

PERSONAL EXPENSE TRACKER

NALAIYA THIRAN PROJECT BASED LEARNING ON PROFESSIONAL READINESS FOR INNOVATION, EMPLOYMENT AND ENTREPRENEURSHIP

A PROJECT REPORT

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1. INTRODUCTION

TEAM ID : PNT2022TMID32503

INDUSTRY MENTOR : Kusboo

FACULTY MENTOR : M. Revathi

Skills Required:

IBM Cloud, HTML, Javascript, IBM Cloud Object Storage, Python- Flask, Kubernetes, Docker, IBM DB2, IBM Container Registry

a) Project Overview

This project is based on expense tracking. This project aims to create an easy, faster and smooth cloud application. For better expense tracking we developed our project that will help the users a lot. Most of the people cannot track their expenses and income leading to facing money crisis, so this application can help people to track their expense day to day and make life stress free. Money is the most valuable portion of our daily life and without money we will not last one day on earth. So using the daily expense tracker application is important to lead a happy family. It helps the user to avoid

unexpected expenses and bad financial situations. It will save time and provide a responsible lifestyle.

- b) 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.

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

a. Existing problem

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

In another survey conducted by Level 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%)

b. References

S.No	TITLE	PROPOSED WORK	TOOLS USED/ ALGORITHM	TECHNOLOGY	ADVANTAGES/ DISADVANTAGES
1.	EXPENSE MANAGER APPLICATION. (2020)	To Develop A Moblie Application That Keeps Record Of User Personal Expenses Contribution In Group Expenditure Top Investment Options View Of The Current Stock Market ,Read Authenticated Financial News	Android Studio	Cloud Application	Advantages: ➤ Keeps Track All Of Your Daily Transactions, Keeps Track Of Your Money Lent Or Borrowed. Disadvantages: ➤ Occupy Lot Of Space.
2.	A NOVEL EXPENSE TRACKER USING STATISTICAL ANALYSIS. (2021)	To Maintain And Manage Data Of Daily Expenditure In A More Precise Way.	SQL Lite	Cloud Application	Advantages: ➤ Its Suggest You With The Most Effective Investment Options. Disadvantages: ➤ The Work Done Being Is Not Accurate.

S.No	TITLE	PROPOSED WORK	TOOLS USED/ ALGORITHM	TECHNOLOGY	ADVANTAGES/ DISADVANTAGES
3.	EXPENSE TRACKER. (2021)	Facilitates The User To Keep Track And Manage Their Personal As Well As Business Expenses.	Android OS	Cloud Application	Advantages: ➤ Become Aware Of Poor Spending Habits And Take Care Of Your Finances Saving And Investment. Disadvantages: ➤ Searching And Referencing Is Difficult And Time-consuming.
4.	EXPENSE TRACKER. (May 2021)	The Application Keeps The Track Of The Income And Expenses Both Of User On A Day To Day Bases	Java	Cloud Application	Advantages: ➤ The Project Effectively Keeps Away From The Manual Figuring. Disadvantages: ➤ Report Generation Is A Tedious Process.

c. Problem Statement Definition :

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.

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	Student	Manage my expenses	It is very difficult	There is no proper app to warn me regarding my expense	Frustrated
PS-2	IT employee	Reduce my expense	I am not able to keep track of my expense	I cant see the app whoch satisfies my needs	Annoyed

3. IDEATION & PROPOSED SOLUTION

a) 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 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.




b) 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.

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

Template



Brainstorm & ideaprioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

10 minutes to prepare
1 hour to collaborate
2-8 people recommended

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**
Define 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

PROBLEM
How might we track personal expenses?

Key rules of brainstorming
It's run an smooth and productive session

- Stay in topic.
- Encourage wild ideas.
- Defer judgment.
- Listen to others.
- Go for volume.
- If possible, be visual.

Step-2: Brainstorm, Idea Listing and Grouping

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

10 minutes

Kavinaya N

Day to Day reminder about account balance via mail

Afra Thaiseen J

If the user spent high ,then send mail

Abdul Wassem Rhaad KW

If they logged in to the web app, we can send some alert

Jayanti PS

Sending mail when exceeds the limit

Group ideas
Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, 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.

10 minutes

Frequent monitoring on balance by user.

