

A
Mini Project Report
on
FinWise AI Financial Advisor
Submitted in partial fulfillment of the requirements for the
degree
Third Year Engineering – Computer Science Engineering (Data Science)
by

Ishan Rane 22107052

Piyush Ghadge 24207005

Krish Patil 24207006

Muhammad Momin 24207008

Under the guidance of
Prof. Shubhangi Soni



DEPARTMENT OF COMPUTER SCIENCE ENGINEERING (DATA SCIENCE)

A.P. SHAH INSTITUTE OF TECHNOLOGY

G.B. Road, Kasarvadavali, Thane (W)-400615

UNIVERSITY OF MUMBAI

Academic year: 2025-26

CERTIFICATE

This to certify that the Mini Project report on FinWise has been submitted by Krish Patil (24207006), Piyush Ghadge(24207005), Muhammad Momin(24207008) and Ishaan Rane (22107052) who are bonafide students of A. P. Shah Institute of Technology, Thane as a partial fulfillment of the requirement for the degree in **Computer Science Engineering (Data Science)**, during the academic year **2025-2026** in the satisfactory manner as per the curriculum laid down by University of Mumbai.

Prof. Shubanghi Soni
Guide

Mr. Pravin Adivaekar
HOD, CSE(Data Science)

Dr. Uttam D. Kolekar
Principal

External Examiner:

1.

Internal Examiner:

1.

Place: A. P. Shah Institute of Technology, Thane

Date:30/10/25

ACKNOWLEDGEMENT

This project would not have come to fruition without the invaluable help of our guide **Prof. Shubhangi Soni**. Expressing gratitude towards our HOD, **Mr. Pravin Adivaekar**, and the Department of Computer Science Engineering (Data Science) for providing us with the opportunity as well as the support required to pursue this project. We would also like to thank our project coordinator **Prof. Shubhangi Soni** who gave us her valuable suggestions and ideas when we were in need of them. We would also like to thank our peers for their helpful suggestions.

TABLE OF CONTENTS

Abstract

1. Introduction.....	2
1.1.Purpose.....	3
1.2.Problem Statement.....	3
1.3.Objectives.....	4
1.4.Scope.....	4
2. Literature Review.....	6
3. Proposed System.....	7
3.1. Features and Functionality.....	7
4. Requirements Analysis.....	8
5. Project Design.....	9
5.1.Use Case diagram.....	9
5.2.DFD (Data Flow Diagram)	10
5.3.System Architecture.....	13
5.4.Implementation.....	16
6. Technical Specification.....	19
7. Project Scheduling.....	20
8. Results.....	23
9. Conclusion.....	25
10. Future Scope.....	26

References

ABSTRACT

This report presents the development and evaluation of FinWise/FinAI, an innovative financial advisory system tailored to deliver personalized, intelligent financial insights and recommendations. FinWise/FinAI employs a synergistic blend of Rule-Based Logic and Machine Learning Models (augmented by Gemini AI) to analyze user financial data and generate actionable guidance. The system's robust architecture encompasses secure data ingestion via Financial Aggregation APIs and CSV uploads, comprehensive processing using Pandas for data handling, and structured persistence within Supabase.

Key features designed to enrich the user experience include the Interactive Dashboard for visual summary and charts, a dedicated Transaction Management module for granular control, and the AI Chatbot & Alerts feature for real-time advice and notifications. The performance of FinWise/FinAI is rigorously evaluated using metrics such as financial health scoring, accuracy of predictive budgeting, and user engagement with personalized goal-tracking, all of which underscore the system's efficacy in providing tailored, reliable financial planning that resonates with users' objectives.

Keywords—FinWise, FinAI, AI Financial Advisor System, Hybrid AI, Rule-Based Logic, Machine Learning Models, Gemini AI, API Integration, Data Flow Diagram (DFD), Interactive Dashboard, Transaction Management, Predictive Analytics, Natural Language Processing (NLP), Performance Evaluation, User-Centric Design.

Chapter 1

Introduction

In the modern world, financial management has become a critical aspect of daily life. Individuals are constantly required to keep track of their income, expenses, savings, and investments to ensure financial stability and achieve their goals. However, managing finances manually can be time-consuming, error-prone, and often overwhelming, especially when dealing with multiple sources of income, recurring expenses, or various financial documents. Many people struggle to gain a clear understanding of their financial health, which can lead to poor budgeting decisions, missed opportunities for savings, and unnecessary debt.

To address these challenges, FinWise has been developed as an intelligent personal finance management system. The platform allows users to upload financial documents such as bank statements, bills, and invoices, and automatically extracts key information including income, expenses, assets, and liabilities. By organizing this data effectively, FinWise provides users with a clear and comprehensive view of their financial situation.

The system is equipped with features that go beyond simple tracking. It offers visual dashboards with tables, bar charts, and pie charts to represent financial trends, enabling users to easily understand their spending patterns and financial performance. Additionally, FinWise integrates AI-driven recommendations, assisting users in making informed decisions about budgeting, saving, and investments. An interactive Q&A interface allows users to ask finance-related questions and receive intelligent, context-aware guidance tailored to their specific needs.

Security and user accessibility are also key priorities of FinWise. The platform ensures that all financial data is stored securely in a database and provides role-based access control to maintain privacy. Users can confidently manage their personal finances knowing their information is protected.

Overall, FinWise aims to simplify financial management, promote better financial planning, and empower users to make smarter financial decisions. By combining automation, analytics, and AI-driven insights, the system transforms complex financial data into actionable knowledge, helping individuals achieve financial stability and long-term growth.

1.1. Purpose

The primary purpose of FinWise is to provide individuals with a reliable and intelligent platform to manage their personal finances efficiently. In today's complex financial environment, people often struggle to track income, expenses, savings, and investments accurately. FinWise addresses this problem by automating financial data collection, analysis, and visualization, making it easier for users to understand their financial situation at a glance.

The system aims to:

- **Simplify Financial Management:** Reduce manual effort in recording and analyzing financial transactions.
- **Provide Insights and Analysis:** Offer visual dashboards and reports to help users monitor their spending patterns and financial health.
- **Assist in Decision-Making:** Use AI-driven recommendations to guide users in budgeting, saving, and making informed financial decisions.
- **Enhance Financial Awareness:** Educate users about their financial habits and encourage responsible money management.
- **Ensure Data Security:** Protect sensitive financial data through secure storage and controlled access.

By achieving these goals, FinWise empowers users to take control of their finances, plan for the future, and achieve financial stability and growth.

1.2. Problem Statement

1. Difficulty in Managing Personal Finances

Many individuals struggle to manage their personal finances effectively due to the absence of automated and intelligent financial management tools. Manual tracking of expenses, income, and savings is time-consuming and often leads to errors, poor financial planning, and missed opportunities for savings or investment.

2. Lack of Automated Insight Extraction from Financial Documents

Financial data is usually spread across multiple documents such as bank statements, bills, salary slips, and investment records. Extracting meaningful insights manually from these documents is tedious and inefficient. Hence, there is a need for a system that can automatically extract, organize, and interpret key financial information.

3. Inability to Analyze Financial Performance Effectively

Without proper analytical tools, users find it difficult to evaluate their financial performance. They often lack knowledge of standard financial metrics and methods to assess their spending patterns, debt levels, and savings growth, which hinders informed financial decision-making.

4. Lack of Intelligent Financial Guidance

Individuals frequently make financial decisions based on intuition rather than data-driven insights. The absence of a system that provides personalized and intelligent financial recommendations results in poor budgeting, unnecessary expenses, and unachieved financial goals.

1.3. Objectives:

1. To allow users to upload financial documents and automatically extract key financial insights using data parsing

This objective focuses on enabling users to upload documents such as bank statements, salary slips, and investment records. The system will use data parsing and processing techniques to automatically extract and organize key financial details, minimizing manual effort and ensuring accuracy in data handling.

