

PERSONAL EXPENSE TRACKER APPLICATION

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CHAPTER 1

INTRODUCTION

1.1 Project Overview

This project is an attempt to manage our daily expenses in a more efficient and manageable way. Sometime 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 and save reports. With the help of this application, the user can manage their expenses on a daily, weekly and monthly basis. Users can insert and delete transactions as well as can generate and save their reports. The graphical representation of the application is the main part of the system as it appeals to the user more and is easy to understand.

1.2 Purpose

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. So, for keep tracking on their income and expense this app was developed.

CHAPTER 2

LITERATURE SURVEY

2.1 Existing problem

The problem faced by today's people are that they can't even remember that how much they spend in their day to day expense and also they can't make note of their all expenses. In this time there is no such perfect solution which helps a person to track their daily expenditure easily and efficiently and notify them about the money shortage they have. For making this they have maintained ledgers for the expense and income or computer logs is to maintain for such data and the calculation is done manually by the user, which may generate errors leading to the money loss. It is not complete tracking process.

2.2 Reference

1. <https://nevonprojects.com/daily-expense-tracker-system/>
2. <https://phpgurukul.com/daily-expense-tracker-using-php-and-mysql/>
3. <https://ijarsct.co.in/Paper391.pdf>
4. <https://kandi.openweaver.com/>

2.3 Problem Statement Definition

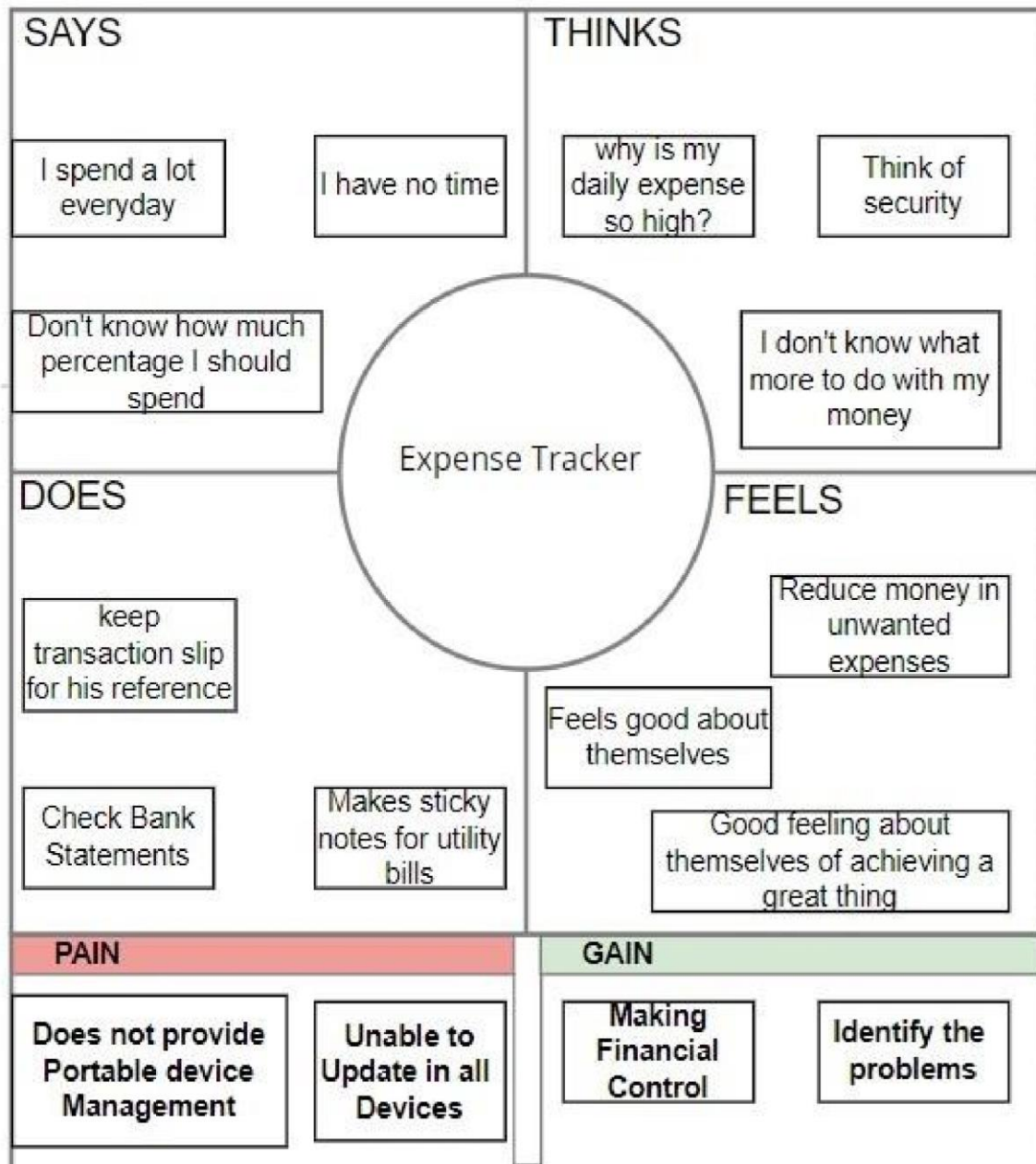
At the instant, there is no as such complete solution present easily or we should say free of cost which enables a person to keep a track of its daily expenditure easily. To do so a person has to keep a log in a diary or in a computer, also all the calculations needs to be done by the user which may sometimes results in errors leading to losses.

Due to lack of a complete tracking system, there is a constant overload to rely on the daily entry of the expenditure and total estimation till the end of the month. As the name itself suggests, this project is an attempt to manage our daily expenses in a more efficient and manageable way. The system 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 dairy or a log of the expenses on the smartphones or laptops, this system enables the user to calculate the expenses accurately without any bugs. One of the drawbacks is the on-going maintenance, a lot of budget software offer the simplicity of integrating with all users financial accounts and consolidating their activity into one dashboard. However though, some of this existing software mostly have complicated features that are not user friendly.

CHAPTER 3

IDEATION & PROPOSED SOLUTION

3.1 Empathy Map canvas



3.2 Ideation & Brainstorming

Our problem statement is about Expense Tracker, discussing this problem we team members came out with few solutions out of all the solutions we discussed we are here going to upload the top three ideas.

