A Mid-Term Progress Report

on

ExpensoMeter

Submitted in partial fulfillment of the requirements for the award of the degree of

Bachelor of Technology
In
Computer Science and Engineering

SUBMITTED BY

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ABSTRACT

ExpensoMeter – Expense Tracking Application Based Project

In today's fast-paced world, managing personal finances efficiently is essential for achieving financial stability and long-term goals. Many individuals struggle with tracking their expenses, leading to unplanned spending, difficulty in saving, and a lack of financial awareness. **ExpensoMeter** is a **user-friendly expense tracking application** designed to address this challenge by providing an intuitive platform for monitoring, categorizing, and analyzing expenditures.

The application allows users to **record expenses, set budgets, and visualize financial trends** through interactive reports and graphical insights. By leveraging **local storage**, ExpensoMeter ensures seamless data management without dependency on external databases, making it accessible and efficient. The system also aims to integrate **machine learning-based analysis** to identify spending patterns and **AI-powered alerts** to notify users when they exceed their predefined budgets.

ExpensoMeter not only simplifies personal finance management but also promotes financial discipline by offering **detailed expense reports, category-wise breakdowns, and smart financial recommendations**. This project is designed to empower users to take control of their financial well-being, make informed decisions, and cultivate responsible spending habits.

ACKNOWLEDGMENT

We extend our sincere gratitude to Dr. Kiran Jyoti, Head of the Computer Science and Engineering Department at GNDEC, Ludhiana, for her continuous guidance, encouragement, and invaluable insights throughout the development of our project, ExpensoMeter. Her unwavering support has been instrumental in shaping this project and ensuring its successful execution.

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CHAPTER 1 INTRODUCTION

1.1 Brief Introduction

Rightly said, “Financial health hinges on understanding where your money goes.” In today's fast-paced world, keeping track of expenses can be a daunting task. From daily coffee runs to unexpected bills, our finances often feel like a chaotic puzzle, making personal finance management crucial for achieving financial stability and goals.

By meticulously recording every expenditure, we gain insights into areas of overspending, enabling better financial awareness. Incorporating expense tracking into daily routines helps individuals understand spending habits, make informed decisions, and improve overall financial health.

This project, ExpensoMeter, is a user-friendly application designed to empower individuals to take control of their finances. It makes financial management easily accessible anytime, anywhere. By seamlessly integrating data entry, visualization, and insightful reporting, ExpensoMeter provides users with a powerful tool to monitor their expenses and work toward financial goals.

1.2 Objectives of Project

The following objectives will be achieved for this minor project:

i. To create a functional and user-friendly GUI application to track expenses on individual level and at large scale (i.e. for a company).
ii. To analyze expenses using Machine Learning and generate detailed reports, identify spending patterns and offer actionable insights for better financial management.
iii. To implement AI-powered suggestions and alerts when users exceed their budget.

CHAPTER 2 SYSTEM REQUIREMENTS

2.1 Software Requirements

The development process relies on various software tools to streamline coding, version control, and deployment:

- **GitHub**
  - Primary platform for version control, collaboration and deployment.
- **GitHub Desktop**
  - Simplifies repository management.
- **VS Code**
  - Integrated development environment (IDE) for writing and debugging code.
- **Command Prompt (Cmd)**
  - Supports essential command-line operations.
- **Local Storage**
  - Used for storing user data temporarily before syncing with cloud services.

2.2 Hardware Requirements

For optimal project execution, the following hardware components are essential:

- **Laptop**
  - A reliable system with sufficient processing power and storage to handle development tasks efficiently.
- **Stable Internet Connection**

- Ensures smooth online collaboration, access to resources, and seamless deployment activities.

2.3 Technologies Used

- **Frontend Development:**
  - HTML, CSS, JavaScript (for basic structure and styling)
  - React.js (for dynamic and responsive user interfaces)
- **Backend Development:**
  - Browser Local Storage & Session Storage
  - Used to store user data persistently on the client-side without requiring a backend database.
- **ML Integration:**
  - Python-based analysis report generation for expense tracking using trained data models.

These system requirements collectively provide a strong foundation for the successful execution of the ExpensoMeter project.

