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1. Introduction

1.1 Project Overview:-

Tracking our expenses is often the first step in getting our finances in order. By understanding what we spend money on and how much we spend, we can see exactly where our cash is going and areas where we can cut back.The applications really help us to track and control the wastage of money in our day to day life.These applications certainly overlap with budgeting apps, but while the latter provides a big-picture view of our finances, expense tracker apps put more of an emphasis on our spending.

A need for a helper to save our money was an essential one. The application that stores all our transaction data was uploaded by us will be helpful for the calculation purpose and make us aware about spending the money on unwanted things.

1.2 Purpose :-

Being aware of our spending habits is the best way of utilizing our money. When we know how much money we spend, it’s easy to balance our income with our spending and even save for the future.If we operate a budget; (daily, monthly or even annual), the best way of ensuring that our spending is within the budget is by tracking our spending. When we track our spending, we know where our money goes and we can ensure that our money is used wisely.

Tracking our expenditures also allows us to understand why we’re in debt and how we got there. This will then help we design a befitting strategy of getting out of debt.

2. Literature Survey

2.1. Existing Problem:-

In most of the existing Expense tracker applications, the android mobile user will not be able to insert or view details if the server goes down and a disadvantage of single point of failure. Most of the user details remain unverified and it's difficult to track the fake users. The user interface of the application is not user friendly and the user must have a device with an android operating system with an active internet connection to interact with this application.

Sl.no	Year	Title	Authors	Description
1	2018	eExpense: A Smart Approach to Track Everyday Expense	Shahed Anzarus Sabab; Sadman Saumik Islam; Md. Jewel Rana; Monir Hossain	Expense is an application that runs on Android smartphones. By using this application, users can save their expense by simply scanning the bills or receipt copies.
2	2022	Expense Manager: An Expense Tracking Application using Image Processing	Nupur Sawarkar1, Pranay Yenagandula2, Devang Shetye3, Prof. Shruti Agrawal4	Users will be provided with visual statistics of expenses by transaction date or by category. This project is not intended for a particular user or age group but anyone and everyone who wants to track their expenses can use this app.

3	2021	Daily Expense Tracker	Shivam Mehra, Prabhat Parashar	Daily Expense Tracker is a web application that allows you to track the daily expense of the user and help them to better manage their resources. It creates a digital record of the income and expense of the user
4	2016	Smart Expense Management Model for Smart Homes	R.Velmurugan, Mrs.P.Usha	The recorded expenses are categorized to provide an insightful distribution of the total spending. Integration of smart homes with expense management systems, increases the efficiency and effectiveness in the task of maintaining household budgets. In this research paper the significance and need of such a system is discussed that helps in significant savings and future planning by analyzing daily household expenses with available funds.

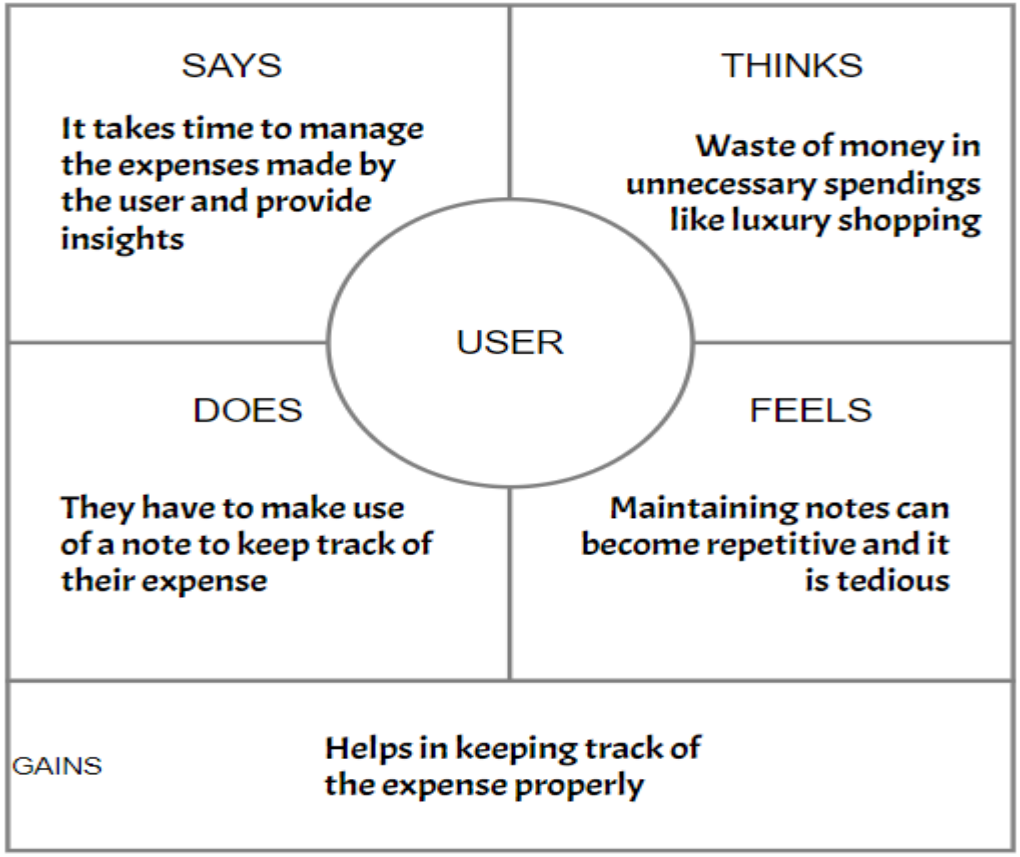
2.3. Problem Statement Definition: -

The daily expense tracker is a web application which is used to maintain data of daily, weekly, monthly and yearly expenses in an eye-catching way. This project is aimed at developing a web application which will be helpful to users who run out of resources due to mismanagement and also find it difficult to maintain records of their expenses. So a daily expense tracker will help them manage their needs and spending in a better way by accessing the web application directly

from web browsers. It is designed and developed in a way that it is compatible with each and every device. We have also considered disinterest or the lack of time of users to maintain such records and thus made the web application voice powered as well making sure that there is something for each and every type of users. The application doesn’t need any extended hardware or software support to run and thus a user with minimal resources can also make use of the application to make a difference in their life. The application will prove to be a crucial utility among the families removing the fear of losing the physical records , here data is stored in local storage of the browser and thus is never lost and stays as it is even if you open the application after a long period of time.

3. IDEATION & PROPOSED SOLUTION

3.1. Empathy Map Canvas:-



3.2 Ideation & Brainstorming:-

Management of finance and accounts have been an issue for a long time. People are less likely to keep track of their expenses, they keep it in a checkbook or even small notes and excel sheets. Despite that, it has got a new perspective with the advent of modern technologies and the internet which is becoming more and more accessible. Expenses Tracker is a way that can help us to keep up with our spending. It is a web-based system that can keep track of their expenses and determine whether they are spending as per their set budget. Potential users need to input the required data such as the expense amount, merchant, category, and date when the expense was made. This mobile system is a fully detailed expense tracker tool that will not only help users keep a check on their expenses, but also cut down the unrequired expenses, and thus will help provide a responsible lifestyle.

3.3 Proposed Solution:-

This proposed system aims to track the day to day spending of the user. By using this application, the users can have an awareness on wastage of money. The basic solution is to make a note of the expense done on a day and evaluate it at the month end or after a certain period of time.

Application contains a role :

User

- If the user needs to register with his/her personal details.
- After successful registration of users.
- A successful registration email is sent to the user.

• After successful registration, users will be directed to the home page.

