



**RMK ENGINEERING COLLEGE**



**(An Autonomous Institution)**

**R.S.M. Nagar, Kavaraipettai-601 206, Gummidipoondi Taluk,  
Thiruvallur District.**

**NALAIYA THIRAN PROJECT**

**PERSONAL EXPENSE TRACKER**

**DONE BY**

**TEAM ID: PNT2022TMID15893**

**VAYUGANDLA NEELIMA (111719104172)**

**VANKADARU LEELA SATHVIKA (111719104169)**

**SHAIK SAFEENA (111719104140)**

**S PRAGNASYA (111719104151)**

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# 1. INTRODUCTION

## 1.1 Project Overview

The web application “Personal Expense Tracker” is developed to manage the daily expenses in a more efficient and manageable way. By using this application, we can reduce the manual calculations of the daily expenses and keep track of the expenditure. In this application, user can provide his income to calculate his total expenses per day and these results will be stored for each user. Sometimes we can't remember where our money goes. And we can't handle our cash flow.

For this problem, we need a solution that everyone can manage their expenses. So, we decided to find an easier way to get rid of this problem. So, our application attempts to free the user with as much as possible the burden of manual calculation and to keep the track of the expenditure. Instead of keeping a diary or a log of the expenses, this application enables the user to not just keep the control on the expenses but also to generate reports and analysis

With the help of this application, the user can manage their expenses on a daily, weekly, monthly, and yearly basis. Users can insert and delete transactions as well as can generate reports and analysis.

The graphical representation of the application along with the reminders and loan tracking is the main part of the system as it makes a full-fledged application of managing all the tasks.

## 1.2 Purpose

The main purpose of this application is to provide the customers with all the abilities to manage their personal expenses. For an average individual, it is very difficult to track expenses as it takes a long time because there are way too many expenses to track. It is not feasible to manage personal transactions in various accounts as it is not trackable because there are various payment options to consider. This makes it hard to save money because of high unmanageable expenditures. It is also difficult to calculate the taxes because needs statistical thinking and management of various assets such as vehicles, properties, salary etc. Users try to analyze expenses, but they can't do it efficiently because it may involve a lot of data and graphical representations which makes it complicated. Users feel frustrated, confused, stressed etc. which makes them give up.

## 2. LITERATURE SURVEY

Project Title	Publisher	Advantages	Disadvantages
Expenditure Management System	Journal Of Engineering, Computing & Architecture	It provides reminders to assist user to track the project	Lacks in providing the savings analysis and records
Expense Tracker: A Smart Approach to Track	EasyChair Preprint	It provides the user to choose an expense category and add additional info such as a photo, a location, expense made.	The application is not user friendly and lacks in UI.
Expense Tracker	IJARSCT	The application they proposed allows users to keep up a digital automated diary.	Security provided by the application is low.
Application for Predictive Recommendation and Visualization of Personal Expenses	Darsh Shah, Sanay Shah, Ritik Savani	They offer shortcut and indicators to the consumer to go into the ordinary expenses from time to time	The tracking of loans and reminders is not provided
Daily Expense Tracker	Muskaan Sharma <sup>1</sup> , Ayush Bansal <sup>2</sup>	They used ReactJS to make it feasible for builders to broaden User Interfaces (UI) without difficulty via way of means of dividing it into diverse additives and additionally to develop fast systems	The analysis reports the expenses and savings is not generated.
A Review on Budget Estimator Android Application	Namita Jagtap, Priyanka Joshi, Aditya Kamble	This utility is meant to run on android tool specifically clever phone.	No specific usage of Chabot in the cloud or the usage of any helping service that would serve the expense customers

## 2.1 Existing problem

The main purpose of this application is to provide the customers with all the abilities to manage their personal expenses. In the existing problem they proposed an expense tracker that will maintain all the expenses record of users and manage them efficiently. The user can choose an expense category and provide additional information such as a photo, a location, and the amount of the expense, among other things. This will save the information to the local database. The user can examine and sort expenses on a weekly, monthly, or annual basis. By utilizing this, they reduced the quantity of manual calculations for their expenses and maintain track of their spending. The user can enter his income to compute his total daily expenses, and the data will be saved for each individual user. This tracker could be useful for people who frequently go on trips or to the theatre with their buddies. This tracker will make it easier for them to disburse the bill. This will show the graph in the chosen view.

To reduce manual calculations, they proposed an application. The application they proposed allows users to keep up a digital automated diary. Each user is going to be required to register on the system at registration time, the user is going to be provided id, which is able to be went to maintain the record of every unique user. Expense Tracker application which can keep a track of IncomeExpense of a user on each day-to-day basis. the most effective organizations have the way of tracking and handling these reimbursements. This ideal practice guarantees that the expenses tracked are accurately and in an exceedingly timely manner. From a corporation perspective, timely settlements of those expenses when tracked well will boost employees' morale. Additional feature of Expense and income prediction helps to higher budget management

Every day in our lives we have a tendency to invest in distinct styles of things. A massive quantity may be remembered and additionally helps in the very last tallying of the costs and earnings. But the smaller costs pass unattended, and people small quantities eventually lead to a massive amount of cash being misplaced or spent. As a result, an overall comprehension of man or woman budget is getting progressively extensive because the regular human being's disposable earnings has dwindled due to a converting monetary atmosphere. For the nice OCR results, a couple of schooling and checking out photographs could be required with guide efforts to accurate the textual content fetched from the receipts without a fix/established format. In assessment to the numerous gift apps to be had at the Play Store and AppStore for iOS, we described a few base parameters primarily based totally on their certain evaluation with the add-on of the prediction fashions to set it unique with inside the market.

## 2.2 References

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- [8]. B. B. Chaudhuri and U. Pal, "An OCR system to read two Indian language scripts: Bangla and Devnagari (Hindi)", Document Analysis and Recognition 1997.
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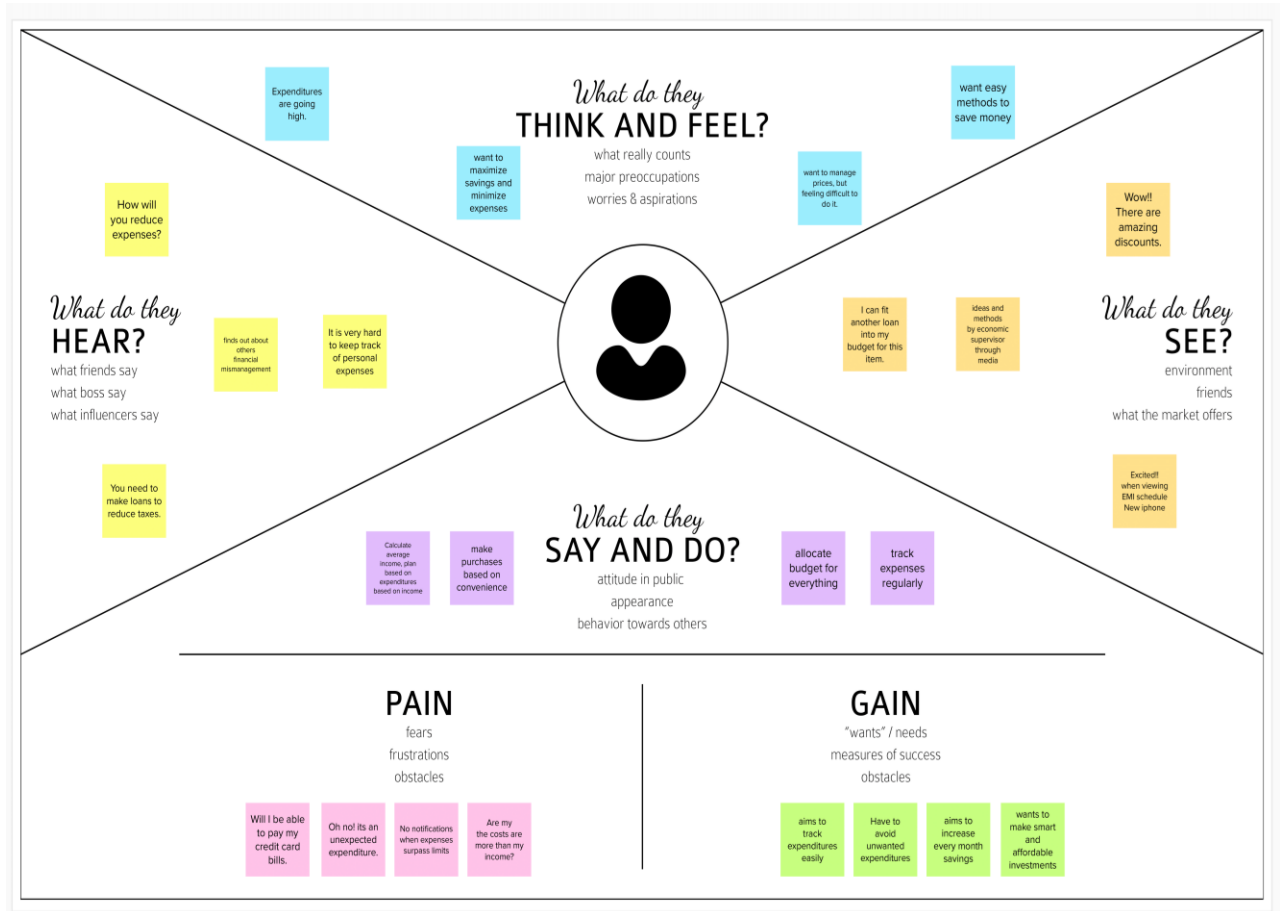
## 2.3 Problem Statement Definition

In order to guide the customers to manage all the expenses in their everyday life, a personal expense tracker has to be introduced to provide people with the best solution possible. The users are the customers who need to manage expenses, and guide them through the various features of the application. So, an enhanced and smarter way of interaction with the customers has to be built to ensure efficient way of managing the expenses. In order to overcome the user satisfaction issues associated with tracking services, a Chatbot will provide personal and efficient communication between the users. It is built to be the managing system that can facilitate customers to track expenses, add savings, loan management and getting reminders for the same.