2. To assess a user's income, expenses, assets, and liabilities through standard financial metrics for evaluating financial performance and risk

The goal here is to provide a detailed financial assessment by analyzing a user's income, spending patterns, assets, and liabilities. By applying standard financial metrics, the system can generate an overview of the user's financial health and identify risks or areas that need improvement.

3. To assist users in making major financial decisions by calculating affordability and providing personalized recommendations using Machine Learning

This objective aims to help users make informed financial decisions, such as planning investments, managing loans, or optimizing budgets. Using Machine Learning algorithms, the system will analyze user data to provide personalized recommendations and affordability insights based on financial trends and patterns.

4. To provide an intelligent Q&A interface where users can ask financial questions and receive AI-driven, context-aware advice

The objective is to create an interactive question-and-answer system that allows users to seek personalized financial advice. Through natural language understanding and AI-driven insights, the interface will provide context-aware and accurate responses, helping users make smarter financial choices in real time.

1.4. Scope:

1. Functional Scope

- **Financial Document Upload:** Users can upload financial documents like bank statements, bills, and invoices.
- **Data Extraction & Storage:** Extracts key details such as income, expenses, assets, and liabilities, and stores them securely.
- **Data Visualization:** Displays insights through tables, bar graphs, pie charts, and summary dashboards.
- **Financial Analysis & Recommendations:** Provides AI-driven suggestions for budgeting, savings, and investment decisions.
- **Interactive Q&A:** Users can ask finance-related questions and receive context-aware guidance.

2. Technological Scope

- Tech Stack: Backend (Python), Frontend (Python).
- Database: Uses MySQL for secure data storage and retrieval.
- AI/ML Integration: Employs data parsing and basic ML models for recommendations.

3. User Scope

- Users: Individuals seeking personal financial management and insights.
- Admins: Manage system data, monitor usage, and maintain security.

4. Future Enhancements

- Bank Integration: Connect with bank accounts for real-time tracking.
- Mobile App: Enable financial management on the go.
- Advanced AI Features: Predictive analytics for investments, loans, and financial planning.

Chapter 2

Literature Review

The development of intelligent financial management systems has been a key area of research in recent years, with various approaches focusing on automation, efficiency, and risk assessment.

[1] Alsabah, Capponi, and Lacedelli (2021) conducted a comprehensive review of Robo-Advisors, examining their benefits and challenges. Robo-advisors provide cost-effective and accessible financial advice, making investment and financial management more streamlined for users. The study employed a systematic review methodology, analyzing existing platforms and their features. However, challenges such as regulatory compliance and risk management remain significant concerns. The insights from this work highlight the potential for AI-driven financial systems to democratize access to financial advice while underlining the importance of secure and compliant systems.

[2] Leo, Sharma, and Madduley (2019) explored the applications of machine learning in financial risk management, particularly for credit risk assessment and market risk prediction. Their review of existing literature demonstrated that machine learning techniques like neural networks and decision trees can improve predictive accuracy and assist in more informed financial decision-making. This work underscores the value of integrating AI and machine learning algorithms into personal finance systems to enhance analytical capabilities and risk assessment.

[3] (67–77) Dixon, M. F., & Klabjan, D. (2017) examined the application of deep learning techniques to financial market prediction in their study “Classification-based Financial Markets Prediction Using Deep Neural Networks.” The authors demonstrated how deep neural networks can be configured and trained to predict market movement directions and discussed the advantages of these models over traditional approaches in tasks like trading and portfolio management. Their work provides empirical evidence of improved predictive performance, and it has been widely cited in later reviews that discuss broader AI adoption in finance. The paper also highlights practical and methodological challenges — such as model complexity, overfitting, and interpretability — which parallel concerns raised in later literature about transparency, fairness, and accountability when deploying AI in financial systems.

[4] (112–120) Chen, Y., Zhang, L., & Wong, K. (2022) presented a study on “AI-Driven Personal Finance Recommendation Systems” that focuses on personalized financial insights generated through user behavior analysis and natural language processing. Their model demonstrated how AI could offer real-time budgeting tips, spending alerts, and saving strategies tailored to individual financial profiles. This research emphasizes the potential of AI assistants in enhancing user engagement and financial literacy through conversational and predictive technologies — a direction closely aligned with FinWise’s goal of integrating intelligent financial assistance within its platform.

The findings from these studies emphasize the importance of automation, data analysis, and AI integration in modern financial management systems. For FinWise, these insights provide a foundation for implementing features such as automated data extraction, financial analysis, and AI-driven recommendations, ensuring that users can manage their finances efficiently while receiving intelligent guidance. Furthermore, the need to address challenges like data security, compliance, and accurate prediction informs the design and implementation of a robust and user-friendly platform.

Chapter 3

Proposed system

3.1. Features and functionalities

1. Features

- Financial Document Upload: Users can upload documents such as bank statements, bills, and invoices.
- Automated Data Extraction: Extracts key financial information like income, expenses, assets, and liabilities.
- Expense & Income Tracking: Users can categorize and monitor their transactions efficiently.
- Data Visualization: Provides dashboards with tables, bar charts, and pie charts to display financial insights.
- AI-driven Recommendations: Offers personalized suggestions for budgeting, saving, and investments.
- Interactive Q&A Interface: Users can ask finance-related queries and get context-aware advice.
- Secure User Access: Ensures data privacy with secure login and role-based access.

2. Functionalities

- Upload & Parse Financial Documents: Reads and stores user data for analysis.
- Generate Financial Reports: Summarizes income, expenses, assets, liabilities, and savings.
- Visual Analytics: Displays trends, comparisons, and performance summaries.
- Decision Support: Helps users evaluate affordability for purchases, loans, or investments.
- Alerts & Notifications: Reminds users of bills, overspending, or saving targets.

Chapter 4

Requirements Analysis

1. Functional Requirements:

- Financial Document Upload: Users can upload documents like bank statements and bills.
- Data Extraction & Storage: Automatically extract income, expenses, assets, and liabilities from uploaded files.
- Financial Analysis & Recommendations: Calculate key metrics and provide personalized advice for budgeting, saving, and investments.
- Interactive Q&A: Users can ask financial questions and receive intelligent, context-aware answers.
- Data Visualization: Display financial information using charts, graphs, and tables.

2. Non-Functional Requirements:

- Usability: Simple and intuitive interface for all users.
- Security: Encrypt sensitive data and ensure user privacy.
- Performance: Fast data processing and response time.
- Reliability: Accurate financial analysis and recommendations.

3. System Requirements:

- Hardware: Standard PC or mobile device with internet access.
- Software: Backend (NodeJS), database (Supabase), AI/ML frameworks for analysis.