• They will be asked to enter the details about the expense on the day.

• He/She can enter the date and time, things bought, how much was spent.

• After filling the details I am able to store it.

• The entire data has been stored under our database.

3.4 Problem Solution Fit

Tracking expenses is the difference between creating a budget that works, and one that doesn't. Whether you're about to start budgeting for the first time, or have been living on a budget for years, knowing where your money goes is the one thing that is guaranteed to make your budget work.

4. REQUIREMENT ANALYSIS

4.1. Functional Requirements:-

The below are the Functional Requirements of the Personal Expense Tracker

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Form for collecting details
FR-2	Login	Enter username and password
FR-3	Calendar	Personal expense tracker applications must allow users to add the data to their expenses.
FR-4	Expense Tracker	This application should graphically represent the expense in the form of a report.
FR-5	Report generation	Graphical representation of the report must be generated.
FR-6	Category	This application shall allow users to add categories of their expenses.

4.2. Non-functional Requirements:-

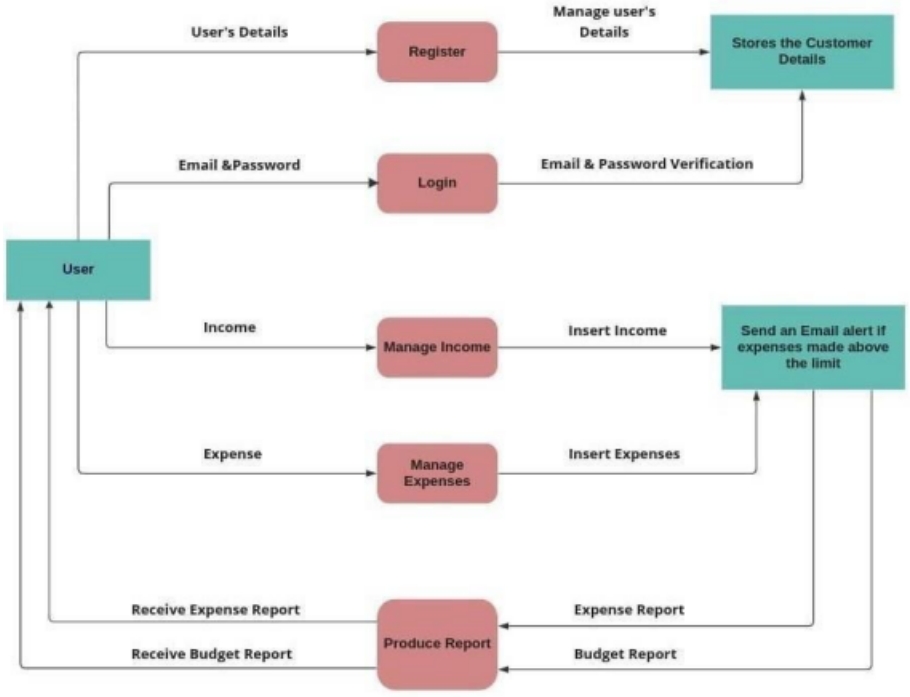
The below are the Non-functional requirements of the Personal Expense Tracker

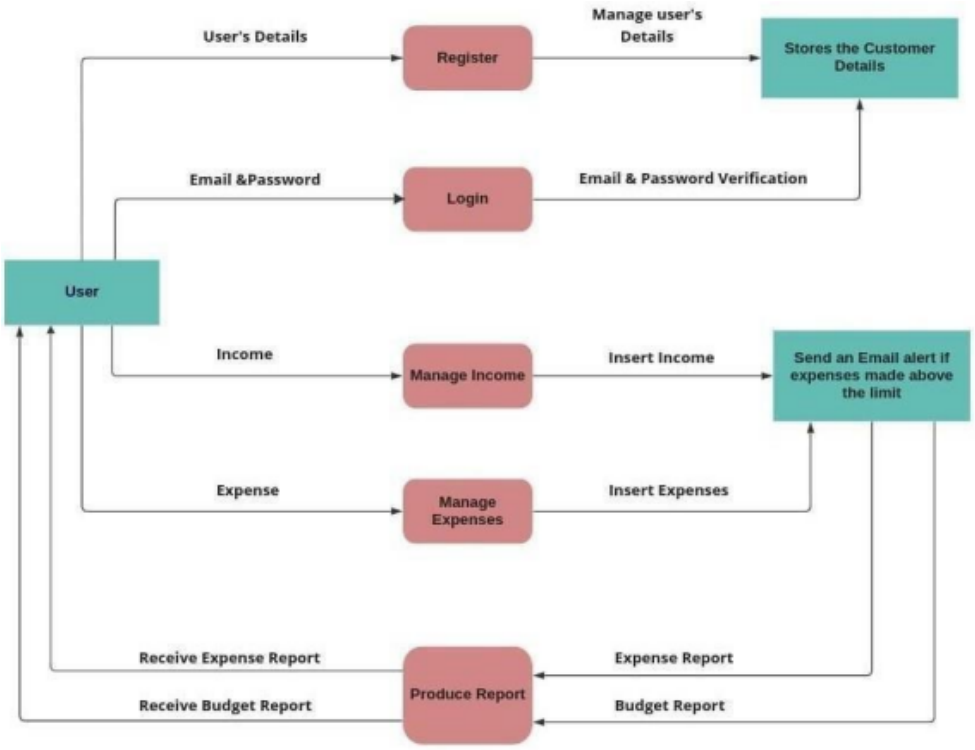
FR No.	Non-Functional Requirement	Description
NFR -1	**Usability**	Helps to keep an accurate record of your income and expenses.
NFR -2	**Security**	Budget tracking apps are considered very safe from those who commit cyber crimes.
NFR -3	**Reliability**	Each data record is stored on a well built efficient database schema. There is no risk of data loss.
NFR -4	**Performance**	The types of expense are categories along with an option. Throughput of the system is increased due to light weight database support.
NFR -5	**Availability**	The application must have a 100% up-time.
NFR -6	**Scalability**	The ability to appropriately handle increasing demands.

5. PROJECT DESIGN

5.1. Data Flow Diagrams:-

Data Flow Diagrams: A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFDcan depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