If they logged in to the web app, we can send some alert

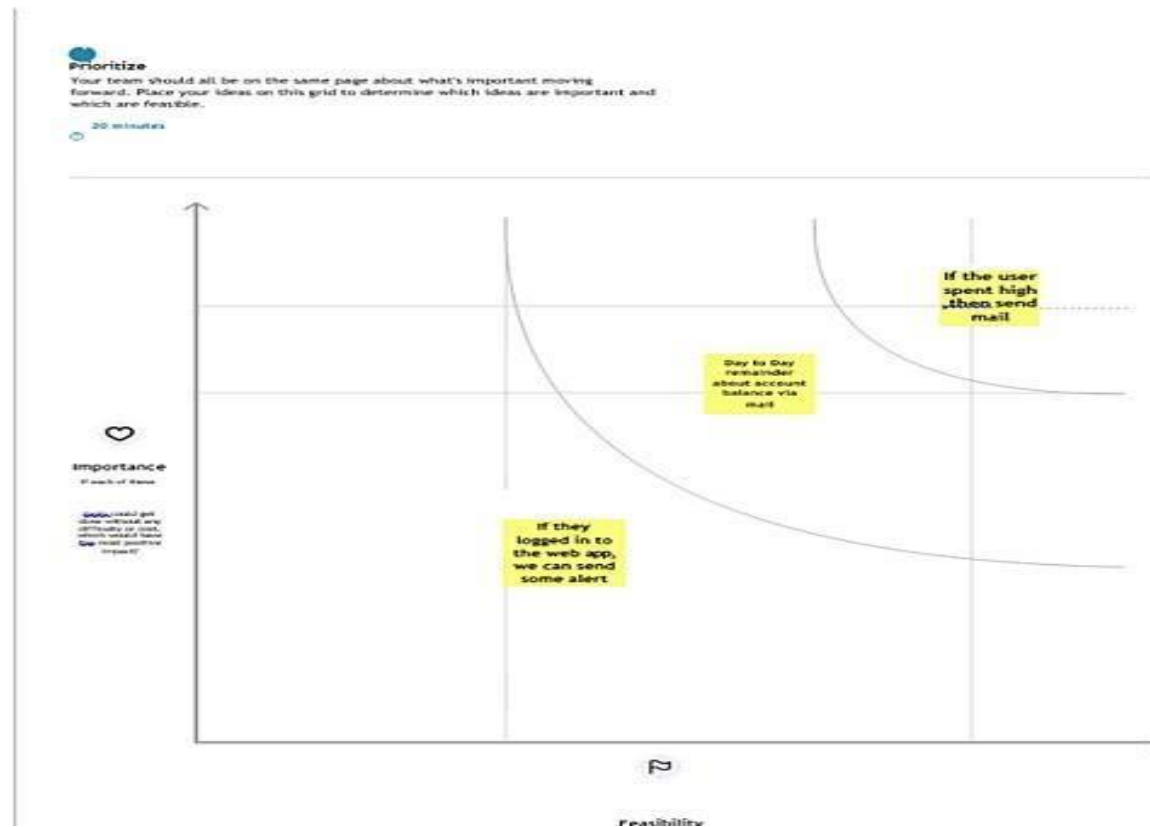
Sending mail when exceeds the limit

If the user spent high ,then send mail

Day to Day reminder about account balance via mail

Sending mail after exceeds the limit is useless

Step-3: Idea Prioritization



c) Proposed Solution

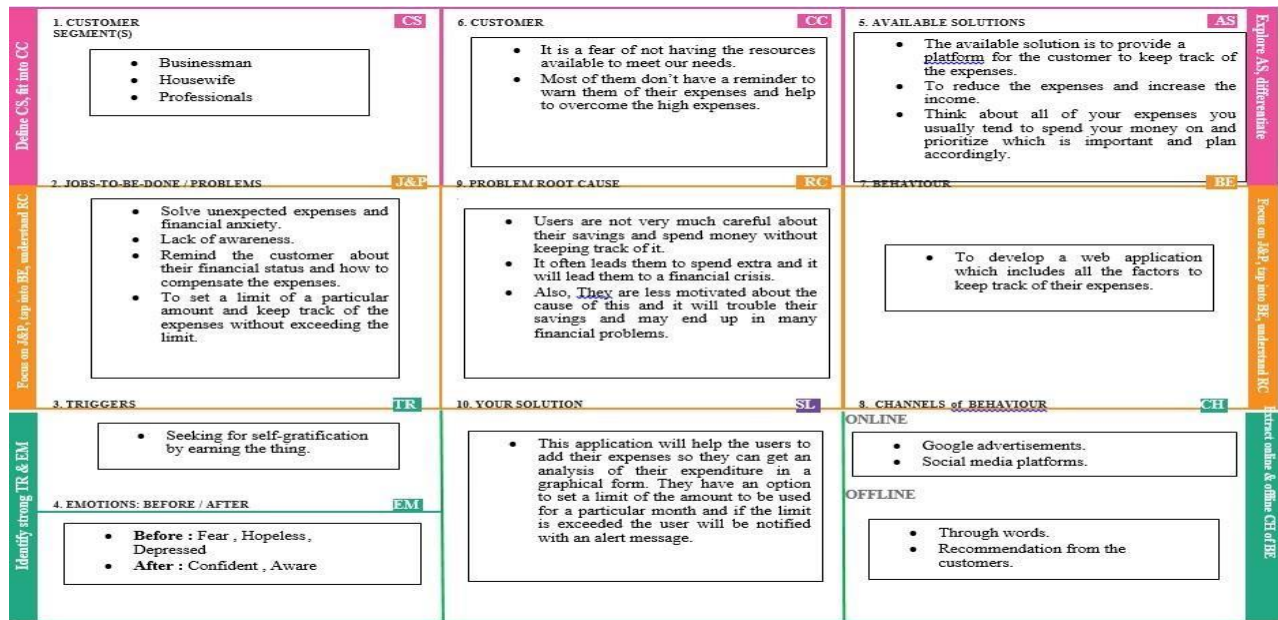
S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	<p>Keeping Proper track of our daily expenses is becoming challenging in today's world. Without the proper money management knowledge people overspend on their wants instead of focusing on their needs.</p> <p>Especially when using online applications for purchasing their requirements consumers tend to over spend. This problem leads to improper distribution of their daily expenses. Without proper knowledge on managing money poor are becoming poorer and rich are becoming richer.</p>

2.	Idea / Solution description	An attempt to develop an app to manage our daily expenses and give us insights on managing our money would be a good idea. This app will be able to track expenses on various online platforms and apps. The app can help with proper budgeting and give alerts when the user over spends or crosses the limit previously set by them. This will lead to proper spending habits and make them knowledgeable about money management. IBM cloud can be used to handle the data safely.
3.	Novelty / Uniqueness	The speciality for the app will be the data security with IBM cloud being used for data storage and this app genuinely helps with the money management. The proper and personalized budgeting of the user's money leads them to trust the app and they wouldn't have to worry about their expenditure on unnecessary things.

4.	Social Impact / Customer Satisfaction	People using the app will be becoming better at their spending habits and will be able to save more than their peers who are not using the app. This application aims to improve the users' savings sustainably and steadily which leads them to trust the app without worrying about their money.
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5.	Business Model (Revenue Model)	This application leads to a business model, the user can be suggested the right products to buy based on their budget and this can lead to targeted business approaching the right consumers. The model leads to systematic and structured expenses of the user and also leads to predictive analysis of the future expenses of the consumer. This model makes the user more careful with expenses as they are provided with the money management insights.
6.	Scalability of the Solution	This application can be created as a multi user model nationwide. The model can also be modified based on the country's law on applications and data security which leads to international implementation of this application by maintaining proper gateway rules. This app when developed for multiple nations can be modified to their requirements. The app can also be modified for a particular group of people or organization.

d) Problem Solution Fit



4. REQUIREMENT ANALYSIS

a) Functional requirements

FR No.	Functional Requirement	Description
FR-1	Register	Registration is the process of the user to complete the application's form. Certain details must be submitted such as e-mail address, password, and password confirmation. The user is identified using these details.
FR-2	Login	The login screen is used to verify the identity of the user. The account can be accessed using the user's registered email address and password.

FR-3	Categories	On the main page, we can see overall revenue and spending, as well as the balance remaining after expenditure, as well as the user's entire categories namely Entertainment, Cloth, Food and Drinks, Health and Fitness and so on.
FR-4	Update Daily Expensive	The user can upload the daily expensive details what they are spending on each day. The details such as cloth, entertainment, food, health etc.,

FR-5	View Expensive Chart	This module used to see a pictorial depiction of all details in the form of a pie chart, where each slice of the pie chart represents that the viewer to gain an approximatention of which category has the highest expenses.
FR-6	Set Alert	When a user attempts to spend more than the pre-defined amount limit, the app will automatically send an alertif the threshod amount they selected for an aert is exceeded

b) Non-Functional requirements

NFR No.	Non-Functional Requirement	Description

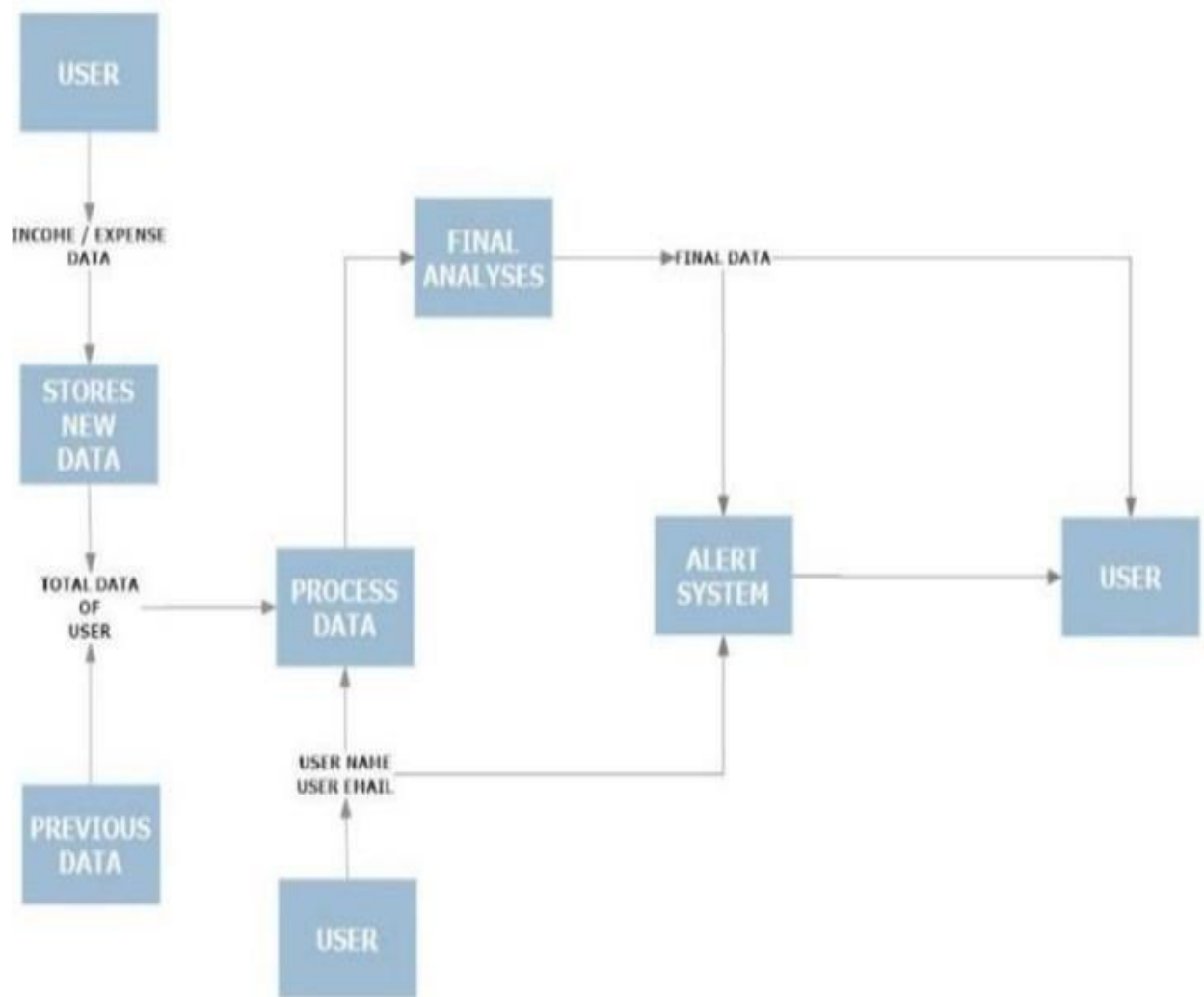
NFR-1	Usability	<p>The system shall allow the users to access the system with pc using web application. The system uses a web application as an interface. The system is user friendly which makes the system easy.</p>
NFR-2	Security	<p>A security requirement is a statement of needed security functionality that ensures one of many different security properties of software is being satisfied.</p>
NFR-3	Reliability	<p>The system has to be 100% reliable due to the importance of data and the damages that can be caused by incorrect or incomplete data.</p> <p>The system will run 7 days a week.</p> <p>24 hours a day.</p>