IDEA 1:

To reduce manual calculations, we propose an application. This application allows users to maintain a digital automated diary. Each user will be required to register on the system at registration time, the user will be provided id, which will be used to maintain the record of each unique user.

IDEA 2:

Expense Tracker application which will keep a track of Income-Expense of a user on a day to day basis. The best organizations have a way of tracking and handling these reimbursements. This ideal practice guarantees that the expenses tracked are accurately and in a timely manner.

IDEA 3:

From a company perspective, timely settlements of these expenses when tracked well will certainly boost employee's morale. Additional feature of Expense and income prediction helps to better budget management.

3.3 Proposed Solution

S.NO.	Parameter	Description
1.	Problem Statement	In paper-based expense tracker system it is difficult to track our monthly expenses manually. In paper-based expense tracker system it is difficult to track our monthly expenses manually. The paper-based expense records may get lost in case of fire accidents, flood etc.
2.	Scalability of the Solution	This application can handle large number of users and data with high performance and security. This application can adapt for both large-scale and small-scale purposes. Easily available in all kinds of devices.
3.	Idea / Solution description	Daily expense management system which is specially designed for non-salaried and salaried personnel for keeping track of their daily expenditure with easy and effective way through computerized system which tends to eliminate manual paper works. 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. 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.

4.	Novelty / Uniqueness	The user gets notified when their expense exceeds the limit and also it reminds the user when they forgot to make entry. Tracking expenses through SMS. Data analytics on expenses. Future expense prediction
5.	Social Impact / Customer Satisfaction	The application should be able to generate reports of their spending and notify users if they have exceeded their budget. It is designed to be dynamic to produce the prediction. It also provides users' personal information, their income as well as their expenses. This application can create awareness among common people about finance and stuffs. This application also helps user to be financially responsible. It Reduces time rather than entering details manually.
6.	Business Model (Revenue Model)	This Application is provided for free of cost. But It will have some advertisement. In premium version there is no advertisement and contains some additional features.

3.4 Proposed Solution Fit

The solution to this problem is, the user who spends more money can avoid unwanted expenses. The user can effectively spend their money for their essential needs.

Define CS, fit into CL	1. CUSTOMER SEGMENT(S) CS People who are struggling to track their expenses are our customers. They can use our app to maintain records about their income and expenses	6. CUSTOMER LIMITATIONS CL <small>EG. BUDGET, DEVICES</small> User have to entry every record manually. The category divided may be blunder or messy. person who is handling system must have some technical knowledge.	5. AVAILABLE SOLUTIONS AS <small>PLUSES & MINUSES</small> User can add their income and expenses. 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.	Explore AS, differentiate
Focus on PR, tap into BE, understand RC	2. PROBLEMS / PAINS PR <small>• ITS FREQUENCY</small> In paper-based expense tracker system it is difficult to track our monthly expenses manually. The paper-based expense records may get lost in case of fire accidents, flood etc.	9. PROBLEM ROOT / CAUSE RC When the digits could not be recognized correctly. When the transactions are not successful. When the elder people unable to understand the smaller handwritten digits. When the paper based expense tracker records are subjected to fire accident, flood, etc.	7. BEHAVIOR BE <small>• ITS INTENSITY</small> They may keep a temporary note on their mobile. He/She will tell the other persons to remember the expense they do while calculating the expenses they consider only on the expenses that are single time and huge and leave the rest	Focus on PR, tap into BE, understand RC
Identify strong TR & EM	3. TRIGGERS TO ACT TR This application can create awareness among common people about their income and expenses. It Reduces time rather than entering details manually.	10. YOUR SOLUTION SL The application should be able to generate reports of their spending and notify users if they have exceeded their budget. This application can create awareness among common people about finance and stuffs. This application also helps user to be financially responsible.	8. CHANNELS of BEHAVIOR CH ONLINE Download statements from bank and pay monthly installment OFFLINE Using spreadsheets and notes for financial management	Extract online & offline CH of BE
	4. EMOTIONS EM <small>BEFORE / AFTER</small> Frustration, Confusion, Inadequate > Boost, Feeling smart, Be an example for others			

CHAPTER 4

REQUIREMENT ANALYSIS

4.1 Functional requirement

Following are the functional requirements of the proposed solution.

