliminated, and missing values were dealt with either by deletion and mean imputation. To ensure dependability and clarity, uniform data formats and formatting guidelines were applied to all tables.

VII. Output

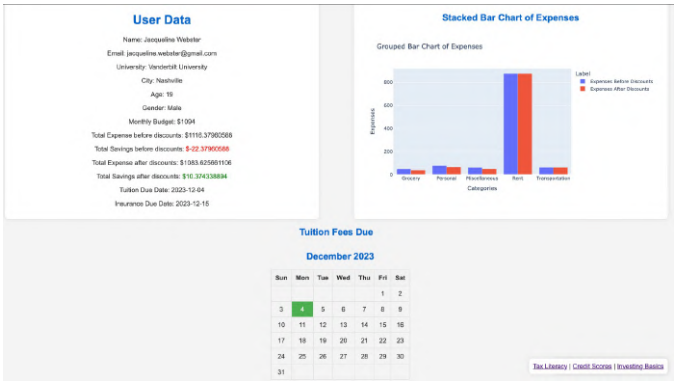


Fig. 11. Output

VIII. Lesson Learnt

We gained knowledge about the significance of financial management from this project. The ability to manage one's finances, which is influenced by a number of factors beyond one's level of financial literacy, has a significant impact on one's standard of living. The project's goal is to compare financial outcomes and get user feedback, with an emphasis on real-world effects, to ascertain how effective "StudyBucks" is. We discovered that data gathered through real-time public surveys carried out across multiple states ensures the applicability and efficacy of the program for a broad spectrum of student demographics. In order to address challenges with database selection and data preprocessing, we also learned active problem-solving and research techniques, demonstrating flexibility and diligence in technology selection. Delivering a top-notch, data-driven application that necessitates a strong emphasis on quality and data integrity taught us how to concentrate on these two areas. This include generating data analysis queries, developing analytical tools, and completing data preprocessing.

IX. Unique Aspects

With a focus on particular financial issues like managing tuition and part-time income, "StudyBucks" is especially designed for college students. Its goal is to reduce financial stress and promote academic success. A solid and well-considered technical approach is represented by the data analysis using SQL, PostgreSQL, Python with the Flask framework, and Python notebook.Features that are specifically tailored to the needs of students are included in the application, such as the integration of part-time job income, the emergency fund builder, the integration of the academic calendar, and local student discounts and deals. A strategic approach for project initiation is indicated by the effective definition of the project's goals and scope as well as the deliberate choice of PostgreSQL for database management.The project's emphasis on creating and executing a PostgreSQL database environment for intricate financial data analysis is in line with the course's goals of guaranteeing data integrity and ACID properties.

X. Innovation

Students can simply track and integrate their part-time job income with the Part-Time Job Income Integration feature, which helps them see how much money they are making in comparison to their expenses. This is especially helpful for students who rely on this type of income to cover their expenses. The "Build an Emergency Fund" tool recognizes the value of financial preparedness and assists students in starting and building an emergency fund. It encourages the practice of saving and financial planning by offering methods and recommendations for putting money aside for unforeseen costs. Integration with the Academic Calendar facilitates the coordination of students' financial management and academic schedules. It helps students plan and budget for their educational expenses by providing timely financial reminders and insights based on the academic calendar. By partnering with local businesses, the integration of the Local Student Discounts and Deals feature gives students access to discounts and deals, encouraging frugal spending and supporting the community. Apart from yielding economic advantages, this integration fortifies connections between the student body and neighboring companies.This Python code uses pandas, folium, and sqlalchemy to create a heatmap visualizing the concentration of students in different locations. It connects to a PostgreSQL database, retrieves student data including latitude and longitude from the "User" and "geo" tables, and then generates a folium map. The map is centered at the average location of students and displays a heatmap layer based on their coordinates. The resulting map is saved as an HTML file, providing a graphical representation of student concentration in various regions.