NFR-4	Performance	<p>The information is refreshed depending upon whether some updates have occurred or not in the application. The system shall respond to the member in not less than two seconds from the time of the request submittal. The system shall be allowed to take more time when doing large processing jobs. Responses to view information shall take no longer than 5 seconds to appear on the screen.</p>
NFR-5	Availability	<p>The system is available 100% for the user and is used 24 hrs a day and 365 days a year. The system shall be operational 24 hours a day and 7 days a week.</p>
NFR-6	Scalability	<p>Scalability is the measure of a system's ability to increase or decrease in performance and cost in response to changes in application and system processing demands.</p>

5. PROJECT DESIGN

a) 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.

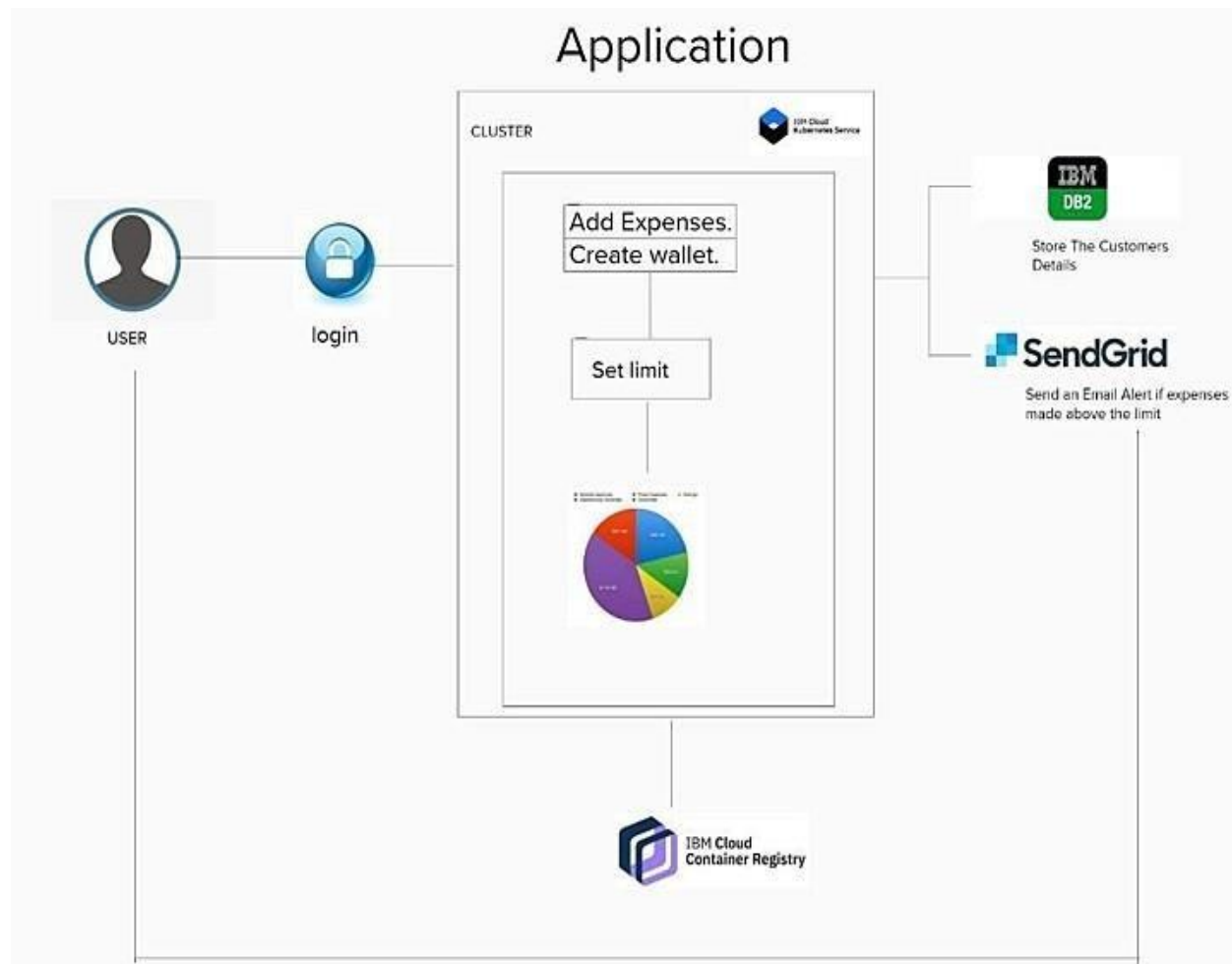


b) Solution & Technical Architecture

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:
 • Find the best tech solution to solve existing business problems.

- Describe the structure, characteristics, behaviour, and other aspects of the software to project stakeholders.

- Define features, development phases, and solution requirements
- Provide specifications according to which the solution is defined, managed, and delivered.



c) User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority

Customer (web user)	Registration	USN-1	As a user, I can register for the application by entering mail id and password	I can access my account/ dashboard	High
		USN-2	As a user, I will receive a confirmation email once I have registered for the email and click application	I can receive a confirmation email	High
		USN-3	As a user, I can access using mail	I can register through mail	Low

	Login	USN-4	As a user, I can login application by entering application using email and password	I can access the application	High
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	Dashboard	USN-5	As a user,I can view my income and expenditure details	I can view my daily expenses	High
Customer care executive		USN-6	As a customer care executive, I can solve the login issue and other issues of the solution at any application	I can provide support	Medium
Administrator	Application	USN-7	As an administrator,I can upgrade or update the application	I can fix the bug	Medium

6. PROJECT PLANNING & SCHEDULING

a) Sprint planning and estimation

Sprint planning and Estimation is done by the entire team during Sprint Planning Meeting. The objective of the Estimation would be to consider the User Stories for the Sprint by Priority and by the Ability of the team to deliver during the Time Box of the Sprint.

