**PERSONAL EXPENSE TRACKER APPLICATION**

**IBM-Project-39256-1660403108**

**NALAIYA THIRAN PROJECT BASED LEARNING ON**

**PROFESSIONAL READLINESS FOR INNOVATION,**

**EMPLOYNMENT AND ENTERPRENEURSHIP**

**A PROJECT REPORT**

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Source Code

GitHub & Project Demo Link

# 1.INTRODUCTION

1.1 Project Overview

Category: Cloud App Development

Team ID : PNT2022TMID19407

💻 **Skills Required:**

IBM Cloud,HTML,Javascript,IBM Cloud Object Storage,Python-

Flask,Kubernetes,Docker,IBM DB2,IBM Container Registry

**Project Description:**

In simple words, personal finance entails all the financial decisions and activities that a Finance app makes your life easier by helping you to manage your finances efficiently. A personal finance app will not only help you with budgeting and accounting but also give you helpful insights about money management.

Personal finance applications will ask users to add their expenses and based on their expenses wallet balance will be updated which will be visible to the user. Also, users can get an analysis of their expenditure in graphical forms. They have an option to set a limit for the amount to be used for that particular month if the limit is exceeded the user will be notified with an email alert.

1.2 Purpose

Personal finance management is an important part of people’s lives. However, everyone does not have the knowledge or time to manage their finances in a proper manner. And, even if a person has time and knowledge, they do not bother with tracking their expenses as they find it tedious and time-consuming. Now, you don’t have to worry about managing your expenses, as you can get access to an expense tracker that will help in the active management of your finances.Also known as expense manager and money manager, an expense tracker is a software or application that helps to keep an accurate record of your money inflow and outflow. Many people in India live on a fixed income, and they find that towards the end of the month they don’t have sufficient money to meet their needs. While this problem can arise due to low salary, invariably it is due to poor money management skills.

People tend to overspend without realizing, and this can prove to be disastrous. Using a daily expense manager can help you keep track of how much you spend every day and on what. At the end of the month, you will have a clear picture where your money is going. This is one of the best ways to get your expenses under control and bring some semblance of order to your finances.Today, there are several expense manager applications in the market. Some are paid managers while others are free. Even banks like ICICI offer their customers expense tracker to help them out. Before you decide to go in for a money manager, it is important to decide the type you want.

# 2.LITERATURE SURVEY

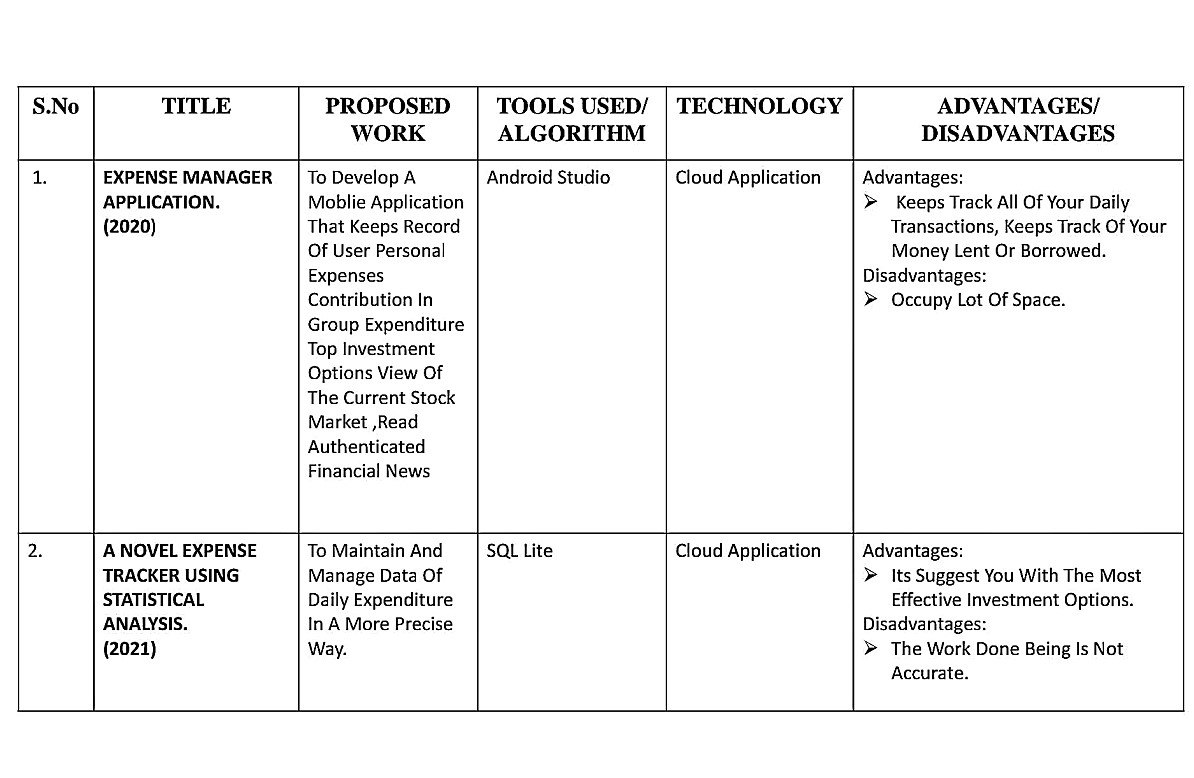
2.1 Existing problem

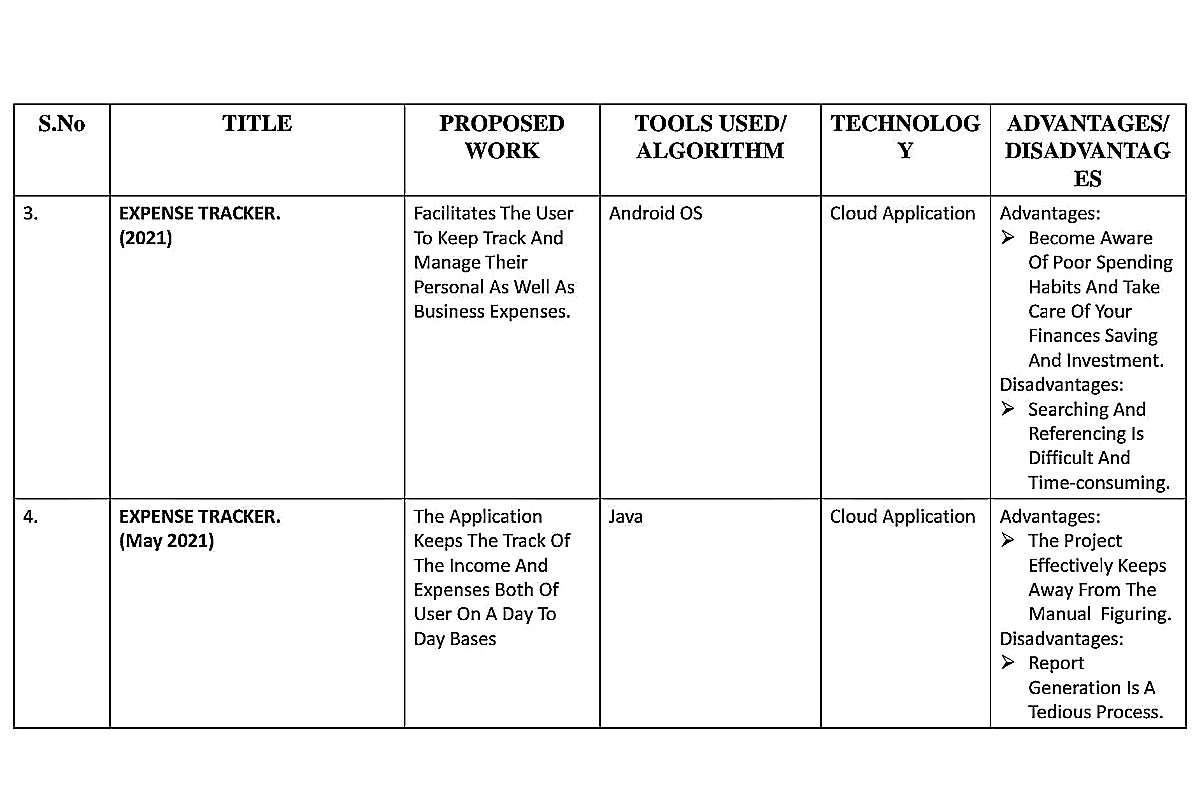
In a study conducted by Forrester in 2016 surveying small and medium businesses (SMBs) across the world, 56% companies reported expense management as being the biggest challenge for their finance departments.