### 3. IDEATION & PROPOSED SOLUTION

#### 3.1 Empathy Map Canvas

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviors and attitudes. It is a useful tool to help teams better understand their users. Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.





## 3.2 Ideation & BrainStorming

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions.

### Brainstorm & idea prioritization

Personal Expense Tracker (Cloud App Development)

10 minutes to prepare  
1 hour to collaborate  
3-8 people recommended

Share template feedback

**Before you collaborate**

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

10 minutes

- Team gathering**  
Invite who should participate in the session and send an invite. Share relevant information or pre-work ahead.
- Set the goal**  
Think about the problem you'll be focusing on solving in the brainstorming session.
- Learn how to use the facilitation tools**  
Use the Facilitation Superpowers to run a happy and productive session.

Open article

**Define your problem statement**

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

5 minutes

How might we track expenses of user?	How might we help user to manage the expenses?
How do we create analysis that user can understand easily?	What kind of graphs should we make use of?
How might we integrate various finance or expenditure into the app?	How might we alert users about the due dates for various payments?
How might we help users increase savings?	How to manage personal transactions?
How might we calculate loans?	How might we manage provident fund?
How might we track user bills?	How might we maintain security of user data?

Need some inspiration?

Here is a sample screen of the Personal Expense Tracker app. Use this as a guide to brainstorm your ideas.

Share example

**Brainstorm**

Write down any ideas that come to mind that address your problem statement.

10 minutes

**Group ideas**

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

20 minutes

**V. Neelima**

- Maintain offline expenditure using bills
- Manually enter expenses for expenditure without bills
- Add a financial news updates
- Tracking taxes for various assets
- Adding recurring expense details
- Reminders for recurring expenses
- user friendly UI/UX

**V. Leela Sathvika**

- Show tips for saving money
- Make loan record various payment accounts of the financial (credit card etc)
- set limit for each payment option
- Alert user on exceeding payment option limits
- Display analysis and graphs for payment options
- Multi-factor authentication
- Token authentication approach
- Easy Accessibility

**S. Pragnasya**

- Maintain user contacts
- manually enter transactions to user contacts
- set salary of user
- salary based tracking and analysis
- set expense per month/year and set when exceeding
- reminders for paying to contacts
- High level encryption and decryption strategies
- using animated interactions

**S. Safeena**

- Add loan details like amount, interest etc.
- Add Provident fund details
- Auto update of details monthly
- loan tracking on amount paid and amount left
- Add reminders and notifications when approaching due dates for loans
- Loan analysis and graphs
- Professional Colour Schemes

**Records**

- maintain record various payment accounts of the financial (credit card etc)
- Maintain user contacts
- Add Provident fund details
- Add loan details like amount, interest etc.
- Adding recurring expense details
- Auto update of details monthly
- Maintain offline expenditure using bills

**Security**

- Multi-factor authentication
- Token authentication approach
- High level Encryption and decryption strategies

**Alerts & reminders**

- Reminders for recurring expenses
- Alert user on exceeding payment option limits
- Add reminders and notifications when approaching due dates for loans
- reminders for paying to contacts

**User Experience**

- user friendly UI/UX
- using animated interactions
- Professional Colour Schemes
- Easy Accessibility
- Manually enter expenses for expenditure without bills
- manually enter transactions to user contacts

**Tracking & Analysis**

- Tracking taxes for various assets
- Display analysis and graphs for payment options
- salary based tracking and analysis
- Loan analysis and graphs
- loan tracking on amount paid and amount left

**Limits**

- set expense per month/year and set when exceeding
- set limit for each payment option
- set salary of user

**Extra Features**

- Add a financial news updates
- Show tips for saving money

4

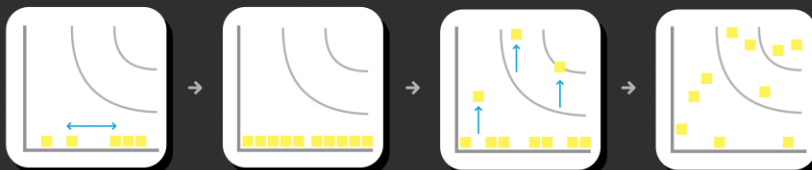
## Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

🕒 20 minutes

### TIP

Participants can use their cursors to point at where sticky notes should go on the grid. The facilitator can confirm the spot by using the laser pointer holding the **H** key on the keyboard.



### Shortlisted Ideas

- Idea 1: Make it user friendly
- Idea 2: Collect only the required details from the customer.
- Idea 3: Build pre-requisite questions for queries regarding some type of loan.

### 3.3. Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	<p>For an average individual, It is very difficult to track expenses as it takes a long time because there are way too many expenses to track. It is not feasible to manage personal transactions in various accounts as it is not trackable because there are various payment options to consider. This makes it hard to save money because of high unmanageable expenditures. It is also difficult to calculate the taxes because needs statistical thinking and management of various assets such as vehicles, properties, salary etc. Users try to analyze expenses but they can't do it efficiently because it may involve a lot of data and graphical representations which makes it complicated. Users feel frustrated, confused, stressed etc. which makes them give up.</p>
2.	Idea / Solution description	<p>The solution to the problems described is a personal expense tracker application with capabilities for analysis and graphical implementations. Users can add their expenses, their payment options, contacts, loans, reminders, EMIs etc which are also tracked and manageable by the user. Detailed graphs are generated as per user convenience. Limits can be set for each payment option and salary. Alerts are provided when expenditure reaches the set limit. This application can also be used to calculate taxes, provident fund and deposits.</p> <p>The application also provides tips to save money and has a news section for financial updates. This application is user-friendly and has easy accessibility. Users can add recurring payments like rent, loans, etc, set due dates and be reminded from time to time. It is an all-round application to track a user's expenses that makes life easier.</p>
3.	Novelty / Uniqueness	<p>It allows users to generate graphs for various expenses. It allows to set limits on finances and be alerted. It reminds us of recurring payments. Helps calculate taxes.</p>

4.	Social Impact / Customer Satisfaction	It has a major impact on users as it helps them efficiently manage their finances. It reduces stress, anxiety and complication for users. It allows them to save considerable amount of money and time as time is money. It provides immense customer satisfaction as it is very user-friendly and is easily accessible. It is a place where user can find all expense and finance related stuff.
5	Business Model (Revenue Model)	The revenue is generated as users more users use the application.
6.	Scalability of the Solution	This application is very scalable as it can meet all the user's finance related demands