Sprint	Functional Requirements (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.	3	High	Eswar R Hariharan T Gopika A Harinimari K
Sprint-1	Login	USN-2	As a user, I can login to user dashboard and see the information about my incomes and expenses.	3	High	Eswar R Hariharan T Gopika A Harinimari K

Sprint-2	Dashboard	USN-3	As a user, I can enter my income and expenditure details.	4	High	Eswar R Hariharan T Gopika A Harinimari K
Sprint	Functional Requirements (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-3	Expense Update	USN-4	As a user, I can track my expenses and manage my monthly budget.	2	High	Eswar R Hariharan T Gopika A Harinimari K
Sprint-3	Email Alert	USN-5	As a user, I can see if there is an excessive expense and if there is such condition, I will be notified via email.	6	Medium	Eswar R Hariharan T Gopika A Harinimari K
Sprint-4	Customer Care	USN-6	As a customer care executive, I can solve the login issues and other issues of the application.	3	Medium	Eswar R Hariharan T Gopika A Harinimari K
Sprint-4	Application	USN-7	As an administrator, I can upgrade or update the application.	3	Medium	Eswar R Hariharan T Gopika A Harinimari K

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

b) Sprint Delivery Schedule

Sprint delivery schedule is a schedule prepare with timelines Within which a particular task should be completed.

S.NO	MILESTONES	ACTIVITIES	DATE
1.	Preparation Phase	Pre-requisites	24 Aug 2022
		Prior Knowledge	25 Aug 2022
		Project Structure	23 Aug 2022
		Project Flow	23 Aug 2022
		Project Objectives	22 Aug 2022
		Registrations	26 Aug 2022
		Environment Set-up	27 Aug 2022
		Literature Survey	29 Aug 2022 – 03 Sept 2022

2.	Ideation Phase		
		Empathy Map	5 Sept 2022 - 7 Sept 2022
		Problem Statement	8 Sept 2022 - 10 Sept 2022
		Ideation	12 Sept 2022 – 16 Sept 2022

3.	Project Design Phase - 1	Proposed Solution	19 Sept 2022 – 23 Sept 2022
		Problem Solution Fit	24 Sept 2022 – 26 Sept 2022
		Solution Architecture	27 Sept 2022 – 30 Sept 2022

4.	Project Design Phase - 2	Customer Journey Map	03 Oct 2022 – 08 Oct 2022
		Requirement Analysis	09 Oct 2022 – 11 Oct 2022
		Data Flow Diagrams	11 Oct 2022 – 14 Oct 2022
		Technology Architecture	15 Oct 2022 - 16 Oct 2022
5.	Project Planning Phase	Milestones & Tasks	17 Oct 2022 – 18 Oct 2022
		Sprint Schedules	19 Oct 2022 – 22 Oct 2022
6.	Project Development Phase	Sprint - 1	24 Oct 2022 –

			29 Oct 2022
		Sprint – 2	31 Oct 2022 – 05 Nov 2022
		Sprint – 3	07 Nov 2022 – 12 Nov 2022
		Sprint – 4	14 Nov 2022 – 19 Nov 2022

7. CODING & SOLUTIONING

i. Python App:

app.py:

```
from flask import Flask, render_template, request, redirect, session, url_for
from werkzeug.security import generate_password_hash, check_password_hash
```

```
from datetime import timedelta
```

```
import re
```

```
from flask_db2 import DB2
```

```
import ibm_db
```

```
import ibm_db_dbi
```

```
from sendemail import sendgridmail,sendmail
```

```
from sqlalchemy import Integer
```

```
app = Flask(__name__)
```

```
app.secret_key = 'expensetrackersecretkey'
```

```
app.permanent_session_lifetime = timedelta(days=1)
```

```
app.config['database'] = 'ibmexpense'
```

```
app.config['hostname'] = '0c77d6f2-5da9-48a9-81f8-  
86b520b87518.bs2io90l08kqb1od8lcg.databases.appdomain.cloud'
```

```
app.config['port'] = '31198'
```

```
app.config['protocol'] = 'tcpip'
```

```
app.config['uid'] = 'dxk20137'
```

```
app.config['pwd'] = '63ZfdzVa5XDeluR3'
```

```
app.config['security'] = 'SSL'
```

```
try:
```

```
    mysql = DB2(app)
```

```
    conn_str='database=ibmexpense;hostname=0c77d6f2-5da9-48a9-81f8-  
86b520b87518.bs2io90l08kqb1od8lcg.databases.appdomain.cloud;port=31198;protocol=tcpip;\
```

```
    uid=dxk20137;pwd=63ZfdzVa5XDeluR3;security=SSL'
```

```
    ibm_db_conn = ibm_db.connect(conn_str,"")
```

```
    print("Database connected without any error !!")
```

```
except:
```

```
print("IBM DB Connection error : " + DB2.conn_errormsg())
```

```
#SIGN--UP--OR--REGISTER
```

```
@app.route("/signup")
```

```
def signup():
```

```
    return render_template("signup.html")
```

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

```
def register():
```

```
    msg = "
```

```
    if request.method == 'POST' :
```

```
        username = request.form['username']
```

```
        email = request.form['email']
```

```
        password = request.form['password']
```

```
        sql = "SELECT * FROM register WHERE email = ?"
```

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

```
        ibm_db.bind_param(stmt, 1, username)
```

```
        ibm_db.execute(stmt)
```

```
        result = ibm_db.execute(stmt)
```

```
        print(result)
```

```
        account = ibm_db.fetch_row(stmt)
```

```
        print(account)
```

```
        param = "SELECT * FROM user WHERE email = " + "\"" + email + "\""
```

```
        res = ibm_db.exec_immediate(ibm_db_conn, param)
```

```
        if account:
```

```
            msg = 'Username already exists !'
```

```
        elif not re.match(r'^[a-zA-Z0-9]+@[a-zA-Z0-9]+\.[a-zA-Z]+', email):
```

```
            msg = 'Invalid email address !'
```



```

elif not re.match(r'[A-Za-z0-9]+', username):
    msg = 'name must contain only characters and numbers !'
else:
    sql2 = "INSERT INTO register (username, email,password) VALUES (?, ?, ?)"
    stmt2 = ibm_db.prepare(ibm_db_conn, sql2)
    ibm_db.bind_param(stmt2, 1, username)
    ibm_db.bind_param(stmt2, 2, email)
    ibm_db.bind_param(stmt2, 3, password)
    ibm_db.execute(stmt2)
    msg = 'You have successfully registered !'
    return render_template('signup.html', msg = msg)

```

#LOGIN--PAGE

```
@app.route("/signin")
```

```
def signin():
```

```
    return render_template("login.html")
```

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

```
def login():
```

```
    global userid
```

```
    msg = "
```

```
if request.method == 'POST' :
```

```
    email = request.form['email']
```

```
    password = request.form['password']
```

```
    sql = "SELECT * FROM user WHERE username = ? and password = ?"
```

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

```
    ibm_db.bind_param(stmt, 1, email)
```

```
    ibm_db.bind_param(stmt, 2, password)
```

```
result = ibm_db.execute(stmt)
```

```
print(result)
```

```
account = ibm_db.fetch_row(stmt)
```

```
print(account)
```

```
param = "SELECT * FROM user WHERE email = " + "\"" + email + "\"" + " and password = " + "\"" + password + "\""
```

```
res = ibm_db.exec_immediate(ibm_db_conn, param)
```

```
if account:
```

```
    session['loggedin'] = True
```

```
    session['id'] = dictionary["ID"]
```

```
    userid = dictionary["ID"]
```

```
    session['username'] = dictionary["USERNAME"]
```

```
    session['email'] = dictionary["EMAIL"]
```

```
    return redirect('/home')
```

```
else:
```

```
    msg = 'Incorrect username / password !'
```

```
return render_template('login.html', msg = msg)
```