In another survey conducted by Levvel Research in 2018 in North America, respondents reported the following pain points in expense management before adopting automation:

* Manual entry and routing of expense reports (62%)
* Lack of visibility into spend data (42%)
* Inability to enforce travel policies (29%)
* Lost expense reports (24%)
* Lengthy expense approval system and reimbursement cycles (23%)

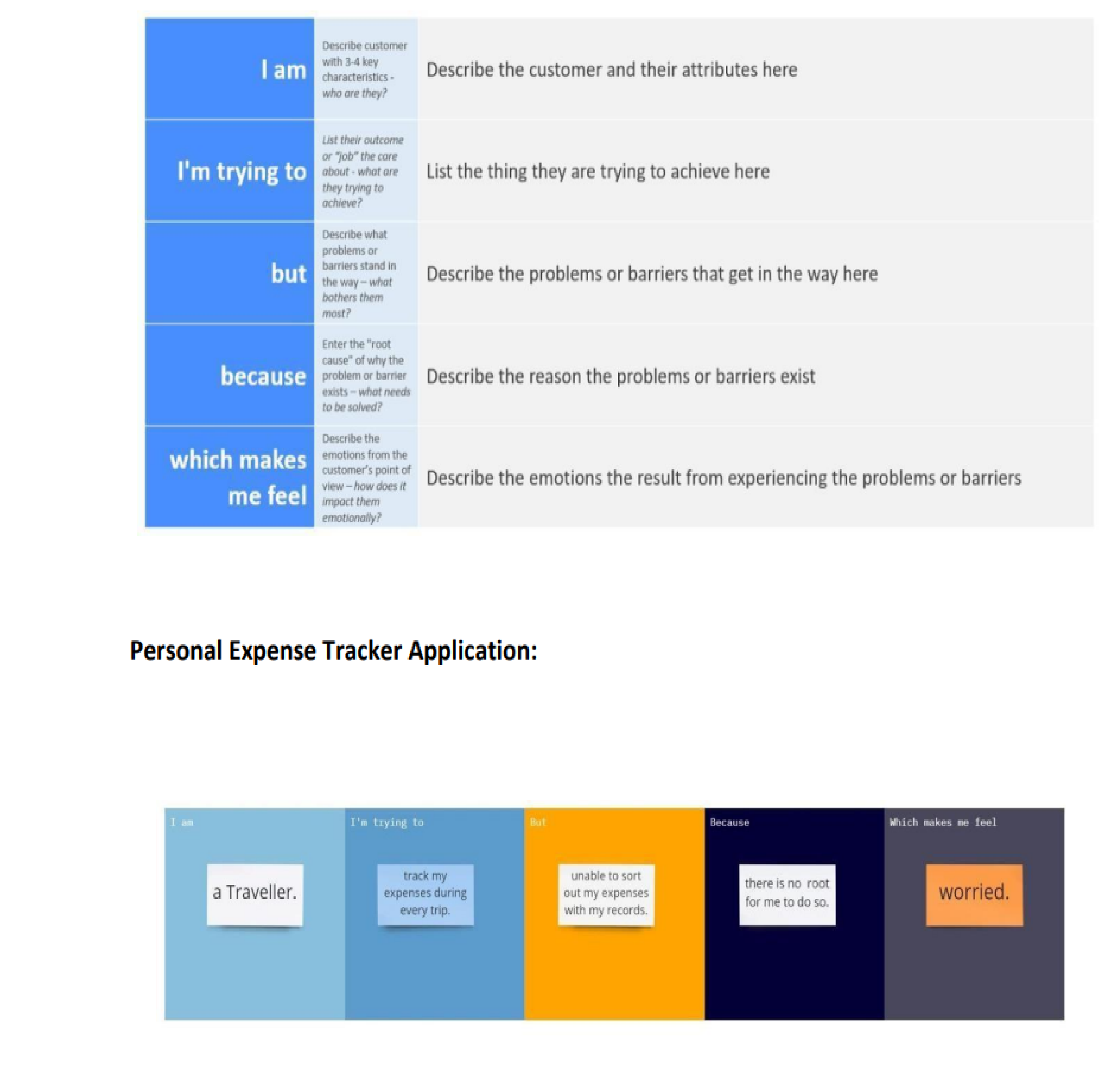
* 1. References

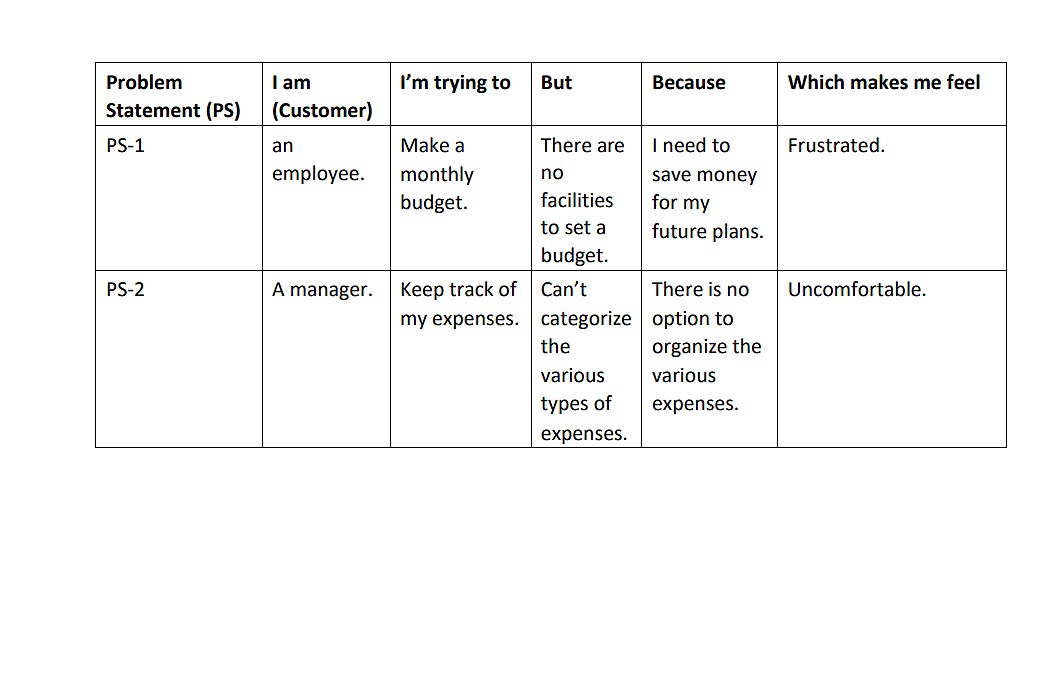




* 1. Problem Statement Definition

**Customer Problem Statement :**

A well-articulated customer problem statement allows us to find the ideal solution for the challenges our customers face. Throughout the process, you’ll also be able to empathize with your customers, which helps you better understand how they perceive your product or service.



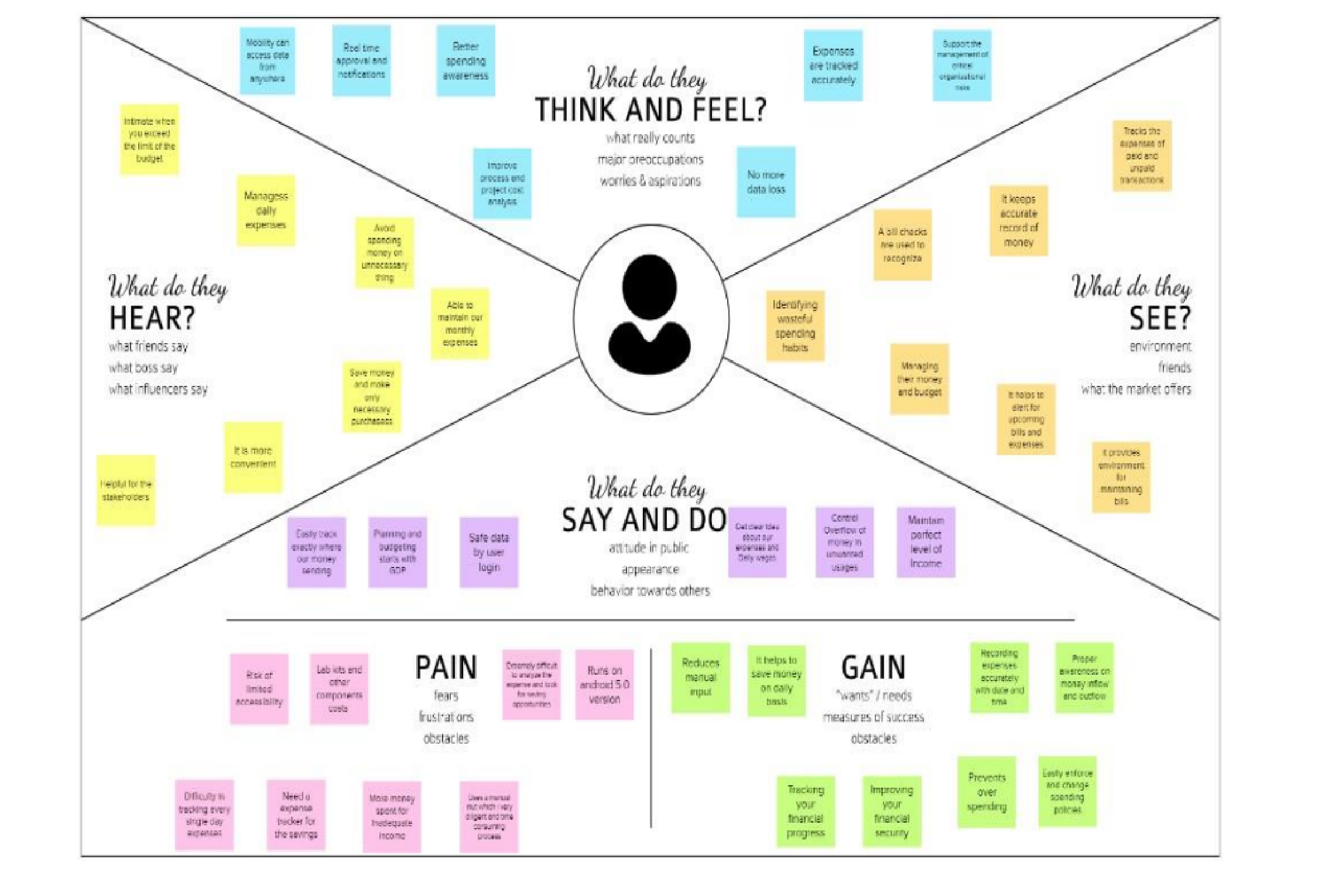
# 3.IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user’s behaviours and attitudes.