### 3.4. Problem Solution fit

Project Title: Personal Expense Tracker

Project Design Phase-I - Solution Fit Template

Team ID: PNT2022TMD15893

<b>1. CUSTOMER SEGMENT(S)</b> <span>CS</span> <p>1. Customers who are unable to keep track of their daily expenses.</p> <p>2. Customers who feel tracking expenses is a tedious and time-consuming task.</p> <p>3. Customers who find it difficult to calculate the taxes because it needs statistical thinking.</p>		<b>6. CUSTOMER CONSTRAINTS</b> <span>CC</span> <p>1. Too many payment options which is troublesome to maintain.</p> <p>2. Lost Receipts</p> <p>3. Insufficient reporting visibility.</p>		<b>5. AVAILABLE SOLUTIONS</b> <span>AS</span> <p>Before this application, customers used to note down the expenses using pen and paper. Noting down and calculating the expenses is a tedious work. It is also not in an organized and customized manner.</p>	
<b>2. JOBS-TO-BE-DONE / PROBLEMS</b> <span>J&amp;P</span> <p>1. Maintain various payment accounts (UPI, Credit Card etc.)</p> <p>2. Loan tracking on amount paid and amount left</p> <p>3. Multi-factor authentication</p> <p>4. Reminders for recurring expenses, paying contacts, and alert user on exceeding payment option limits</p> <p>5. Tips for saving money</p>	<b>9. PROBLEM ROOT CAUSE</b> <span>RC</span> <p>For an average individual, it is very difficult to track expenses as it takes a long time because there are way too many expenses to track. It is not feasible to manage personal transactions in various accounts as it is not trackable because there are various payment options to consider.</p>		<b>7. BEHAVIOUR</b> <span>BE</span> <p>This application alerts the customer with reminders if the salary exceeds the given limit and customer will be aware of how the amount has been spent in the month. With this alert, they can avoid some unwanted expenses and they can categorize their expenses correctly.</p>		
	<b>3. TRIGGERS</b> <span>TR</span> <p>It triggers the customers when they hear about the advantages and features of the application from their friends, news channels, social media.</p>		<b>10. YOUR SOLUTION</b> <span>SL</span> <p>The solution to the problems described is a personal expense tracker application with capabilities for analysis and graphical implementations. Users can add their expenses, their payment options, contacts, loans, reminders, EMIs etc. which are also tracked and manageable by the user. Detailed graphs are generated as per user convenience. Limits can be set for each payment option and salary. Alerts are provided when expenditure reaches the set limit. This application can also be used to calculate taxes, provident fund, and deposits.</p> <p>The application also provides tips to save money and has a news section for financial updates. This application is user-friendly and has easy accessibility. Users can add recurring payments like rent, loans, etc., set due dates and be reminded from time to time. It is an all-round application to track a user's expenses that makes life easier.</p>		
<b>4. EMOTIONS: BEFORE / AFTER</b> <span>EM</span> <p>1. Before using this application, customers feel frustrated to track the expenses because there are too many expenses to track.</p> <p>2. After using this application, customers can easily track their expense and can manage their personal transactions in various accounts.</p>		<b>8. CHANNELS of BEHAVIOUR</b> <span>CH</span> <p><b>8.1 ONLINE</b> As a cloud application, this app is totally run online and all data is stored on the cloud.</p> <p><b>8.2 OFFLINE</b> There is no offline channels for this application.</p>			

## 4. REQUIREMENT ANALYSIS

### 4.1 Functional requirement

The following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail
FR-2	User Confirmation	Confirmation via Email
FR-3	User Login	Authentication
FR-4	Dashboard	Small graph previews, news updates, monthly savings and expense previews.
FR-5	Navigation Side Menu	Nav buttons to all modules, Sign out, Settings and profile module
FR-6	Expense Tracker Module	Add Expense, Delete Expense, Modify Expense, View Expenditure Graph,
FR-7	Remainders Module	Add Remainder, Add Recurring Expense Payment Remainder, Add Loan Remainders
FR-8	Savings and Finance Module	Add Monthly income, Modify monthly income, Add Other sources of income, View Savings graph
FR-9	User Profile Module	Edit User Profile
FR-10	Settings Module	Edit settings

## 4.2 Non-Functional requirements

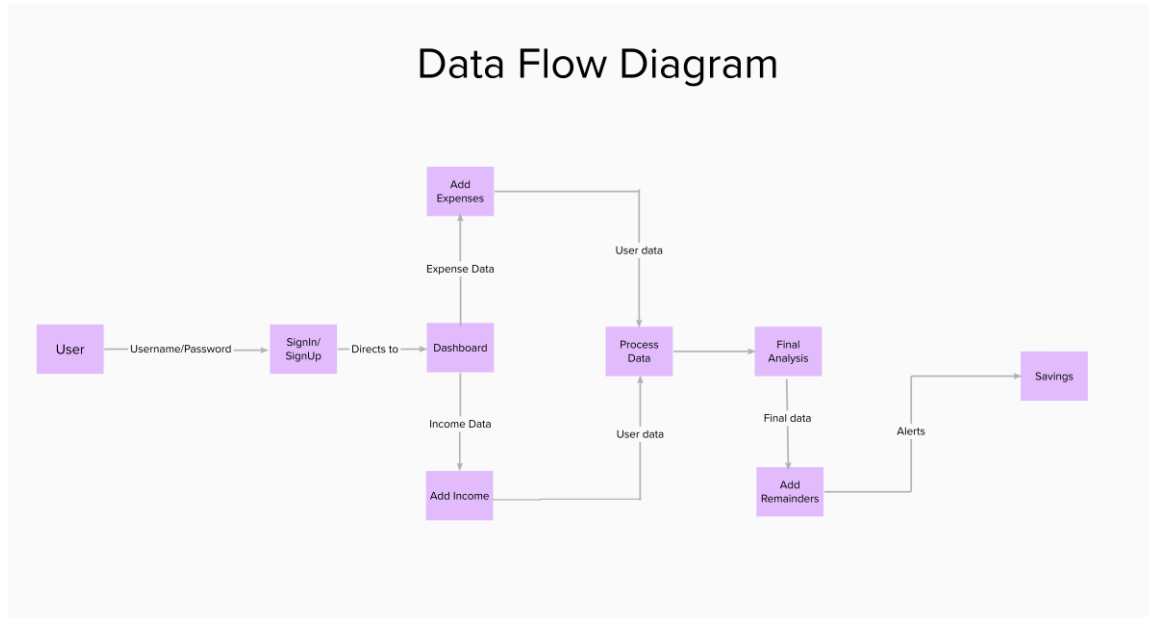
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	<b>Usability</b>	The solution is easy to use as the UI is made to be accessible and user-friendly. Easy navigation is provided through an integrated sidemenu and chatbot assistance.
NFR-2	<b>Security</b>	Application is highly secure as all data is encrypted using a secure encryption algorithm and user data is accessible only on authentication.
NFR-3	<b>Reliability</b>	Application is highly reliable as it is deployed with IBM cloud assistance.
NFR-4	<b>Performance</b>	Performance is stable and smooth as it is very light weight application built with flask.
NFR-5	<b>Availability</b>	It is available easily as it is deployed on the internet.
NFR-6	<b>Scalability</b>	Application is scalable as it uses IBM cloud resources and microservices architecture. Extensions and modifications are done easily.

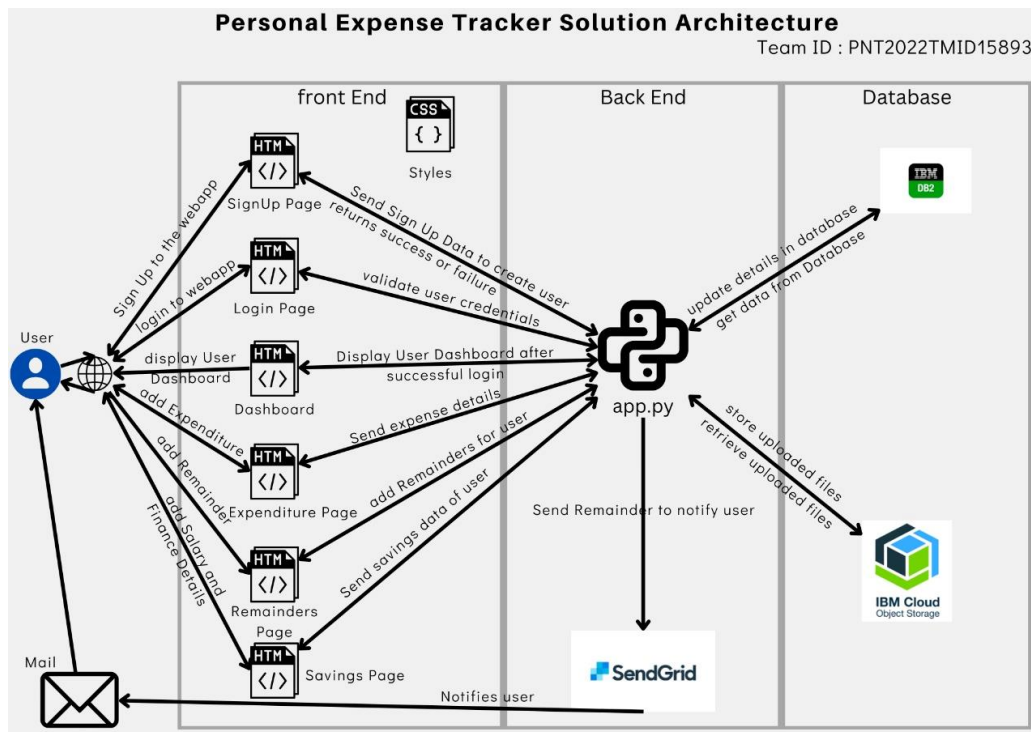
## 5. PROJECT DESIGN

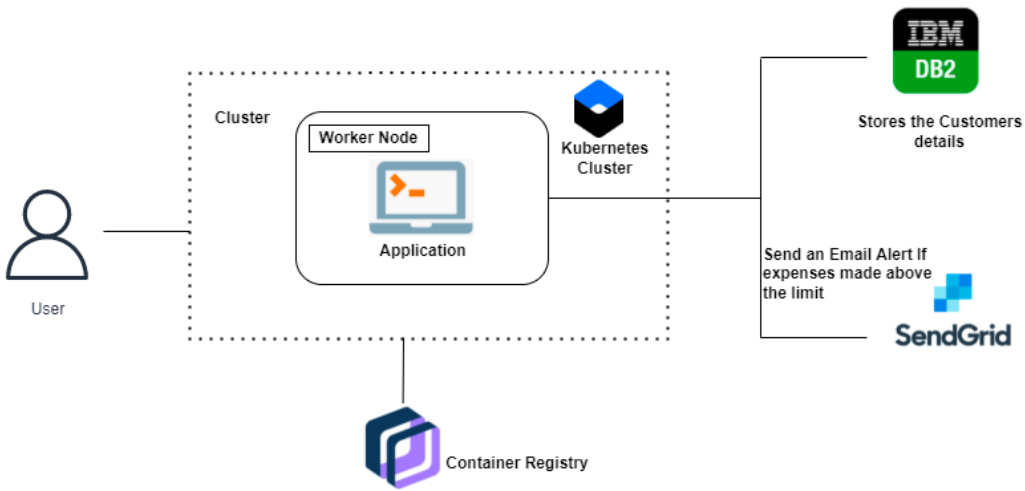
### 5.1 Data Flow Diagrams

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can 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.