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

```
def login()
```

```
    errormsg = "
```

```
if request.method == 'POST' :
```

```
    session.permanent = True
```

```
    email = request.form['email']
```

```
    password = request.form['password']
```

```
    cursor = mysql.connection.cursor()
```

```
sql = "SELECT * FROM user WHERE email = ? and password = ?"
```

```
stmt = ibm_db.prepare(ibm_db_conn, sql)
ibm_db.bind_param(stmt, 1, email)
ibm_db.bind_param(stmt, 2, password)
result = ibm_db.execute(stmt)
account = ibm_db.fetch_row(stmt)
print(account)
```

```
if account:
    if check_password_hash(account[3], password):
        session['user'] = account
        return redirect(url_for('home'))
    else:
        errmsg = 'Password might be wrong !'
else:
    errmsg = 'Invalid credentials !'
return render_template('login.html', errmsg = errmsg)
```

```
@app.route('/index')
def index():
    return render_template("homepage.html")
```

#HOME--PAGE

```
@app.route('/')
@app.route('/home')
def home():
    if 'user' in session:
        # user = session['user']
        # return f" <h1>{user}</h1>"
        return render_template('home.html', user = session['user'][1])
        # return render_template('home.html')
    else:
        return redirect(url_for('index'))
```

```
@app.route("/add")
```

```
def adding():
```

```
    if 'user' in session:
```

```
        return render_template('add.html', user = session['user'][1])
```

```
    else:
```

```
        return redirect(url_for('index'))
```

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

```
def addexpense():
```

```
    id = session['user'][2]
```

```
    date = request.form['date']
```

```
    expensename = request.form['expensename']
```

```
    amount = request.form['amount']
```

```
    paymode = request.form['paymode']
```

```
    category = request.form['category']
```

```
    sql = "INSERT INTO expenses (id, date, expensename, amount, paymode, category) VALUES (?, ?, ?, ?, ?, ?)"
```

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

```
    ibm_db.bind_param(stmt, 1, session['id'])
```

```
    ibm_db.bind_param(stmt, 2, p4)
```

```
    ibm_db.bind_param(stmt, 3, expensename)
```

```
    ibm_db.bind_param(stmt, 4, amount)
```

```
    ibm_db.bind_param(stmt, 5, paymode)
```

```
    ibm_db.bind_param(stmt, 6, category)
```

```
    ibm_db.execute(stmt)
```

```
    param = "SELECT * FROM expenses WHERE userid = " + str(session['id']) + " AND MONTH(date) = MONTH(current timestamp) AND YEAR(date) = YEAR(current timestamp) ORDER BY date DESC"
```

```
    res = ibm_db.exec_immediate(ibm_db_conn, param)
```

```
    print(date + " " + expensename + " " + amount + " " + paymode + " " + category)
```

```
return redirect("/display")
```

```
#DISPLAY---graph
```

```
@app.route("/display")
```

```
def display():
```

```
    if 'user' in session:
```

```
        id = session['user'][2]
```

```
        cursor = mysql.connection.cursor()
```

```
        cursor.execute('SELECT * FROM expenses WHERE user=%s AND date ORDER BY `expenses`.`date`  
DESC',[id])
```

```
        expense = cursor.fetchall()
```

```
        cursor = mysql.connection.cursor()
```

```
        cursor.execute('SELECT * FROM expenses WHERE user=%s AND date ORDER BY `expenses`.`date`  
DESC',[id])
```

```
        expense = cursor.fetchall()
```

```
        cursorfood = mysql.connection.cursor()
```

```
        cursorfood.execute('SELECT sum(amount) from expenses WHERE category="Food" and user=%s',  
[id])
```

```
        sfood = cursorfood.fetchone()
```

```
        if sfood[0] == None:
```

```
            sfooddata = 0
```

```
        else:
```

```
            sfooddata = sfood[0]
```

```
        cursorentertainment = mysql.connection.cursor()
```

```
        cursorentertainment.execute('SELECT sum(amount) from expenses WHERE  
category="Entertainment" and user=%s', [id])
```

```
        sentertainment = cursorentertainment.fetchone()
```

```
        if sentertainment[0] == None:
```

```
            sentertainmentdata = 0
```

```
        else:
```

```
sentertainmentdata = sentertainment[0]
```

```
cursorbusiness = mysql.connection.cursor()
```

```
cursorbusiness.execute('SELECT sum(amount) from expenses WHERE category="Business" and  
user=%s', [id])
```

```
sbusiness = cursorbusiness.fetchone()
```

```
if sbusiness[0] == None:
```

```
    sbusinessdata = 0
```

```
else:
```

```
    sbusinessdata = sbusiness[0]
```

```
cursorrent = mysql.connection.cursor()
```

```
cursorrent.execute('SELECT sum(amount) from expenses WHERE category="Rent" and user=%s', [id])
```

```
srent = cursorrent.fetchone()
```

```
if srent[0] == None:
```

```
    srentdata = 0
```

```
else:
```

```
    srentdata = srent[0]
```

```
cursosemi = mysql.connection.cursor()
```

```
cursosemi.execute('SELECT sum(amount) from expenses WHERE category="EMI" and user=%s', [id])
```

```
semi = cursosemi.fetchone()
```

```
if semi[0] == None:
```

```
    semidata = 0
```

```
else:
```

```
    semidata = semi[0]
```

```
cursorother = mysql.connection.cursor()
```

```
cursorother.execute('SELECT sum(amount) from expenses WHERE category="Other" and user=%s',  
[id])
```

```
sother = cursorother.fetchone()
```

```
if sother[0] == None:
```

```
    sotherdata = 0
```

else:

sotherdata = sother[0]

cursortotal = mysql.connection.cursor()

cursortotal.execute('SELECT sum(amount) from expenses WHERE user=%s', [id])

stotal = cursortotal.fetchone()

if stotal[0] == None:

stotaldata = 0

else:

stotaldata = stotal[0]

return render_template('display.html', user = session['user'][1], expense = expense, sfood = sfooddata, sentertainment = sentertainmentdata, sbusiness = sbusinessdata, srent = srentdata, semi = semidata, sother = sotherdata, stotal = stotaldata)

else:

return redirect(url_for('index'))

#delete---the--data

@app.route('/delete/<string:id>', methods = ['POST', 'GET'])

def delete(id):

param = "DELETE FROM expenses WHERE id = " + format.id

res = ibm_db.exec_immediate(ibm_db_conn, param)

print('deleted successfully')

return redirect("/display")

#UPDATE---DATA

@app.route('/edit/<id>', methods = ['POST', 'GET'])

def edit(id):

cursor = mysql.connection.cursor()

cursor.execute('SELECT * FROM expenses WHERE id = %s', (id,))

row = cursor.fetchall()

print(row[0])

```

return render_template('edit.html', expenses = row[0], user = session['user'][1])

@app.route('/update/<id>', methods = ['POST'])
def update(id):
    if request.method == 'POST' :

        date = request.form['date']
        expensename = request.form['expensename']
        amount = request.form['amount']
        paymode = request.form['paymode']
        category = request.form['category']

        sql = "UPDATE expenses SET date = ? , expensename = ? , amount = ? , paymode = ? , category = ?
WHERE id = ?"

        stmt = ibm_db.prepare(ibm_db_conn, sql)
        ibm_db.bind_param(stmt, 1, p4)
        ibm_db.bind_param(stmt, 2, expensename)
        ibm_db.bind_param(stmt, 3, amount)
        ibm_db.bind_param(stmt, 4, paymode)
        ibm_db.bind_param(stmt, 5, category)
        ibm_db.bind_param(stmt, 6, id)
        ibm_db.execute(stmt)

        print('successfully updated')
        return redirect("/display")

#limit
@app.route("/limit")
def limit():
    return redirect('/limitn')

@app.route("/limitnum" , methods = ['POST' ])
def limitnum():

```



```

if request.method == "POST":
    number= request.form['number']

    sql = "UPDATE `limits` SET `number` = ? WHERE `limits`.`user` = ? "
    stmt = ibm_db.prepare(ibm_db_conn, sql)
    ibm_db.bind_param(stmt, 1, session['user'][2])
    ibm_db.bind_param(stmt, 2, number)
    ibm_db.execute(stmt)
    return redirect('/limitn')