It is a useful tool to helps 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.

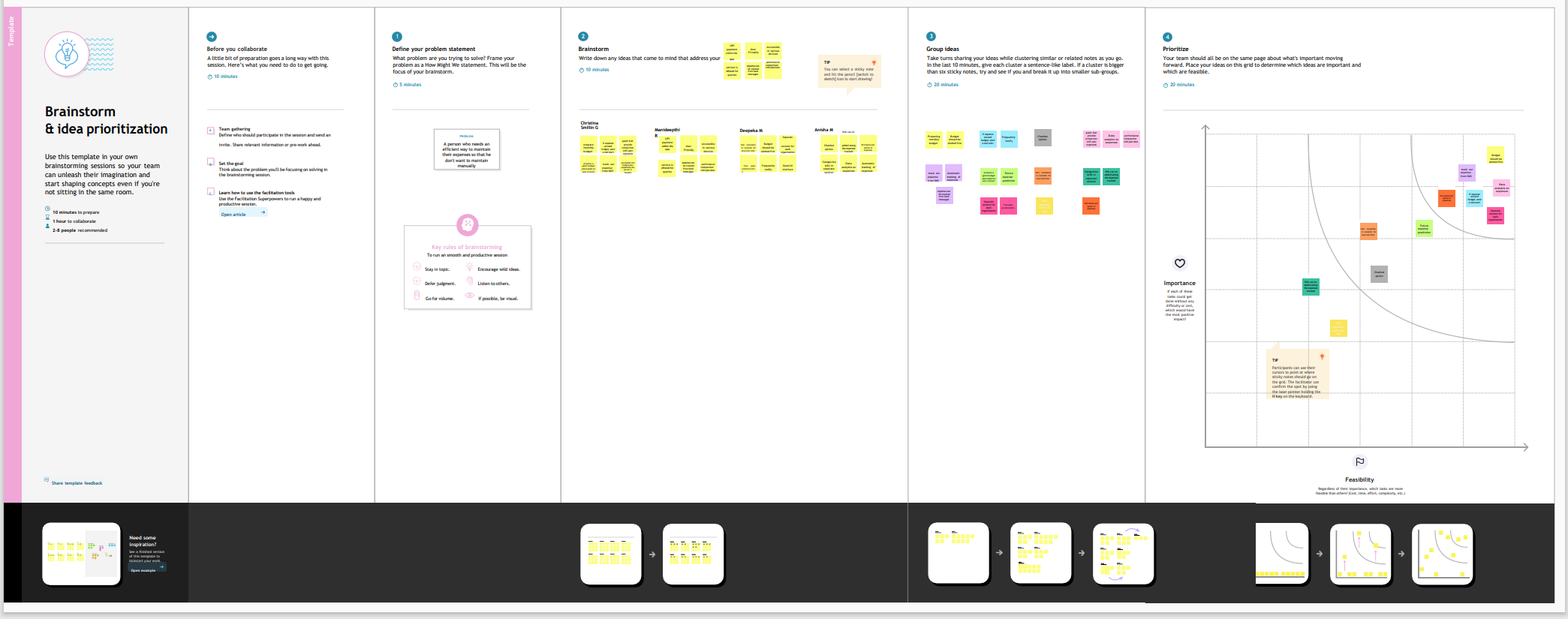


3.2 Ideation & Brainstorming

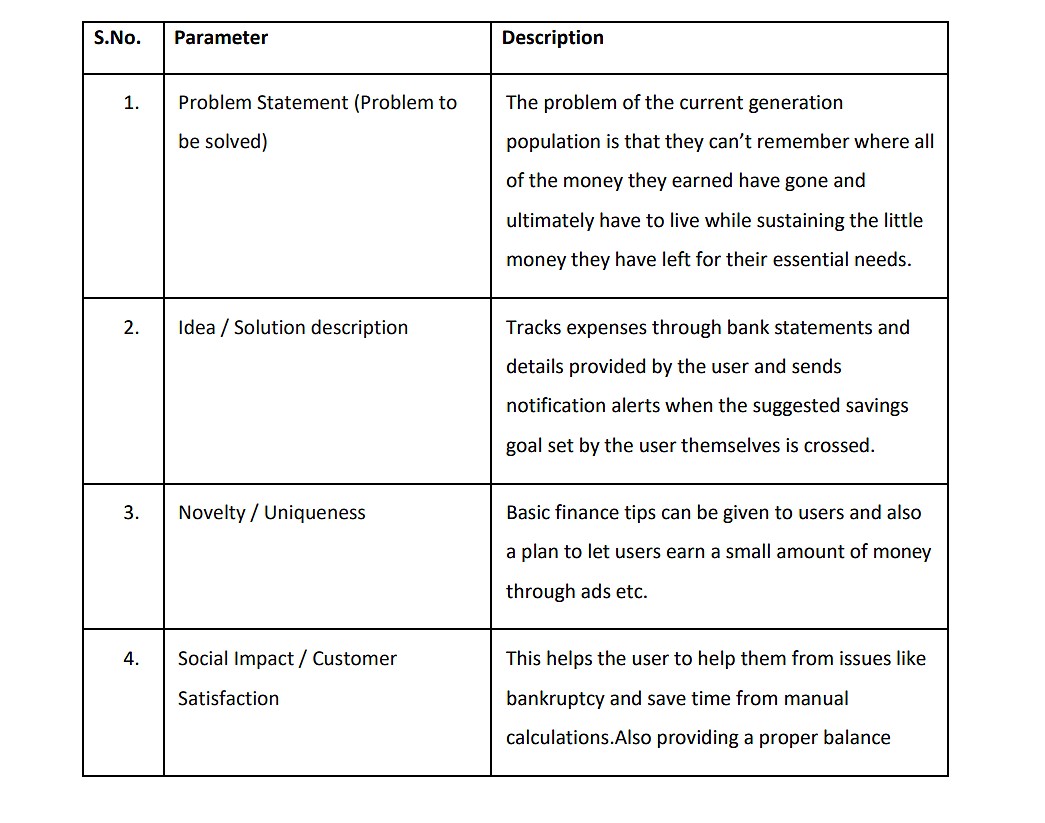
Step-1: Team Gathering, Collaboration and Select the Problem Statement

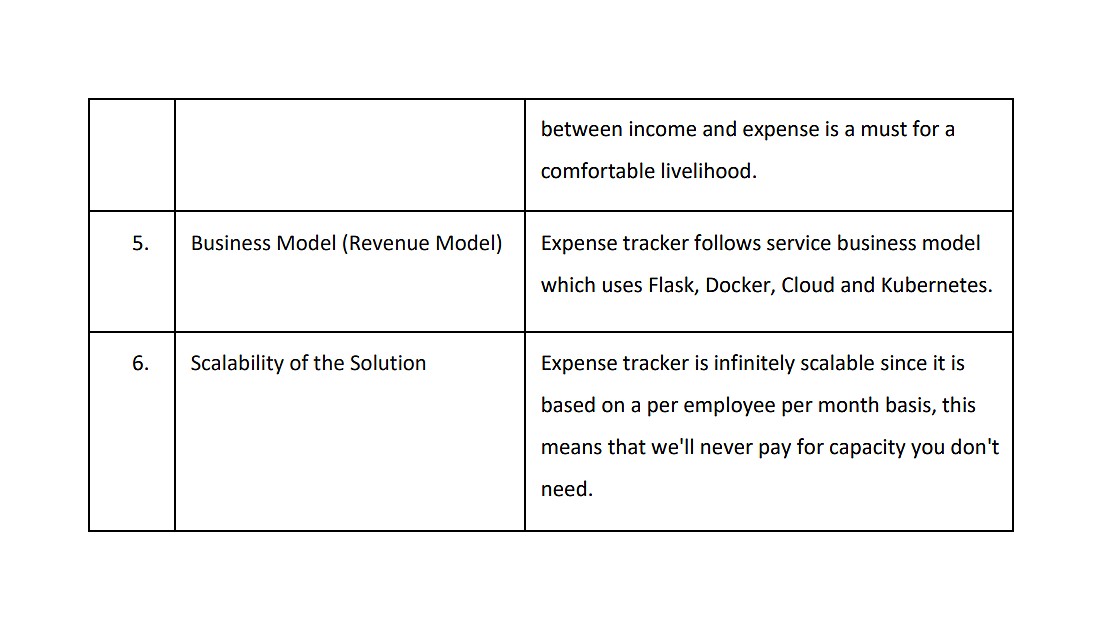
Step-2 : Brainstorm,Idea Listing and Grouping