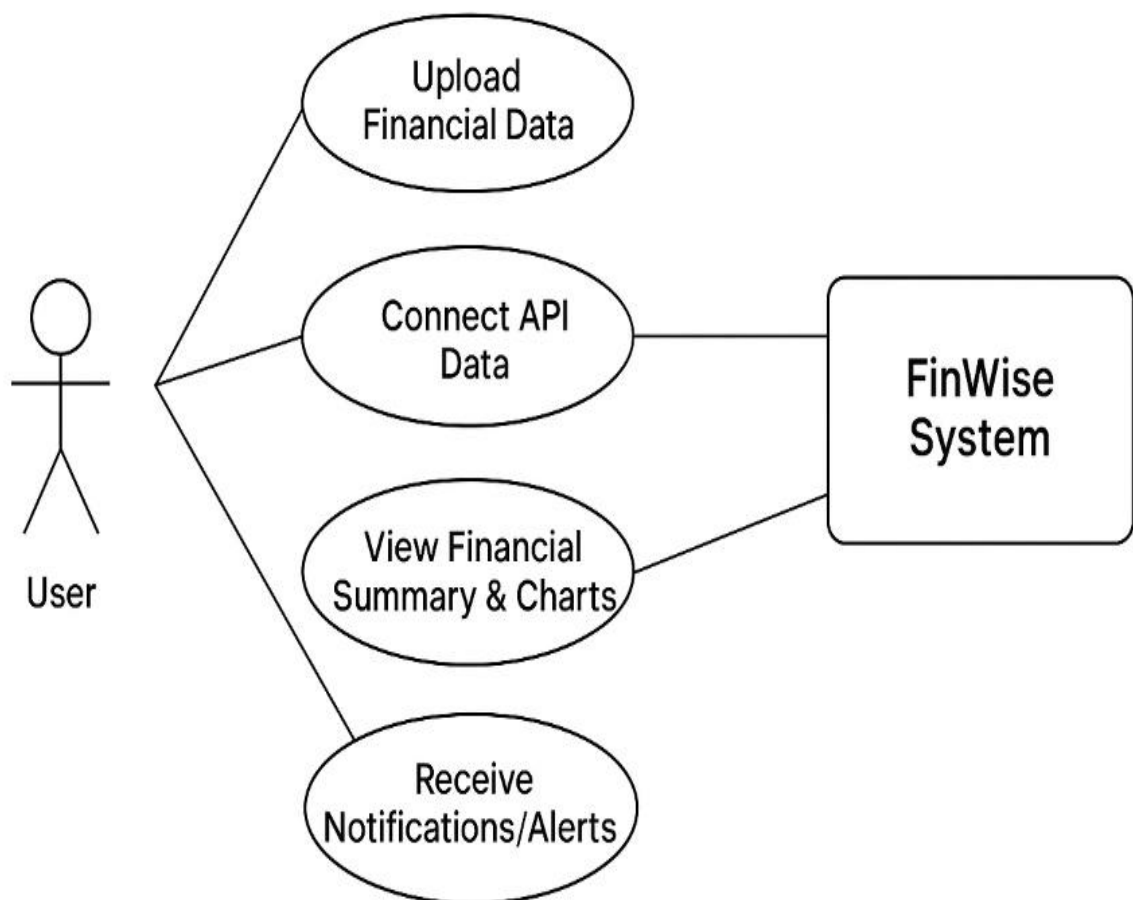
Chapter 5

Project Design

5.1. Use Case Diagram:

- The Use Case Diagram (UCD) for the FinWise/FinAI project defines the user's goals and the primary functions of the application. It highlights the essential interactions between the User and the system. The use cases—such as Upload Financial Data, Connect API Data, View Financial Summary & Charts, and Receive Notifications/Alerts—represent the key measurable outcomes the user expects from the AI advisor.

Use Case Diagram for FinWise – AI Financial Advisor



5.1: Use case Diagram

Figure 5.1 illustrates the use case diagram for Finwise – Ai financial advisor

Actors:

- User: Represents the person utilizing the FinWise application to manage their finances.
- FinWise System: Represents the core AI application responsible for data processing, analysis, summary generation, and proactive alerting.

Use Cases:

1. Upload Financial Data: Allows the user to directly submit their financial information (e.g., CSV files, spreadsheets, or documents) into the system for analysis.
2. Connect API Data: Enables the user to link external accounts (like banks, investment platforms) so the FinWise System can automatically and securely pull transaction and balance data via an API (Application Programming Interface).
3. View Financial Summary & Charts: Displays comprehensive overviews, metrics, and visual data representations (charts, graphs) of the user's financial status, spending habits, and investment performance.
4. Receive Notifications/Alerts: Provides proactive messages and warnings to the user based on real-time analysis, such as budget overruns, suspicious transactions, or important financial deadlines.

Relationships:

- Association: Connects the User actor to all use cases (Upload Financial Data, Connect API Data, View Financial Summary & Charts, Receive Notifications/Alerts), showing the user interacts with every core function.
- System Responsibility: An association connects the FinWise System to Connect API Data and View Financial Summary & Charts, indicating that these use cases involve the system executing complex data fetching and reporting tasks.
-

5.2 DFD (Data Flow Diagram):

The Data Flow Diagram (DFD) for the FinWise/FinAI project focuses on the path and transformation of financial information. It illustrates how the AI advisor processes data by showing the flow of raw data like Transaction History from the Bank and Expense Data from the User into the central FinWise System process.

FinWise Financial Management Application - Level 0 DFF

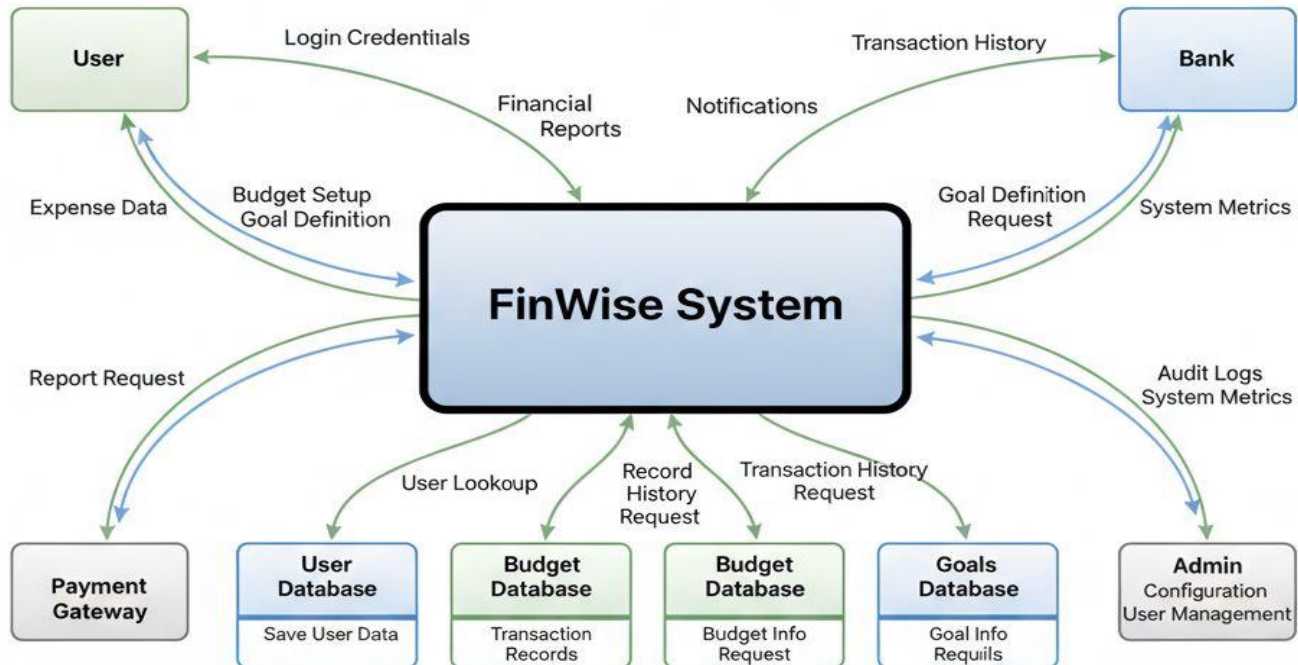


Figure 5.2 Data flow diagram

This diagram illustrates the boundaries of the FinWise System by showing all major external entities and data stores that interact with the central FinWise System process.

I. Central Process

- FinWise System (Central Process): This is the single, core process that represents the entire application. It is responsible for all data transformation, analysis, reporting, and interaction with external actors and databases.

II. External Entities (Actors)

These are outside the scope of the system but interact with it:

1. User:

- Inputs to System: Sends Login Credentials, Expense Data, Budget Setup, and Goal Definition.
- Outputs from System: Receives Financial Reports.

2. Bank:

- Inputs to System: Provides Transaction History.
- Outputs from System: Receives Goal Definition Request (possibly for linked accounts or validation) and sends System Metrics.