```

```
@app.route("/limitn")
```

```

def limitn():
    param = "SELECT number FROM limits WHERE userid = " + str(session['user'][2])
    res = ibm_db.exec_immediate(ibm_db_conn, param)
    s = x[0]
    return render_template("limit.html" , y= s, user = session['user'][1])

```

#REPORT

```
@app.route("/today")
```

```

def today():
    # cursor = mysql.connection.cursor()

    # cursor.execute('SELECT TIME(date) , amount FROM expenses WHERE userid = %s AND DATE(date)
    = DATE(NOW()) ',(str(session['id'])))

    # texpanse = cursor.fetchall()
    # print(texpanse)

    param1 = "SELECT TIME(date) as tn, amount FROM expenses WHERE userid = " + str(session['id']) + "
    AND DATE(date) = DATE(current timestamp) ORDER BY date DESC"

    res1 = ibm_db.exec_immediate(ibm_db_conn, param1)
    dictionary1 = ibm_db.fetch_assoc(res1)
    texpanse = []

```

```

while dictionary1 != False:
    temp = []
    temp.append(dictionary1["TN"])
    temp.append(dictionary1["AMOUNT"])
    texpanse.append(temp)
    print(temp)
    dictionary1 = ibm_db.fetch_assoc(res1)

# cursor = mysql.connection.cursor()
# cursor.execute('SELECT * FROM expenses WHERE userid = % s AND DATE(date) = DATE(NOW()) AND
date ORDER BY `expenses`.`date` DESC',(str(session['id'])))
# expense = cursor.fetchall()

param = "SELECT * FROM expenses WHERE userid = " + str(session['id']) + " AND DATE(date) =
DATE(current timestamp) ORDER BY date DESC"
res = ibm_db.exec_immediate(ibm_db_conn, param)
dictionary = ibm_db.fetch_assoc(res)
expense = []
while dictionary != False:
    temp = []
    temp.append(dictionary["ID"])
    temp.append(dictionary["USERID"])
    temp.append(dictionary["DATE"])
    temp.append(dictionary["EXPENSENAME"])
    temp.append(dictionary["AMOUNT"])
    temp.append(dictionary["PAYMODE"])
    temp.append(dictionary["CATEGORY"])
    expense.append(temp)
    print(temp)
    dictionary = ibm_db.fetch_assoc(res)

total=0

```

t_food=0

t_entertainment=0

t_business=0

t_rent=0

t_EMI=0

t_other=0

for x in expense:

total += x[4]

if x[6] == "food":

t_food += x[4]

elif x[6] == "entertainment":

t_entertainment += x[4]

elif x[6] == "business":

t_business += x[4]

elif x[6] == "rent":

t_rent += x[4]

elif x[6] == "EMI":

t_EMI += x[4]

elif x[6] == "other":

t_other += x[4]

print(total)

print(t_food)

print(t_entertainment)

print(t_business)

```
print(t_rent)
print(t_EMI)
print(t_other)
```

```
return render_template("today.html", texpanse = texpanse, expense = expense, total = total ,
    t_food = t_food,t_entertainment = t_entertainment,
    t_business = t_business, t_rent = t_rent,
    t_EMI = t_EMI, t_other = t_other )
```

```
@app.route("/month")
```

```
def month():
```

```
    # cursor = mysql.connection.cursor()

    # cursor.execute('SELECT DATE(date), SUM(amount) FROM expenses WHERE userid= %s AND
MONTH(DATE(date))= MONTH(now()) GROUP BY DATE(date) ORDER BY DATE(date) ',(str(session['id'])))

    # texpanse = cursor.fetchall()

    # print(texpanse)
```

```
    param1 = "SELECT DATE(date) as dt, SUM(amount) as tot FROM expenses WHERE userid = " +
str(session['id']) + " AND MONTH(date) = MONTH(current timestamp) AND YEAR(date) = YEAR(current
timestamp) GROUP BY DATE(date) ORDER BY DATE(date)"
```

```
    res1 = ibm_db.exec_immediate(ibm_db_conn, param1)
```

```
    dictionary1 = ibm_db.fetch_assoc(res1)
```

```
    texpanse = []
```

```
while dictionary1 != False:
```

```
    temp = []
```

```
    temp.append(dictionary1["DT"])
```

```
    temp.append(dictionary1["TOT"])
```

```
    texpanse.append(temp)
```

```
    print(temp)
```

```
dictionary1 = ibm_db.fetch_assoc(res1)
```

```
# cursor = mysql.connection.cursor()

# cursor.execute('SELECT * FROM expenses WHERE userid = % s AND MONTH(
DATE(date))=
MONTH(now()) AND date ORDER BY `expenses`.`date` DESC',(str(session['id'])))

# expense = cursor.fetchall()
```

```
param = "SELECT * FROM expenses WHERE userid = " + str(session['id']) + " AND MONTH(date) =
MONTH(current timestamp) AND YEAR(date) = YEAR(current timestamp) ORDER BY date DESC"
```

```
res = ibm_db.exec_immediate(ibm_db_conn, param)
```

```
dictionary = ibm_db.fetch_assoc(res)
```

```
expense = []
```

```
while dictionary != False:
```

```
    temp = []
```

```
    temp.append(dictionary["ID"])
```

```
    temp.append(dictionary["USERID"])
```

```
    temp.append(dictionary["DATE"])
```

```
    temp.append(dictionary["EXPENSENAME"])
```

```
    temp.append(dictionary["AMOUNT"])
```

```
    temp.append(dictionary["PAYMODE"])
```

```
    temp.append(dictionary["CATEGORY"])
```

```
    expense.append(temp)
```

```
    print(temp)
```

```
    dictionary = ibm_db.fetch_assoc(res)
```

```
total=0
```

```
t_food=0
```

```
t_entertainment=0
```

```
t_business=0
```

```
t_rent=0
```

```
t_EMI=0
```

```
t_other=0
```

```
for x in expense:
```

```
    total += x[4]
```

```
    if x[6] == "food":
```

```
        t_food += x[4]
```

```
    elif x[6] == "entertainment":
```

```
        t_entertainment += x[4]
```

```
    elif x[6] == "business":
```

```
        t_business += x[4]
```

```
    elif x[6] == "rent":
```

```
        t_rent += x[4]
```

```
    elif x[6] == "EMI":
```

```
        t_EMI += x[4]
```

```
    elif x[6] == "other":
```

```
        t_other += x[4]
```

```
print(total)
```

```
print(t_food)
```

```
print(t_entertainment)
```

```
print(t_business)
```

```
print(t_rent)
```

```
print(t_EMI)
```

```
print(t_other)
```

```

return render_template("today.html", texpanse = texpanse, expense = expense, total = total ,
    t_food = t_food,t_entertainment = t_entertainment,
    t_business = t_business, t_rent = t_rent,
    t_EMI = t_EMI, t_other = t_other )

```

```

@app.route("/year")

```

```

def year():

```

```

    # cursor = mysql.connection.cursor()

    # cursor.execute('SELECT MONTH(date), SUM(amount) FROM expenses WHERE userid= %s AND
YEAR(DATE(date))= YEAR(now()) GROUP BY MONTH(date) ORDER BY MONTH(date) ',(str(session['id'])))

    # texpanse = cursor.fetchall()

    # print(texpanse)

```

```

    param1 = "SELECT MONTH(date) as mn, SUM(amount) as tot FROM expenses WHERE userid = " +
str(session['id']) + " AND YEAR(date) = YEAR(current timestamp) GROUP BY MONTH(date) ORDER BY
MONTH(date)"

```

```

    res1 = ibm_db.exec_immediate(ibm_db_conn, param1)

    dictionary1 = ibm_db.fetch_assoc(res1)

    texpanse = []

