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MONEYMAP - AI PERSONAL FINANCE TRACKER

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Abstract: MONEYMAP – AI Personal Finance Tracker is a modern, AI-driven personal finance management application designed to simplify the way users track, analyze, and optimize financial activities. The system enables users to manage multiple financial accounts such as Savings, Checking, Credit Cards, and Cash through a high-performance and responsive interface developed using Next.js 15, Tailwind CSS, and ShadCN UI. A key feature of the platform is the integration of Generative AI (Google Gemini), which enhances user interaction and financial insights. The application supports Natural Language Processing (NLP) transaction logging, allowing users to record income or expenses using natural language or voice commands, which are automatically interpreted and categorized by AI. It also includes an AI Financial Co-Pilot that evaluates users' spending habits using budgeting principles such as the 50/30/20 rule, provides personalized spending suggestions, and assists with goal-based financial planning through a Life Event Planner. Additionally, a conversational chatbot enables users to query their financial history in plain English to analyze spending patterns or specific transactions. The system further provides automated analytics and real-time data visualization using Recharts, offering category-wise spending analysis and income-versus-expense comparisons. The backend infrastructure utilizes Firebase Authentication for secure user access and Firestore for real-time data storage and synchronization, ensuring that financial data remains private, secure, and always up-to-date. Overall, MoneyMap transforms traditional manual financial tracking into an intelligent, automated, and insight-driven financial management experience.

Keywords: Artificial Intelligence (AI), Personal Finance Management, Natural Language Processing (NLP), Generative AI (Google Gemini), Financial Data Visualization, Firebase Authentication.

I. INTRODUCTION

In today's fast-paced digital economy, managing personal finances effectively remains a significant challenge for many individuals. Despite the availability of several digital tools, a large percentage of people still struggle to maintain budgets, track daily expenses, and make informed financial decisions. Studies indicate that a considerable portion of young professionals and middle-income individuals face difficulties in monitoring their spending habits, which often leads to financial stress, poor saving patterns, and lack of financial planning. The absence of intelligent tools that simplify financial tracking while providing meaningful insights continues to widen the financial literacy gap. MoneyMap – AI Personal Finance Tracker addresses this problem by providing a modern and intelligent finance management platform that simplifies how individuals manage their financial activities. The system allows users to track income and expenses, manage multiple financial accounts such as savings, checking, credit cards, and cash, and gain valuable insights into their spending behavior. Developed using Next.js, Tailwind CSS, and ShadCN UI, the platform offers a fast, responsive, and user-friendly interface. The integration of Generative AI through Google Gemini enables advanced features such as natural language transaction logging, intelligent categorization of expenses, and personalized financial insights that help users make better financial decisions. The importance of efficient financial management is closely linked to overall wellbeing and long-term financial stability. Financial uncertainty can negatively affect productivity, decision-making, and mental health. Individuals who maintain organized financial records and follow structured budgeting strategies tend to achieve better savings outcomes and financial discipline. MoneyMap introduces innovative features such as an AI Financial Co-Pilot, conversational financial chatbot, real-time analytics dashboards, and personalized spending suggestions. By integrating Firebase authentication and Firestore real-time database, the system ensures secure data management while providing users with up-to-date financial information. Through automation, AI assistance, and intelligent visualization tools, MoneyMap transforms traditional financial tracking into a smart, efficient, and user-friendly experience that supports better financial planning and decision-making.

The Main Objectives of the Project:

1. **To develop an AI-powered personal finance management system** that helps users easily track and manage their income, expenses, and financial accounts.

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2. **To implement Natural Language Processing (NLP) based transaction logging**, allowing users to add financial transactions using simple text or voice commands.
3. **To provide intelligent financial insights and analytics** through AI features such as financial health scoring, spending pattern analysis, and personalized recommendations.
4. **To ensure secure and real-time financial data management** using Firebase Authentication and Firestore for reliable data storage and user privacy protection.

II. LITERATURE SURVEY

A literature survey examines existing research relevant to our project, providing an overview of Al-powered finance tracking applications. It explores methodologies, technologies, and their impact on financial management. Modem applications integrate. Al-driven transaction categorization, receipt scanning, real-time visualization, multi-account management, and secure authentication, Research highlights advancements in financial literacy, automation, and security using Al and cloud-based architectures. The following research papers were reviewed in this study:

1. Title: Personal Finance Tracker [1] Authors: Samar Verma, Samarjeet Singh Khoda, Shivam Kawale Year: 2024 Publisher: IRJMETS Description: The Personal Finance Tracker paper presents Nextjs. Tailwind CSS, and PostgreSQL-based web app for budgeting, expense tracking, and data visualization. However, it has limitations like API dependency, scalability issues, lack of investment tracking, and maintenance needs. In contrast, "MoneyMap" addresses these with Al-powered receipt scanning via Google Generative Al, enhanced security through Clerk Authentication, Arvjet's rate limiting, and Zod validation. It also offers Al-driven financial reports, real-time budget notifications, and a scalable stack with Supabase and Prisma, ensuring a more secure, comprehensive, and user-friendly financial management experience.

2. Title: Smart Expense Tracking System Using Machine Learning [2] Authors: S. Aishwarya and S. Hemalatha Year: 2023 Publisher SCITEPRESS Science and Technology Publications, Lda. Description: The Smart Expense Tracking System Using Machine Learning automates expense tricking by collecting, preprocessing, and training models to periodic expenses, using data visualization for insights. A user study showed high accuracy and improved financial management, but limitations include data quality dependency, unique expense categorization challenges, and manual corrections. In contrast, "MoneyMap" overcomes these with Google Generative Al for receipt scarming, reducing reliance on user input, continuous learning for better categorization, user customization, and Zod-based input validation, ensuring greater accuracy, minimal manual connection, and a seamless financial management experience.