3. Payment Gateway:

- Outputs from System: Receives Report Request (likely for processing or historical data).

4. Admin:

- Inputs to System: Provides Configuration and manages User Management data (implied flows).
- Outputs from System: Receives Audit Logs and System Metrics.

III. Data Stores (Databases)

These are where data is stored within the system:

1. User Database:

- Flows: Receives and stores Save User Data from the system, and the system performs a User Lookup.

2. Budget Database:

- Flows: Receives and stores Transaction Records and sends a Budget Info Request to the system.

3. Goals Database:

- Flows: Stores Goal Info Requires (likely requirements/definitions) and receives a Record History Request from the system.

IV. Key Data Flows:

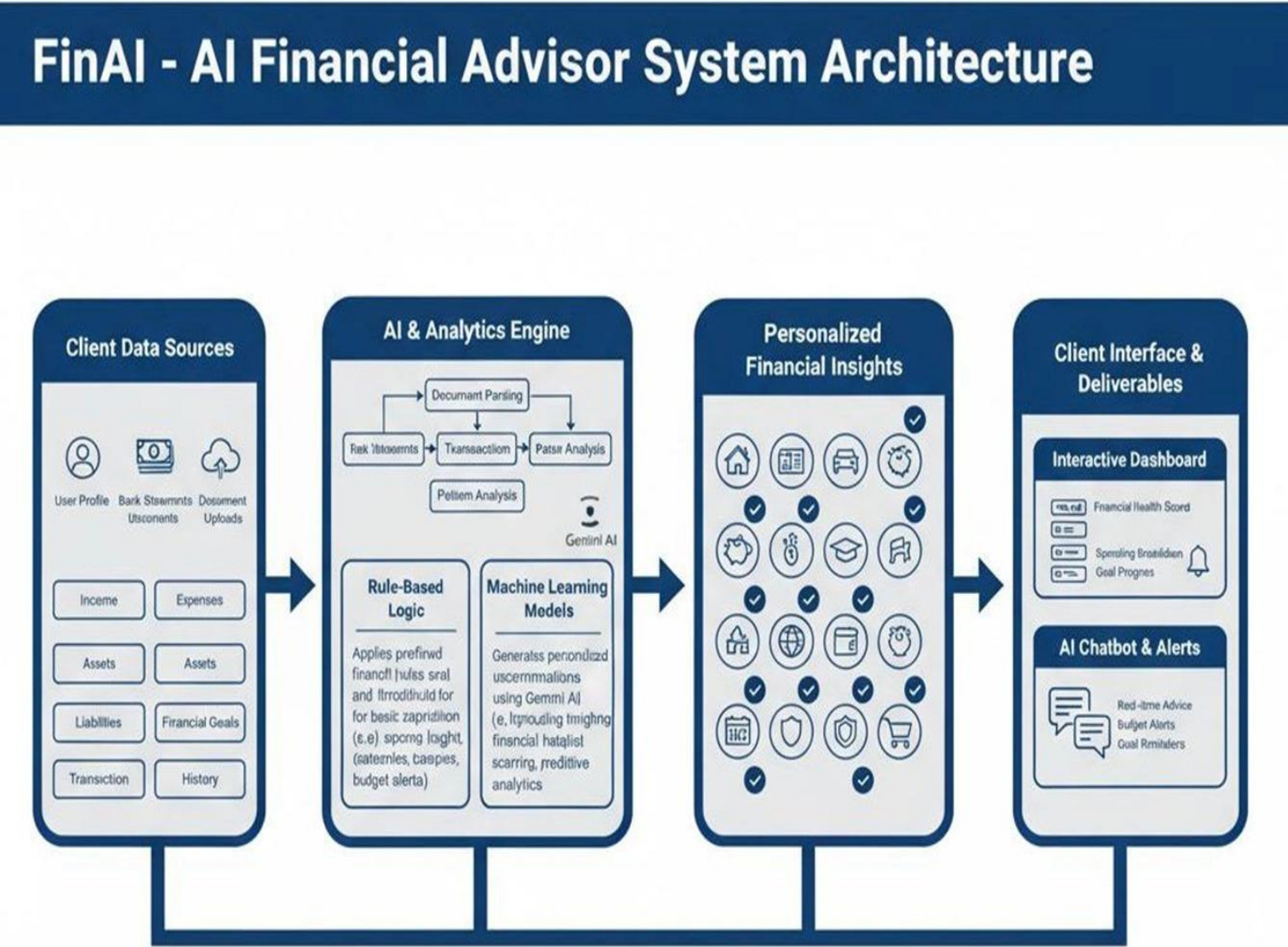
The arrows represent the data flows (pieces of information) exchanged:

- Data Capture: The system captures financial data from the User (Expense Data, Budget Setup, Goal Definition) and from the Bank (Transaction History).
- Data Persistence: The system writes data to its databases: Save User Data, Transaction Records, and Goal Info Requires.
- Data Retrieval: The system retrieves data from its databases: User Lookup, Budget Info Request, and Record History Request.
- Output/Feedback: The system provides outputs to external entities: Financial Reports to the User, Notifications to the Bank (or perhaps sent *to* the user, *via* the bank's services), Audit Logs and System Metrics to the Admin, and a Report Request to the Payment Gateway.

In summary, the Level 0 DFD provides a high-level overview of the FinWise application, showing its connections for user input, reporting, integration with external financial services (Bank), administrative oversight (Admin), and its internal data storage architecture.

5.3 System architecture:

The FinAI architecture is a robust pipeline that starts with diverse Client Data Sources, feeds them into a powerful AI & Analytics Engine that combines rule-based and machine learning models, generates comprehensive Personalized Financial Insights, and finally delivers them through an Interactive Dashboard and a conversational AI Chatbot & Alerts system.



5.3 System architecture

The architecture is divided into four main stages that represent the end-to-end process of the AI financial advisor.

1. Client Data Sources (Input)

This is the initial stage where raw financial data is collected from the user.

- **Data Channels:**

- User Profile: Basic information and user preferences.
- Bank Statements & Documents: Financial records uploaded directly.
- Document Uploads: General financial papers and records.
- Transactions/History: Detailed transactional data.

- **Data Categories:**

The source data is categorized into:

- Income
- Expenses
- Assets
- Liabilities
- Financial Goals

2. AI & Analytics Engine (Processing Core)

This is the core engine where the raw data is processed, analyzed, and transformed into insights using AI and analytics.

- **Initial Processing:**

- Document Parsing: Extracts text and data from uploaded documents.
- Risk Assessment: Evaluates the user's financial risk profile.
- Transaction/Pattern Analysis: Identifies trends and anomalies in spending and income.

- **Core Logic:**

- Rule-Based Logic:
 - Function: Applies predefined financial rules and thresholds for basic calculations (e.g., spending limits, taxes, budget alerts).
- Machine Learning Models (using Gemini AI):

- Function: Generates personalized recommendations using advanced AI. This includes financial health scoring, predictive analytics, and identifying investment or saving opportunities.

3. Personalized Financial Insights (Output Generation)

This stage represents the various high-level, analyzed insights generated by the AI engine. The numerous icons suggest a broad range of topics covered by the advice.

- **Categories of Insights (Implied):**

The icons likely represent categories such as:

- Budgeting and Savings
- Investment Management
- Debt Management/Repayment Strategies
- Retirement Planning
- Tax Optimization
- Insurance/Protection
- Real Estate/Property Analysis
- Financial Health Scoring

4. Client Interface & Deliverables (User Interaction)

This final stage is how the analyzed insights are presented and delivered to the user.