CHAPTER 3 SOFTWARE REQUIREMENT ANALYSIS

3.1 Define the Problem

ExpensoMeter is designed to simplify personal finance management by providing an intuitive platform for recording, categorizing, and analyzing expenses. The system requirements are categorized into data, functional, performance, and security needs to ensure efficiency, reliability, and user-friendliness.

3.2 Define the Modules and Their Functionalities

3.2.1 Data Requirements

ExpensoMeter will store and manage user-generated financial data, including transaction details, spending categories, and budget allocations. Since the application relies on **local storage**, all expense records will be securely saved on the user's device using **Browser Local Storage**. Data privacy will be maintained by encrypting sensitive financial information.

3.2.2 Functional Requirements

- **User Authentication**: Secure login and registration using email or third-party authentication to ensure data privacy and personalization.
- **Expense Management**: Users can add, edit, and delete expenses while categorizing transactions based on date, amount, and payment method.
- **Category Management**: Predefined and customizable spending categories with budget allocation per category.
- **Expense Visualization**: Interactive charts and reports provide monthly and yearly financial summaries.

- **Budgeting & Alerts**: Machine learning-based spending insights, notifications, and alerts when budget limits are exceeded.
- **Offline Data Storage**: Local Storage ensures offline functionality and seamless user experience without requiring an internet connection.

3.2.3 Performance Requirements

- **Lightweight Storage**: Utilizing Local Storage ensures quick read and write operations without dependency on external servers.
- **Responsive Design**: The application will be accessible on both web and mobile platforms with a smooth and intuitive UI.
- **Optimized Load Handling**: Efficient handling of expense tracking and visualization without delays.

3.2.4 Security Requirements

- **Data Encryption**: Sensitive financial data stored in Local Storage will be encrypted to prevent unauthorized access.
- **Authentication Mechanisms**: Secure login system with password hashing and session-based authentication.
- **User Privacy**: Since data is stored locally, no financial data is transmitted to external servers, ensuring complete user control.
- **Regular Updates**: Security patches and enhancements will be applied periodically to prevent vulnerabilities.

By meeting these requirements, ExpensoMeter will provide users with a secure, efficient, and intelligent expense tracking system that enhances financial awareness and control.