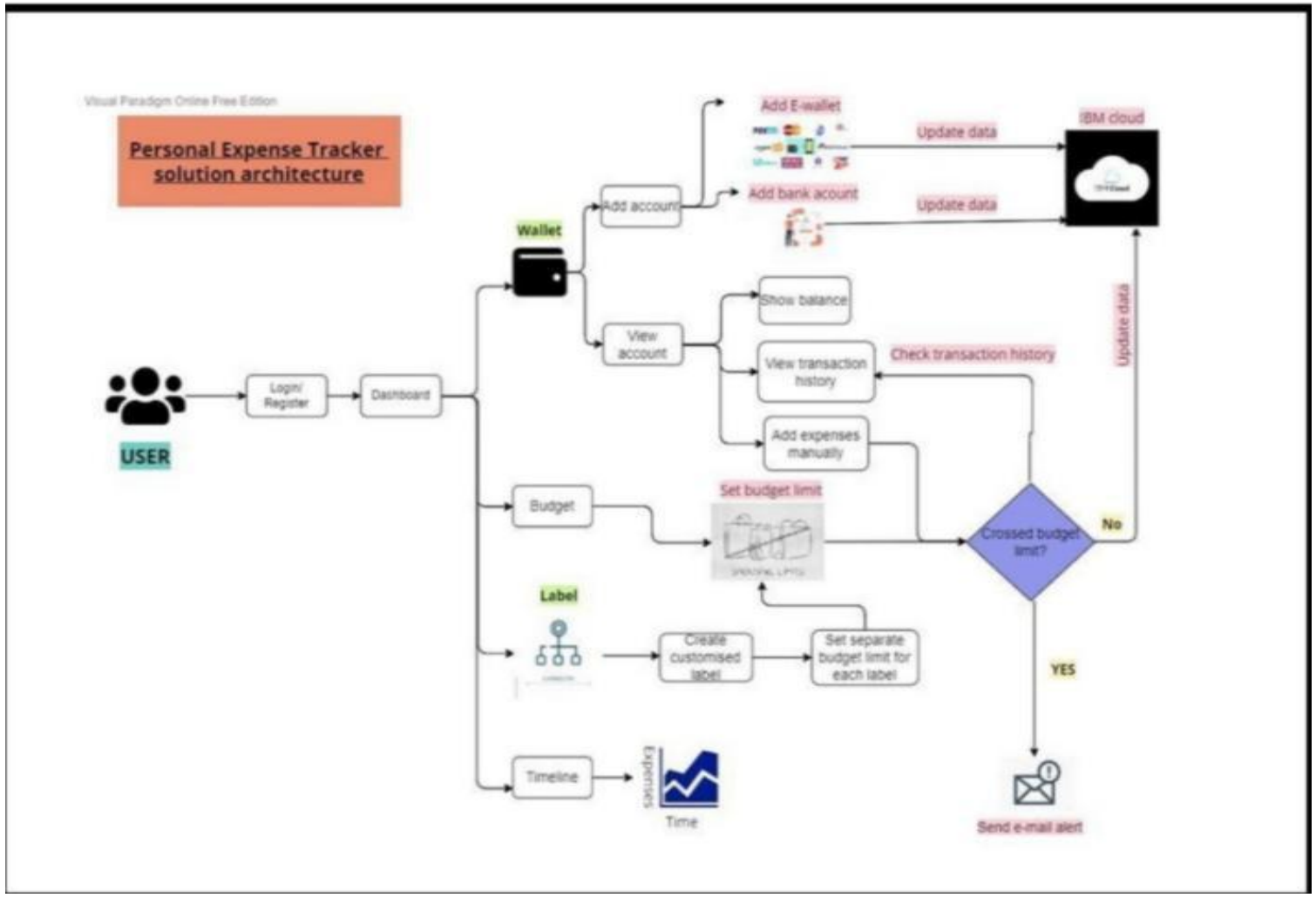



User's Details
Register
Manage user's Details
Stores the Customer Details
Email &Password
Login
Email & Password Verification
User
Income
Manage Income
Insert Income
Send an Email alert if expenses made above the limit
Expense
Manage Expenses
Insert Expenses
Receive Expense Report
Produce Report
Expense Report
Receive Budget Report
Budget Report

miro

5.2. Solution & Technical Architecture:

Solution Architecture:-



Technical Architecture:-

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

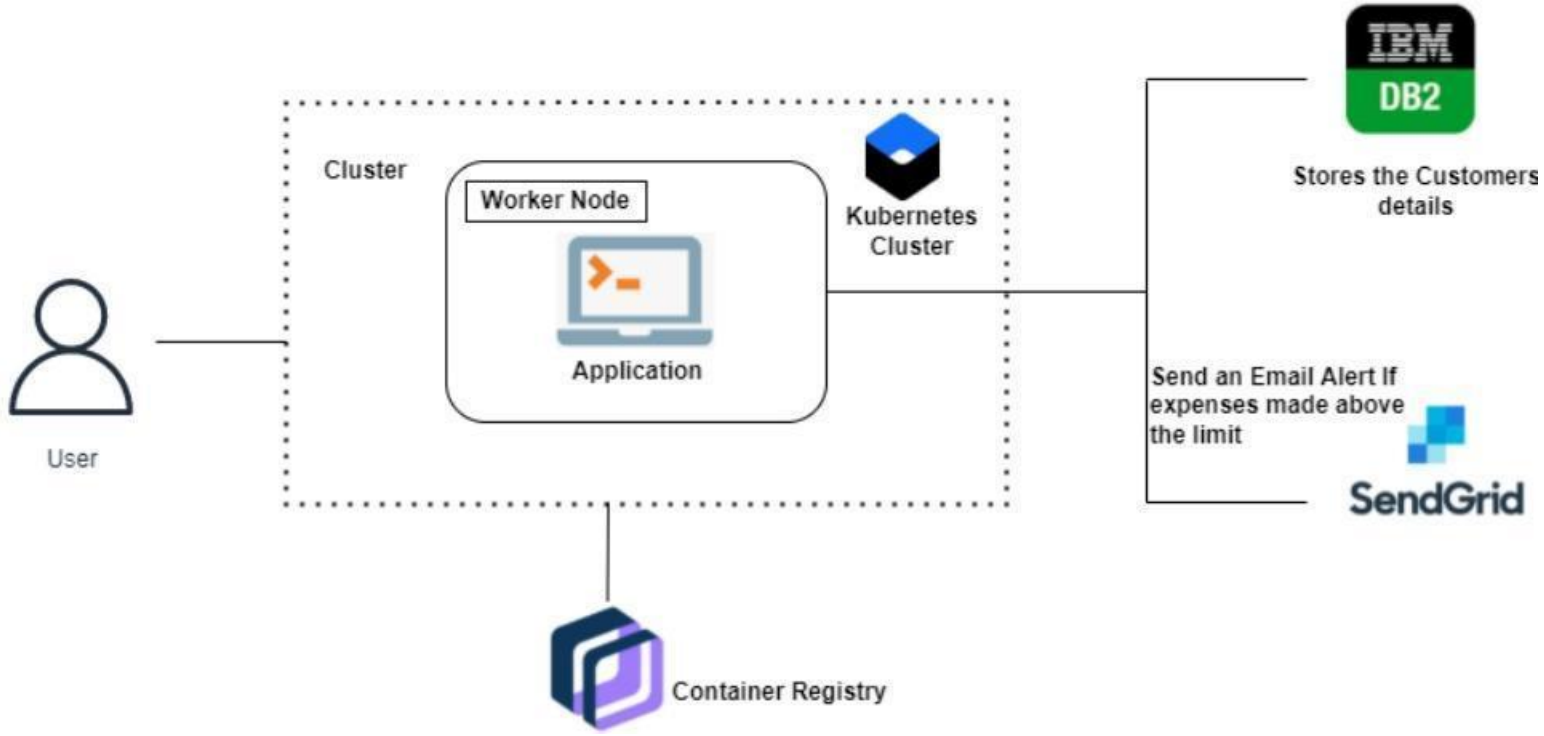


Table-1: Components & Technologies:

S.No.	Component	Description	Technology
1.	User Interface	The user can Interact with the application with use of Chatbot	HTML, CSS, JavaScript / Angular Js / React Js etc.
2.	Application Logic-1	The application contains the sign in/sign up where the user will login into the main dashboard	Java / Python
3.	Application Logic-2	Dashboard contains the fields like Add income, Add Expenses, Save Money	IBM Watson STT service
4.	Application Logic-3	The user will get the expense report in the graph form and also get alerts if the expense limit exceeds	IBM Watson Assistant, SendGrid
5.	Database	The Income and Expense data are stored in the MySQL database	MySQL, NoSQL, etc.
6.	Cloud Database	With use of Database Service on Cloud, the User data are stored in a well secured Manner	IBM DB2, IBM Cloud and etc.
7.	File Storage	IBM Block Storage used to store the financial data of the user	IBM Block Storage or Other Storage Service or Local Filesystem