- **Interactive Dashboard:**

- Function: Provides a visual interface for the user to monitor their finances.
- Metrics Displayed:
 - Financial Health Score
 - Spending Breakdown
 - Goal Progress

- **AI Chatbot & Alerts:**

- Function: Offers a conversational interface and proactive communication.
- Deliverables:
 - Real-time Advice
 - Budget Alerts

5.4 Implementation:

The implementation of the FinWise/FinAI – AI Financial Advisor System is defined by a multi-layered architecture that successfully integrates data ingestion, complex artificial intelligence, and user-friendly interaction. The system's functional scope, derived from the Use Case Diagram (UCD), is realized through modules that allow users to Connect API Data and Upload Financial Data, which feed directly into the core processing engine. The system's logical framework, mapped out by the Level 0 Data Flow Diagram (DFD), confirms the secure and efficient management of financial information across dedicated Data Stores (User, Budget, and Goals Databases) and its interaction with external entities like the Bank and the Payment Gateway. The core of the implementation is the AI & Analytics Engine, which employs a powerful hybrid approach—combining foundational Rule-Based Logic for compliance and basic alerts with sophisticated Machine Learning Models for generating personalized, predictive financial insights. The effectiveness of this entire pipeline is ultimately demonstrated through the final delivery layer: the Client Interface and Deliverables, specifically the Interactive Dashboard, which serves as the visual confirmation of the processed data and fulfilled functional requirements.

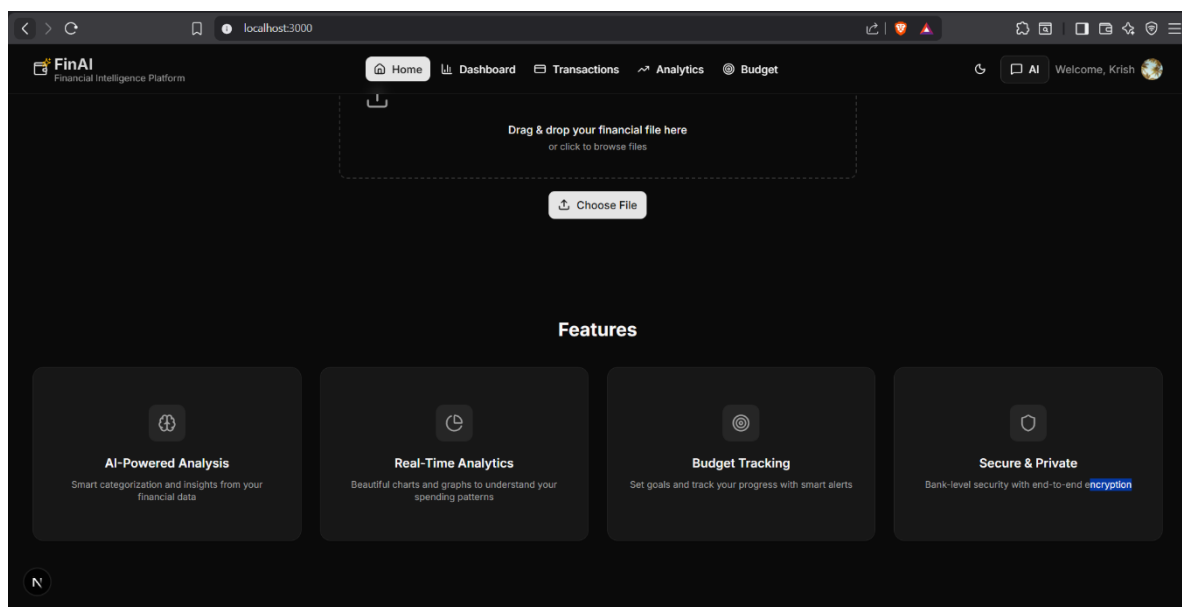


Figure 5.4.1 Dashboard

The FinWise interface provides a sleek and user-friendly dashboard designed for efficient financial management. The homepage allows users to easily upload their financial files through a drag-and-drop or file selection feature, which forms the foundation for AI-powered analysis. Once uploaded, FinWise automatically categorizes and interprets financial data, offering real-time analytics through interactive charts and graphs to help users understand their spending patterns. The platform also includes budget tracking tools that enable users to set financial goals and monitor progress effectively. To ensure data safety, FinWise employs bank-level security with end-to-end encryption, maintaining complete privacy and trust for its users. The overall interface emphasizes simplicity, security, and intelligent automation to enhance the personal finance experience.

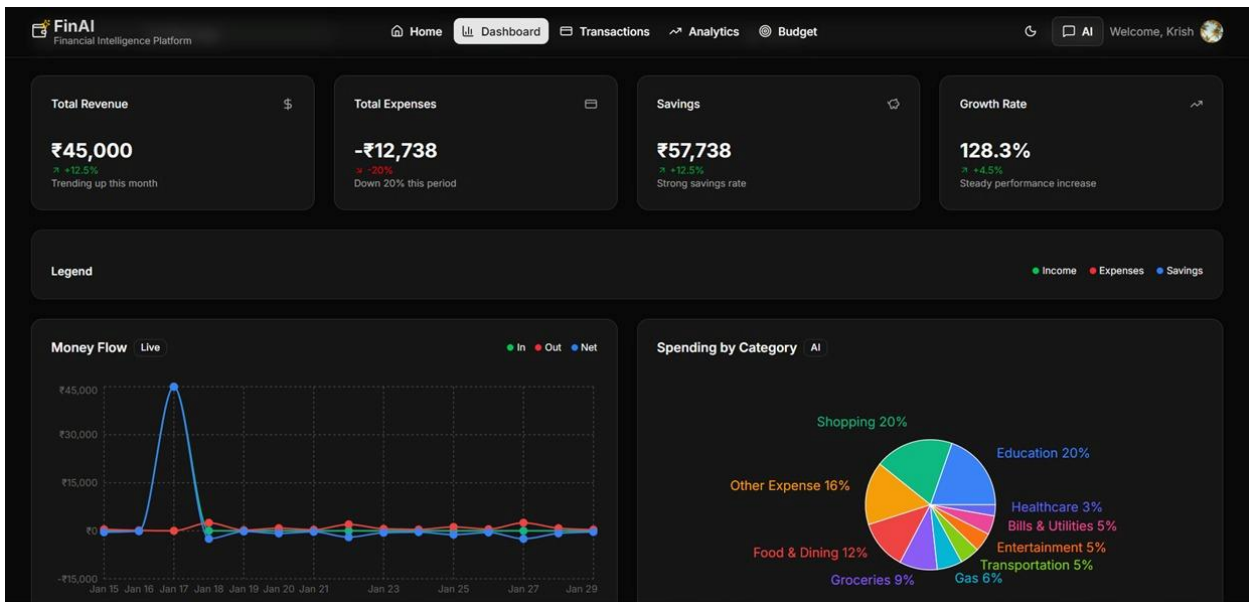


Figure 5.4.2 Dashboard

The dashboard image represents the core of the FinAI system's user interface, effectively translating complex data into actionable financial intelligence. The entire layout uses a modern, dark-themed aesthetic, ensuring high contrast for data readability and immediate visual engagement.

The upper section is dedicated to Key Performance Indicators (KPIs), providing a high-level, real-time snapshot of the user's financial health. These four large cards highlight the critical financial variables:

1. Total Revenue: ₹45,000, marked with a green trend indicator showing it's *trending up 12.5% this month*.
2. Total Expenses: -₹12,738, marked in red to signify a negative flow, though the trend shows it's *down 20% this period* (meaning expenses are falling, which is a positive sign).
3. Savings: ₹57,738, accompanied by a strong performance message: *strong savings rate*.
4. Growth Rate: A substantial 128.3%, with a note on *steady performance increase*.

Below the KPIs, the dashboard features two integrated, dynamic charts, separated by a brief Legend that defines the colors for Income, Expenses, and Savings.