CHAPTER 4 SOFTWARE DESIGN

4.1 Data Flow Diagrams (DFDs)

4.1.1 Level 0 DFD (Context Level)

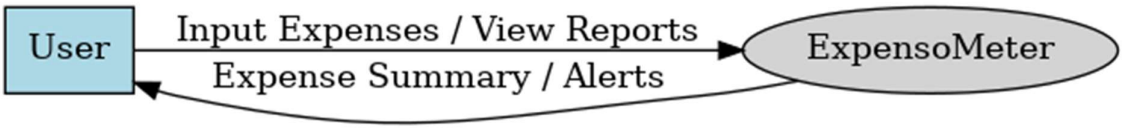

Figure 4.1: Level 0 DFD

4.1.2 Level 1 DFD

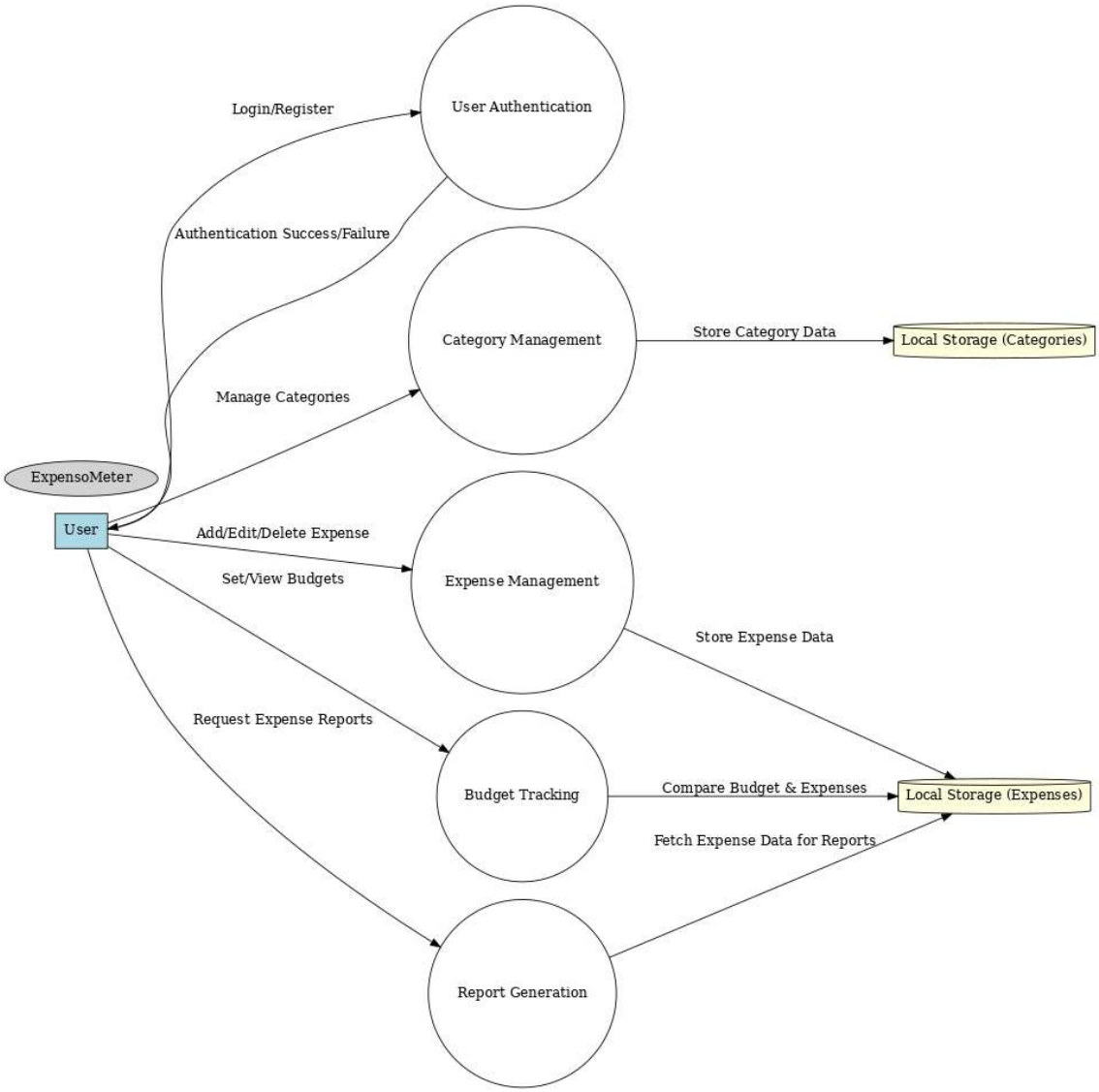

Figure 4.2: Level 1 DFD

CHAPTER 5 CODING/CORE MODULE

5.1 Frontend Architecture

The frontend of ExpensoMeter is built using React.js, following a component-based architecture for modularity and maintainability.

5.1.1 Component Breakdown

The application consists of multiple UI components:

1. **Navigation Bar –** Provides access to different sections (Home, Expenses, Analysis, etc.).
2. **Home Page –** Displays an overview of features and quick-access links.
3. **Login & Register Pages –** Handles user authentication.
4. **Expense Entry Form –** Allows users to input expenses (date, category, amount, etc.).
5. **Expense List –** Shows all recorded expenses.
6. **Analysis Page –** Displays expense trends through charts and graphs.

5.1.2 State Management

- **useState –** Stores dynamic data like entered expenses.
- **useEffect –** Fetches stored data from local storage and updates UI.

5.2 Backend and Data Handling

ExpensoMeter relies on **browser local storage** for data persistency.

5.2.1 Data Storage Structure

Expenses are stored in **JSON format** in **localStorage**, where each expense entry contains:

- **id** – Unique identifier for each expense.
- **date** – Date of the expense.
- **category** – Category (Food, Transport, Shopping, etc.).
- **amount** – Expense amount.
- **description** – User-added notes.