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

4.2 Non-Functional requirement

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

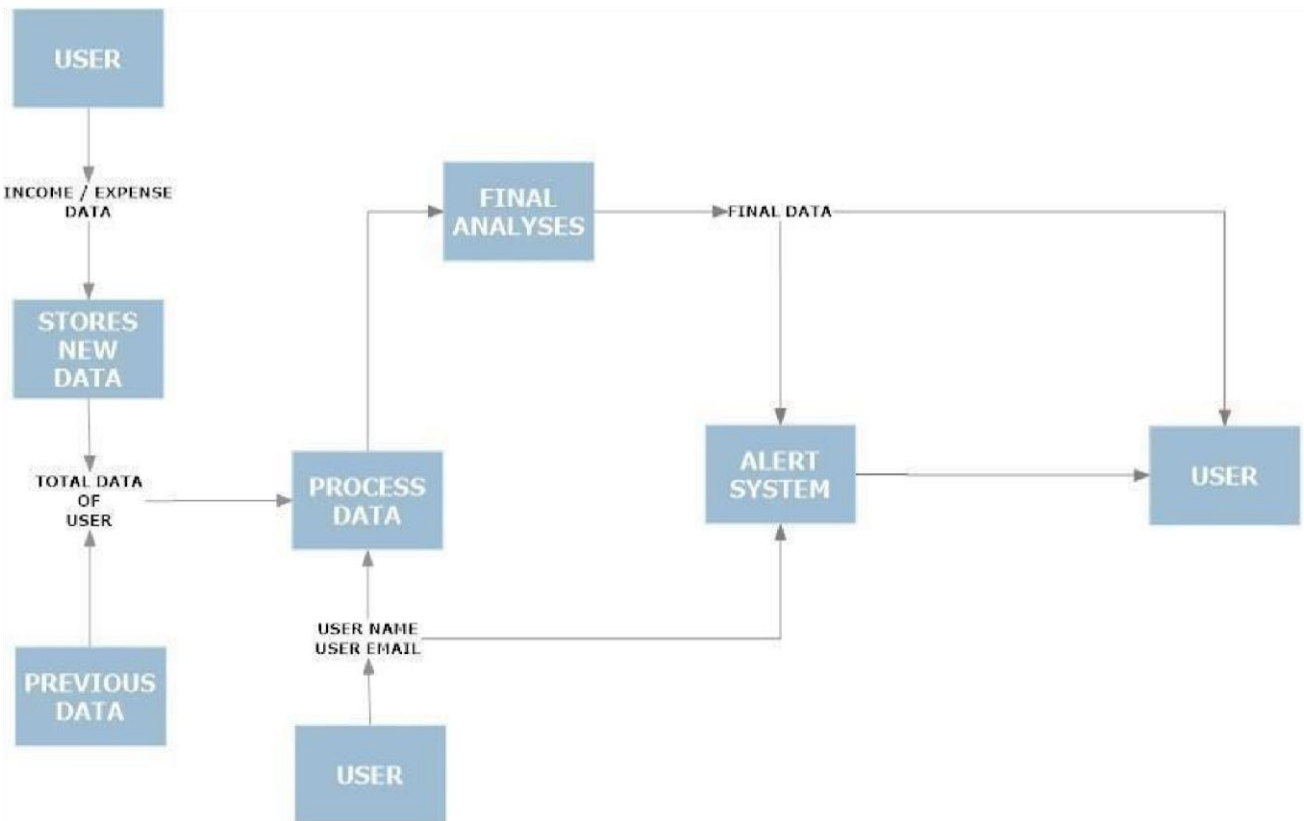
NFR No.	Non-Functional Requirement	Description
NFR-1	Usability	Helps to keep an accurate record of your income and expenses.
NFR-2	Security	Budget tracking apps are considered very safe from those who commit Cyber Crimes.
NFR-3	Reliability	Each data record is stored on a well built efficient database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

CHAPTER 5

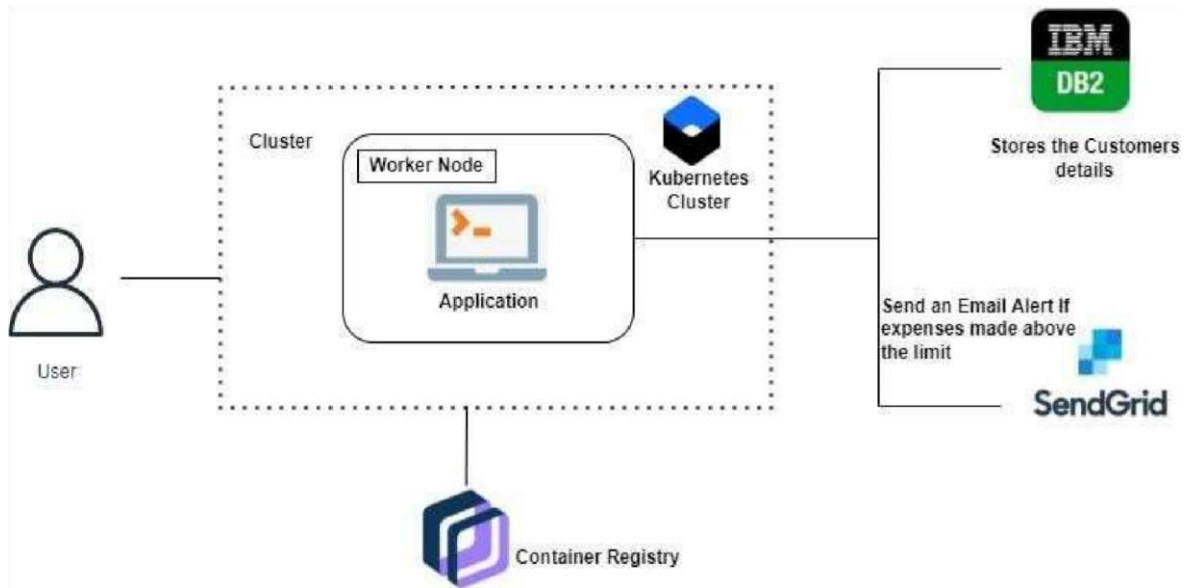
PROJECT DESIGN

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

Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority
Customer (Mobile user & web user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High

		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
		USN- 3	As a user, I can register for the	I can register & access the dashboard	Low
			application through Facebook	with Facebook Login	
	Login	USN - 4	As a user, I can log into the application by entering email & password	I can access the application	High
	Dashboard	USN - 5	As a user I can enter 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 log in issues and other issues of the application.	I can provide support or solution at any time 24*7	Medium
Administrator	Application	USN - 7	As an administrator I can upgrade or update the application. customers and users of the application	I can fix the bug which arises for the customers and users of the application.	Medium

CHAPTER 6

PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration,Login	USN-1	As an User, I can register for the application by entering my email, password, and confirming my password and I can log into the application by entering email and password.	2	High	Siva Anandh K, Suriya K N
Sprint-1	Dashboard	USN-2	As an user, I can Login to the Application by entering correct login credentials and I will be able to Access My dashboard.	2	High	Surya T, Sriramkumar M
Sprint-2	Work Space,Charts	USN-3	There will be a work space for the register user for personal expense tracking and creating various graphs and statistics of user data.	2	Medium	Siva Anandh K, Suriya K N
Sprint-2	Connecting to IBM DB2	USN-4	Linking the database with dashboard and making dashboard more interactive with the JavaScript	2	High	Surya T, Sriramkumar M
Sprint-3	Watson Assistant, Send Grid	USN-5	Creating Chatbot for the expense tracking and for clarifying user's query and using sendgrid to send mail to the user about their expenses	2	High	Siva Anandh K, Surya T
Sprint-4	Docker,Cloud Registry	USN-6	Creating image of website using docker and uploading the docker image to IBM Cloud Registry.	2	High	Suriya K N, Sriramkumar M

6.2 Sprint Delivery Schedule

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	23 Oct 2022	28 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	30 Oct 2022	04 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	06 Nov 2022	11 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	13 Nov 2022	18 Nov 2022	20	19 Nov 2022

CHAPTER 7

Coding And Solutioning

7.1. Features

Feature 1: Add Expense

Feature 2: Update expense

Feature 3: Delete Expense

Feature 4: Set Limit

Feature 5: Send Alert Emails to users

7.2. Other Features:

Track your expenses anywhere, anytime. Seamlessly manage your money and budget without any financial paperwork. Just click and submit your invoices and expenditures. Access, submit, and approve invoices irrespective of time and location. Avoid data loss by scanning your tickets and bills and saving in the app. Approval of bills and expenditures in real-time and get notified instantly. Quick settlement of claims and reduced human errors with an automated and streamlined billing process.