On the left, the Money Flow Live chart is a line graph crucial for trend analysis. It tracks Income (green), Expenses (red), and Net (blue) flows across the second half of January. The chart is particularly effective at pinpointing volatility, clearly showing a dramatic spike and subsequent correction in net money flow around January 17th. This tool enables users to identify specific financial events that significantly impacted their liquidity.

On the right, the Spending by Category (AI) pie chart is a testament to the system's core AI functionality. This visualization automatically breaks down total expenditures into distinct, manageable categories, eliminating the need for manual tracking. The largest segments are Shopping (20%) and Education (20%), followed by Food & Dining (12%), Groceries (9%), Gas (6%), and smaller categories like Healthcare (3%) and Bills & Utilities (5%). By presenting this granular data visually, the system fulfills the requirement to

provide a detailed financial summary, giving the user immediate, data-backed insights necessary for effective budget adjustments and personalized advice generation.

Finally, the top navigation bar confirms the platform’s scope, with access points for the Dashboard, Transactions, Analytics, and Budget, and a personalized welcome message: "Welcome, Krish," confirming the system is tailored to the individual user.

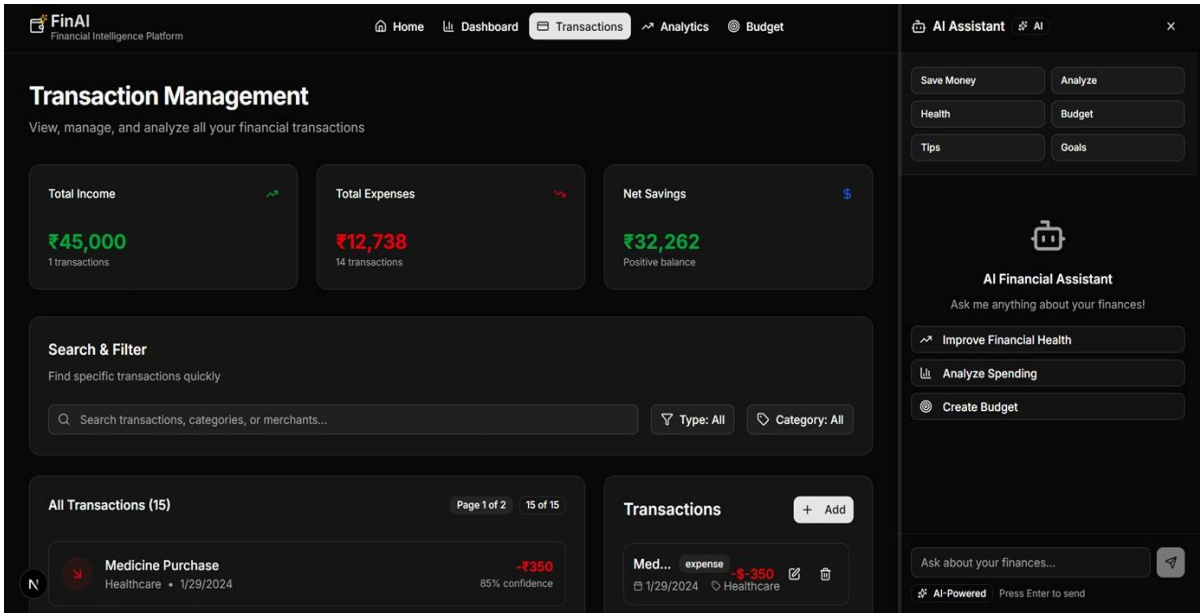


Figure 5.4.3 Transactions

the implementation extends into a dedicated view, likely the Transactions or Analytics page, which focuses on granular data management and deeper analysis. This secondary view is implemented as a structured data grid that lists individual transaction records, designed to fulfill essential tasks like efficient filtering, searching, and sorting of financial activities. The interface features a prominent search bar and advanced filter options—allowing the user to refine transactions by type (Income, Expense), category (e.g., Food & Dining, Shopping), and date range. This implementation directly supports the core function of an AI assistant to manage overwhelming transaction history by providing clarity and organization. Each transaction row presents essential details like the title, date, amount, and category, often utilizing color-coded payment methods or category tags to improve visual hierarchy and allow the user to identify transaction types at a glance.analysis, confirms the robust nature of this module, ensuring users maintain comprehensive control transparency

Chapter 6

Technical specification

The technical specifications of the FinWise/FinAI – AI Financial Advisor System provide the foundational blueprint for its architecture, security, and operation. This section details the specific technologies and methodologies chosen to implement the complex data processing, AI analysis, and user interaction layers necessary to deliver intelligent financial advisory services.

• System Architecture and Core Technologies

The system is built upon a Four-Stage Pipeline Architecture, which dictates the flow from data acquisition to insight delivery.

1. **Client Data Sources:** Data is ingested via APIs for financial info (to connect Transaction History from the Bank) and manual CSV uploads or document uploads (for 'Upload Financial Data' use case).
2. **AI & Analytics Engine:** This core stage handles Document Parsing, Risk Assessments, and Pattern Analysis. The logic employs a hybrid system: Rule-Based Logic for fundamental compliance and alerts, and Machine Learning Models (using Gemini AI) for generating personalized recommendations and predictive analytics. Data handling and analysis is primarily powered by Pandas.
3. **Personalized Financial Insights:** This stage produces the high-level advice, driven by the algorithms and the Summary: Natural Language Processing (NLP) feature.
4. **Client Interface & Deliverables:** The final output is delivered through the Interactive Dashboard and the AI Chatbot & Alerts.

• Frontend Development

1. Frontend Development: Node.js
2. Visualization: D3.js

Technologies: The frontend relies on Node.js as its runtime environment, providing a robust framework for application development. The sophisticated charts and graphs displayed on the Dashboard (such as the Money Flow Live and Spending by Category) are powered by D3.js for high-performance, custom data visualization. This combination ensures the user interface is intuitive, responsive, and capable of handling the real-time data streaming necessary for a financial platform.

• Backend Development and Data Management

1. Backend Database: Supabase
2. Data Modeling: Level 0 DFD

Framework & Database: Supabase is utilized as the backend development platform. This choice provides a scalable, PostgreSQL-based relational database solution for persistence, which manages all structured data including User Database, Budget Database, and Goals Database. Supabase's integrated features provide the necessary tools for authentication, API handling, and scalable data storage required for the FinWise System to process core data flows such as Record History Request and Transaction History Request.

Chapter 7

Project Scheduling

Project scheduling is crucial to ensure systematic development and timely completion. The Student Hub project followed a structured approach, dividing tasks among team members and setting clear milestones.

Sr. No.	Group Members	Duration	Task Performed
1.	Krish, Momin	2 nd week of July	Project Finalization & Architecture Design. Identifying the scope, defining the Use Cases, and finalizing the FinAI System Architecture.
2.	Ishan	1 st week of august	Backend Setup & Data Modeling. Setting up the Supabase backend platform and structuring the Level 0 DFD to define data flows for the User, Budget, and Goals Databases.
3.	Piyush, Krish	3 rd week of august	Frontend Design (GUI). Designing the user interface, including the Interactive Dashboard layout, KPIs, and navigation for Transactions and Analytics.
4.	Krish, Ishan	1 st week of September	Core AI Engine Development. Implementing the Rule-Based Logic and training initial Machine Learning Models for Transaction and Pattern Analysis.
5.	Momin. Ishan	2 nd week of September	Data Integration & Functionality. Implementing APIs for financial info and CSV uploads to connect the system to the Bank and handling the 'Connect API Data' use case.
6.	Momin, Krish, Piyush	3 rd week of September	Visualization and Delivery. Integrating D3.js to visualize data as Money Flow and Spending by

Sr. No.	Group Members	Duration	Task Performed
			Category charts, and implementing the AI Chatbot & Alerts feature.
7.	Ishan, Piyush	1 st week of October	Testing and Final Deployment. System-wide testing of data flow integrity, dashboard accuracy, and compliance with the Budget Setup & Goal Definition requests.