Step-3: Idea Prioritization

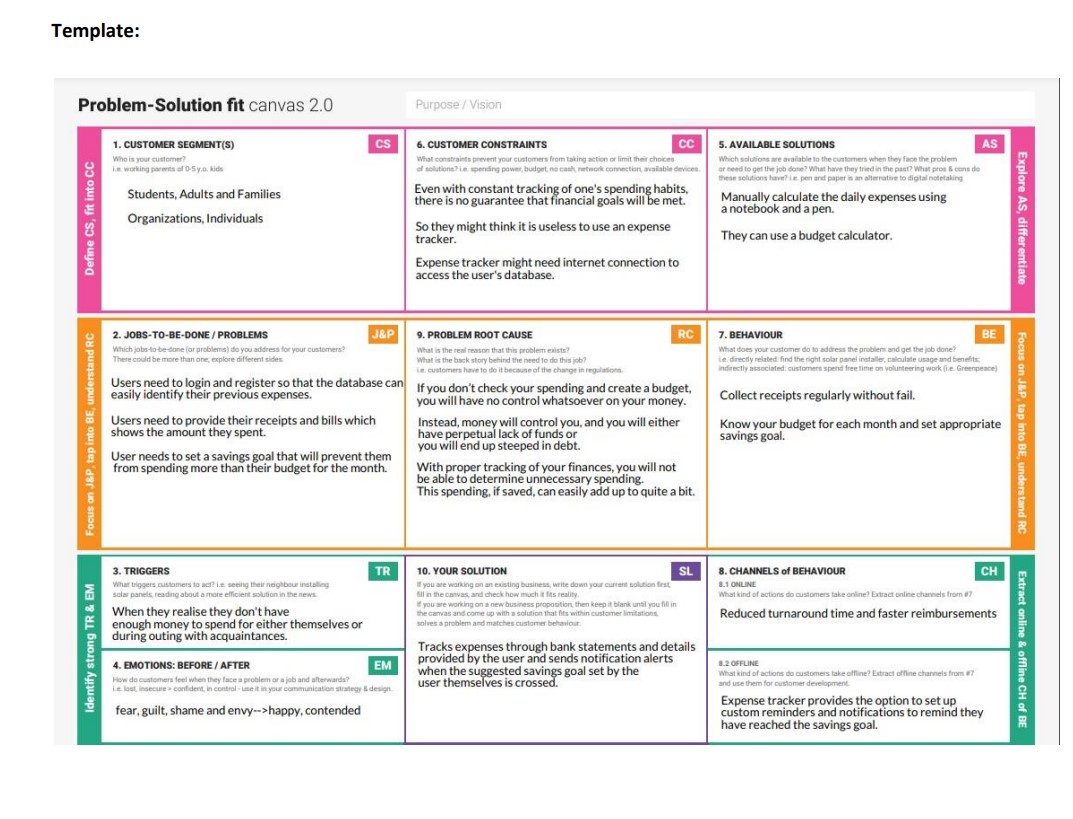


3.3 Proposed Solution



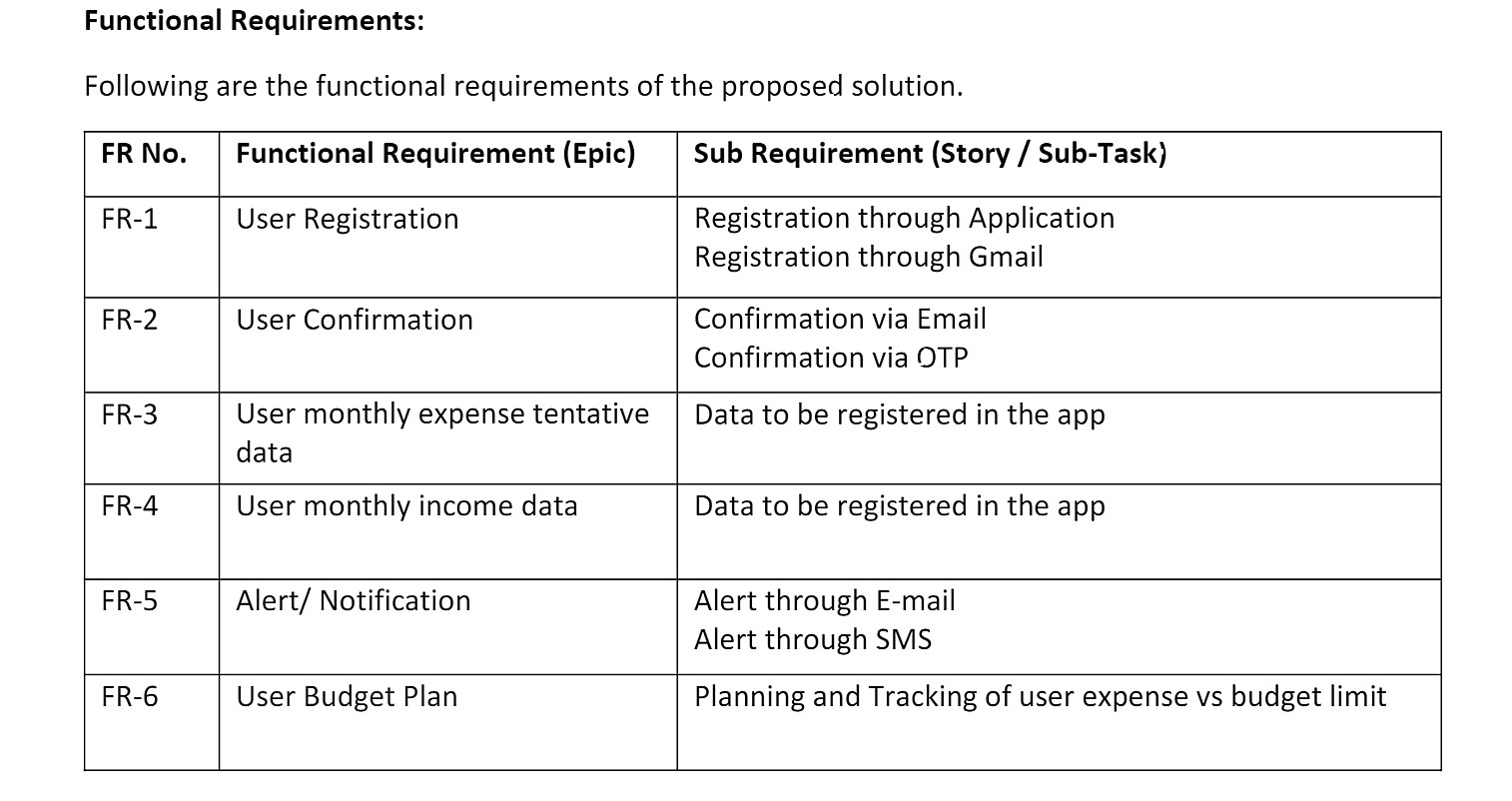


3.4 Problem Solution fit

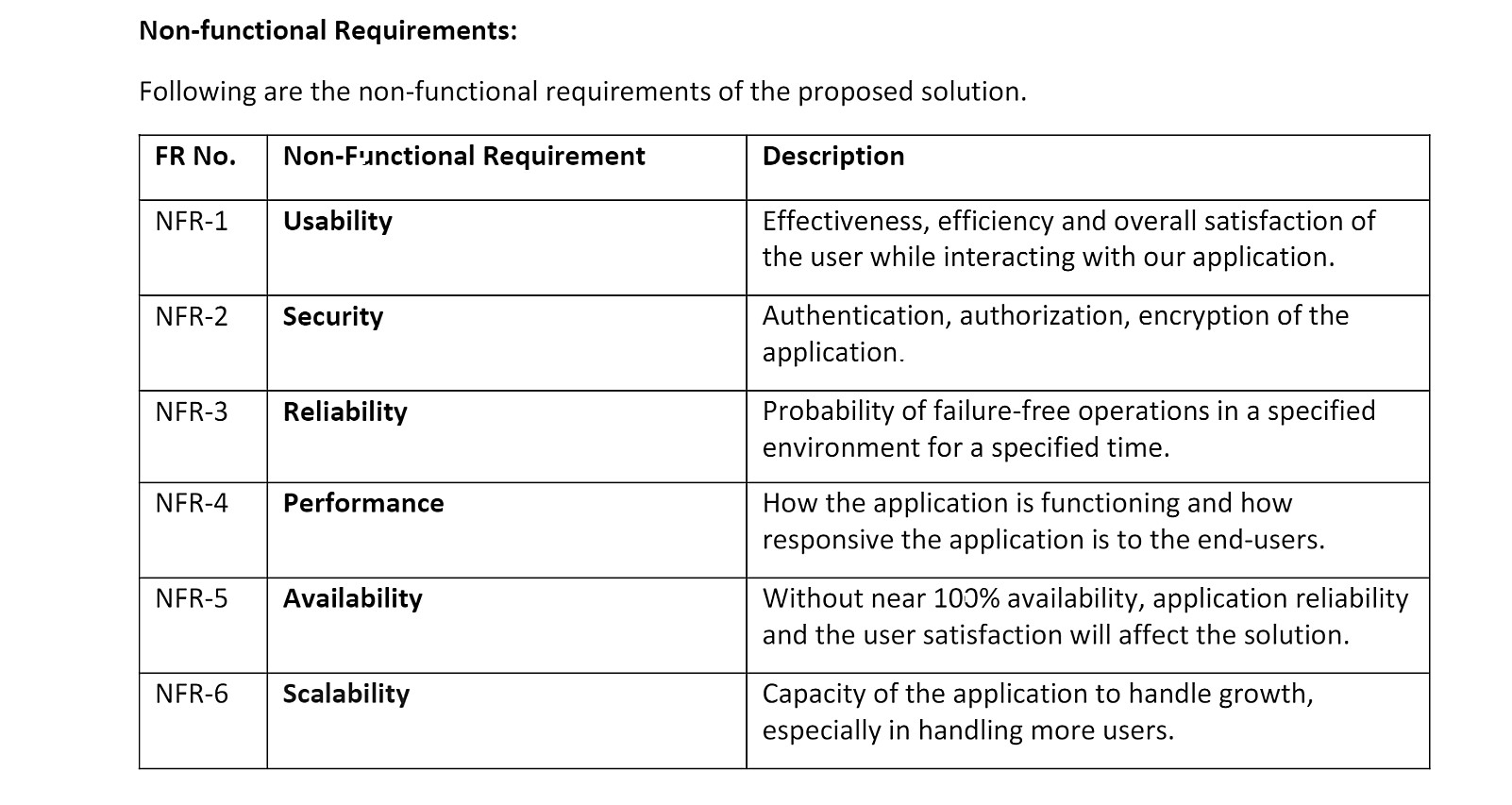


# 4.REQUIREMENT ANALYSIS

4.1 Functional requirement

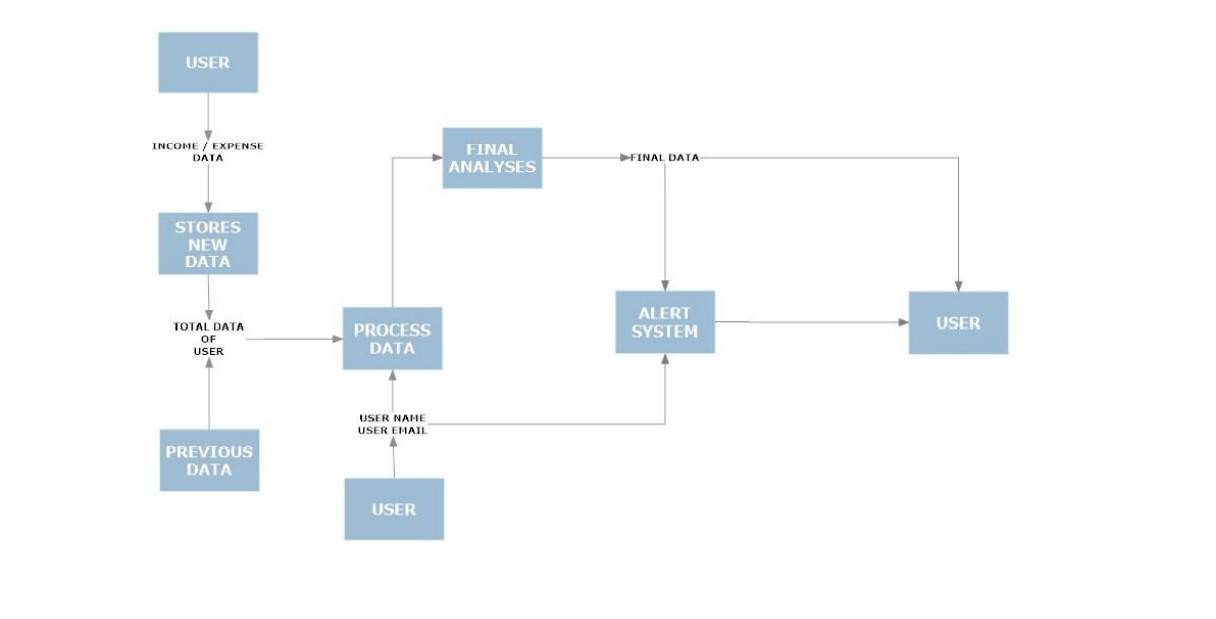


4.2 Non-Functional requirements

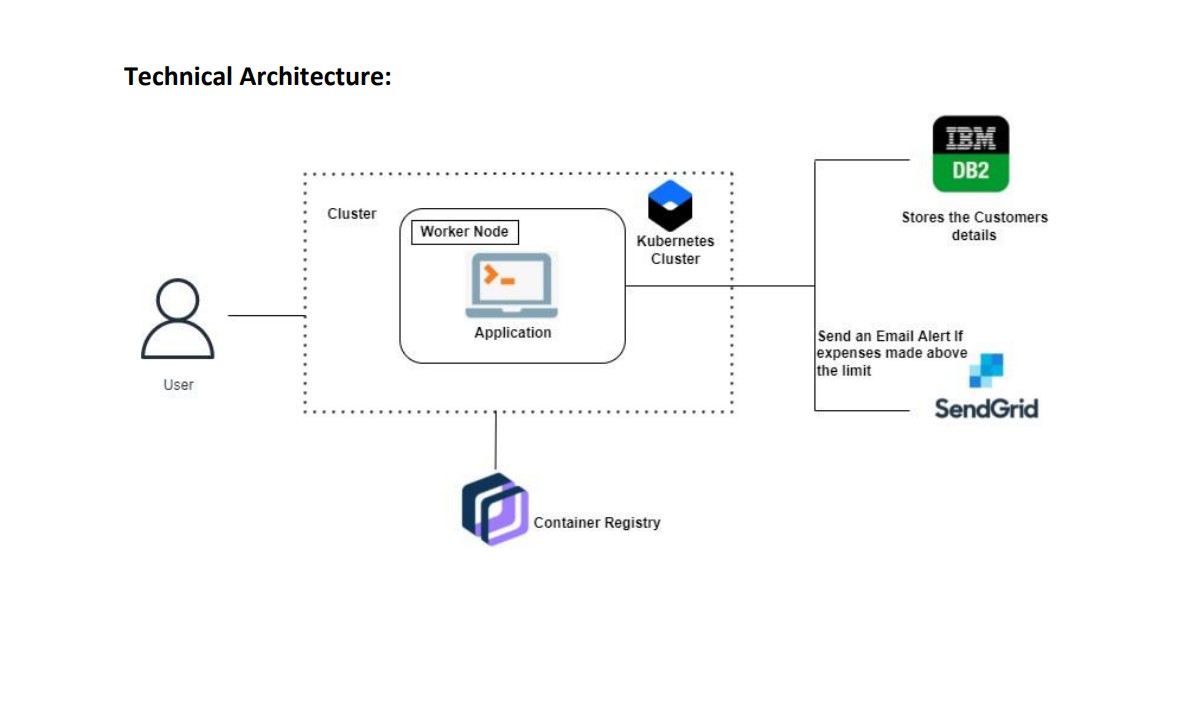


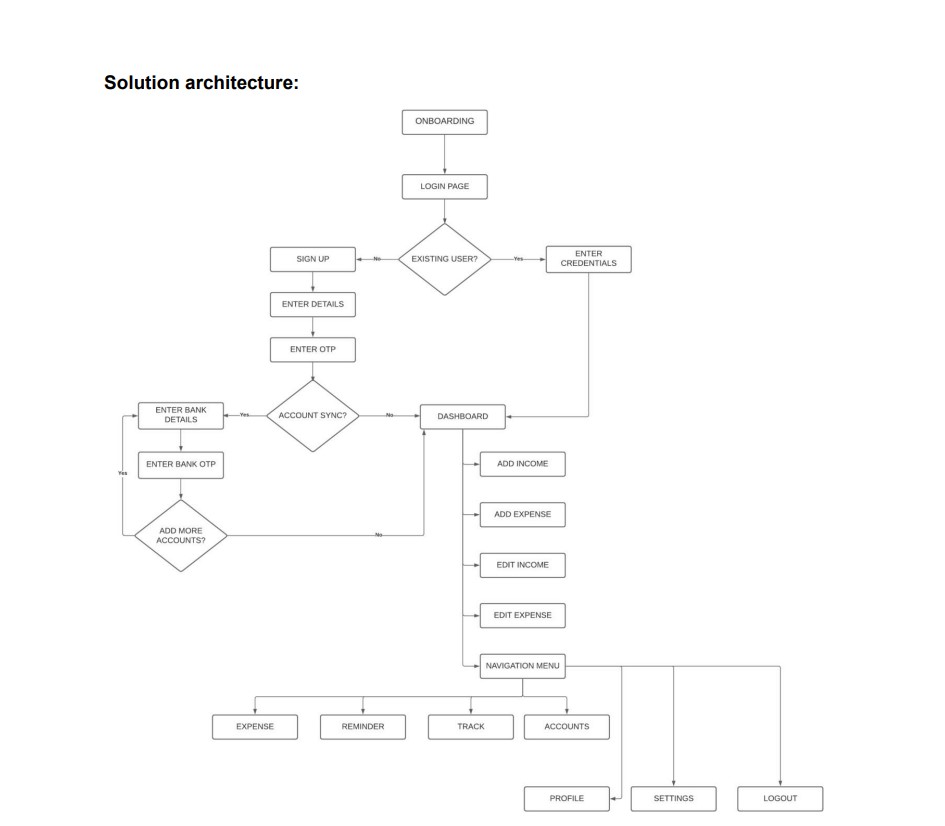
# 5.PROJECT DESIGN

5.1 Data Flow Diagrams

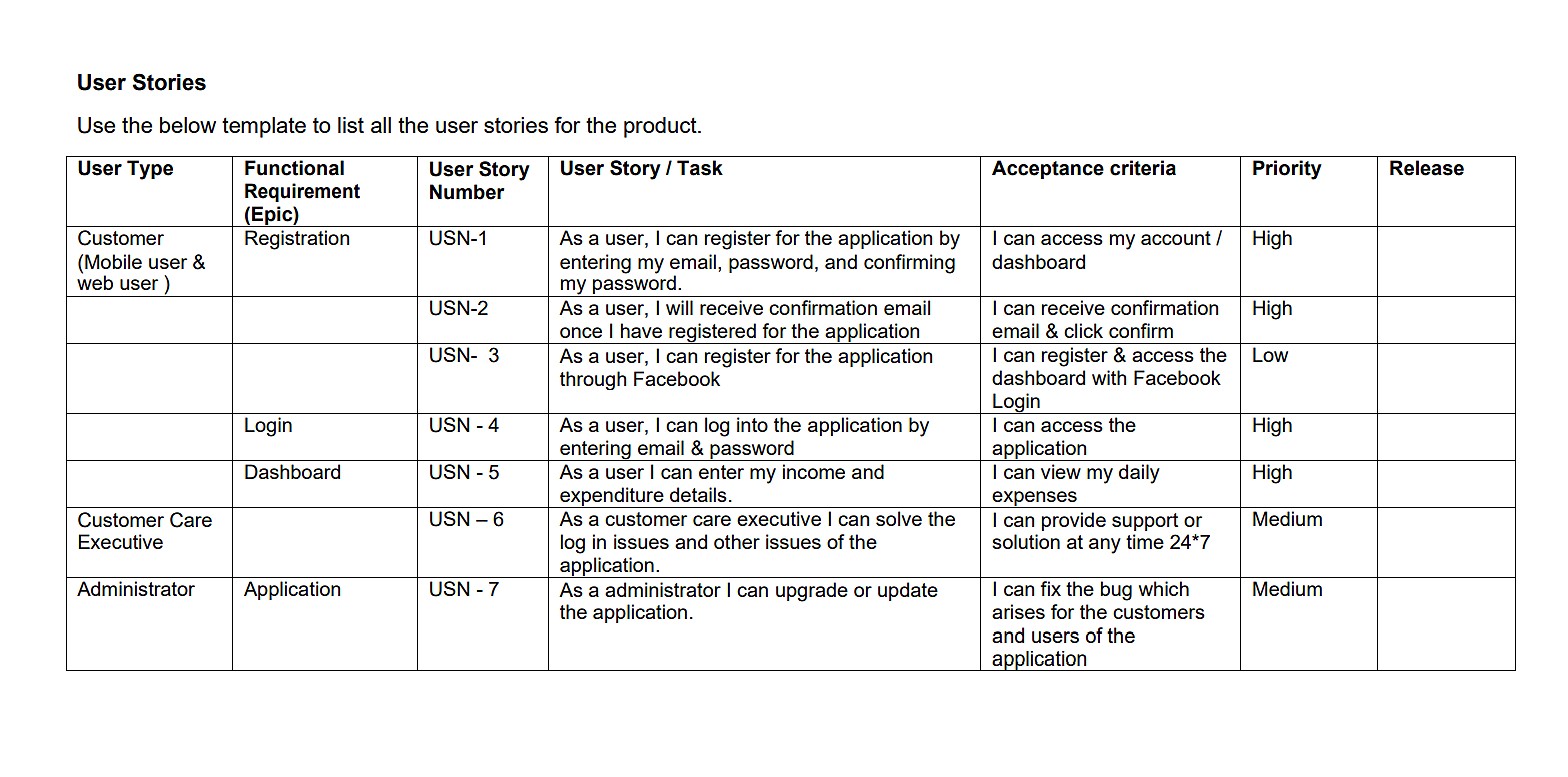


5.2 Solution & Technical Architecture



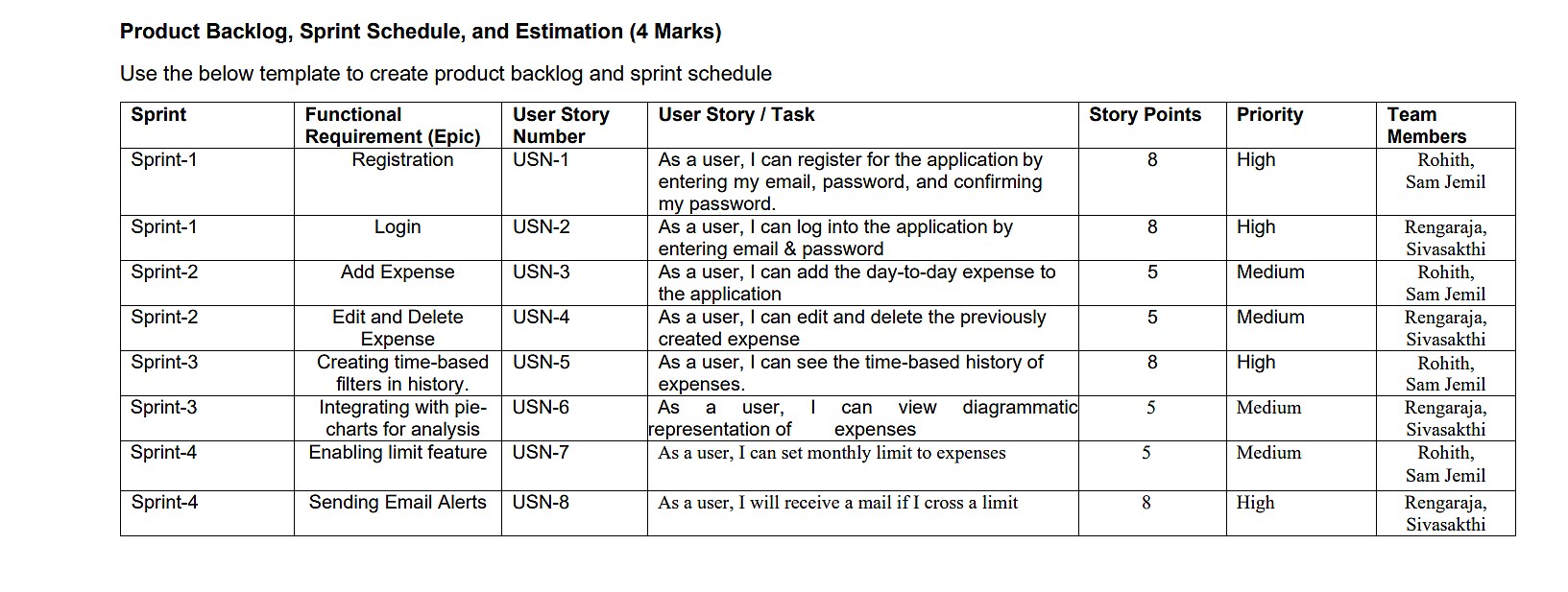


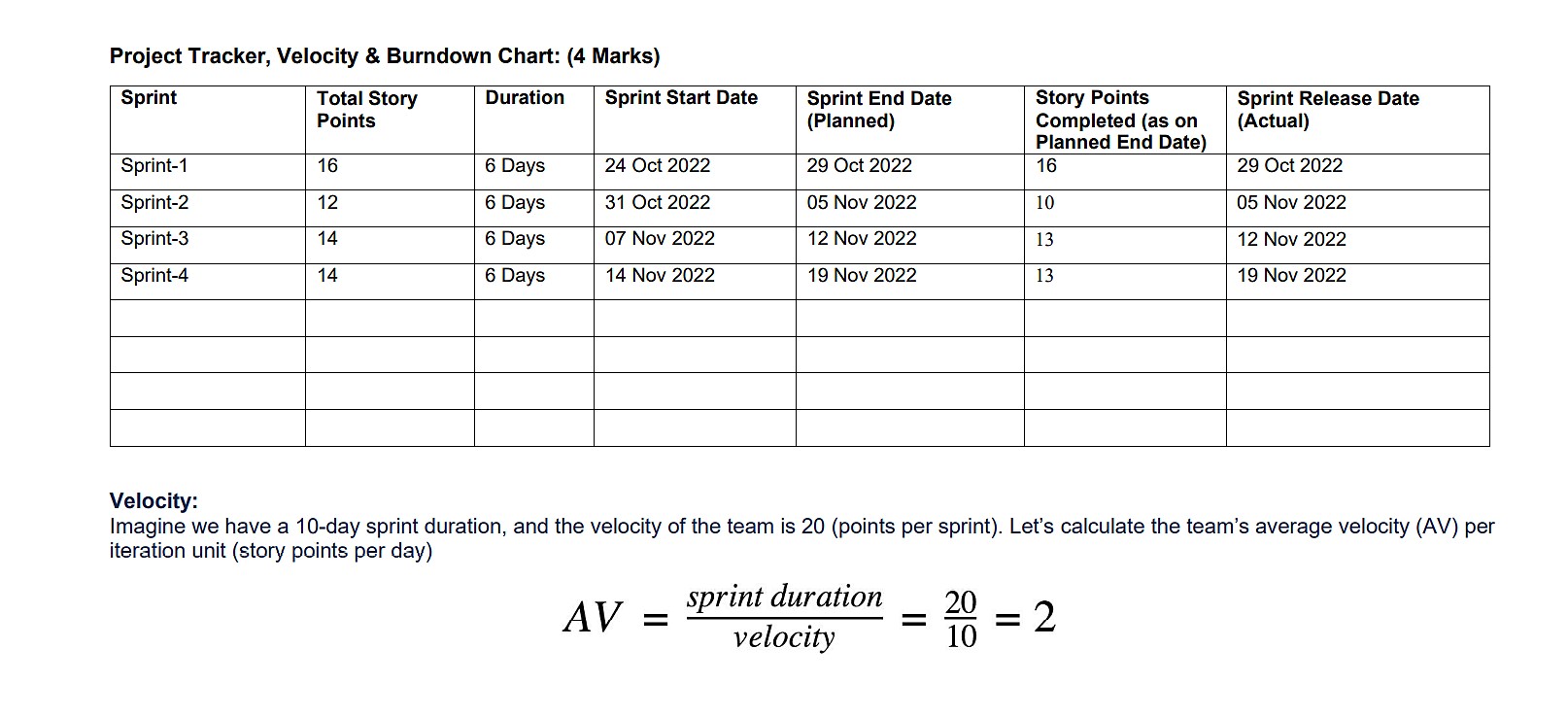
5.3 User Stories



**6.PROJECT PLANNING & SCHEDULING**

6.1 Sprint Planning & Estimation

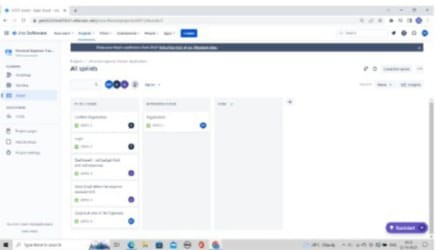


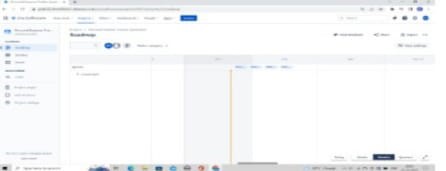


6.2 Sprint Delivery Schedule



6.3 Reports from JIRA





# 7.CODING & SOLUTIONING

7.1 Feature 1

We have added the data visualization on methods for expenditure. The pie chart have been used to represent the monthly expenses. The pie chart is a pictorial representation of data that makes it possible to visualize the relationships between the parts and the whole of a variable. For example, it is possible to understand the industry count or percentage of a variable level from the

division by areas or sectors. The recommended use for pie charts is two-

dimensional, as three-dimensional use can be confusing.

|  |  |  |
| --- | --- | --- |
| The dimensions form sectors of the measurement values; they can have one or two sizes and up to two measures. The first dimension is used to define the angle of each sector that makes up the chart and the second dimension optionally determines the radius of each sector. Additionally, these plots are useful for comparing data over a fixed period since they do not show changes over time. Therefore, their use should be considered if: | | |
| ● | You are looking to categorize and compare a set of data. |  |

* You only have positive values.
* You have less than seven categories since a larger number can make it difficult to perceive each segment.

**CODE :**

**todayExpenses.html & app.py**

|  |
| --- |