Codes:

```
import OS
import calendar from flask
import request, session from flask
session import Session from sql
alchemy import create_engine from sql
alchemy.orm import scoped_session,
sessionmaker from datetime import
datetime from helpers import
convertSQLToDict

# Create engine object to manage connections to DB, and scoped session to separate
user interactions with DB
engine = create_engine(os.getenv("DATABASE_URL")) db
= scoped_session(sessionmaker(bind=engine))

# Add expense(s) to the users expense records
# There are two entry points for this: 1) 'addexpenses' route and 2) 'index' route.
#1 allows many expenses whereas #2 only allows 1 expense per POST. def
addExpenses(formData, userID):
```

```
expenses = []    expense = {"description": None,  
"category": None,      "date": None, "amount":  
None, "payer": None}
```

```
# Check if the user is submitting via 'addexpenses' or 'index' route - this determines  
if a user is adding 1 or potentially many expenses in a single  
POST
```

```
    if "." not in formData[0][0]:  
    for key, value in formData:  
    # Add to dictionary  
    expense[key] = value.strip()
```

```
    # Convert the amount from string to float for the DB  
    expense["amount"] = float(expense["amount"])
```

```
    # Add dictionary to list (to comply with design/standard of expensed.html)  
    expenses.append(expense)
```

```
# User is submitting via 'addexpenses' route  
else:
```

```
    counter = 0    for key,  
value in formData:
```

```
        # Keys are numbered by default in HTML form. Remove those numbers  
        so we can use the HTML element names as keys for the dictionary.  
        cleanKey = key.split(".")
```

```
        # Add to dictionary  
        expense[cleanKey[0]] = value.strip()
```

```
        # Every 5 loops add the expense to the list of expenses (because there are  
        5 fields for an expense record)
```

```
        counter += 1  
    if counter % 5 == 0:
```

```
        # Store the amount as a float  
        expense["amount"] = float(expense["amount"])
```

```
# Add dictionary to list
expenses.append(expense.copy())
```

```
# Insert expenses into DB
for expense in expenses:
    now = datetime.now().strftime("%m/%d/%Y %H:%M:%S")
    db.execute("INSERT INTO expenses (description, category, expenseDate,
amount, payer, submitTime, user_id) VALUES (:description, :category,
:expenseDate, :amount, :payer, :submitTime, :usersID)",
    {"description": expense["description"], "category": expense["category"],
"expenseDate": expense["date"], "amount": expense["amount"], "payer":
expense["payer"], "submitTime": now,
"usersID": userID})
    db.commit()

return expenses
```

```
# Get and return the users lifetime expense history def
getHistory(userID):    results = db.execute("SELECT description,
category, expenseDate AS date, payer, amount, submitTime FROM
expenses WHERE user_id =
:usersID ORDER BY id ASC",
    {"usersID": userID}).fetchall()
```

```
history = convertSQLToDict(results)
```

```
return history
```

```
# Get and return an existing expense record with ID from the DB
def getExpense(formData, userID):    expense = {"description":
None, "category": None,
    "date": None, "amount": None, "payer": None, "submitTime":
None, "id": None}    expense["description"] =
formData.get("oldDescription").strip()    expense["category"] =
```

```
formData.get("oldCategory").strip()    expense["date"] =
formData.get("oldDate").strip()    expense["amount"] =
formData.get("oldAmount").strip()    expense["payer"] =
formData.get("oldPayer").strip()    expense["submitTime"] =
formData.get("submitTime").strip()
```

```
# Remove dollar sign and comma from the old expense so we can convert
to float for the DB    expense["amount"] = float(
    expense["amount"].replace("$", "").replace(",", ""))
```

```
# Query the DB for the expense unique identifier
expenseID = db.execute("SELECT id FROM expenses WHERE user_id = :usersID
AND description = :oldDescription AND category = :oldCategory AND expenseDate
= :oldDate AND amount = :oldAmount AND payer = :oldPayer AND submitTime =
:oldSubmitTime",
    {"usersID": userID, "oldDescription": expense["description"],
"oldCategory": expense["category"], "oldDate": expense["date"],
"oldAmount": expense["amount"], "oldPayer":
expense["payer"], "oldSubmitTime": expense["submitTime"]}).fetchone()
```

```
# Make sure a record was found for the expense otherwise set as None
if expenseID:    expense["id"] = expenseID[0]    else:
    expense["id"] = None
```

```
return expense
```

```
# Delete an existing expense record for the user def
deleteExpense(expense, userID):    result = db.execute("DELETE
FROM expenses WHERE user_id =
:usersID AND id = :oldExpenseID",
    {"usersID": userID, "oldExpenseID": expense["id"]})
db.commit()
```

```
return result
```

```

# Update an existing expense record for the user def
updateExpense(oldExpense, formData, userID):    expense =
{"description": None, "category": None,         "date":
None, "amount": None, "payer": None}
expense["description"] = formData.get("description").strip()
expense["category"] = formData.get("category").strip()
expense["date"] = formData.get("date").strip()
expense["amount"] = formData.get("amount").strip()
expense["payer"] = formData.get("payer").strip()

```

```

# Convert the amount from string to float for the DB
expense["amount"] = float(expense["amount"])

```

```

# Make sure the user actually is submitting changes and not saving the
existing expense again    hasChanges = False    for key, value in
oldExpense.items():