Table 7.1 :Timeline Chart

The Gantt chart provides a structured timeline for the FinWise project, outlining key phases, tasks, and deadlines. It visually represents the project's progress, dependencies, and team responsibilities. The chart is divided into two main phases: Project Conception and Initiation and Project Design and Implementation. The first phase focuses on topic selection, defining objectives, and creating an initial prototype, spanning the first four weeks. The second phase involves designing the database, developing the UI, integrating various modules, and finalizing the project. Different colors indicate task progress, with blue representing completed tasks, green for ongoing tasks, red and yellow for critical dependencies, and brown/gold for final stages like testing and presentation. The timeline extends beyond 12 weeks, emphasizing continuous refinement and final documentation. This structured scheduling ensures a systematic workflow, allowing efficient task management and timely project completion.

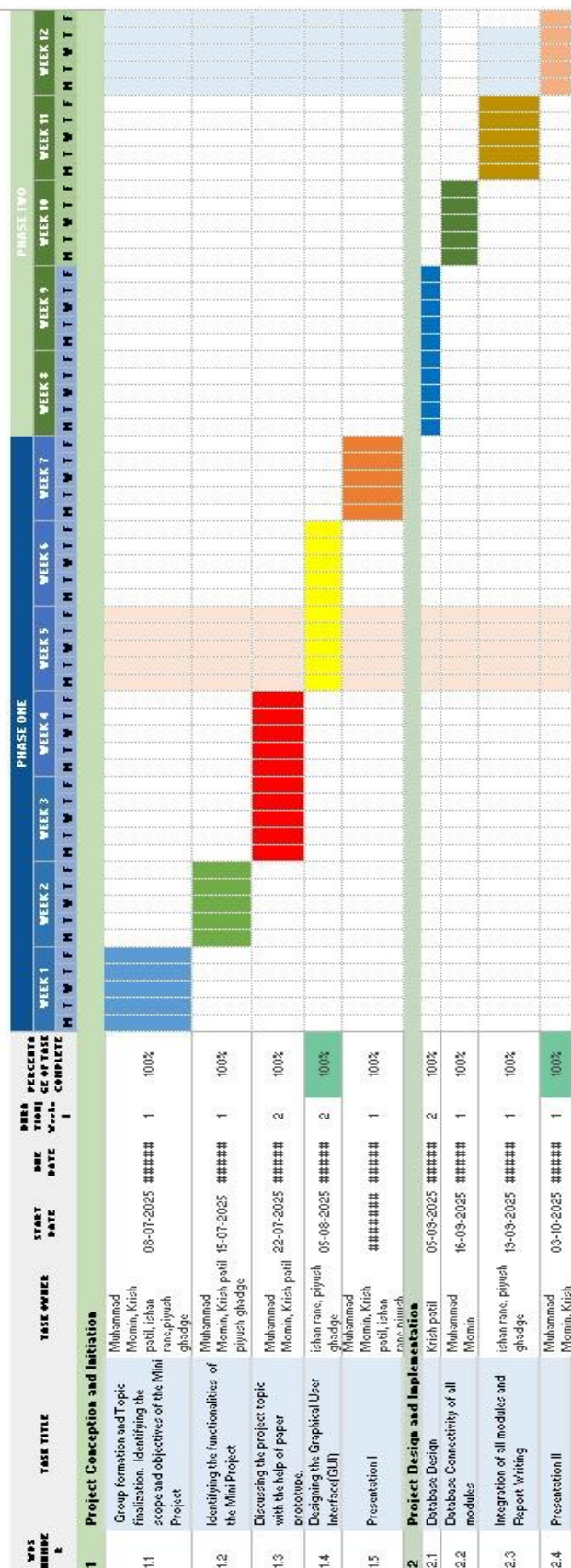


Figure 7.1-Gant Chart of FInwise

Chapter 8

Results

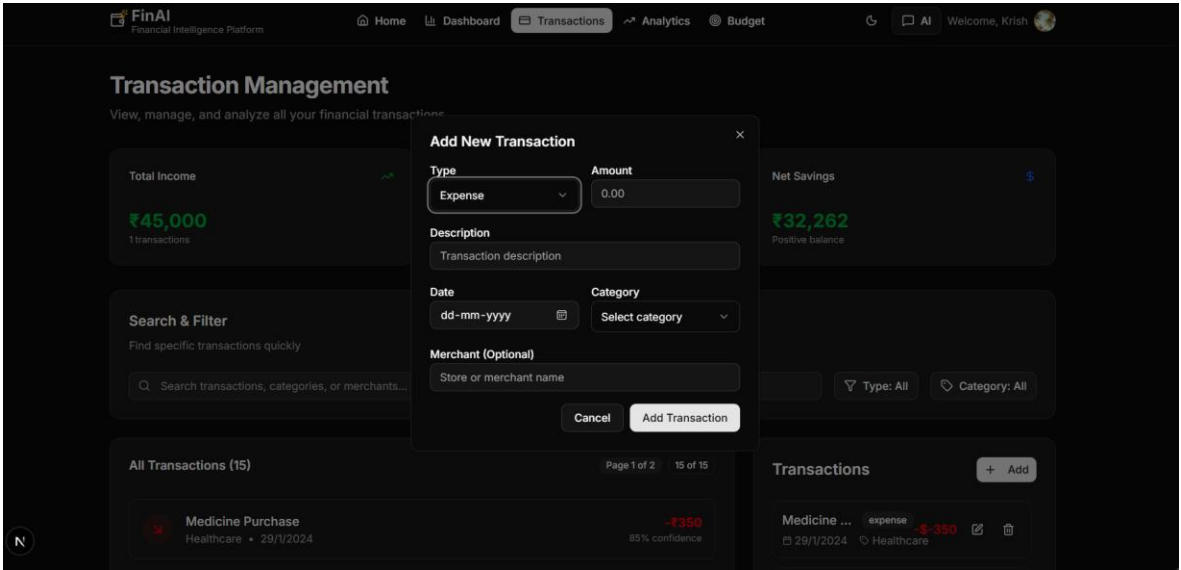


Fig 8.1. Adding new transactions

The Transactions section (Fig. 8.1) provides a detailed overview of all financial activities performed by the user. Each record includes essential details such as the transaction date, description, category, and amount, allowing users to track their income and expenses effectively. This feature enables users to analyze their spending patterns and maintain accurate financial records for better money management.

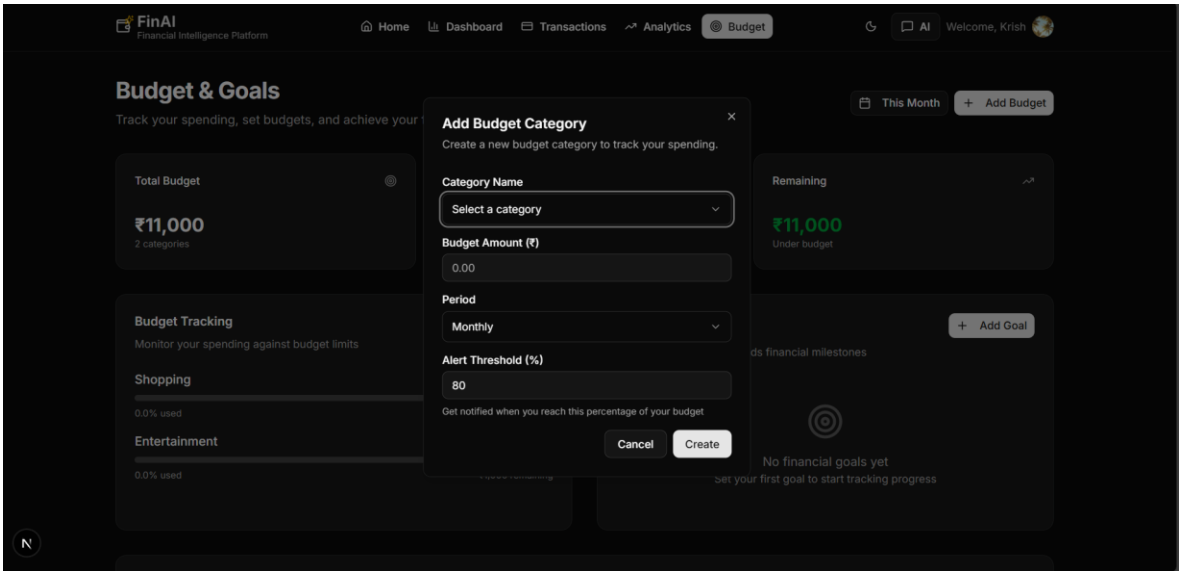


Fig 8.2. Budget Page

The Budget section (Fig. 8.2) allows users to set monthly or custom budgets across different categories such as food, travel, and utilities. It visually displays spending progress and remaining balance, helping users stay within their financial limits. By comparing actual spending with budget goals, users can make informed decisions, improve savings habits, and achieve better financial control.