### 5.2 Solution & Technical Architecture





### 5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Webuser)	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	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through social media	I can register & access the dashboard with Social Media Login	Low	Sprint-1
		USN-4	As a user, I can register for the application through Gmail	I can register & access the dashboard with Gmail	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password	I can access the application	High	Sprint-1
	Dashboard	USN-6	As a user, I can navigate the different features of the application	I can do all CRUD operations	High	Sprint-1



	Home	USN-7	As a user, I can get the overview of the expenses.	I can view the expenses.	High	Sprint-1
	Track expenses- Add expenses	USN-8	As a user, I can able to add the new expenditure details.	I can add new expenses	High	Sprint-2
	Track expenses-graph	USN-9	As a user, I can able to get the details of the expenses in the form of a graph.	I can analyse the expenses	High	Sprint-2
	Payment Options- Add Card Details	USN-10	As a user, I can able to add a various card payment details.	I can add payment details from different cards.	Medium	Sprint-3
	Payment Options-Graph	USN-11	As a user, I can able to get the details of various card payment details in the form of a graph.	I can analyse the various payment options.	Medium	Sprint-3
	Loan Tracker-AddLoan	USN-12	As a user, I can be able to add new loan details in my application.	I can add new loan details	Low	Sprint-4
	Loan Tracker-Graph	USN-13	As a user, I can be able to get the details of the loan in the form a graph.	I can analyse the loandetails	Low	Sprint-4

## 6. PROJECT PLANNING & SCHEDULING

### 6.1 Sprint Planning & Estimation

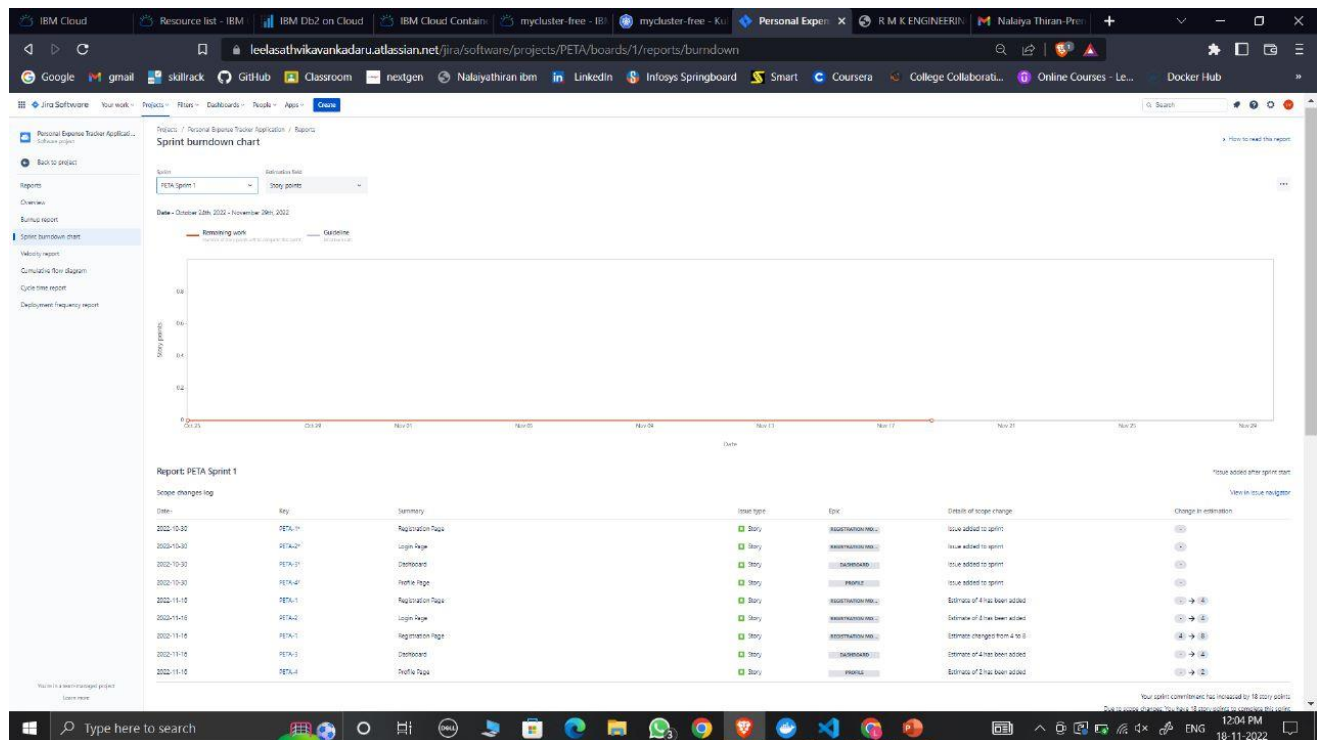
Team Members-

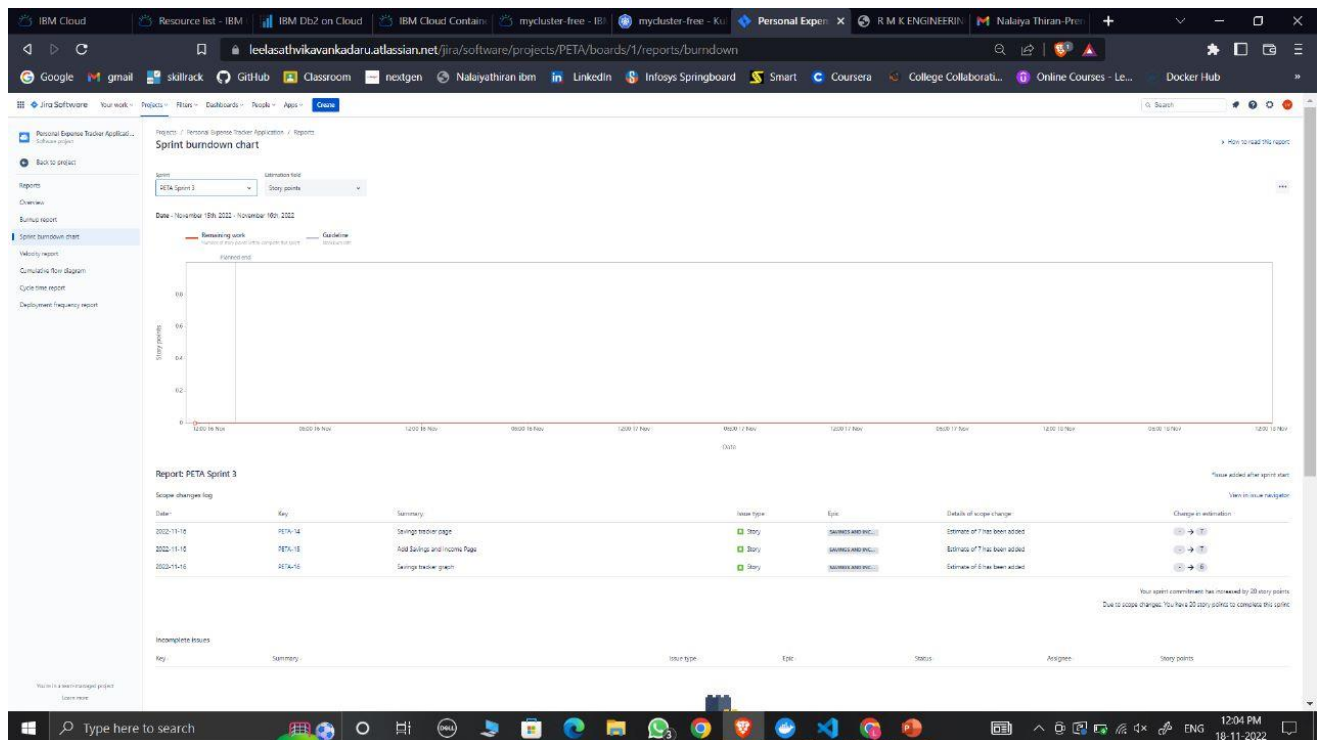
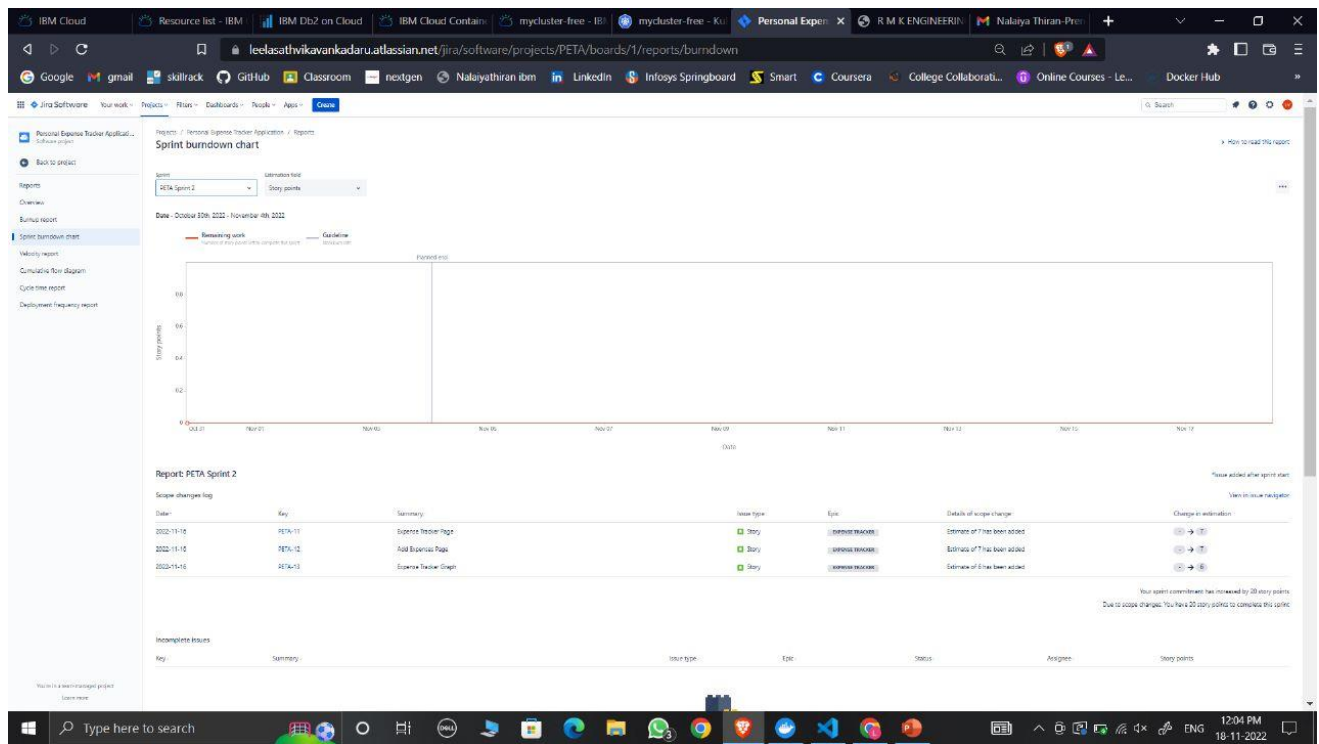
- VLS- Vankadaru Leela Sathvika
- PS- Pragnasya S
- SS- Shaik Safeena
- VN- Vayugandla Neelima