Table-2: Application Characteristics:

S.No.	Characteristics	Description	Technology
1.	Open-Source Frameworks	Flask Framework in Python is used to implement this Application.	Python-Flask
2.	Security Implementations	This Application Provides high security to the user financial data. It can be done by using the Container Registry in IBM cloud	Container Registry, Kubernetes Cluster
3.	Scalable Architecture	Expense Tracker is a life time access supplication. It's demand will increase when the user's income is high	Container Registry, Kubernetes Cluster
4.	Availability	This application will be available to the user at any part of time	Container Registry, Kubernetes Cluster
5.	Performance	The performance will be high because there will be no network traffics in the application	Kubernetes Cluster

5.3. User Stories:-

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account /dashboard	High	
	Login	USN-2	As a user, I can log into the application by entering email & password	I can access the application	High	
	Dashboard	USN-3	As a user I can enter my income and expenditure details.	I can view my daily expenses	High	
Customer Care Executive		USN-4	As a customer care executive, I can solve the log in issues and other issues of the application.	I can provide support or solution at any time 24*7	Medium	

Administrator	Application	USN-5	As an administrator I can upgrade or update the application.	I can fix the bug which arises for the customers and users of the application	Medium	

6.PROJECT PLANNING AND SCHEDULING

6.1. SPRINT PLANNING AND ESTIMATION:

Project Tracker, Velocity & Burndown Chart: (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) pe iteration unit (story points per day)

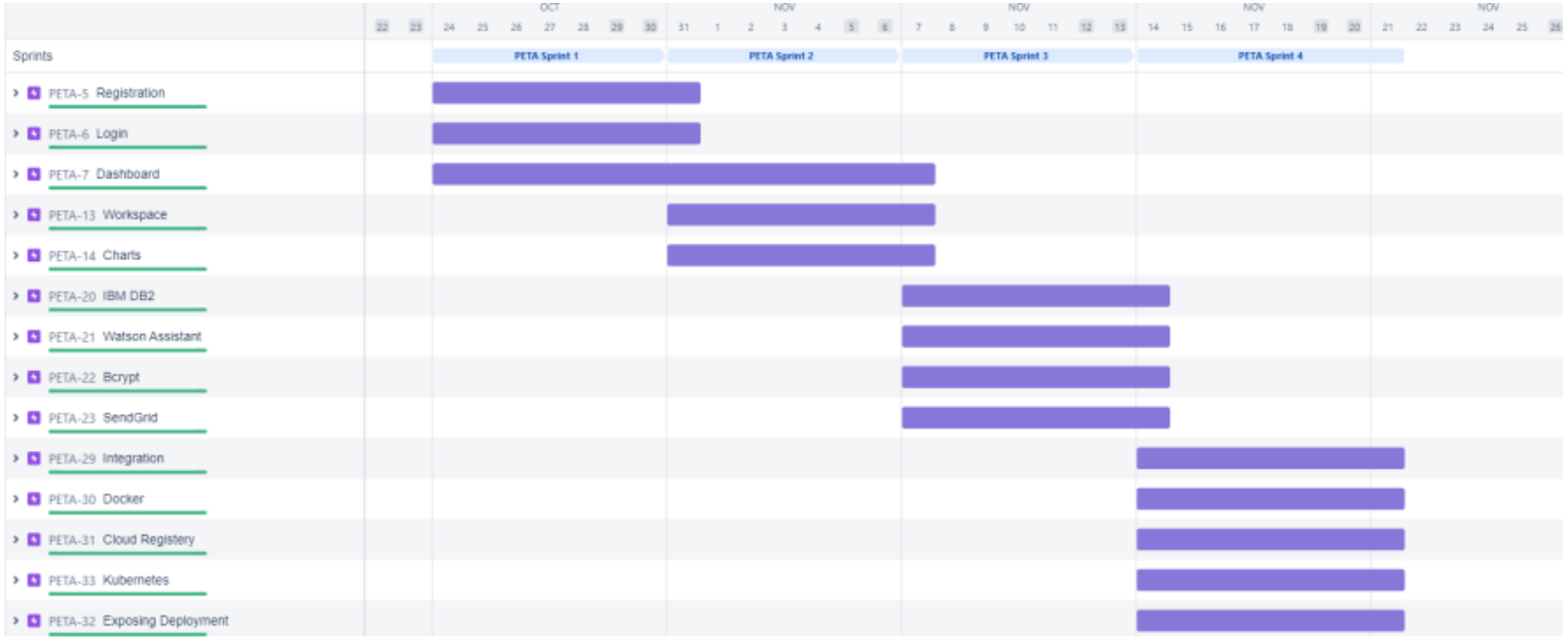
$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

6.2. SPRINT DELIVERY SCHEDULE

SPRINTS	FUNCTIONAL REQUIREMENT	USER STORY NO.	USER STORY	STORY POINTS	PRIORITY	TEAM MEMBERS
ST–1	User Registration	USN-1	Create an account for the users to get access to all the features	9	High	Aswath Swasun P Gurusaran M Srivathsan V Santhasa Rooban M
ST–1	User Wallets	USN-2	Wallets hold the users money	8	High	Srivathsan V Santhasa Rooban M
ST–1	User Category Management	USN-3	Users can customize their income and expense categories	9	High	Aswath Swasun P
ST–2	User Income	USN-4	Users can attach their income to the wallets	6	Low	Santhasa Rooban M
ST–2	User Expenses	USN-5	Users can deduct their amount from the wallets	3	Low	Gurusaran M Srivathsan V
ST–2	User Budget Alerts	USN-6	Users can set alerts and limit their expenses	6	Medium	Srivathsan V
ST–3	Analytics	USN-7	Users can get a visualization on their income and expenses	8	High	Aswath Swasun P Gurusaran M Santhasa Rooban M
ST–3	Multilingual Support	USN-8	Users should be able to use the application in their languages	5	Low	Aswath Swasun P Santhasa Rooban M
ST–3	File Management	USN-9	Users should be able to attach files to their income or expenses	8	Medium	Gurusaran M
ST–3	Economic News	USN-10	Users should be alerted with economic news	6	Low	Santhasa Rooban M
ST–4	Debt and Investment Calc	USN-11	Users can calculate their returns and risks	9	High	Aswath Swasun P Gurusaran M Srivathsan V

ST–4	Dockerization and Deploy the application	USN-13	Container the application and deploy to the kubernetes cluster	11	High	Aswath Swasun P Gurusaran M Srivathsan V Santhasa Rooban M