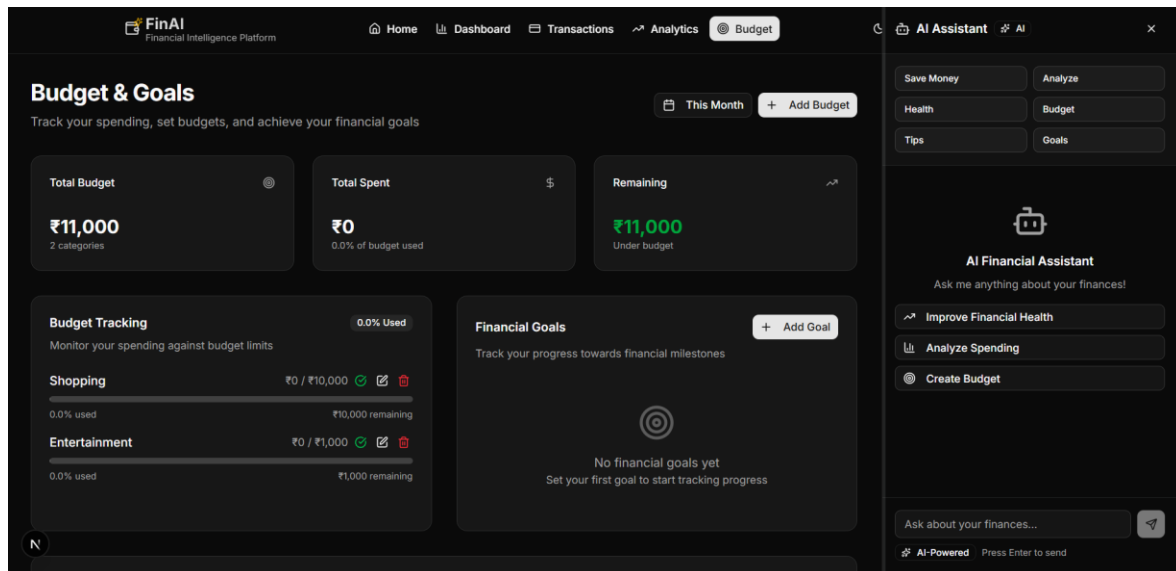


Fig 8.3. AI Chat

The AI Chatbot feature (Fig. 8.3) serves as an intelligent financial assistant that helps users manage their personal finances more effectively. It can analyze spending habits, suggest budgeting strategies, and provide actionable tips for improving financial health. The chatbot also allows users to set and track goals, create budgets, and receive real-time insights through interactive conversation. By integrating AI into financial management, this feature enhances user experience and offers personalized financial guidance, making FinWise a more efficient and user-friendly platform.

Chapter 9

Conclusion

FinWise is designed to simplify personal financial management by providing an intelligent, user-friendly platform that integrates data extraction, analysis, and personalized insights. Through features such as document upload, automated data parsing, financial assessment, and AI-driven recommendations, the system empowers users to make informed decisions about their income, expenses, assets, and liabilities. Additionally, the intelligent Q&A interface enhances accessibility, allowing users to interact with financial data in a meaningful way. Overall, FinWise demonstrates how technology can streamline financial planning, improve decision-making, and promote financial literacy, making it a valuable tool for individuals seeking better control over their financial well-being.

Chapter 10

Future scope

The current implementation of FinWise/FinAI provides a robust foundation for intelligent financial advisory. Future development will focus on expanding advisory capabilities, enhancing user autonomy, and integrating advanced technologies to maintain market competitiveness and scalability.

- **Expansion of Predictive and Prescriptive Analytics:** The core AI & Analytics Engine will be advanced to incorporate more sophisticated predictive modeling, moving beyond basic forecasting to offer prescriptive recommendations—telling the user *exactly what actions to take* (e.g., "Transfer ₹5,000 to Savings Goal X by Tuesday") based on real-time data and goal progress.
- **Integration of Investment and Tax Advisory Modules:** Dedicated modules will be implemented to address complex financial domains, extending the current insights to include robo-advisory for investment portfolio management and automated tax estimation and optimization.
- **Two-Way Bank Transaction Automation:** The current one-way 'Connect API Data' capability will be enhanced to allow two-way API integration, enabling the system to execute approved transactions autonomously, such as automatically paying bills or transferring funds to a savings goal once a budget threshold is cleared, adhering to Goal Definition workflows.
- **Enhanced Generative AI Chatbot Capabilities:** The AI Chatbot & Alerts feature will be upgraded to use the full capacity of the Gemini AI integration, enabling it to answer complex, multi-layered "what-if" scenarios (e.g., "What if I invest 10% more each month?") and provide real-time contextual financial education.
- **Mobile Application Development:** A dedicated native mobile application will be developed using React Native (complementing the Node.js frontend environment) to ensure users can View Financial Summary & Charts and Receive Notifications/Alerts on the go, improving accessibility and engagement.

References

- [1] Leo, Martin; Sharma, Suneel; Maddulety, K. “Machine Learning in Banking Risk Management: A Literature Review.” *Risks*, 2019, 7(1), 29. <https://www.mdpi.com/2227-9091/7/1/29>
- [2] Alsabah, Humoud; Capponi, Agostino; Ruiz Lacedelli, Octavio; Stern, Matt. “Robo-advising: Learning Investors’ Risk Preferences via Portfolio Choices [Mean-variance versus Full-scale Optimisation: In and out of Sample].” *Journal of Financial Econometrics*, 2021, Vol. 19, No. 2, 369-392.
<https://doi.org/10.1093/jjfinec/nbz040>
- [3] Deku, S. Y.; Kara, A.; Semeyutin, A. “Artificial intelligence in Finance: a comprehensive review through bibliometric and content analysis.” *SN Business & Economics*, 2024, 4:23. Published 20 January 2024.
<https://link.springer.com/article/10.1007/s43546-023-00618-x>
- [4] Chen, Y., Zhang, L., & Wong, K. (2022). AI-driven personal finance recommendation systems: Enhancing user engagement through behavioral analytics. *Expert Systems with Applications*, 205, 117695. <https://doi.org/10.1016/j.eswa.2022.117695>
- [5] Ghosh, S., & Raj, R. (2020). Artificial Intelligence in Personal Financial Management: Opportunities and Challenges. *International Journal of Scientific & Technology Research*, 9(4), 188–195. <https://www.ijstr.org/paper-references.php?ref=IJSTR0420-38414>
- [6] Kumar, N., & Garg, A. (2021). Machine Learning Approaches for Financial Forecasting and Portfolio Optimization: A Review. *Journal of Risk and Financial Management*, 14(3), 105. <https://doi.org/10.3390/jrfm14030105>