| **1{% extends 'base.html' %}**  **2{% block body %}**  **3<div class="container ">**  **4<div class="row">**   1. **<div class="col-md-5">** 2. **<h3 class="mt-5">Today Expense**   **Breakdown</h3>**   1. **<div class="card shadow mb-2 bg-white rounded-pill">** 2. **<div class="card-body ">** 3. **<div class="row">** 4. **<div class="col-md-**   **6">TIME</div>**   1. **<div class="col-md-6">**   **AMOUNT </div>**   1. **</div>** |

1. **</div>**
2. **</div>**
3. **{% for row in texpense %}**
4. **<div class="card shadow mb-2 bg-white rounded-bottom">**
5. **<div class="card-body ">**
6. **<div class="row">**
7. **<div id ="ttime" class="col-md-6">{{row [0]}}</div>**
8. **<div id="tamount" class="col-md-6"> {{row[1] }}**

**</div>**

1. **</div>**
2. **</div>**
3. **</div>**
4. **{% endfor %}**

**25</div>**

**26</div>**

**27<section>**

|  |
| --- |
| 1. **<div class="row">** 2. **<div class="col-md-6">** 3. **<h3 class="mt-5">Expense**   **Breakdown BY Category</h3>**   1. **<div class="card shadow mb-**   **2 bg-white rounded-bottom">**   1. **<div class="card-body ">** 2. **<div class="row">** 3. **<div class="col-md-**   **6">Food</div>**   1. **<div id="tfood" class="col-md-6"> {{ t\_food}} </div>** 2. **</div>** 3. **</div>** 4. **</div>**   **39 <div class="card shadow mb-2 bg-white rounded">** |

|  |
| --- |
| 1. **<div class="card-body">** 2. **<div class="row">** 3. **<div class="col-md-**   **6">Entertainment</div>**   1. **<div id="tentertainment" class="col-md-6">**   **{{ t\_entertainment}} </div>**   1. **</div>** 2. **</div>** 3. **</div>** 4. **<div class="card shadow mb-2 bg-white rounded">** 5. **<div class="card-body">** 6. **<div class="row">** 7. **<div class="col-md-**   **6">Business</div>**   1. **<div id="tbusiness" class="col-md-6"> {{t\_business}}** |

**</div>**

|  |
| --- |
| 1. **</div>** 2. **</div>** 3. **</div>** 4. **<div class="card shadow mb-2 bg-white rounded">** 5. **<div class="card-body">** 6. **<div class="row">** 7. **<div class="col-md-**   **6">Rent</div>**   1. **<div id="trent" class="col-md-6"> {{ t\_rent }} </div>** 2. **</div>** 3. **</div>** 4. **</div>** 5. **<div class="card shadow mb-2 bg-white rounded">** 6. **<div class="card-body">** 7. **<div class="row">** 8. **<div class="col-md-** |

|  |
| --- |