5.2.2 Data Handling Functions

The application includes various functions to interact with **localStorage**:

1. **Add Expense** – Saves a new expense entry to storage.
2. **Retrieve Expenses** – Fetches all stored expenses for display.
3. **Update Expense** – Modifies an existing entry.
4. **Delete Expense** – Removes an expense record.

5.3 Workflow and Interaction Model

The application follows a structured workflow to ensure smooth operation:

5.3.1 User Flow

1. **User opens ExpensoMeter** – Home page loads existing expense data.
2. **User adds an expense** – Data is stored in localStorage.
3. **Expense list updates in real-time** – User can edit or delete records.
4. **Analysis module processes training data** – Displays trends and alerts.
5. **Machine Learning module (upcoming)** – Analyzes spending patterns.

5.3.2 Interaction Between Components

The following diagram illustrates the interaction between frontend components and local storage:

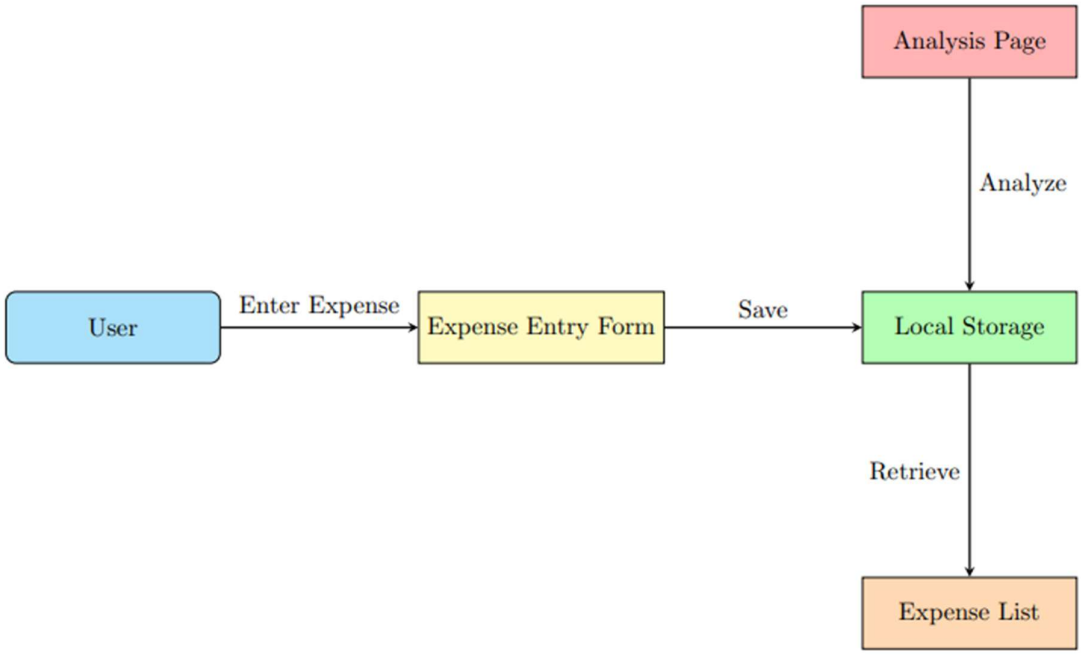

Figure 5.1: Workflow

- **Expense Entry Form** – Stores user input in localStorage.
- **Expense List** – Retrieves and displays saved expenses.
- **Analysis Page** – Reads data and generates spending insights.

5.4 ML Integration for Financial Analysis

The Machine Learning (ML) component in this project is currently focused on **analyzing financial data**. The primary goal is to **visualize category-wise and amount-wise distribution** using **pie charts and bar charts**.

5.4.1 Training Data Processing

- **Data Collection -** The dataset is derived from training data.
- **Data Preprocessing -** All transformations and analysis are based on training data.

5.4.2 Visualization & Insights

- **Bar Chart:** Displays total spending per category, providing insights into major expense areas.
- **Pie Chart:** Shows the percentage distribution of expenses across different categories.