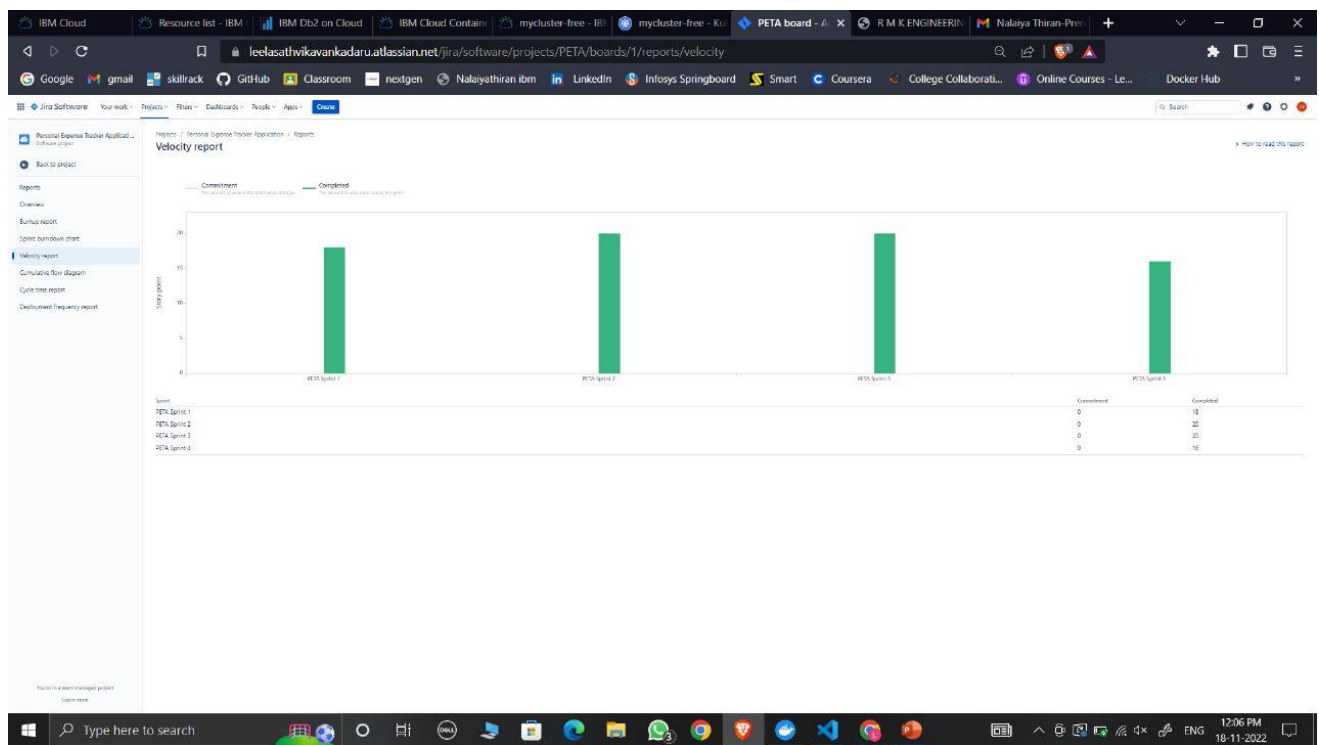
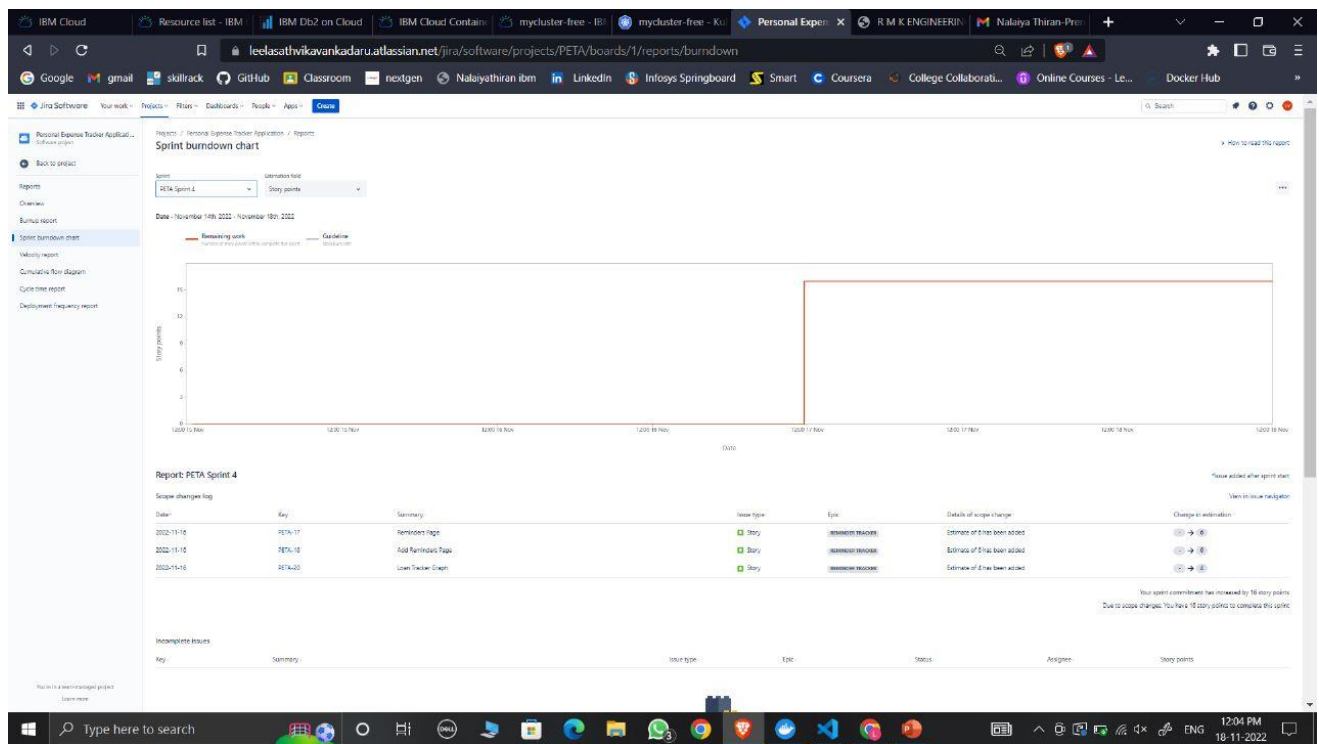
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	4	High	PS, VLS
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	2	High	PS, VLS
Sprint-1		USN-3	As a user, I can register for the application through Gmail	2	Medium	PS, VLS
Sprint-1	Login	USN-4	As a user, I can log into the application by entering email & password	4	High	VN, SS
Sprint-1	Dashboard	USN-5	As a user, I can navigate the different features of the application. I can get the overview of the expenses.	4	High	PS, VN, SS, VLS
Sprint-1	Profile	USN-6	As a User, I can view and change my profile settings.	2	Medium	VN, SS
Sprint-2	Track Expenses Page	USN-7	Consolidated view of all expense related operations and data	7	High	PS, VLS
Sprint-2	Track Expenses – Add Expenses	USN-8	As a user, I can able to add the new expenditure details	7	High	PS, SS
Sprint-2	Track Expenses - Graph	USN-9	As a user, I can able to get the details of the expenses in the form of a graph.	6	Low	SS, VN