```

```

    # Exit the loop when reaching submitTime since that is not something
the user provides in the form for a new expense        if key ==
"submitTime":        break        else:        if oldExpense[key] !=
expense[key]:        hasChanges = True        break        if
hasChanges is False:        return None

```

```

# Update the existing record
now = datetime.now().strftime("%m/%d/%Y %H:%M:%S")    result =
db.execute("UPDATE expenses SET description = :newDescription,
category = :newCategory, expenseDate = :newDate, amount = :newAmount,
payer = :newPayer, submitTime = :newSubmitTime
WHERE id = :existingExpenseID AND user_id = :userID",
        {"newDescription": expense["description"], "newCategory":
expense["category"], "newDate": expense["date"], "newAmount":
expense["amount"], "newPayer": expense["payer"], "newSubmitTime": now,
"existingExpenseID": oldExpense["id"], "userID": userID}).rowcount
db.commit()

```

```

# Make sure result is not empty (indicating it could not update the expense)
if result:

```

```

        # Add dictionary to list (to comply with design/standard of expensed.html)
        expenses = []
    expenses.append(expense)
    return expenses
else:
    return None
import os
import calendar
import copy
import expenze_expenses
import expenze_dashboard
import expenze_categories
import expenze_budgets

from flask import request, session
from flask_session import Session
from sqlalchemy import create_engine
from sqlalchemy.orm import scoped_session, sessionmaker
from helpers import convertSQLToDict
from datetime import datetime

# Create engine object to manage connections to DB, and scoped session to separate
# user interactions with DB
engine = create_engine(os.getenv("DATABASE_URL"))
db = scoped_session(sessionmaker(bind=engine))

# Generates data needed for the budget report by looping through each budget
# and adding expense history where categories match between budgets and
# expenses
# TODO: This data/reporting becomes less beneficial when users have multiple
# budgets that have the same categories checked because 1 expense with
# 'Category A' will be associated with for example 3 budgets that have
# 'Category A' checked
def generateBudgetsReport(userID, year=None):
    # Create data structure to hold users category spending data
    budgetsReport = []

```



```

    # Default to getting current years budgets
    if not year:
        year = datetime.now().year

    # Get every budgets spent/remaining for the user
    budgetsReport = expenze_dashboard.getBudgets(userID, year)

    # Loop through the budgets and add a new key/value pair to hold expense
    details per budget    if budgetsReport:        for record in budgetsReport:
        budgetID = expenze_budgets.getBudgetID(record["name"], userID)
    results = db.execute("SELECT expenses.description,
expenses.category, expenses.expenseDate, expenses.payer, expenses.amount
FROM expenses WHERE user_id = :usersID AND date_part('year',
date(expensedate)) = :year AND category IN (SELECT categories.name
FROM budgetcategories INNER JOIN categories on
budgetcategories.category_id = categories.id WHERE
budgetcategories.budgets_id = :budgetID)",
                        {"usersID": userID, "year": year, "budgetID":
budgetID}).fetchall()
        expenseDetails = convertSQLToDict(results)
    record["expenses"] = expenseDetails

    return budgetsReport

# Generates data needed for the monthly spending report
def generateMonthlyReport(userID, year=None):

    # Default to getting current years reports
    if not year:
        year = datetime.now().year

    # Create data structure to hold users monthly spending data for the chart
    (monthly summed data)

```

```

    spending_month_chart = expenze_dashboard.getMonthlySpending(userID, year)

    # Get the spending data from DB for the table (individual expenses per month)
    results = db.execute(
        "SELECT description, category, expensedate, amount, payer FROM
        expenses WHERE user_id = :userID AND date_part('year', date(expensedate))
        = :year ORDER BY id ASC", {"userID": userID, "year":
        year}).fetchall()
    spending_month_table = convertSQLToDict(results)

    # Combine both data points (chart and table) into a single data structure
    monthlyReport = {"chart": spending_month_chart,
        "table": spending_month_table}

    return monthlyReport

# Generates data needed for the spending trends report def
generateSpendingTrendsReport(userID, year=None):

    # Default to getting current years reports
    if not year:
        year = datetime.now().year

    # Get chart data for spending trends
    spending_trends_chart = expenze_dashboard.getSpendingTrends(userID, year)

    # Data structure for spending trends table
    categories = []
    category = {"name": None, "expenseMonth": 0,
        "expenseCount": 0, "amount": 0}
    spending_trends_table = {
        "January": [],
        "February": [],
        "March": [],

```

```
"April": [],  
"May": [],  
"June": [],  
"July": [],  
"August": [],  
"September": [],  
"October": [],  
"November": [],  
"December": []  
}
```

Get all of the users categories first (doesn't include old categories the user deleted but are still tracked in Expenses)

```
categories_active = expenze_categories.getSpendCategories(userID)
```

Get any categories that are in expenses but no longer exist as a selectable category for the user (because they deleted the category)

```
categories_inactive =
```

```
expenze_categories.getSpendCategories_Inactive(userID)
```

First fill using the users current categories, and then inactive categories from Expenses

```
for activeCategory in categories_active:  
category["name"] = activeCategory["name"]  
categories.append(category.copy())
```

```
for inactiveCategory in categories_inactive:  
category["name"] = inactiveCategory["category"]  
categories.append(category.copy())
```

Place a deep copy of the categories into each month (need deep copy here because every category may have unique spend data month to month. TODO: optimize this for memory/performance later) for month in spending_trends_table.keys(): spending_trends_table[month] = copy.deepcopy(categories)

```

# Get expense data for each category by month (retrieves the total amount of
expenses per category by month, and the total count of expenses per category
by month. Assumes there is at least 1 expense for the category)  results =
db.execute(
    "SELECT date_part('month', date(expensedate)) AS monthofcategoryexpense,
category AS name, COUNT(category) AS count,
SUM(amount) AS amount FROM expenses WHERE user_id = :userID AND
date_part('year', date(expensedate)) = :year GROUP BY date_part('month',
date(expensedate)), category ORDER BY
COUNT(category) DESC",
    {"userID": userID, "year": year}).fetchall()

```

```

spending_trends_table_query = convertSQLToDict(results)