6.3. REPORT FROM JIRA:-



7. CODING & SOLUTIONING

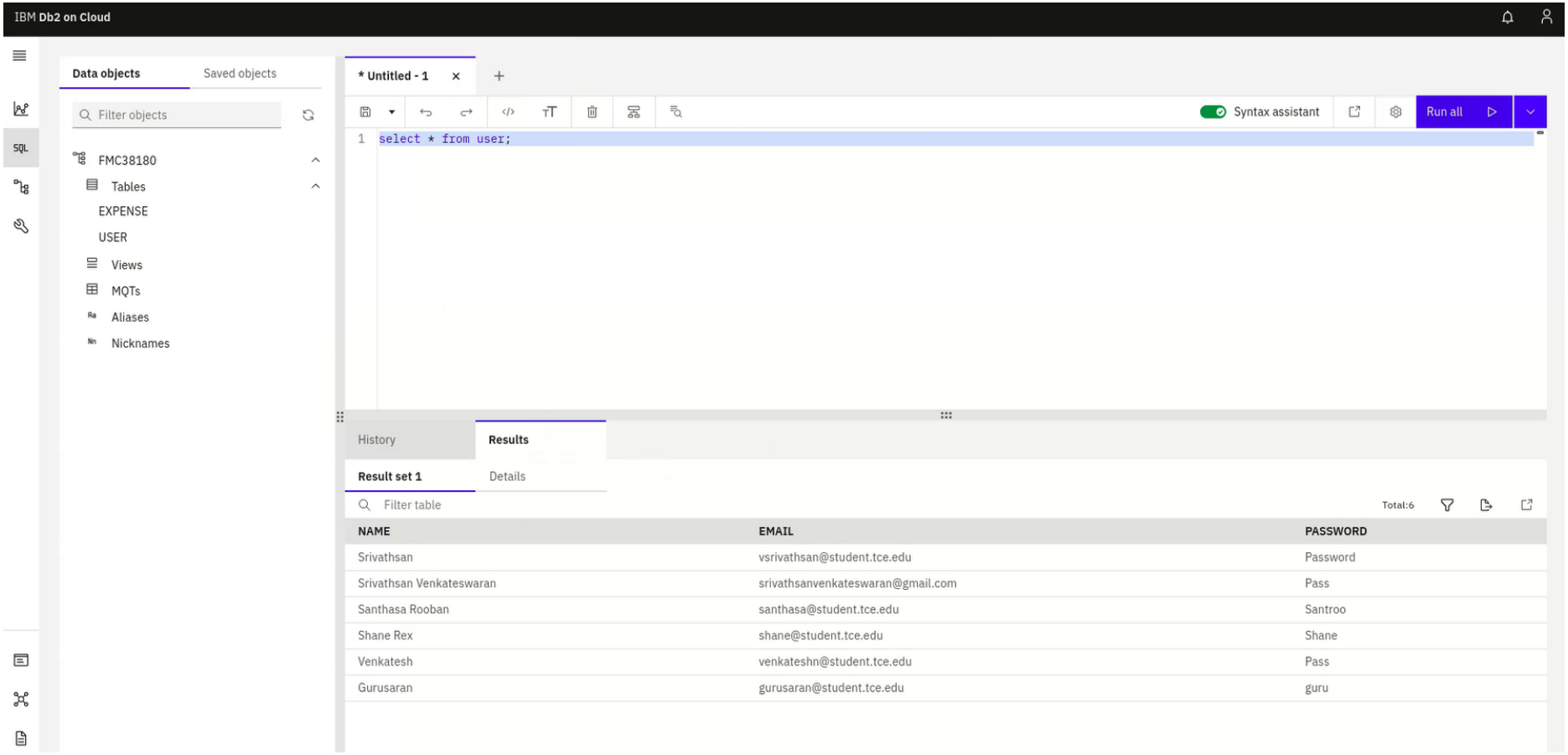
7.1 Code

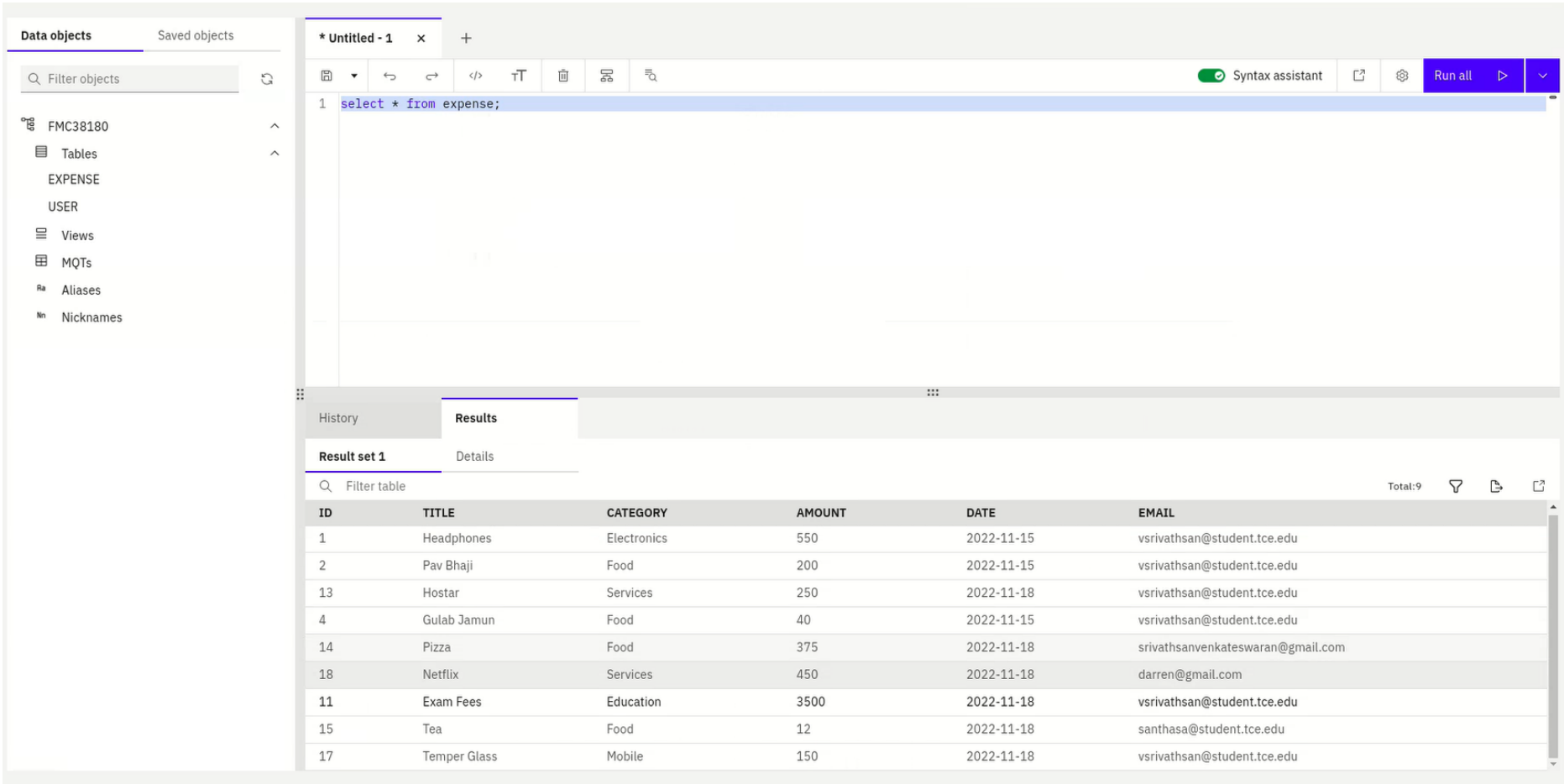
```
from flask import Flask

from flask_mail import Mail, Message


# SENDER's and RECEIVER's mail have been hidden for privacy reasons


app = Flask(__name__)

mail = Mail(app)


# configuration of mail

app.config['MAIL_SERVER']='smtp.gmail.com'

app.config['MAIL_PORT'] = 465

app.config['MAIL_USERNAME'] = 'SENDER_MAIL'

app.config['MAIL_PASSWORD'] = '*****'
```

```
app.config['MAIL_USE_TLS'] = False
app.config['MAIL_USE_SSL'] = True
mail = Mail(app)


# message object mapped to a particular URL ‘/’
@app.route("/")
def index():
   msg = Message(
                        'Hello',
                        sender ='SENDER_MAIL',
                        recipients = ['RECEIVER_MAIL']
                    )
   msg.body = 'Hello Flask message sent from Flask-Mail'
   mail.send(msg)
   return 'Sent'
```

```
if __name__ == '__main__':
    app.debug = True
    app.run()
```