Sprint-3	Track Savings Page	USN-10	Consolidated view of all savings related operations and data	7	High	PS, VLS
Sprint-3	Track Savings – Add Personal Income Details	USN-11	As a user, I can able to add a various income details.	7	High	SS, VN
Sprint-3	Track Savings – Graph	USN-12	As a user, I can able to get the details of various card payment details in the form of a graph	6	Low	SS, VN, VLS
Sprint-4	Track Reminders Page	USN-13	Consolidated view of all reminders related operations and data	6	High	PS, VLS
Sprint-4	Reminders – Add Remainder	USN-14	As a user, I can be able to add new reminders for payments in my application.	6	High	PS, VN
Sprint-4	Reminders - Add Recurring Reminder	USN-15	As a user, I can be able to add new reminders for recurring payments such as EMIS and loans in my application.	4	Medium	SS, VN
Sprint-4	Loan Tracker Graph	USN-16	As a user, I can be able to get the details of the loan in the form a graph	4	Low	SS, VLS

## 6.3 Reports from JIRA



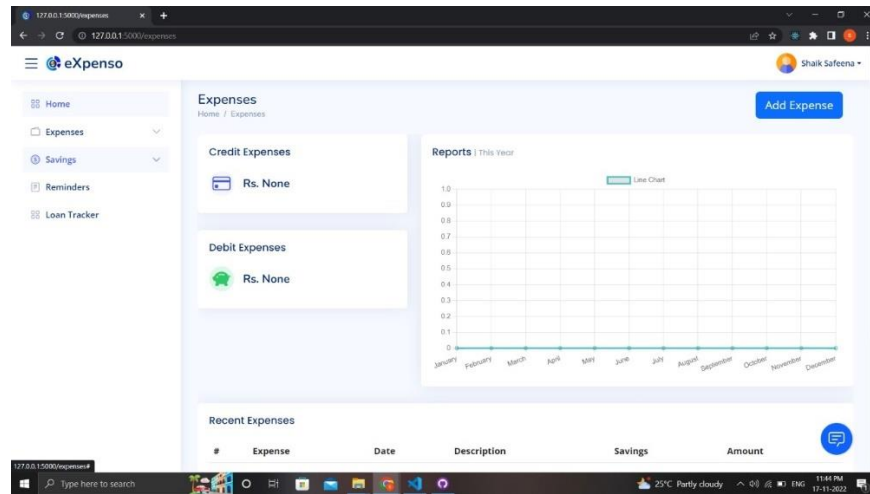




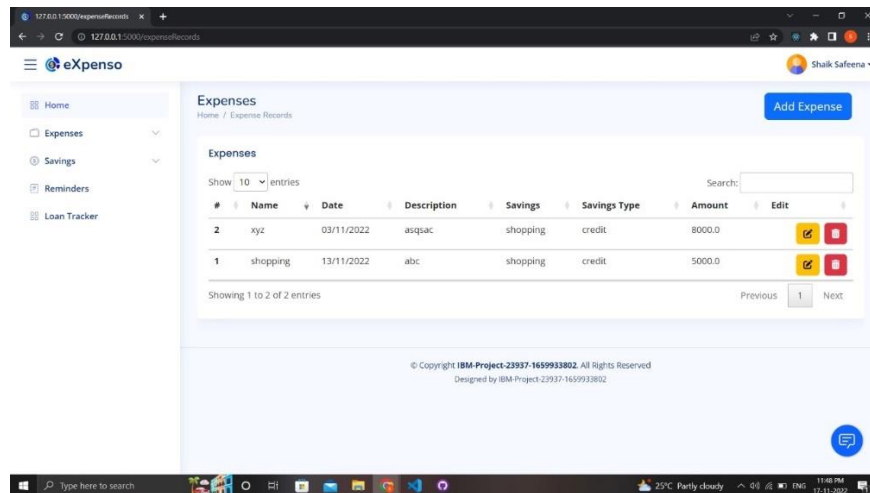
## 7. CODING & SOLUTIONING

### 7.1 Feature 1

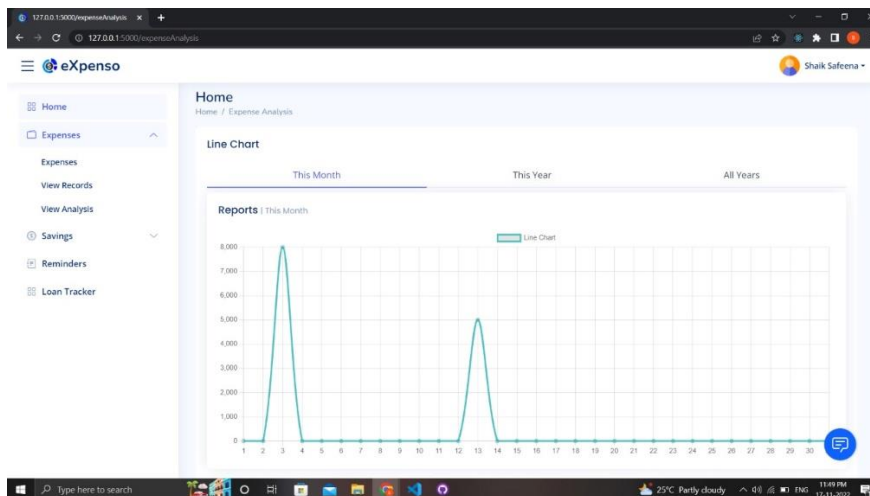
#### 7.1.1 Expenses



#### 7.1.2 Expenses -Record

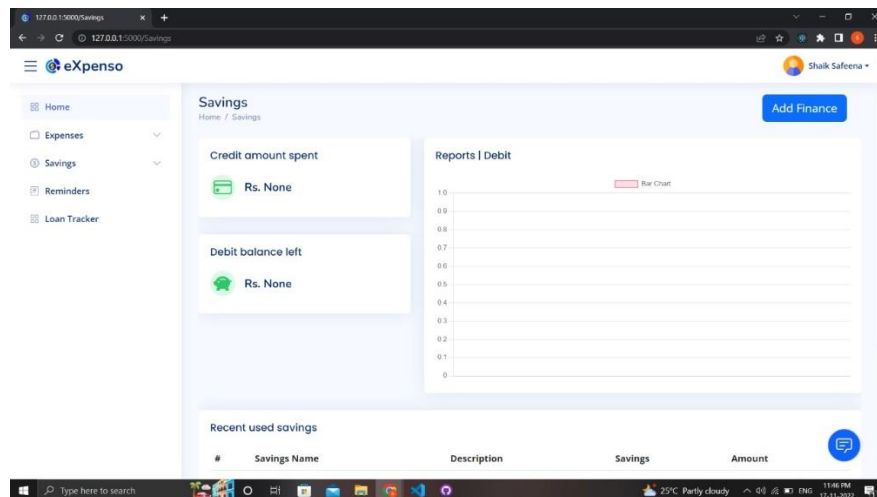


#### 7.1.3 Expenses - Analysis

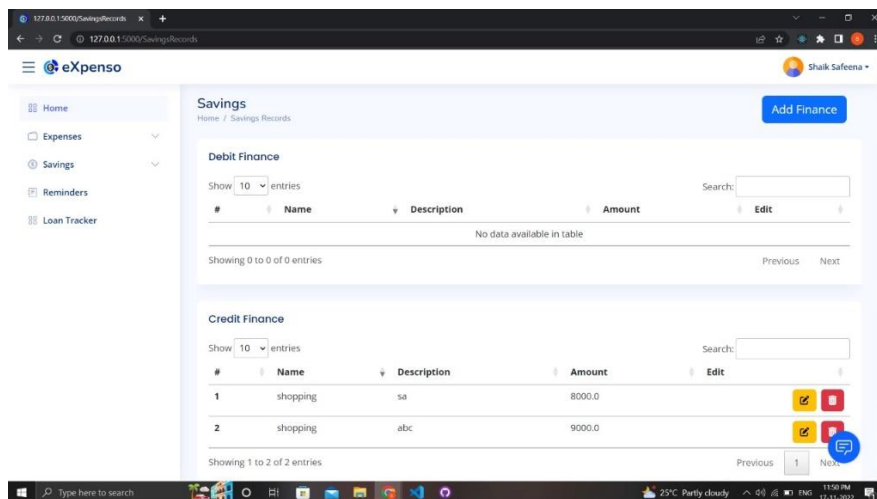


### 7.2 Feature 2

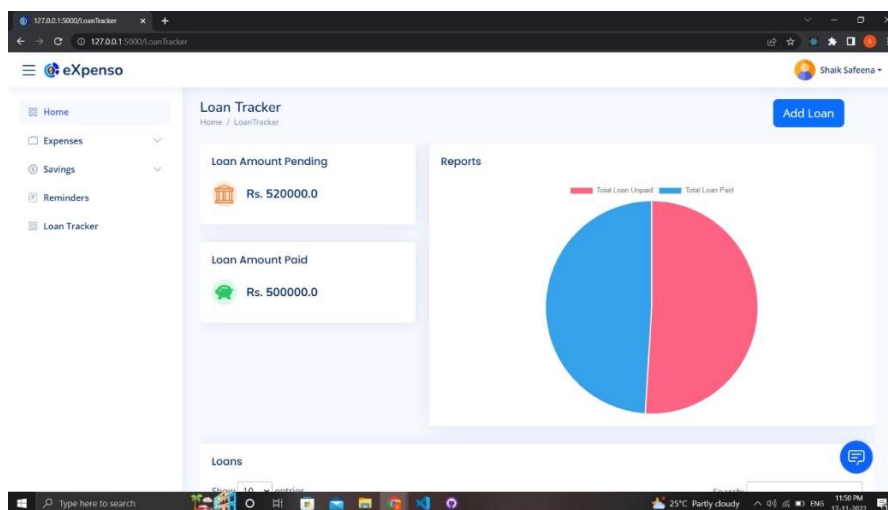
## 7.2.1 Savings



## 7.2.2 Savings- Records









## 7.2.2 Savings- Analysis



## 7.3 Feature 3

### 7.3.1 Reminders

The screenshot displays the 'Reminders' page in the eXpenso application. The page features a sidebar on the left with navigation links: Home, Expenses, Savings, Reminders, and Loan Tracker. The main content area is titled 'Reminders' and includes an 'Add Reminder' button. Below the title, there is a search bar and a table of reminders. The table has columns for #, Name, Date, Description, Frequency, and Edit. There are three reminders listed. The footer of the page contains copyright information: '© Copyright IBM-Project-23937-1659933802. All Rights Reserved. Designed by IBM-Project-23937-1659933802'.

#	Name	Date	Description	Frequency	Edit
2	nothing	18/11/2022	abc	Only Once	 
3	nothing	18/11/2022	abc	Only Once	 
1	abc	17/11/2022	dsxz	Only Once	 

## 7.4 Feature 4

### 7.4.1 Loan Tracker

The screenshot displays the 'Loan Tracker' page in the eXpenso application. The page features a sidebar on the left with navigation links: Home, Expenses, Savings, Reminders, and Loan Tracker. The main content area is titled 'Loan Tracker' and includes an 'Add Loan' button. Below the title, there is a summary of loan amounts pending and paid, and a pie chart showing the distribution of loan status. The footer of the page contains copyright information: '© Copyright IBM-Project-23937-1659933802. All Rights Reserved. Designed by IBM-Project-23937-1659933802'.

Loan Amount Pending	Loan Amount Paid
Rs. 520000.0	Rs. 500000.0



## 7.5 Database Schema

The screenshot displays the IBM Db2 on Cloud console interface. The top navigation bar includes tabs for 'Load Data', 'Load History', 'Tables', 'Views', 'Indexes', 'Aliases', 'MQTs', 'Sequences', and 'Application objects'. The 'Tables' tab is currently selected. Below the navigation bar, there is a search bar labeled 'Find schemas or tables' and a 'Refresh' button. The main content area is divided into two panels: 'Schemas' on the left and 'Tables' on the right. The 'Schemas' panel shows a table with columns 'Name', 'Type', and 'Tables'. It contains one entry: 'DPQ83331' of type 'User' with 6 tables. The 'Tables' panel shows a table with columns 'Name', 'Schema', and 'Properties'. It lists six tables: 'EXPENSES', 'LOANS', 'REMINDERS', 'SAVINGS', 'USER', and 'USERS', all belonging to the 'DPQ83331' schema. A 'New table' button is located at the top right of the 'Tables' panel. The bottom of the screenshot shows a Windows taskbar with various application icons and a system clock indicating 01:06 AM on 18-11-2022.

IBM Db2 on Cloud

Load Data Load History **Tables** Views Indexes Aliases MQTs Sequences Application objects

Find schemas or tables Refresh