```

```

# Loop thru each monthly category expense from above DB query and
update the data structure that holds all monthly category expenses  for
categoryExpense in spending_trends_table_query:      # Get the key
(month) for the data structure      monthOfExpense =
calendar.month_name[int(
categoryExpense["monthofcategoryexpense"])]

```

```

# Traverse the data structure: 1) go to the dict month based on the
category expense date, 2) loop thru each dict category until a match in name
occurs with the expense, 3) update the dict month/amount/count properties to
match the DB record      for category in
spending_trends_table[monthOfExpense]:      if category["name"] ==
categoryExpense["name"]:      category["expenseMonth"] =
categoryExpense["monthofcategoryexpense"]
category["expenseCount"] = categoryExpense["count"]
category["amount"] = categoryExpense["amount"]
break      else:      continue

```

```

# Calculates and stores the amount spent per category for the table (note: can't
get this to work in jinja with the spending_trends_table dict because of how
jinja scopes variables. TODO: rethink data-structure to combine these)
numberOfCategories = len(categories)

```

```

categoryTotal = 0

```

```

# Loops through every month per category and sums up the monthly
amounts  for i in range(numberOfCategories):

```

```

        for month in spending_trends_table.keys():
            categoryTotal += spending_trends_table[month][i]["amount"]
        categories[i]["amount"] = categoryTotal
        categoryTotal = 0

# Combine both data points (chart, table, categories) into a single data structure
spendingTrendsReport = {"chart": spending_trends_chart,
                        "table": spending_trends_table, "categories": categories}
return spendingTrendsReport

```

```

# Generates data needed for the payers spending report
def generatePayersReport(userID, year=None):

```

```

    # Default to getting current years reports
    if not year:

```

```

        year = datetime.now().year

```

```

    # First get all of the payers from expenses table (this may include payers that
    # don't exist anymore for the user (i.e. deleted the payer and didn't update
    # expense records))

```

```

    results_payers = db.execute(
        "SELECT payer AS name, SUM(amount) AS amount FROM expenses
        WHERE user_id = :userID AND date_part('year', date(expensedate)) = :year
        GROUP BY payer ORDER BY amount DESC", {"userID": userID, "year":
        year}).fetchall()

```

```

    payers = convertSQLToDict(results_payers)

```

```

    # Now get any payers the user has in their account but haven't expensed anything
    results_nonExpensePayers = db.execute(
        "SELECT name FROM payers WHERE user_id = :userID AND name
        NOT IN (SELECT payer FROM expenses WHERE expenses.user_id = :userID
        AND date_part('year', date(expensedate)) = :year)", {"userID": userID, "year":
        year}).fetchall()

```

```

    nonExpensePayers = convertSQLToDict(results_nonExpensePayers)

```

```
# Add the non-expense payers to the payers data structure and set their
amounts to 0    for payer in nonExpensePayers:    newPayer =
{"name": payer["name"], "amount": 0}    payers.append(newPayer)
```

```
# Calculate the total paid for all payers combined
totalPaid = 0
for payer in payers:    totalPaid =
totalPaid + payer["amount"]
```

```
# Calculate the % paid per payer and add to the data structure
if totalPaid != 0:    for payer in payers:
    payer["percentAmount"] = round((payer["amount"] / totalPaid) * 100)
```

```
    return payers
else:
```

```
    return None
from flask import request, session
from flask_session import Session
from sqlalchemy import create_engine
from sqlalchemy.orm import scoped_session, sessionmaker
from helpers import convertSQLToDict
```

```
# Create engine object to manage connections to DB, and scoped session to separate
user interactions with DB
```

```
engine = create_engine(os.getenv("DATABASE_URL"))
db = scoped_session(sessionmaker(bind=engine))
```

```
# Gets and return the users spend categories
def getSpendCategories(userID):
```

```
    results = db.execute(
        "SELECT categories.name FROM usercategories INNER JOIN categories
        ON usercategories.category_id = categories.id WHERE usercategories.user_id
        = :userID",
```

```

{"usersID": userID}).fetchall() categories

=      convertSQLToDict(results)      return

categories

```

```

# Gets and return the users *inactive* spend categories from their expenses
(e.g. they deleted a category and didn't update their expense records that still
use the old category name) def getSpendCategories_Inactive(userID):
    results = db.execute(
        "SELECT category FROM expenses WHERE user_id = :usersID AND
category NOT IN(SELECT categories.name FROM usercategories INNER
JOIN categories ON categories.id = usercategories.category_id WHERE user_id
= :usersID) GROUP BY category",
        {"usersID": userID}).fetchall()

    categories = convertSQLToDict(results)

    return categories

```

```

# Get and return all spend categories from the category library def
getSpendCategoryLibrary():
    results = db.execute("SELECT id, name FROM categories").fetchall()

    convertSQLToDict(results)

    return categories

```

```

# Get and return the name of a category from the library def
getSpendCategoryName(categoryID):
    name = db.execute(