| **6">EMI</div>**   1. **<div id="temi" class="col-md-6">{{ t\_EMI }} </div>** 2. **</div>** 3. **</div>** 4. **</div>** 5. **<div class="card shadow mb-2 bg-white rounded">** 6. **<div class="card-body">** 7. **<div class="row">** 8. **<div class="col-md-**   **6">Other</div>**   1. **<div id="tother" class="col-md-6"> {{ t\_other}}</div>** 2. **</div>** 3. **</div>** 4. **</div>** 5. **<div class="card shadow mb-2 btn-outline-danger rounded-pill">** |

|  |
| --- |
| 1. **<div class="card-body">** 2. **<div class="row">** 3. **<div class="col-md6">Total</div>** 4. **<div class="col-md-**   **6">₹ {{total}} </div>**   1. **</div>** 2. **</div>** 3. **</div>** 4. **</div>** 5. **<div class="col-md-6">** 6. **<canvas id="myChart" width="400" height="400"></canvas>** 7. **<script>** 8. **let food = document.getElementById('tfood').innerHT ML** 9. **let entertainment = document.getElementById('tentertainment'** |

|  |
| --- |
| **).innerHTML**   1. **let business = document.getElementById('tbusiness').inn erHTML** 2. **let rent = document.getElementById('trent').innerHT ML** 3. **let emi = document.getElementById('temi').innerHT ML** 4. **let other = document.getElementById('tother').innerH TML** 5. **var ctx = document.getElementById('myChart').getCo ntext('2d');** 6. **var myChart = new Chart(ctx, {** 7. **type: 'doughnut',** 8. **data: {** |

|  |
| --- |
| 1. **labels: ['Food',**   **'Entertainment', 'Business', 'Rent',**  **'EMI', 'Other'],**   1. **datasets: [{** 2. **label:**   **'Expenses Chart',**   1. **data: [food, entertainment, business, rent, emi, other],** 2. **backgroundColor: [** 3. **'rgb(255, 99, 132)',** 4. **'rgb(0, 0, 0)',** 5. **'rgb(255, 205, 86)',** 6. **'rgb(201, 203,**   **207)',** |

|  |
| --- |
| 1. **'rgb(54,**   **162, 235)',**   1. **'rgb(215, 159, 64)'** 2. **],** 3. **}]** 4. **},** 5. **options: {** 6. **responsive: true,** 7. **plugins: {** 8. **legend: {** 9. **position: 'bottom',** 10. **},** 11. **title: {** 12. **display: true,** 13. **text: 'EXPENSE BREAKDOWN'** 14. **}** 15. **}** 16. **}** |

**127**

**})**

**;**

**128**

**<**

**/**

**script**

**>**

**129**

**<**

**/**

**div**

**>**

**130**

**<**

**/**

**div**

**>**

**131**

**<**

**/**

**div**

**>**

**132**

**<**

**/**

**section**

**>**

**133**

**<**

**/**

**div**

**>**

**134**

**{**

**%**

**endblock**

**%}**

|  |