5.5 System Architecture Diagram

Here's an overview of how different parts of the system interact:

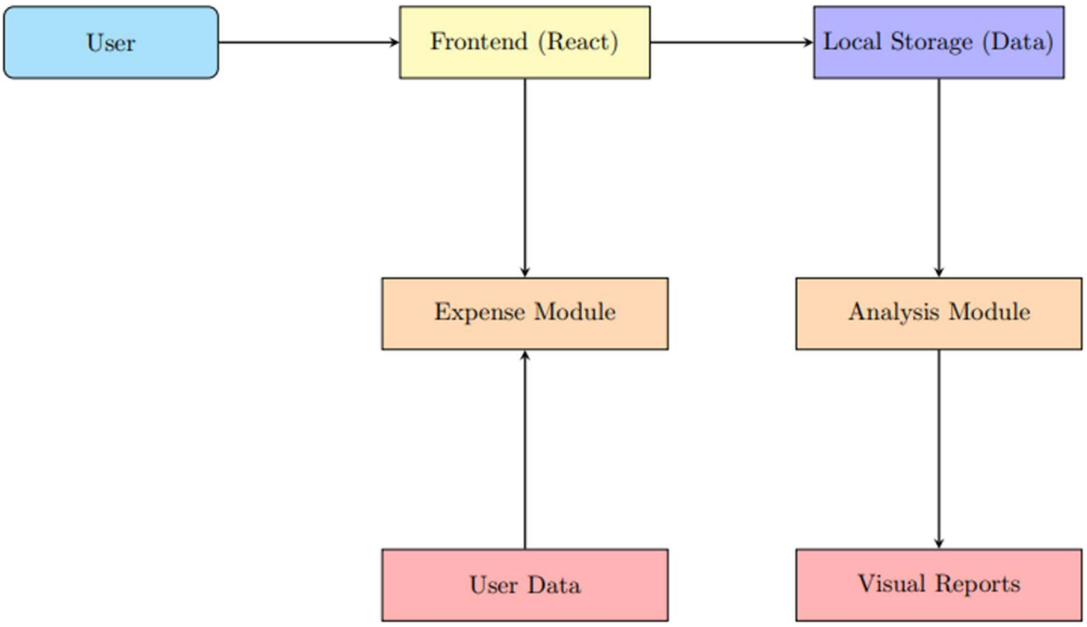

Figure 5.3: System Architecture

CHAPTER 6 PERFORMANCE OF THE PROJECT DEVELOPED

The **ExpensoMeter** project is designed to provide a **functional and user-friendly application** for tracking expenses and improving financial management. Its performance can be evaluated based on the following aspects:

6.1 Established Features (Successfully Implemented)

- ✓ **Record Expenses** – Users can record their expenses regularly.
- ✓ **Categorize Expenses** – Users can categorize and group their expenses with details like date, amount and expense type.
- ✓ **Local Storage Integration** – Data is efficiently stored and retrieved using the browser's local storage.

6.2 Features in Progress

- **Machine Learning-Based Analysis** – Work is underway to analyze spending patterns and generate financial insights.
- **AI-Powered Suggestions & Alerts** – The system will provide recommendations and warnings when users exceed their budget.