```

```
        "SELECT name FROM categories WHERE id = :categoryID",
{"categoryID": categoryID}).fetchone()[0]
    return name
```

```
# Gets and return the users budgets, and for each budget the categories they've
selected
def getBudgetsSpendCategories(userID):    results =
db.execute("SELECT budgets.name AS budgetname, categories.id AS
categoryid, categories.name AS categoryname FROM budgetcategories
INNER JOIN budgets on budgetcategories.budgets_id = budgets.id INNER
JOIN categories on budgetcategories.category_id = categories.id WHERE
budgets.user_id = :usersID ORDER BY budgets.name, categories.name",
        {"usersID": userID}).fetchall()
```

```
    budgetsWithCategories = convertSQLToDict(results)
```

```
    return budgetsWithCategories
```

```
# Gets and returns the users budgets for a specific category ID
def getBudgetsFromSpendCategory(categoryID, userID):    results =
db.execute("SELECT budgets.id AS budgetid, budgets.name AS
budgetname, categories.id AS categoryid, categories.name AS categoryname
FROM budgetcategories INNER JOIN budgets on
budgetcategories.budgets_id = budgets.id INNER JOIN categories on
budgetcategories.category_id = categories.id WHERE budgets.user_id =
:usersID AND budgetcategories.category_id = :categoryID ORDER BY
budgets.name, categories.name", {
        "usersID": userID, "categoryID": categoryID}).fetchall()
```

```
    budgets = convertSQLToDict(results)
    return
```

```
    budgets
```



```
# Updates budgets where an old category needs to be replaced with a new
one (e.g. renaming a category) def
updateSpendCategoriesInBudgets(budgets, oldCategoryID,
newCategoryID):    for budget in budgets:
    # Update existing budget record with the new category ID
    db.execute("UPDATE budgetcategories SET category_id = :newID WHERE
budgets_id = :budgetID AND category_id = :oldID",
                {"newID": newCategoryID, "budgetID": budget["budgetid"],
"oldID": oldCategoryID})
    db.commit()
```

```
# Updates budgets where a category needs to be deleted def
deleteSpendCategoriesInBudgets(budgets, categoryID):
for budget in budgets:
    # Delete existing budget record with the old category ID
    db.execute("DELETE FROM budgetcategories WHERE budgets_id =
:budgetID AND category_id = :categoryID",
                {"budgetID": budget["budgetid"], "categoryID": categoryID})

    db.commit()
```

```
# Generates a ditionary containing all spend categories and the budgets
associated with each category def
generateSpendCategoriesWithBudgets(categories, categoryBudgets):
    categoriesWithBudgets = []

    # Loop through every category
    for category in categories:
        # Build a dictionary to hold category ID + Name, and a list holding all the
        budgets which have that category selected
        categoryWithBudget = {"name": None, "budgets": []}
        categoryWithBudget["name"] = category["name"]
```

```

        # Insert the budget for the spend category if it exists        for budget
in categoryBudgets:        if category["name"] ==
budget["categoryname"]:
categoryWithBudget["budgets"].append(budget["budgetname"])

```

```

        # Add the completed dict to the list
        categoriesWithBudgets.append(categoryWithBudget)

```

```

return categoriesWithBudgets

```

```

# Checks if the category name exists in the 'library' or 'registrar' (categories
table) - if so, return the ID for it so it can be passed to below add def
existsInLibrary(newName):

```

```

    # Query the library for a record that matches the name
row = db.execute(
    "SELECT * FROM categories WHERE LOWER(name) = :name",
    {"name": newName.lower()}).fetchone()

```

```

    if row:
        return True
    else:
        return
False

```

```

# Get category ID from DB def
getCategoryID(categoryName, userID=None):

```

```

    # If no userID is supplied, then it's searching the category library
if userID is None:
    categoryID = db.execute(
        "SELECT id FROM categories WHERE LOWER(name) = :name",
        {"name": categoryName.lower()}).fetchone()

```

```

    if not categoryID:
return None    else:

```

```

        return categoryID["id"]

    # Otherwise search the users selection of categories
else:
    categoryID = db.execute(
        "SELECT categories.id FROM usercategories INNER JOIN categories
ON usercategories.category_id = categories.id WHERE
usercategories.user_id = :usersID AND LOWER(categories.name) = :name",
        {"usersID": userID, "name": categoryName.lower()}).fetchone()

    if not categoryID:
return None    else:
        return categoryID["id"]

# Checks if the category name exists in the users selection of categories
(usercategories table) - if so, just return as False? def
existsForUser(newName, userID):
    # Query the library for a record that matches the name
row = db.execute(
        "SELECT categories.id FROM usercategories INNER JOIN categories ON
usercategories.category_id = categories.id WHERE
usercategories.user_id = :usersID AND LOWER(categories.name) = :name",
        {"usersID": userID, "name": newName.lower()}).fetchone()

    if row:
return True
    else:    return
False

# Adds a category to the database (but not to any specific users account) def
addCategory_DB(newName):
    # Create a new record in categories table
categoryID = db.execute(
        "INSERT INTO categories (name) VALUES (:name) RETURNING id",

```

```
{"name": newName}).fetchone()[0]
    db.commit()
```

```
    return categoryID
```

```
# Adds a category to the users account def
addCategory_User(categoryID, userID):    db.execute("INSERT
INTO usercategories (user_id, category_id)
VALUES (:userID, :categoryID)",
        {"userID": userID, "categoryID": categoryID})
db.commit()
```

```
# Deletes a category from the users account def
deleteCategory_User(categoryID, userID):    db.execute("DELETE FROM
usercategories WHERE user_id = :userID
AND category_id = :categoryID",
        {"userID": userID, "categoryID": categoryID})
db.commit()
```

```
# Update just the spend categories of expense records (used for category renaming)
def updateExpenseCategoryNames(oldCategoryName, newCategoryName, userID):
    db.execute("UPDATE expenses SET category = :newName WHERE user_id
= :userID AND category = :oldName",
        {"newName": newCategoryName, "userID": userID, "oldName":
oldCategoryName})
    db.commit()
```

```
# Rename a category def renameCategory(oldCategoryID,
newCategoryID, oldCategoryName, newCategoryName, userID):
    # Add the renamed category to the users account
    addCategory_User(newCategoryID, userID)
```

```
# Delete the old category from their account
deleteCategory_User(oldCategoryID, userID)
```

```
# Update users budgets (if any exist) that are using the old category to the new
one
```

```
budgets = getBudgetsFromSpendCategory(oldCategoryID, userID)
```

```
if budgets:
```

```
    updateSpendCategoriesInBudgets(budgets, oldCategoryID, newCategoryID)
```

```
# Update users expense records that are using the old category to the new one
```

```
updateExpenseCategoryNames(oldCategoryName, newCategoryName, userID)
```

```
# Delete a category def
```

```
deleteCategory(categoryID, userID): #
```

```
Get budgets that are currently using the
category they want to delete    budgets =
getBudgetsFromSpendCategory(categor
yID, userID)
```

```
# Delete categories from the users budgets
```

```
if budgets:
```

```
    deleteSpendCategoriesInBudgets(budgets, categoryID)
```

```
# Delete the category from the users account
```

```
deleteCategory_User(categoryID, userID)
```

CHAPTER 8

TESTING

8.1. TESTING:

- Login Page (Functional)
- Login Page (UI)
- Add Expense Page (Functional)

8.2. User Acceptance Testing:

1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the [ProductName] project at the time of the release to User Acceptance Testing (UAT).