```

```

while dictionary1 != False:

```

```

    temp = []

    temp.append(dictionary1["MN"])

    temp.append(dictionary1["TOT"])

    texpanse.append(temp)

    print(temp)

    dictionary1 = ibm_db.fetch_assoc(res1)

```

```

# cursor = mysql.connection.cursor()

# cursor.execute('SELECT * FROM expenses WHERE userid = % s AND YEAR(DATE(date))= YEAR(now())
AND date ORDER BY `expenses`.`date` DESC',(str(session['id'])))

# expense = cursor.fetchall()

```

```
param = "SELECT * FROM expenses WHERE userid = " + str(session['id']) + " AND YEAR(date) =  
YEAR(current timestamp) ORDER BY date DESC"
```

```
res = ibm_db.exec_immediate(ibm_db_conn, param)
```

```
dictionary = ibm_db.fetch_assoc(res)
```

```
expense = []
```

```
while dictionary != False:
```

```
    temp = []
```

```
    temp.append(dictionary["ID"])
```

```
    temp.append(dictionary["USERID"])
```

```
    temp.append(dictionary["DATE"])
```

```
    temp.append(dictionary["EXPENSENAME"])
```

```
    temp.append(dictionary["AMOUNT"])
```

```
    temp.append(dictionary["PAYMODE"])
```

```
    temp.append(dictionary["CATEGORY"])
```

```
    expense.append(temp)
```

```
    print(temp)
```

```
    dictionary = ibm_db.fetch_assoc(res)
```

```
total=0
```

```
t_food=0
```

```
t_entertainment=0
```

```
t_business=0
```

```
t_rent=0
```

```
t_EMI=0
```

```
t_other=0
```

```
for x in expense:
```

```
    total += x[4]
```

```
    if x[6] == "food":
```

```
        t_food += x[4]
```



```
elif x[6] == "entertainment":
```

```
    t_entertainment += x[4]
```

```
elif x[6] == "business":
```

```
    t_business += x[4]
```

```
elif x[6] == "rent":
```

```
    t_rent += x[4]
```

```
elif x[6] == "EMI":
```

```
    t_EMI += x[4]
```

```
elif x[6] == "other":
```

```
    t_other += x[4]
```

```
print(total)
```

```
print(t_food)
```

```
print(t_entertainment)
```

```
print(t_business)
```

```
print(t_rent)
```

```
print(t_EMI)
```

```
print(t_other)
```

```
return render_template("today.html", texpanse = texpanse, expense = expense, total = total ,
```

```
    t_food = t_food, t_entertainment = t_entertainment,
```

```
    t_business = t_business, t_rent = t_rent,
```

```
    t_EMI = t_EMI, t_other = t_other )
```

```

#log-out
@app.route('/logout')
def logout():
    session.pop('user', None)
    return redirect(url_for('index'))

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

```

Deployment.yaml:

apiVersion: apps/v1

kind: Deployment

metadata:

name: sakthi-flask-

node-deployment

spec:

replicas: 1

selector:

matchLabels:

app: flasknode

template:

metadata:

labels:

app: flasknode

spec:

containers:

- name: flasknode

image:

icr.io/expense_tracker/

flask-template2

imagePullPolicy:

Always

ports:

- containerPort:

5000

flask-service.yaml:

apiVersion: v1

kind: Service

metadata:

name: flask-app-
service

spec:

selector:

app: flask-app

ports:

- name: http

protocol: TCP

port: 80

targetPort: 5000

type: LoadBalancer

sendemail.py:

import smtplib

import sendgrid as sg

import os

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

SUBJECT = "expense tracker"

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

```

def sendmail(TEXT,email):

    print("sorry we cant process your candidature")

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

    s.starttls()

    # s.login("no-reply.expenseracker@gmail.com",
"oms@Expens")

    # s.login("no-reply.expenseracker@gmail.com",
"oms@Expens")

    message = 'Subject: {}\n\n{}'.format(SUBJECT, TEXT)

    s.sendmail("no-reply.expensetracker@gmail.com",
email, message)

    s.quit()

def sendgridmail(user,TEXT):

    from_email = Email("no-
reply.expensetracker@gmail.com")

    to_email = To(user)

    subject = "Sending with SendGrid"

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

    mail = Mail(from_email, to_email, subject, content)

    mail_json = mail.get()

    response =

sg.client.mail.send.post(request_body=mail_json)

    print(response.status_code)

    print(response.headers)

```

iii. Database Schema

Tables :

1.User:

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

2.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

3.LIMIT

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

8. TESTING:

a) TestCases:

A test case is a set of actions performed on a system to determine if it satisfies software requirements and functions correctly. The purpose of a test case is to determine if different features within a system are performing as expected and to confirm that the system satisfies all related standards, guidelines and customer requirements. The process of writing a test case can also help reveal errors or defects within the system.

a.

Test case ID	Feature Type	Component	Test Scenario	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	BUG ID	Executed By
LoginPage_TC_OO1	Functional	Home Page	Verify user is able to see the Login/Signup popup when user clicked on My account button	1. Go to website 2. Enter Valid username and password	Username: Kavi password: 123456	Login/Signup popup should display	Working as expected	Pass	-		Kavinaya
LoginPage_TC_OO2	Functional	Home Page	Verify that the error message is displayed when the user enters the wrong credentials	1. Go to website 2. Enter Invalid username and password	Username: XXXX Password: 12345	Error message should displayed	Working as expected	Pass	-		Afra
LoginPage_TC_OO2	UI	Home Page	Verify the UI elements in Login/Signup popup	1. Go to website 2. Enter valid credentials 3. Click Login	Username: Kavi password: 123456	Application should show below UI elements: a. email text box b. password text box c. Login button with orange colour d. New customer? Create account link e. Last password? Recovery password link	Working as expected	Pass	-		Abdul Waseem
LoginPage_TC_OO3	Functional	Home page	Verify user is able to log into application with Valid credentials	1. Go to website 2. Enter details and click login	Username: Kavi password: 123456	User should navigate to user account homepage	Working as expected	Pass	-		Jayasri
LoginPage_TC_OO4	Functional	Login page	Verify user is able to log into application with Invalid credentials	1. Go to website 2. Enter details and click login	Username: Kavi password: 123456	Application should show 'Incorrect email or password' validation message.	Working as expected	Pass	-		Afra
LoginPage_TC_OO4	Functional	Login page	Verify user is able to log into application with Invalid credentials	1. Go to website 2. Enter details and click login	Username: Kavi password: 123456	Application should show 'Incorrect email or password' validation message.	Working as expected	Pass	-		Kavinaya
LoginPage_TC_OO5	Functional	Login page	Verify user is able to log into application with Invalid credentials	1. Go to website 2. Enter details and click login	Username: Kavi password: 123456	Application should show 'Incorrect email or password' validation message.	Working as expected	Pass	-		Abdul Waseem
AddExpensePage_TC_OO6	Functional	Add Expense page	Verify whether user is able to add expense or not	1. Add date, expense name and other details 2. Check if the expense gets added	add rent = 6000	Application adds expenses	Working as expected	Pass	-		Jayasri

b) User Acceptance Testing

User Acceptance Testing (UAT) is a type of testing performed by the end user or the client to verify/accept the software system before moving the software application to the production environment. UAT is done in the final phase of testing after functional, integration and system testing is done.

1. Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	10	4	2	8	15
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	9	2	4	11	20
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	0	5	0	1	8
Totals	22	14	11	22	51

2. Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Interface	7	0	0	7
Login	20	0	0	20
Logout	2	0	0	2
Limit	3	0	0	3
Signup	8	0	0	8
Final Report Output	4	0	0	4

9. RESULTS

ADDING EXPENSES:

Add Expense

Date
dd-mm-yyyy --:--

Expense name

Expense Amount

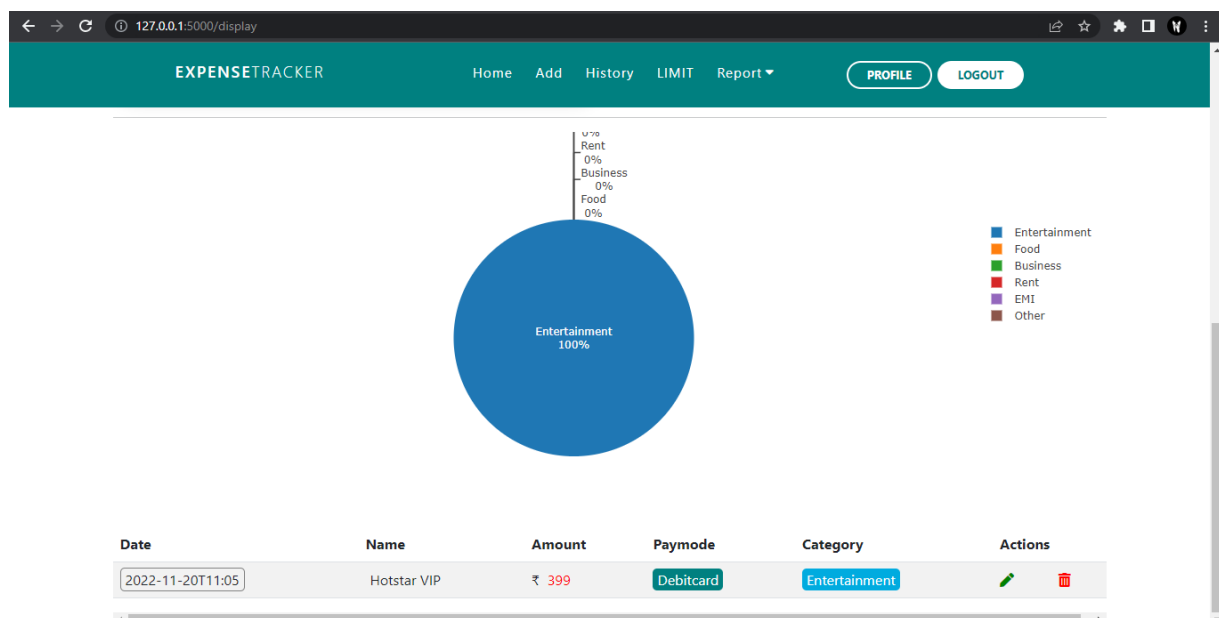
Pay-Mode
--SELECT--

Category
--SELECT--

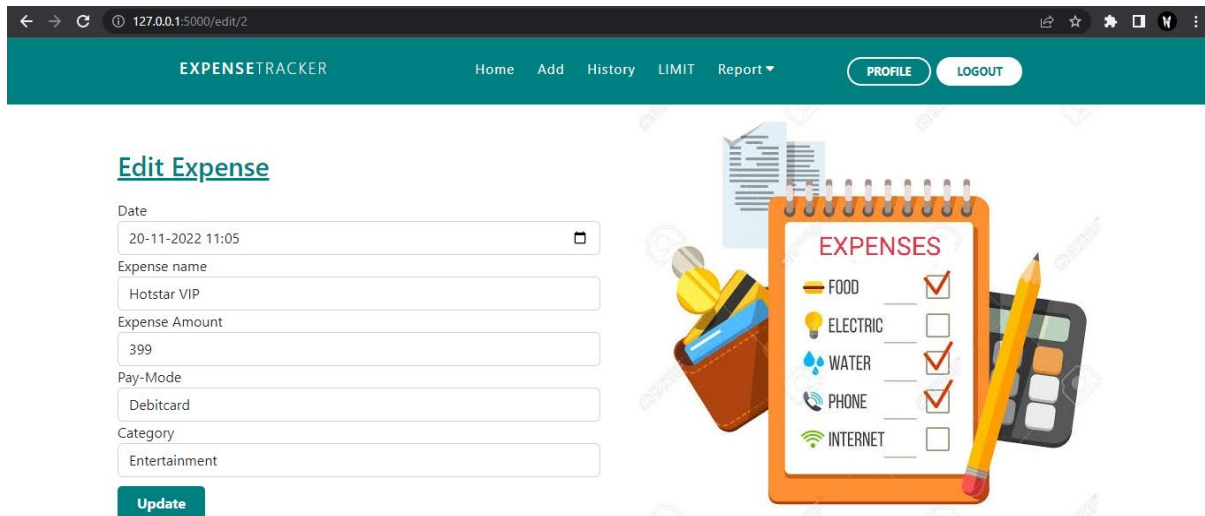
Add



EXPENSE HISTORY:



EDITING EXPENSE:



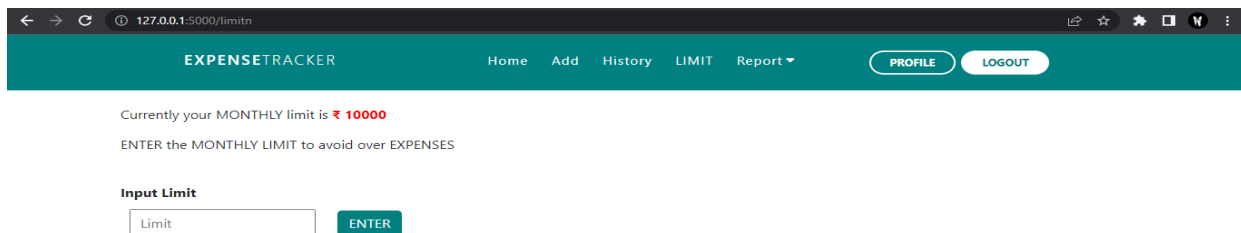
The screenshot shows the 'Edit Expense' page of the EXPENSETRACKER application. The form contains the following fields:

- Date: 20-11-2022 11:05
- Expense name: Hotstar VIP
- Expense Amount: 399
- Pay-Mode: Debitcard
- Category: Entertainment

An 'Update' button is located at the bottom of the form. To the right of the form is a decorative illustration of a notepad titled 'EXPENSES' with a checklist:

Category	Status
FOOD	<input checked="" type="checkbox"/>
ELECTRIC	<input type="checkbox"/>
WATER	<input checked="" type="checkbox"/>
PHONE	<input checked="" type="checkbox"/>
INTERNET	<input type="checkbox"/>

SETTING LIMIT:



The screenshot shows the 'LIMIT' page of the EXPENSETRACKER application. It displays the current monthly limit and a form to set a new one.

Currently your MONTHLY limit is ₹ 10000

ENTER the MONTHLY LIMIT to avoid over EXPENSES

Input Limit

Limit

i. Performance Metrics:

- i. **Tracking income and expenses:** Monitoring the income and tracking all expenditures (through bank accounts, mobile wallets, and credit & debit cards).
- ii.

Transaction Receipts: Capture and organize your payment receipts to keep track of your expenditure.

iii. **Organizing Taxes:** Import your documents to the expense tracking app, and it will streamline your income and expenses under the appropriate tax categories.

iv. **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 trackingapp sends remindersfor payments and automatically matches the payments with invoices.

v. **Reports:** The expense tracking app generates and sends reports to give a detailed insight about profits, losses, budgets, income, balance sheets, etc., vi. **E-commerce integration:** Integrateyour expense trackingapp with your eCommerce store and track your sales through payments received via multiple payment methods.

vii. **Vendors and Contractors:** Manage and track all the payments to the vendors and contractors added to the mobile app.

- viii. **Access control:** Increase your team productivity by providing access control to particular users through custom permissions.
- ix. **Track Projects:** Determine project profitability by tracking labor costs, payroll, expenses, etc., of your ongoing project.
- x. **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.
- xi. **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.
- xii. **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:

1. The application is unable to maintain the backup of data once it is uninstalled. 2. 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-8385-1658917175>