7.2 Database Schema

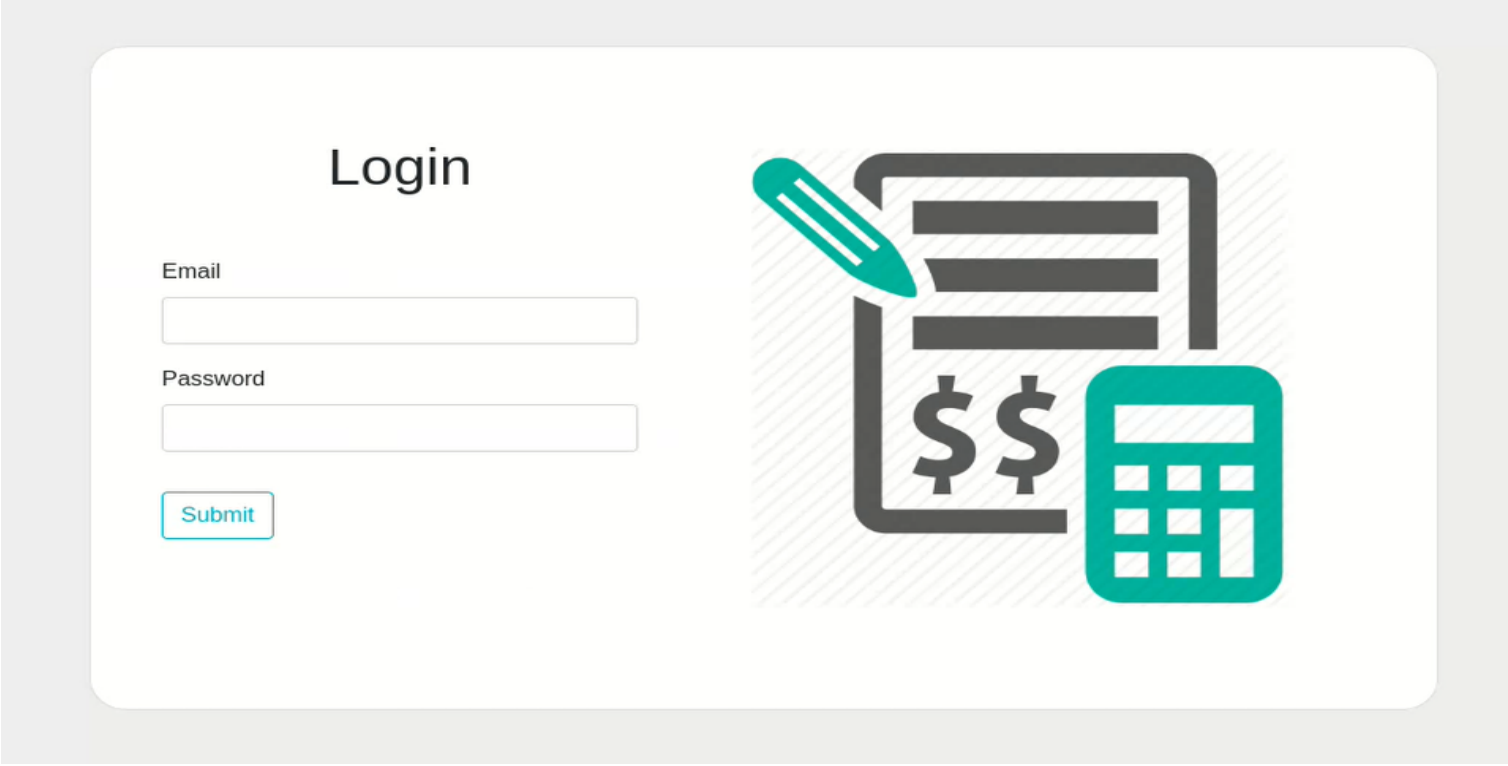



Data objects
Saved objects
Filter objects
FMC38180
Tables
EXPENSE
USER
Views
MQTs
Aliases
Nicknames
* Untitled - 1
Syntax assistant
Run all
1 select * from expense;
History
Results
Result set 1
Details
Filter table
Total:9
ID TITLE CATEGORY AMOUNT DATE EMAIL
1 Headphones Electronics 550 2022-11-15 vsrivathsan@student.tce.edu
2 Pav Bhaji Food 200 2022-11-15 vsrivathsan@student.tce.edu
13 Hostar Services 250 2022-11-18 vsrivathsan@student.tce.edu
4 Gulab Jamun Food 40 2022-11-15 vsrivathsan@student.tce.edu
14 Pizza Food 375 2022-11-18 srivathsanvenkateswaran@gmail.com
18 Netflix Services 450 2022-11-18 darren@gmail.com
11 Exam Fees Education 3500 2022-11-18 vsrivathsan@student.tce.edu
15 Tea Food 12 2022-11-18 santhasa@student.tce.edu
17 Temper Glass Mobile 150 2022-11-18 vsrivathsan@student.tce.edu