2. 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 Reproduce	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

3. 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	43	0	0	43
Logout	2	0	0	2

CHAPTER 9

RESULTS

9.1 Performace Metrics

Home Page



Login Page



Add Expense Page

MyBudget

Home

Add

History

LIMIT

Report

Logout

Add Expense

Date

dd.mm.yyyy

Time

--:-- --

Expense name

Expense Amount

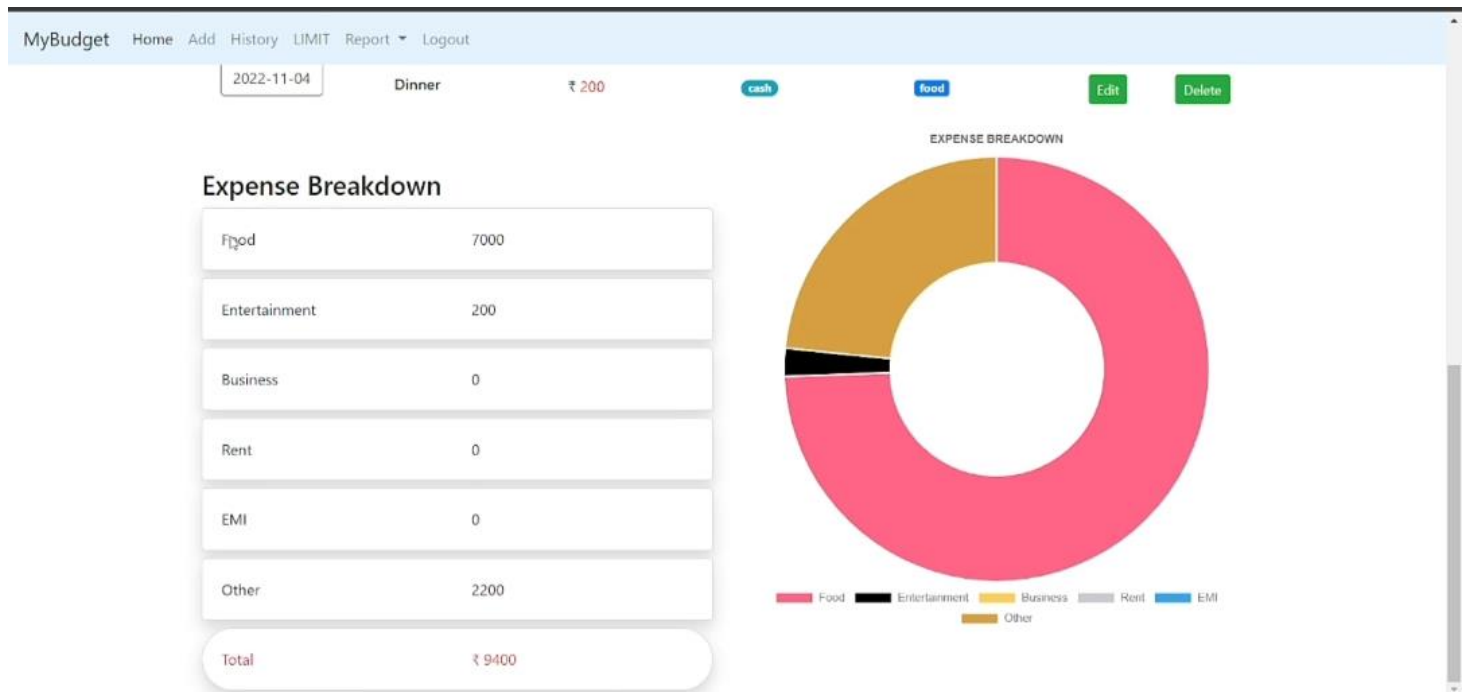
Pay-Mode

Category

Add

Breakdown of Expenses

MyBudget	Home	Add	History	LIMIT	Report	Logout
EXPENSES						
2022-11-11	Lunch	₹ 1000	cash	food	Edit	Delete
2022-11-12	Dinner	₹ 4000	cash	food	Edit	Delete
2022-11-11	Lunch	₹ 1000	cash	food	Edit	Delete
2022-11-13	Meat	₹ 800	cash	food	Edit	Delete
2022-11-11	Car	₹ 200	payment	other	Edit	Delete
2022-11-11	Lunch	₹ 200	cash	entertainment	Edit	Delete



Limit Page

MyBudget Home Add History LIMIT Report Logout

Currently your MONTHLY limit is ₹ (2000.)

ENTER the MONTHLY LIMIT to avoid over EXPENSES

ENTER

CHAPTER 10

ADVANTAGES AND DISADVANTAGES

10.1. ADVANTAGES:

As expending money is easier, we often fall prey to overspending. So, one of the immediate benefit of budgeting and expense tracking is that, it prevents overspending. Budgeting makes us aware of where we spend our money. Once we know this, it then helps us to fix a limit. Budgeting and expense tracking works like a control. It continuously gives us feedback about our spending patterns. This is what is called expense tracking. It makes us aware of how well we are performing on our different budgeted expense heads. Using the Expense Manager, you can easily make month on month comparisons of earning, expenses and spending in a more organized manner.

10.2. DISADVANTAGES:

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

CHAPTER 11

CONCLUSION

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 successfully 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. Modules 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 ideal practice guarantees that the expenses tracked are accurately and in a timely manner.

CHAPTER 12

FUTURE SCOPE

- It will have various options to keep record (for example Food, Travelling Fuel, Salary etc.).
- Automatically it will keep on sending notifications for our daily expenditure.
- In today's busy and expensive life, we are in a great rush to make moneys, but at the end of the month we broke off. As we are unknowingly spending money on title and unwanted things. So, we have come over with the plan to follow our profit.
- Here user can define their own categories for expense type like food, clothing, rent and bills where they have to enter the money that has been spend and likewise can add some data in extra data to indicate the expense.

CHAPTER 13

APPENDIX:

GitHub Link:

<https://github.com/IBM-EPBL/IBM-Project-5031-1658745750>

Demo Link:

https://drive.google.com/file/d/1zKzzjQRbdqObI3VXI4O_x_ivYwliVLFM/view?usp=drivesdk