| --- |
| 1. @app.route("/today") 2. def today():   3   1. param1 = "SELECT TIME(date) as tn, amount FROM expenses   WHERE userid = " + str(session['id']) + " AND DATE(date) =  DATE(current timestamp) ORDER BY date DESC"   1. res1 = ibm\_db.exec\_immediate(ibm\_db\_conn, param1) 2. dictionary1 = ibm\_db.fetch\_assoc(res1) 3. texpense = []   8   1. while dictionary1 != False: 2. temp = [] 3. temp.append(dictionary1["TN"]) |

|  |
| --- |
| 1. temp.append(dictionary1["AMOUNT"]) 2. texpense.append(temp) 3. print(temp) 4. dictionary1 = ibm\_db.fetch\_assoc(res1) 16 5. param = "SELECT \* FROM expenses WHERE userid = " + str(session['id']) + " AND DATE(date) = DATE(current timestamp) ORDER BY date DESC" 6. res = ibm\_db.exec\_immediate(ibm\_db\_conn, param) 7. dictionary = ibm\_db.fetch\_assoc(res) 8. expense = [] 9. while dictionary != False: 10. temp = [] 11. temp.append(dictionary["ID"]) 12. temp.append(dictionary["USERID"]) 13. temp.append(dictionary["DATE"]) 14. temp.append(dictionary["EXPENSENAME"]) 15. temp.append(dictionary["AMOUNT"]) 16. temp.append(dictionary["PAYMODE"]) 17. temp.append(dictionary["CATEGORY"]) 18. expense.append(temp) 19. print(temp) 20. dictionary = ibm\_db.fetch\_assoc(res) 33 21. total=0 22. t\_food=0 23. t\_entertainment=0 24. t\_business=0 25. t\_rent=0 26. t\_EMI=0 27. t\_other=0   41 |



7.2 Feature 2

Email notifications will be sent to the users once they cross the expenditure limit through send grid mail system. Most notifications are transactional, meaning a recipient’s action or account activity triggers them. But some notifications are marketing related, encouraging the recipient to take a specific action. Ecommerce product notifications inform recipients about new products or discounts. Plus, unlike general marketing emails, these are highly personalized and focus on a single product. For example, if a customer views an item on your website and that item goes on sale, you can send the customer a notification to let them know this is the best time to buy. Users can also opt into receiving notifications when an out-of-stock item is back in stock.