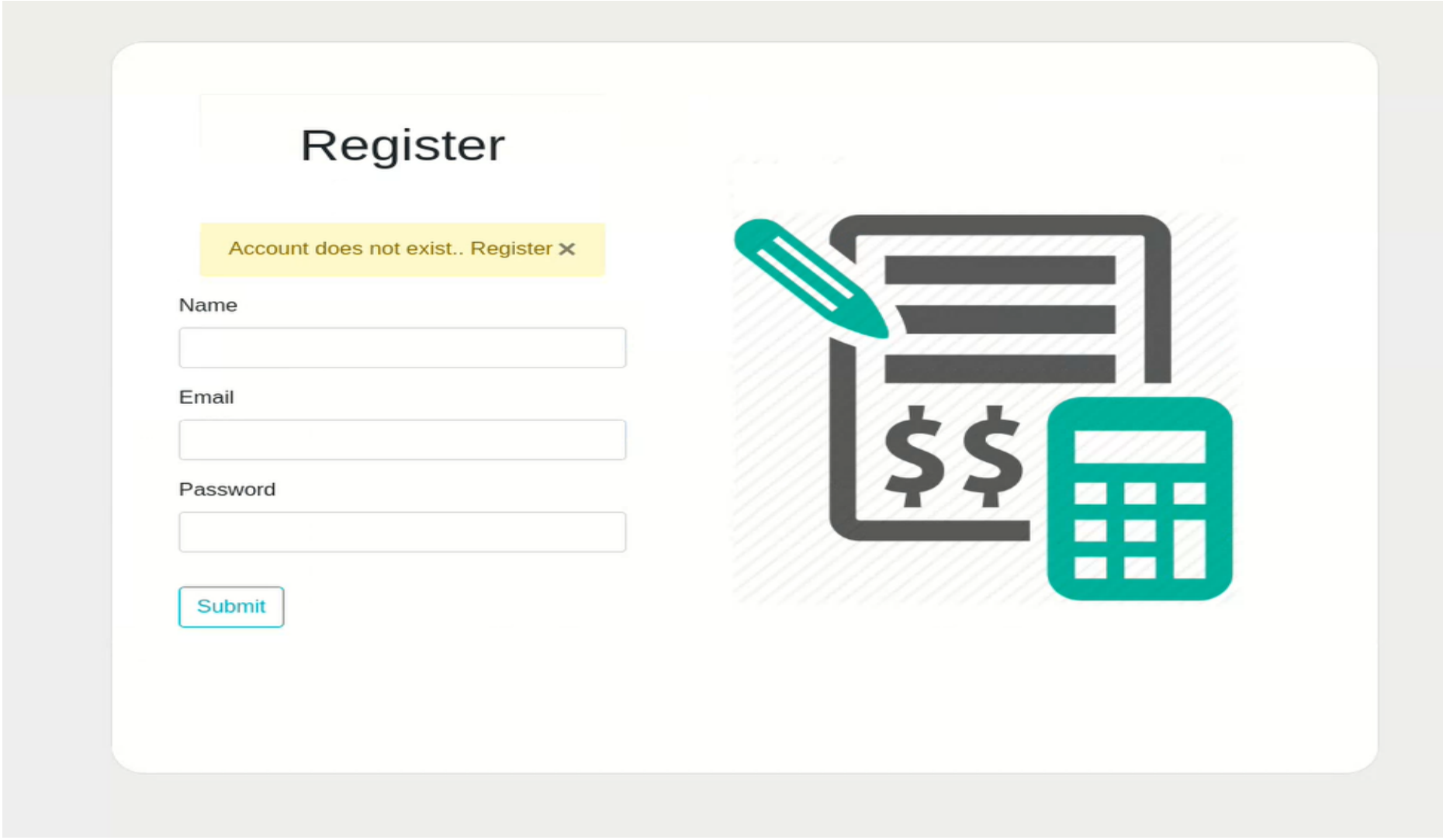
8. RESULT

- The user should register the account with name and email id then the user is able to sign in the account.
- Then the user is able to add the new expenses with respective details.
- Later users are also able to alter the expenses like deleting the unwanted expensive tracking.