CHAPTER 7 OUTPUT SCREENS

7.1 Home Page

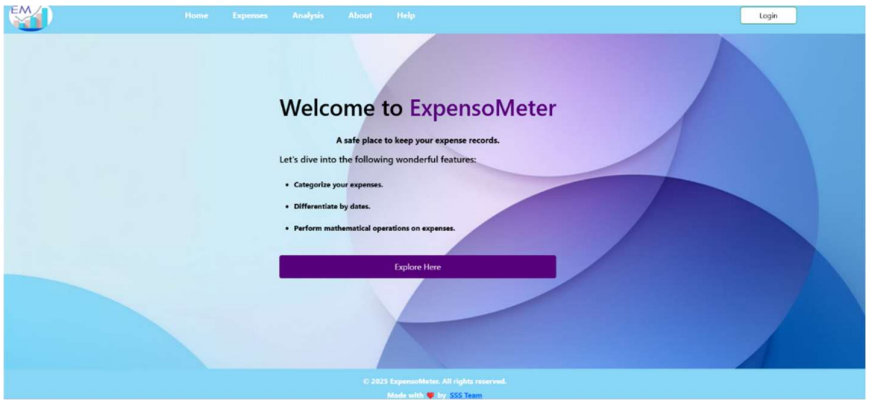

Figure 7.1: Home Page

7.2 Login

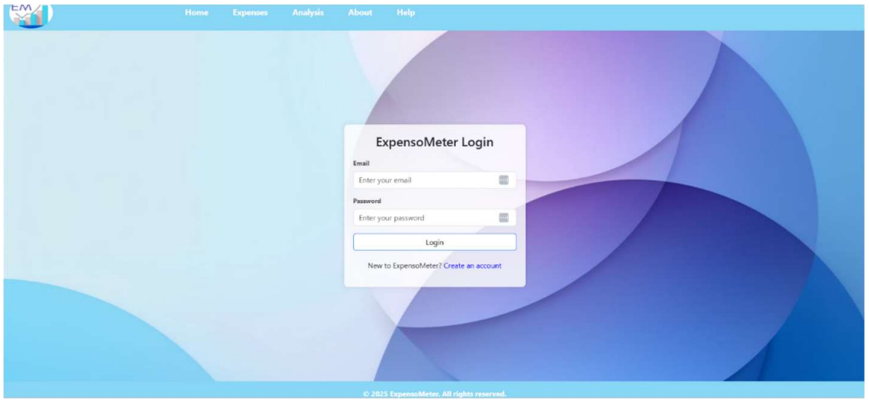

Figure 7.2: Login

7.3 Register

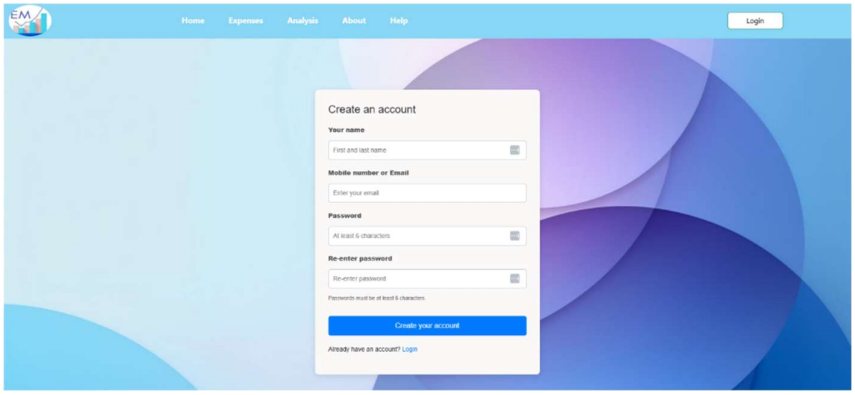

Figure 7.3: Register

7.4 Expenses Page

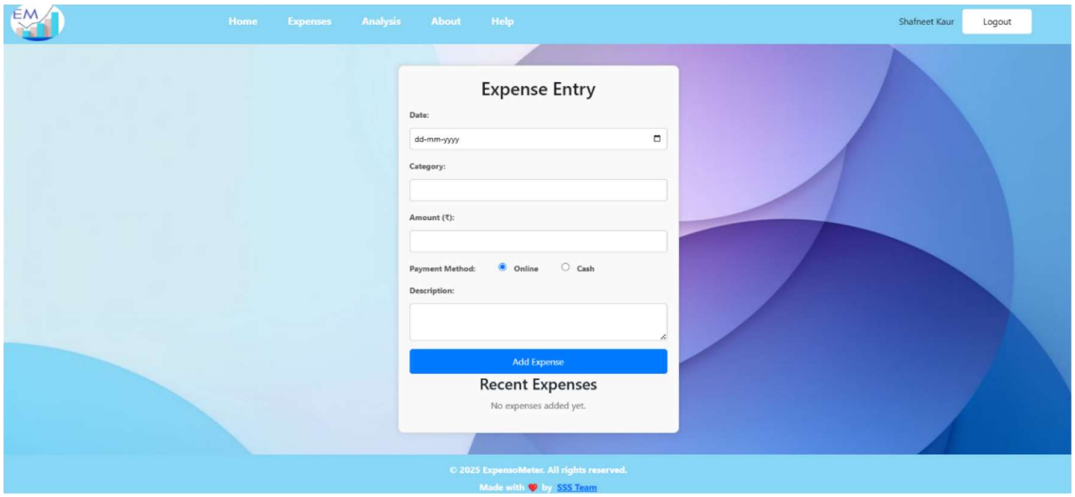