XI. Team Work

TABLE I
TEAM MEMBER ROLES

Team Members	Role
Akanksha Paspuleti	Technical Documenter, trello, Data Analysis of Integration with Academic Calender, ETL
Kamakshi Lahoti	Data Analysis of Emergency Fund Builder, Node JS integration, ppt, dynamic UI
Mohini Kathrotiya	Data Analysis of Integration with Academic Calender and Local Student Discount and Deals, flask connection, heatmap visualization
Vaidehi Patel	Data cleaning and preprocessing, Data Analysis of Part-Time job income integration, Technical Documenter

XII. Pair Programming

We have used pair programming in the "StudyBucks" project development process to improve our teamwork and the quality of our code. The Live Share function in Visual Studio Code (VS Code) made it possible for team members to work together to write and debug code in real time. This method not only increased our coding productivity but also helped team members grasp the project at a deeper level. We acknowledge the need to test this collaborative approach further as part of our continuous development process. Testing will guarantee that the pair programming approach—especially with Live Share—is meeting our standards for teamwork and code quality and is making the most positive impact on the project's advancement.

XIII. Relavance to the course

Although there are a lot of budgeting apps on the market right now, the main focus of our project is on how we are utilizing the data that we collect from the users in a novel way—that is, for financial management—by incorporating features like tracking income from a part-time job, creating an emergency fund, integrating with the academic calendar, and offering local student discounts and deals. Since the database is the center of StudyBucks, we will be utilizing a lot of ETL functions.

XIV. Technical Difficulties

We have had issues regarding database management and scaling as it gets harder to effectively handle a lot of data as the user base expands. It's critical to scale the database without sacrificing data integrity or performance. The project entails integrating a number of external systems, including local business transactions, part-time employment portals, and academic calendars. Technically speaking, ensuring dependable and seamless integration was difficult. It was challenging to create an intuitive and user-friendly interface for a wide range of users while taking into account their differing degrees of technical comfort and financial literacy. The data collected requires validation and cleaning to ensure accuracy. We actively worked to remove duplicates, correct data format errors, and address outliers. Selecting and configuring the most suitable database for the project requires careful consideration. We had a brainstorming session to decide which database or warehouse was best suited for our project. We were considering Google BigQuery, but upon extensive research, we have decided to move forward with PostgreSQL because of its advantage in DML operations.

XV. Novelty

The "StudyBucks" project is notable for its creative approach to money management that is geared toward college students in particular. With its unique integration of financial planning tools with academic schedules, it offers specialized features like Emergency Fund Builder, Part-Time Job Income Integration, and Local Student Discounts and Deals. This integration promotes community involvement in addition to helping with budgeting. The project also places a strong emphasis on usability to accommodate different financial literacy levels, all the while guaranteeing strong data security and PostgreSQL management. The project's responsiveness to user needs is further improved by the agile development methodology, which makes "StudyBucks" a unique offering in the field of student financial management tools.

XVI. Impact

This project has the potential to have a big influence on college students' financial security. It addresses the particular financial challenges faced by this group by offering an extensive suite of tools created especially for student financial management, including cutting-edge features like Emergency Fund Builder and Part-Time Job Income Integration. The integration of local student discounts and academic calendars promotes responsible financial practices as well as community involvement. This project has the potential to reduce financial stress, which will benefit the students' overall academic experience and future financial stability in addition to improving their financial literacy and responsibility.

XVII. Discussions and conclusion:

We came to the conclusion that the "StudyBucks" project, which is an innovative financial management tool, has the potential to drastically change how college students manage their finances during our discussions about it. The project effectively closes the gap between financial planning and academic life by providing special features catered to each student's individual needs. These include combining financial planning tools with emergency fund creation, academic calendars, and part-time income management. Robustness and scalability are ensured by the project's use of contemporary technologies like Flask and PostgreSQL in conjunction with an agile development methodology. The user base's enthusiastic responses and involvement confirm the project's applicability and efficacy even more. Overall, "StudyBucks" is evidence of the potential of focused financial management programs to improve students' financial literacy and general well-being.

Acknowledgment

We would like to express our gratitude to San Jose State University's Department of Applied Data Science. We are truly appreciative of Professor Pendyala's guidance and expertise throughout this project. We would like to thank the Instructional Student Assistants (ISAs) for their invaluable assistance with any questions.