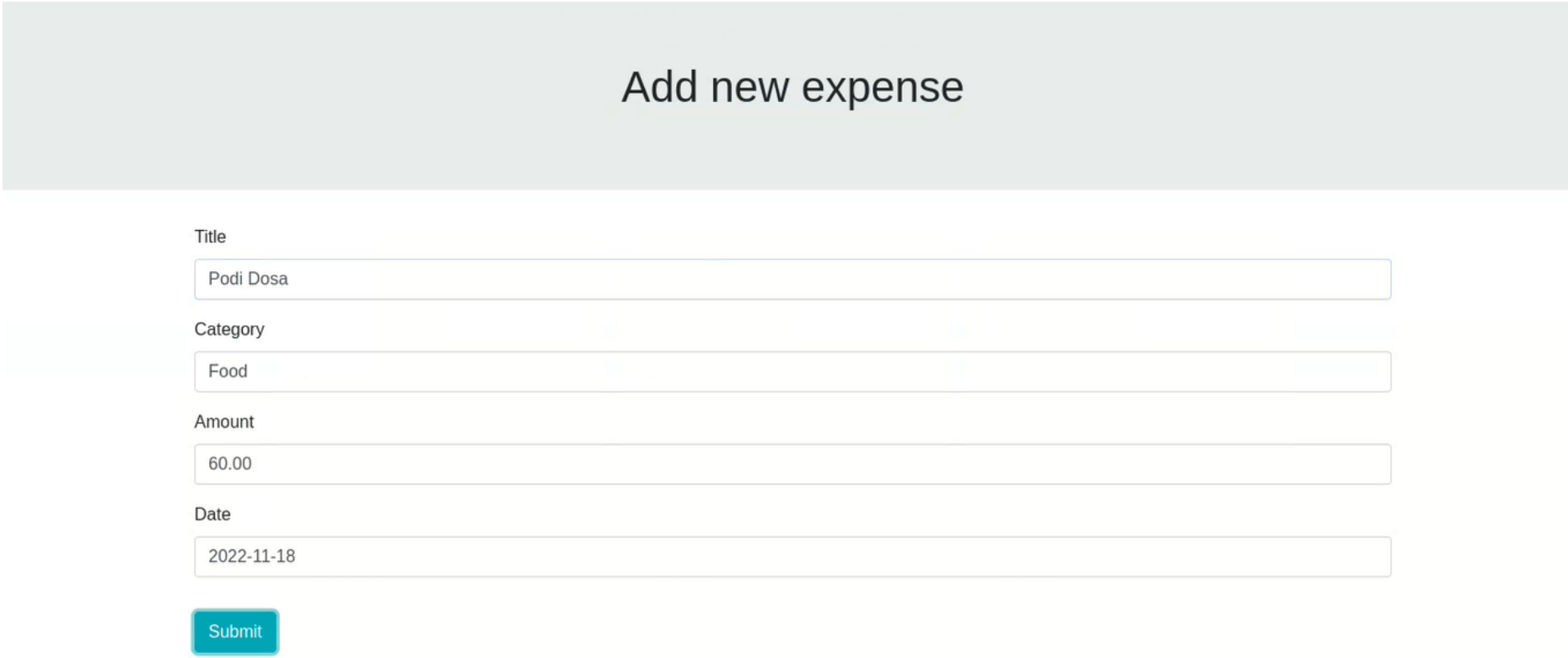
Sign in



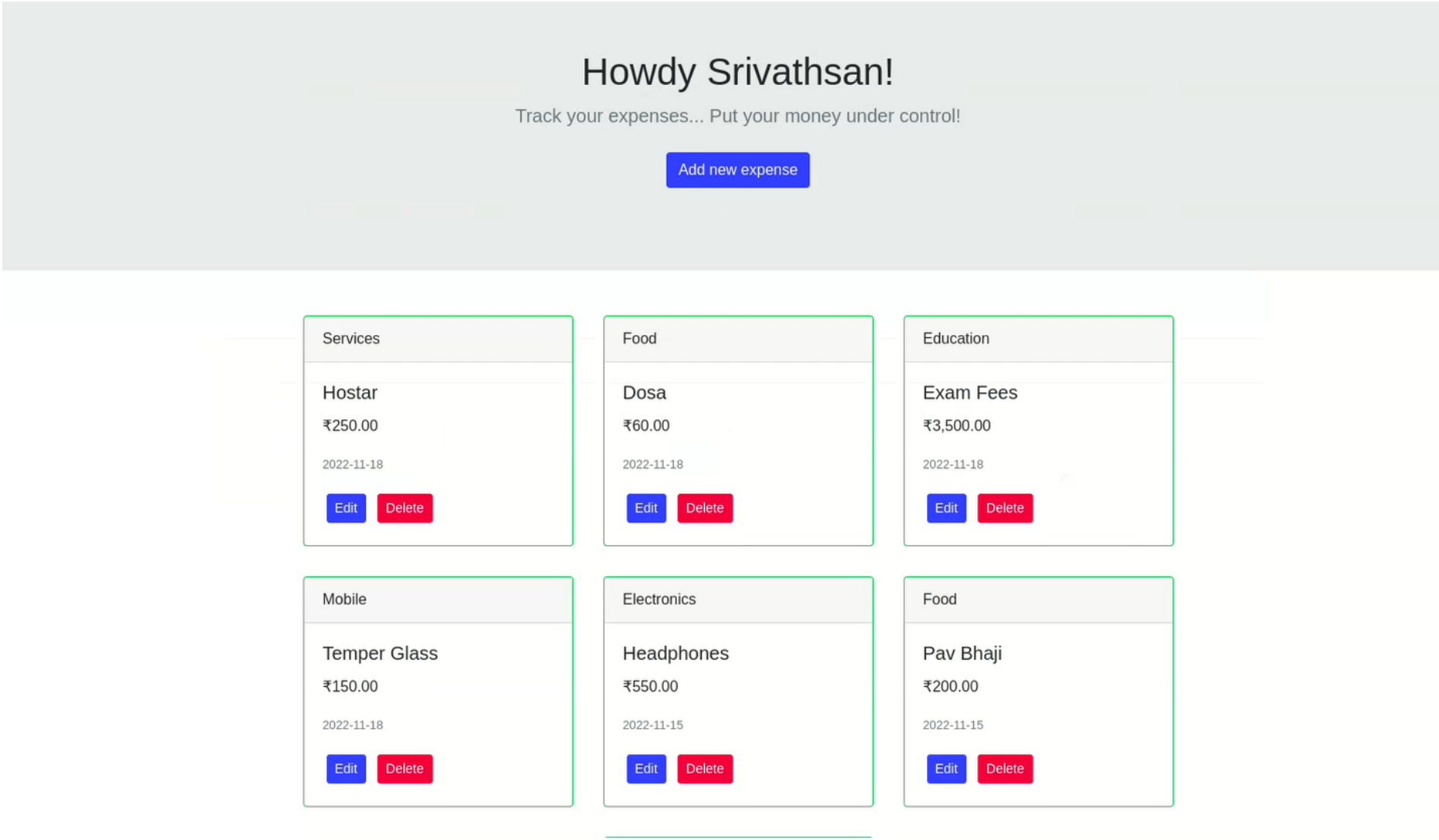
Sign Up


Register
Account does not exist.. Register ×
Name
Email
Password
Submit

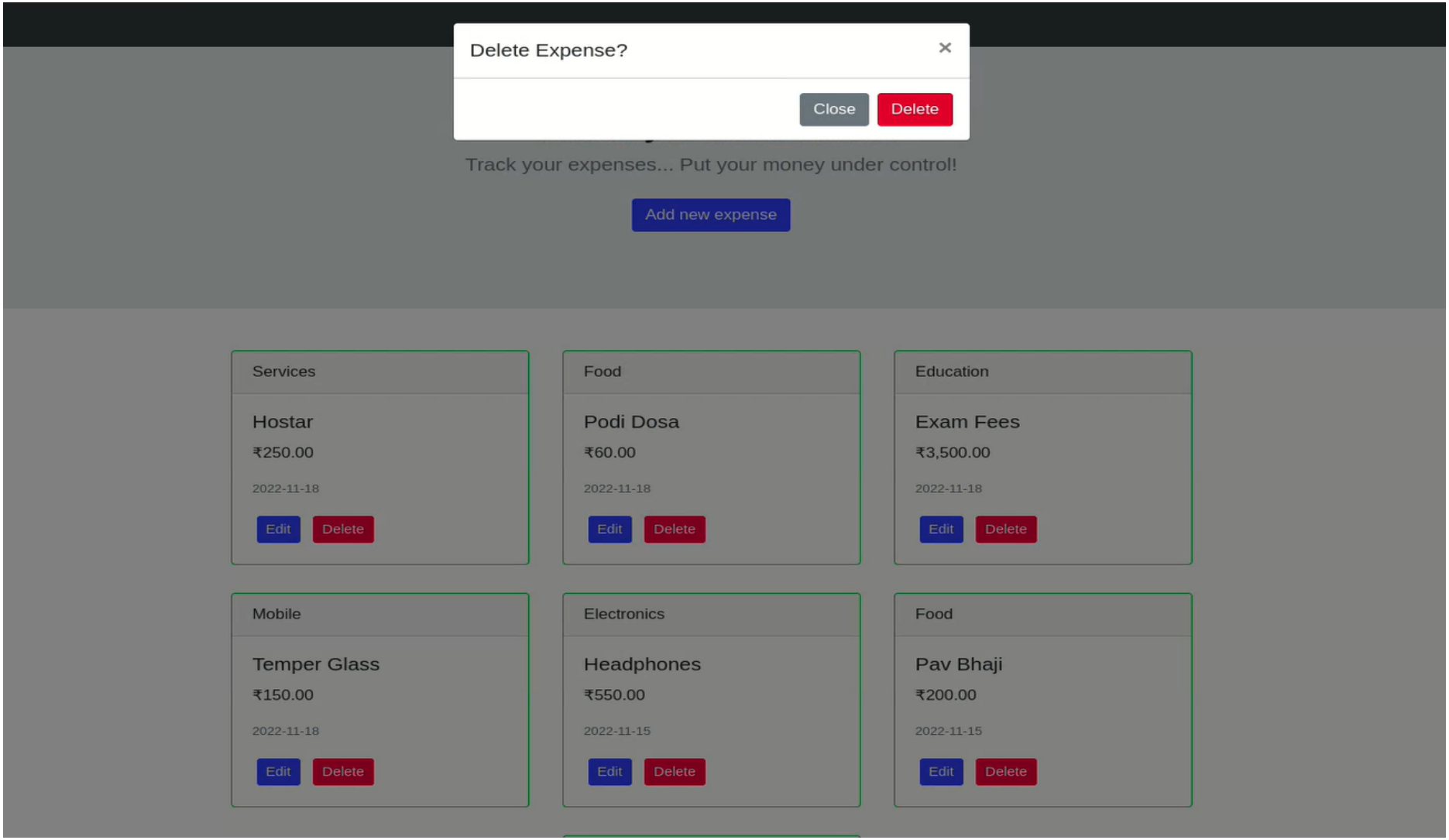
Adding new Expenses



Tracking the Expenses



Altering the Expenses



9. ADVANTAGES AND DISADVANTAGES

Advantages

One of the major pros of tracking spending is always being aware of the state of one's personal finances. Tracking what you spend can help you stick to your budget, not just in a general way, but in each category such as housing, food, transportation and gifts. While a con is that manually tracking all cash that is spent can be irritating as well as time consuming, a pro is that doing this automatically can be quick and simple. Another pro is that many automatic spending tracking software programs are available for free. Having the program on a hand-held device can be a main pro since it can be checked before spending occurs in order to be sure of the available budget.

Disadvantages

A con with any system used to track spending is that one may start doing it then taper off until it's forgotten about all together. Yet, this is a risk for any new goal such as trying to lose weight or quit smoking. If a person first makes a budget plan, then places money in savings before spending any each new pay period or month, the tracking goal can help. In this way, tracking spending and making sure all receipts are accounted for only needs to be done once or twice a month. Even with constant tracking of one's spending habits, there is no guarantee that financial goals will be met. Although this can be considered to be a con of tracking spending, it could be changed into a pro if one makes up his or her mind to keep trying to properly manage all finances.

10. CONCLUSION

From this project, we are able to manage and keep tracking the daily expenses as well as income. While making this project, we gained a lot of experience of working as a team. We discovered various predicted and unpredicted problems and we enjoyed solving them a lot as a team. We adopted things like video tutorials, text tutorials, internet and learning materials to make our project complete.

11. FUTURE SCOPE

The project assists well to record the income and expenses in general.However, this project has some limitations:

- The application is unable to maintain the backup of data once it is uninstalled.
- This application does not provide higher decision capability.

To further enhance the capability of this application, we recommend the following features to be incorporated into the system :

- Multiple language interfaces.
- Provide backup and recovery of data.
- Provide a better user interface for user.
- Mobile apps advantage.

12. APPENDIX

Github Link :

https://github.com/IBM-EPBL/IBM-Project-25349-1659960135

Project Demo Link :

https://drive.google.com/file/d/1JOhHJKtwFXI05gS1WlFUQQqH4KRtfC16/view?usp=sharing