Figure 7.4.1: Expenses Page

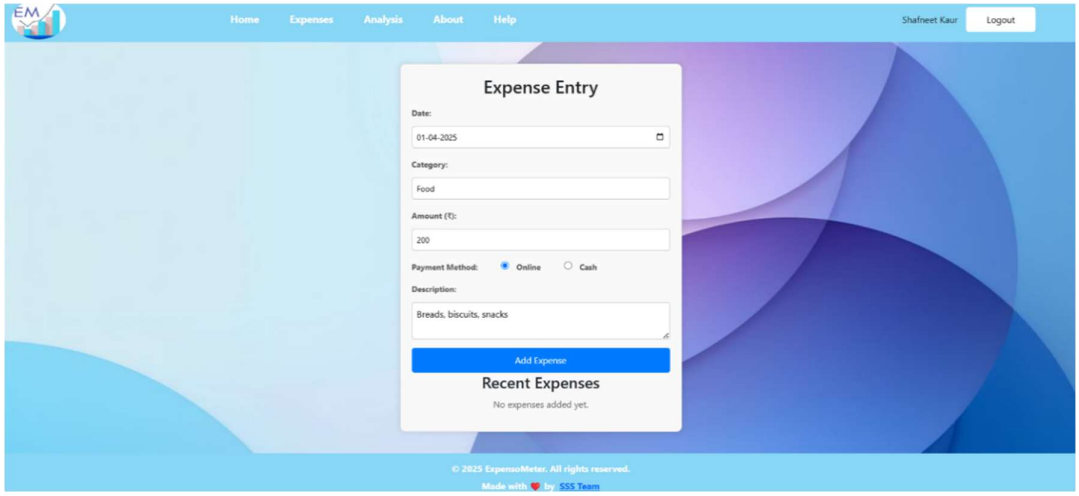

Figure 7.4.2: Entries added in Expenses Page

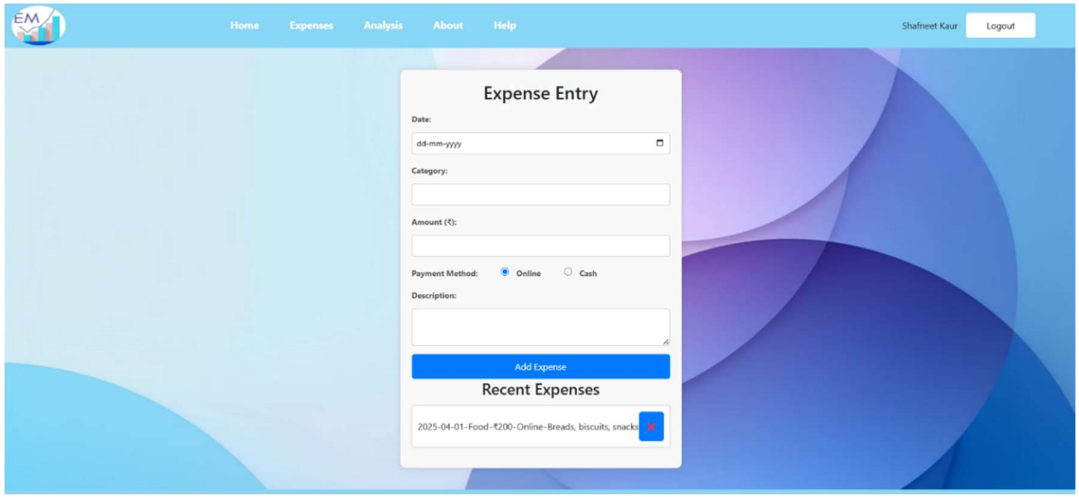

Figure 7.4.3: Recent Entries shown on Expenses Page

7.5 Analysis Page

Figure 7.5: Analysis Page

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