APPENDIX

A. Code Walkthrough

We have explained each part of thew code used in different stages of architecture, and a detailed demo is given during the presentation.

B. Discussion / Q&A

After each presentation, we have set aside time for questions and potential discussion topics.

C. Demo

Recommender system is being executed during the presentation to demonstrate the results.

D. Report

Every phase of the project has been carefully documented, and we have included brief examples of each step's output. Throughout the entire project, we appropriately employed formal language. We formatted the report using LaTex, following the IEEE guidelines.

E. Version control

To track the source code, we have set up a GitHub repository. Git commands such as git init and git push have been utilized to maintain synchronization between our local project and the GitHub repository, guaranteeing the inclusion of project files and rubrics in the commit.

https://github.com/vaidehipatel05/studybucks.git

F. Lessons Learned

We had the chance to learn about a lot of new technologies while working on the project, and although there were many obstacles to overcome—such as coding mistakes and problems with analysis—it was a really educational experience. These lessons have been discussed in our report's Lessons Learnt chapter.

G. Unique aspects

Several innovative elements mentioned in the report collectively enhance the financial management experience specifically for the student demographic, setting "StudyBucks" apart in its field.

H. Prospects of winning competition / Publication

There is a great chance that the creative approach to college student financial management will be recognized in publications. It stands out in the industry thanks to its special features, which include integration with academic calendars and an emphasis on the financial needs of individual students. The project's potential for recognition in technological and educational forums, as well as interest from academic and professional publications, is further strengthened by its use of cutting-edge technology and positive user feedback.

I. Innovation

The project includes a number of cutting-edge features, such as local student discounts and deals and integration with academic calendars. As we have noted in our report, integration sets it apart from traditional financial management tools, especially in its customized approach to meet the needs of college and university students.

J. Teamwork

Every team member has participated in every phase of the project's development, contributing ideas according to their areas of expertise. We have held multiple meetings where we have exchanged ideas for the project and supported one another when we have made mistakes. The roles are covered in our report's section on teamwork.

K. Technical difficulty

A section has been incorporated to address the mistakes made throughout the project.

L. Pair Programming

In our report, under the pair programming section, we have detailed the pair programming process.

M. Practiced agile / scrum

We have used Trello board by Atlassian for Project Management and to keep track of the progress of the project. Its board and card system makes it simple to assign tasks, monitor advancement, and establish due dates. Additionally, Trello makes it easier for team members to communicate clearly, which makes it perfect for effectively managing various project components and maintaining team alignment with deadlines and goals.

https://trello.com/invite/b/BwMcKCdd/ATTI6b1d7318ceeddecc8fce6e25a10be8b41140C249/group2

N. Used Grammarly/ other tools

Grammarly has been utilized to verify the research paper's grammar.

O. Presentation Techniques

We used Google Slides to create our presentations for both Elevator pitch video and the main presentation. Its cloud-based nature ensures easy access and sharing, allowing to view the presentation from anywhere. With customizable templates and interactive elements, Google Slides can create a visually appealing and informative presentation that accurately showcases the features and benefits of the "StudyBucks" project.

P. Includes DB Connectivity / API calls (Possibly using Python)

Our code incorporates database connectivity using the psycopg2 library for PostgreSQL. Various functions, such as 'fetch user data', 'get due dates', and 'get ef knowledge', have been implemented to interact with the PostgreSQL database, retrieving information on user data, academic calendar events, and emergency fund knowledge, respectively.

Q. Used ETL tool

During the ”StudyBucks” project development process, PostgreSQL has been utilized as our main tool for Extract, Transform, Load (ETL) operations. Strong open-source relational database system PostgreSQL was used because of its ability to manage databases and efficiently perform ETL operations. With this decision, we were able to effectively gather data from multiple sources, convert it into an application-appropriate structured format, and import it into our database system. Our dedication to utilizing strong and adaptable tools that improve the effectiveness and productivity of our data management strategies within the project is demonstrated by our use of PostgreSQL for ETL tasks.

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