**Schemas**

Name	Type	Tables
DPQ83331	User	6

Total: 1, selected: 1

**Tables**

Name	Schema	Properties
EXPENSES	DPQ83331	...
LOANS	DPQ83331	...
REMINDERS	DPQ83331	...
SAVINGS	DPQ83331	...
USER	DPQ83331	...
USERS	DPQ83331	...

Total: 6, selected: 0

Type here to search

01:06 AM 18-11-2022

## 8 TESTING

### 8.1 Test Cases

S.No	Test Cases	Passed/ Failed
1.	Login and Logout	Passed
2.	Profile Creation and Editing	Passed
3.	Expenses – Add, Edit and Delete	Passed
4.	Expense Analysis Module	Passed
5.	Savings – Add, Edit and Delete	Passed
6.	Savings Analysis Module	Passed
7.	Reminders – Add, Edit and Delete	Passed
8.	Loan Tracker – Add, Edit and Delete	Failed to Deploy

### 8.2 User Acceptance Testing

S.No	Test Cases	Yes/ No
1.	Keyword driven	Yes
2.	Responds in manually drafted rules	Yes
3.	Manages multiple users	Yes
4.	Conversational Paradigm	Yes
3.	Learns from real interactions	Yes
4.	Training via historical data	No
5.	Has decision-making skills	No

## 9. RESULTS

### 9.1 Performance Metrics

Cloud performance monitoring and testing tools help organizations gain visibility into their cloud environments, using specific metrics and techniques to assess performance. Efficient cloud performance is critical for maintaining business continuity and ensuring all relevant parties gain access to cloud services. This is true for basic cloud usage of public clouds and complex hybrid clouds and multi-cloud architectures. Cloud performance metrics enable you to effectively monitor your cloud resources, to ensure all components communicate seamlessly. Typically, cloud performance metrics measure input/output operations per second (IOPS), filesystem performance, caching, and autoscaling.

S. No	Test Cases	Time
1.	Error rates	1 second
2.	Response times	3 seconds
3.	Request rates	1.14 seconds
4.	Customer experience	Good

## **10. ADVANTAGES & DISADVANTAGES**

### **10.1 Advantages**

- Available 24/7 across the globe
- Easy tracking of savings and expenses
- User friendly dashboards
- Understandable charts and graphs
- Updated to the latest details
- Easy to setup and communicate

### **10.2 Disadvantages**

- Direct connection with bank account could not be achieved
- Loan Tracker page could not be deployed
- Multiple profiles not available

## **11. CONCLUSION**

This project focuses on tracking the personal finances of a user. It is implemented in a user-friendly and accessible manner to achieve all the financial asset maintenance goals of an individual. The new system has overcome most of the limitations of the existing system and works according to the design specification given. The project what we have developed is work more efficient than the other income and expense tracker. The project avoids the manual calculation for avoiding calculating the income and expense per month. The modules are developed with efficient and also in an attractive manner. The developed systems dispense the problem and meet the needs of by providing reliable and comprehensive information. All the requirements projected by the user have been met by the system.

The newly developed system consumes less processing time, and all the details are updated and processed immediately. Since the screen provides online help messages and is very user-friendly, any user will get familiarized with its usage. Module s are designed to be highly flexible so that any failure requirements can be easily added to the modules without facing many problems. The best organizations have a way of tracking and handling these reimbursements. This project also focuses on giving set reminders for users who wish to be up to date in their payments. This project gives aesthetic charts and analysis for the user's financial records.

## **12. FUTURE SCOPE**

The future of project lies entirely on how the customers get benefitted from the interaction and the interface. We would have to make improvements in the application to make it more user-friendly. The following areas could have a serious impact on our scope:

- i. Support for multiple accounts
- ii. Direct Connection with bank
- iii. Tips and Recommendations on where to save money.