Notification emails tend to perform well because the content is highly relevant to the recipient. But the only way for the recipient to know this is if you state the content clearly in the subject line.

For example, the subject line “New Sign-in to Your Account” gets straight to the point, letting the user know why you sent this notification.

**sendemail.py**

import smtplib

import sendgrid as sg

import os

from sendgrid import SendGridAPIClient

from sendgrid.helpers.mail import Mail, Email, To, Content

SUBJECT = "personal expense tracker"

s = smtplib.SMTP('smtp.gmail.com', 587)

def sendmail(TEXT,email):

    from\_email = Email("tour7107@gmail.com")

    to\_email = To(email)

    subject = "Sending with SendGrid is Fun"

    content = Content("text/plain",TEXT)

    mail = Mail(from\_email, to\_email, subject, content)

    try:

        sg=SendGridAPIClient('SG.PJq2l00SRKyfdCTfm5b4XQ.I5p737Yx2imRbcRxykMCtRlq1iZ7s0\_cTEDwQbm8nI4')

        response = sg.send(mail)

        print(response.status\_code)

        print(response.body)

        print(response.headers)

    except Exception as e:

        print(e)

# 7.3 Database Schema

Tables :

1) Admin

id INT NOT NULL GENERATED ALWAYS AS IDENTITY,username VARCHAR(32) NOT NULL, email VARCHAR(32) NOT NULL,

password VARCHAR(32) NOT NULL

1. EXPENSE

id INT NOT NULL GENERATED ALWAYS AS IDENTITY, userid INT NOT NULL, date TIMESTAMP(12) NOT NULL,expensename VARCHAR(32) NOT NULL,

amount VARCHAR(32) NOT NULL, paymode VARCHAR(32) NOT NULL, category VARCHAR(32) NOT NULL

1. LIMIT

id INT NOT NULL GENERATED ALWAYS AS IDENTITY,userid VARCHAR(32) NOT NULL, limit VARCHAR(32) NOT NULL

# 8.TESTING

8.1 Test Cases

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Test Case ID** |  |  | **Purpose** |  |  | **TestCases** |  |  | **Result** |  |
|  |  |  |  |
|  | TC1 |  |  | Authentication |  |  | Password with |  |  | Password |  |
|  |  | length less than 4 | cannot be less than 4 |
| characters | characters |
|  | TC2 |  |  | Authentication |  |  | User name |  |  | User name |  |
|  |  | with length less than 2 | cannot be less than 2 |
| characters | characters |
|  | TC3 |  |  | Authentication |  |  | Valid user |  |  | User name |  |
|  |  | name with minimum 2 | accepted |
| characters |

TC4

Authentication

User name le

blank

User name

cannot be less

than 2

characters

TC5

Authentication

Password field

le blank

Password

cannot be

empty

TC6

Authentication

Minimum 4

characters

valid password

Password

accepted

TC7

Authentication

Password and

Confirm

Password did

not match

Please enter

same

password

TC8

Authentication

Confirm

Password field

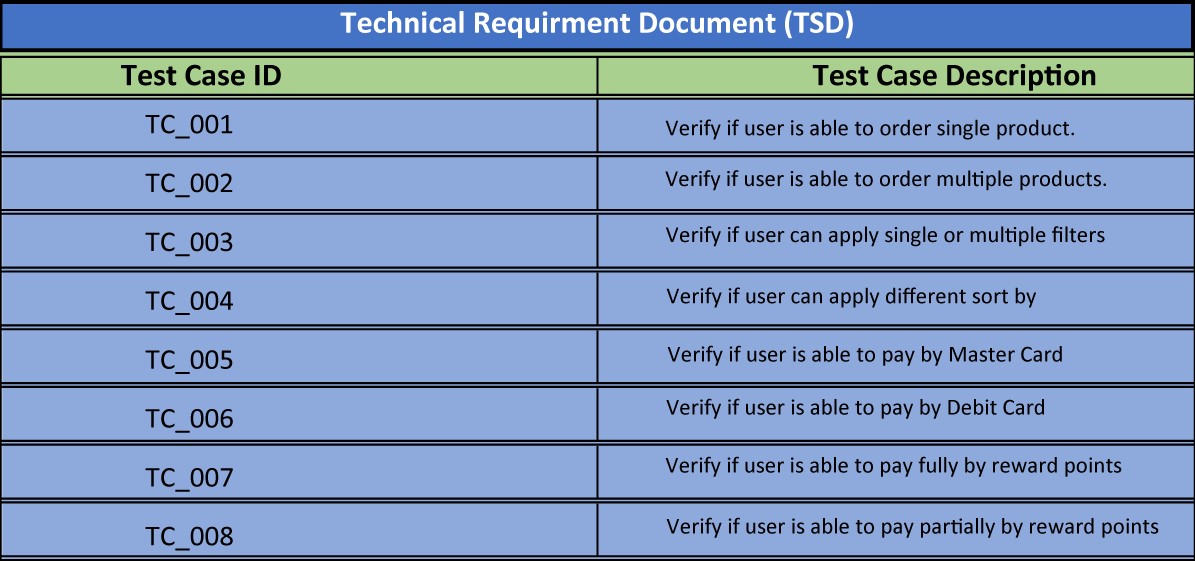
le blank

Please enter

same

password

8.2 User Acceptance Testing



# 9.RESULTS

9.1 Performance Metrics

* Tracking income and expenses: Monitoring the income and tracking all expenditures (through bank accounts, mobile wallets, and credit & debit cards).
* Transaction Receipts: Capture and organize your payment receipts to keep track of your expenditure.
* Organizing Taxes: Import your documents to the expense tracking app, and it will streamline your income and expenses under the appropriate tax categories.
* Payments & Invoices: Accept and pay from credit cards, debit cards, net banking, mobile wallets, and bank transfers, and track the status of your invoices and bills in the mobile app itself. Also, the tracking app sends reminders for payments and automatically matches the payments with invoices.
* Reports: The expense tracking app generates and sends reports to give a detailed insight about profits, losses, budgets, income, balance sheets, etc.,
* E-commerce integration: Integrate your expense tracking app with your eCommerce store and track your sales through payments received via multiple payment methods.
* Vendors and Contractors: Manage and track all the payments to the vendors and contractors added to the mobile app.
* Access control: Increase your team productivity by providing access control to particular users through custom permissions.
* Track Projects: Determine project profitability by tracking labor costs, payroll, expenses, etc., of your ongoing project.
* Inventory tracking: An expense tracking app can do it all. Right from tracking products or the cost of goods, sending alert notifications when the product is running out of stock or the product is not selling, to purchase orders.
* In-depth insights and analytics: Provides in-built tools to generate reports with easy-to-understand visuals and graphics to gain insights about the performance of your business.
* Recurrent Expenses: Rely on your budgeting app to track, streamline, and automate all the recurrent expenses and remind you on a timely basis.

# 10.ADVANTAGES & DISADVANTAGES

1. **Achieve your business goals** with a tailored mobile app that perfectly fits your business.
2. **Scale-up** at the pace your business is growing.
3. Deliver an **outstanding** customer experience through additional control over the app.
4. Control the **security** of your business and customer data
5. Open **direct marketing channels** with no extra costs with methods such as push notifications.
6. **Boost the productivity** of all the processes within the organization.
7. Increase **efficiency** and **customer satisfaction** with an app aligned to their needs.
8. **Seamlessly integrate** with existing infrastructure.
9. Ability to provide **valuable insights**.

10.Optimize sales processes to generate **more revenue** through enhanced data collection.

# 11.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 a lot solving them as a team. We adopted things like video tutorials, text tutorials, internet and learning materials to make our project complete.

# 12.FUTURE

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 interface.

* Provide backup and recovery of data.

* Provide better user interface for user.

* Mobile apps advantage.

**13.APPENDIX**

**Source Code Github Link :**

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

39256-1660403108

**Project Demo Link :**

https://drive.google.com/file/d/19gNcaIW91kQ

FQI8ytmLBq1pELsY-

TH3s/view?usp=share\_link