## I. APPENDIX

### 1. SOURCE CODE

#### a) app.py

```
import os

from flask import *
from database import *
from models import *
from random import *
from flask_mail import Mail, Message
from datetime import *
from time import *

database = Database()


app = Flask(__name__)
app.secret_key = "FlaskNotFoundError"
app.config['MAIL_SERVER'] = 'smtp.sendgrid.net'
app.config['MAIL_PORT'] = 587
app.config['MAIL_USE_TLS'] = True
app.config['MAIL_USERNAME'] = 'apikey'
app.config['MAIL_PASSWORD'] = credentials.SENDGRID_API_KEY
app.config['MAIL_DEFAULT_SENDER'] = credentials.MAIL_DEFAULT_SENDER
mail = Mail(app)


#Index
@app.route('/')
def index():
    return render_template('index.html')


#Signup
@app.route('/signup', methods = ['GET', 'POST'])
def signup():
    msg=None
```

```

if request.method == 'POST':
    name = request.form['name']
    email = request.form['email']
    password = request.form['password']
    account = database.fetchUser(email)
    if account:
        flash("You are already a member, please login using your details")
        return redirect('signin')
    else:
        if database.insertSignUpUserData(email,password,name):
            msg = Message('eXpenso Registration', recipients=[email])
            msg.body = "Thank you for registering with eXpenso! Happy Managing!!"
            msg.html = """<h1>Sucessfully Registered with eXpenso</h1>
                        <h3>Thank you for registering with eXpenso! Happy Managing!!</h3>
                        """
            mail.send(msg)
            flash("Registration successfull...")
            return redirect('signin')
        else:
            msg="Unable to Register!! Try again"
    return render_template('signup.html',msg=msg)

#Signin
@app.route('/signin',methods = ["GET","POST"])
def signin():
    invalidLogin = None
    if request.method == 'POST':
        email = request.form['email']
        password = request.form['password']
        if database.fetchUser(email):
            fetchedPassword = database.fetchPassword(email)
            if fetchedPassword==password:
                session['email']=email

```



```

        return redirect('home')
    else:
        invalidLogin="Your Password is wrong!!"
    else:
        invalidLogin="You have not Registered yet!!"
    return render_template('signin.html',invalidLogin=invalidLogin)

@app.route('/signout')
def signOut():
    if 'email' in session:
        session.pop('email',None)
        return redirect('/')
    return redirect('/')

#Home
@app.route('/home')
def presentHome():
    if 'email' not in session:
        return redirect('/')
    email=session['email']
    user = database.fetchUser(email)
    totalExpenses = database.getTotalExpenseAmount(email)
    totalSavings = database.getDebitSavingsAmount(email)
    expenseFilter = "year"
    expenses = database.fetchExpensesPreview(email,5)
    monthExpenses=database.getExpensesThisYear(email)
    monthLabels=['January', 'February', 'March', 'April', 'May', 'June',
'July','August','September','October','November','December']
    monthExpenseList = [0]*12
    for expense in monthExpenses:
        monthExpenseList[int(expense["MONTH"])-1]=expense["AMOUNT"]
    totalLoanPaid = database.getTotalLoanPaid(email)
    totalLoanLeft = database.getTotalLoanLeft(email)

```

```

reminders = database.readRemindersWithLimit(email)

reminderList = []

for reminder in reminders:

    days = (date(int(reminder["YEAR"]),int(reminder["MONTH"]),int(reminder["DATE"])) -
date.today()).days

    label = "left"

    if days<0:

        continue

    elif days == 0:

        label = "today"

    name = reminder["REMINDERNAME"]

    reminderdate = reminder["DATE"]+"/"+reminder["MONTH"]

    description = reminder["DESCRIPTION"]

    reminderList.append([days,name,description,label,reminderdate])

return render_template('home.html',user = user,expenseFilter = expenseFilter,totalExpenses =
totalExpenses, totalSavings = totalSavings, expenses = expenses, monthLabels = monthLabels,
monthExpenseList = monthExpenseList, totalLoanPaid = totalLoanPaid , totalLoanLeft =
totalLoanLeft,reminders = reminderList)

```

## **b) database.py**

```

import credentials

import ibm_db

import ibm_boto3

from ibm_botocore.client import Config, ClientError

from datetime import *

from models import *

conn =
ibm_db.connect("DATABASE="+credentials.DB2_DATABASE_NAME+";HOSTNAME="+creden
tials.DB2_HOST_NAME+";PORT="+credentials.DB2_PORT+";SECURITY=SSL;SSLServerCertifi
cate=DigiCertGlobalRootCA.crt;UID="+credentials.DB2_UID+";PWD="+credentials.DB2_PWD+""
",")

cos = ibm_boto3.resource("s3",

    ibm_api_key_id=credentials.COS_API_KEY_ID,

    ibm_service_instance_id=credentials.COS_INSTANCE_CRN,

    config=Config(signature_version="oauth"),

```

```

        endpoint_url=credentials.COS_ENDPOINT
    )

class Database:

    def __init__(self) -> None:

        pass

    def fetchUser(self,email):

        sql = "SELECT email,name,phone,country FROM user WHERE email=?"

        stmt = ibm_db.prepare(conn, sql)

        ibm_db.bind_param(stmt,1,email)

        ibm_db.execute(stmt)

        account = ibm_db.fetch_assoc(stmt)

        if account:

            user =
User(account["EMAIL"],account["NAME"],account["PHONE"],account["COUNTRY"])

            return user

        return None

    def fetchPassword(self,email):

        try:

            sql = "SELECT password FROM user WHERE email = ?"

            stmt = ibm_db.prepare(conn, sql)

            ibm_db.bind_param(stmt,1,email)

            ibm_db.execute(stmt)

            account = ibm_db.fetch_assoc(stmt)

            if account:

                return account["PASSWORD"]

            else:

                return False

        except:

            return False

    def insertSignUpUserData(self,email,password,name):

        try:

            insert_sql = "INSERT INTO user(email,password,name) VALUES (?,?)"

            prep_stmt = ibm_db.prepare(conn, insert_sql)

```

```

        ibm_db.bind_param(prepare_stmt, 1, email)
        ibm_db.bind_param(prepare_stmt, 2, password)
        ibm_db.bind_param(prepare_stmt, 3, name)
        ibm_db.execute(prepare_stmt)
    except:
        print("error")
        return False
    return True

def updateUserData(self,email,name,country,phone):
    try:
        sql = "update user set name = ? , country = ?, phone = ? where email = ?;"
        stmt = ibm_db.prepare(conn, sql)
        ibm_db.bind_param(stmt,1,name)
        ibm_db.bind_param(stmt,2,country)
        ibm_db.bind_param(stmt,3,phone)
        ibm_db.bind_param(stmt,4,email)
        ibm_db.execute(stmt)
    except:
        return False
    return True

def updatePassword(self,email,password):
    try:
        sql = "update user set password = ? where email = ?;"
        stmt = ibm_db.prepare(conn, sql)
        ibm_db.bind_param(stmt,1,password)
        ibm_db.bind_param(stmt,2,email)
        ibm_db.execute(stmt)
    except:
        return False
    return True

def fetchExpensesPreview(self,email,limit=10):
    sql ="SELECT
    expensename,date,month,year,expenses.description,savingsname,savingstype,expenses.amount

```

FROM expenses join savings on expenses.savingsid=savings.savingsid WHERE expenses.email=?  
order by expenseid desc limit ?;"

```
stmt = ibm_db.prepare(conn, sql)

ibm_db.bind_param(stmt,1,email)

ibm_db.bind_param(stmt,2,limit)

ibm_db.execute(stmt)

expense = ibm_db.fetch_both(stmt)

expenseList = []

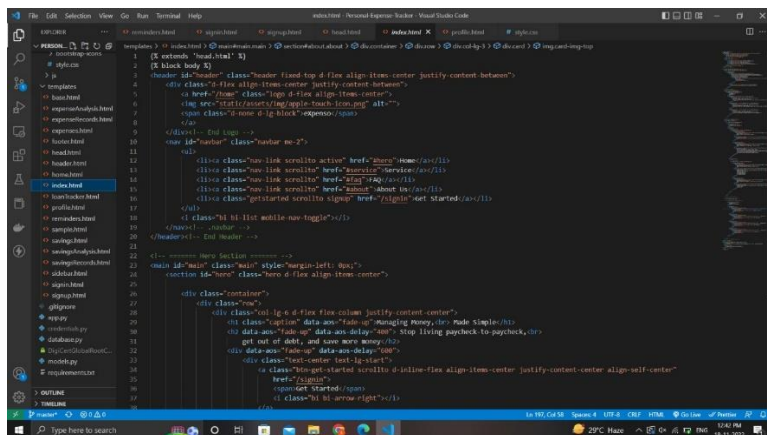
while expense != False:

    expenseList.append(expense)

    expense = ibm_db.fetch_both(stmt)

return expenseList
```

### c) FRONTEND PART:



2. **GitHub:** <https://github.com/IBM-EPBL/IBM-Project-23937-1659933802>

3. **Project Demo Link:**

[https://drive.google.com/drive/folders/1Z oef61TFQbDTdd6bNZ5\\_SCXbtcLTDzQo?usp=sharing](https://drive.google.com/drive/folders/1Z oef61TFQbDTdd6bNZ5_SCXbtcLTDzQo?usp=sharing)

**Deployed Link:** <http://159.122.187.49:30281/>