3. Title: Personal Finance Management Application [3] Authors Tihomir Stefanov P. Milena Stefanova P. Silviya Varbanova P. Stanislav Temelkov P Year: 2024 Publisher: TEM Jomal Description: The "Personal Finance Management Application" paper details the development of an Android-based mobile application with features like budgeting, financial reporting, and barcode scanning, addressing the need for localized financial tools, however, it is limited by the lack of cryptocurrency support, exclusive Android availability, a need for statistical validation, and limited analysis of emerging financial technologies. In contrast, "MoneyMap" overcomes these limitations by potentially integrating cryptocurrency APIs, ensuring cross-platform compatibility through Next.js, continuously validating usability with data analytics and user feedback, and adapting to new technologies with as Al-driven approach, which also enables proactive financial advice, thus providing a more comprehensive and future-proof financial management solution.

These studies provide valuable insights into Al-powered financial management applications, emphasizing the importance of automation, secure data handling, and intelligent financial insights. The project, MoneyMap, builds on these findings by integrating Al-driven receipt scanning, antennated budgeting, real-time transaction tracking, and secure authentication to enhance user financial management while maintaining privacy and security.

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III. PROPOSED METHODOLOGY

1. System Architecture:

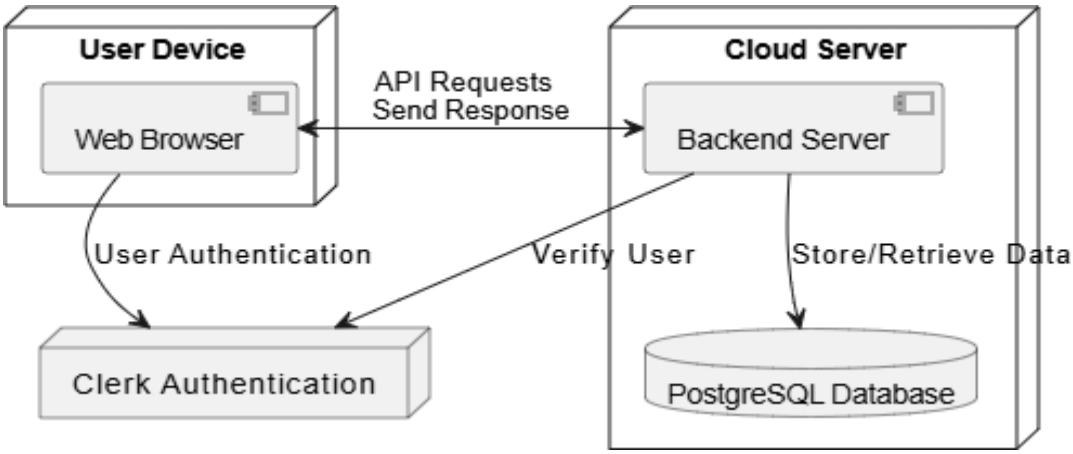

Fig 1. System Architecture

The system architecture of **MoneyMap** is designed as a modern cloud-based web application with a clear separation between the **user interface, application logic, and data storage layers**. The architecture consists of a **user device (web browser)** interacting with a cloud-based backend infrastructure through secure API communication. The system uses **Firebase Authentication** to verify user credentials before granting access to the application. Once authenticated, the backend services process user requests and interact with the **Firestore database** to store and retrieve financial data. This architecture ensures **secure, efficient, and scalable financial management**, allowing users to track transactions, analyze spending patterns, and manage financial accounts with a seamless and responsive experience.

2. Technology Stack:

MoneyMap utilizes a modern technology stack that emphasizes **performance, scalability, and efficient development**. **Next.js** is used as the primary web framework, providing server-side rendering and optimized routing capabilities for faster application performance. **Tailwind CSS and ShadCN UI** are used to design responsive and visually consistent user interfaces. The backend infrastructure is powered by **Firebase**, which provides services such as authentication, cloud database management, and real-time data synchronization. **Firestore** acts as the main database for storing user profiles, financial transactions, accounts, and budgeting data. Additionally, **Google Gemini Generative AI API** is integrated into the system to support intelligent features such as natural language transaction logging and automated financial insights.

3. Key Technological Components:

MoneyMap incorporates several important technological components that support the system's intelligent financial management capabilities. **Next.js** manages both frontend rendering and API route handling, enabling efficient communication between the user interface and backend services. **Tailwind CSS and ShadCN UI** help create a modern and responsive interface that enhances the user experience across multiple devices. **Firebase Authentication** ensures secure user identity verification and session management. **Firestore database** handles the storage and retrieval of financial data with real-time synchronization. The integration of **Google Gemini Generative AI** enables advanced capabilities such as natural language transaction parsing, AI-powered financial insights, and intelligent financial analysis, making the system more interactive and user-friendly.

4. System Workflow:

The system workflow of **MoneyMap** is designed to provide smooth interaction between users and system components. When a user accesses the application through a web browser, the request is first processed through the **Firebase Authentication system** to verify user credentials. After successful authentication, the application dashboard becomes accessible, allowing users to manage financial accounts and transactions. The backend services process user requests and communicate with the

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Firestore database to store or retrieve financial records. For transaction entry, users can manually add details or use **natural language input**, which is processed by the **Google Gemini AI engine** to extract relevant financial information. The system supports operations such as creating, editing, deleting, filtering, and analyzing transactions. Budget monitoring and financial insights are generated automatically, and users can view real-time analytics through interactive dashboards and visual charts. The overall workflow is designed to ensure **secure, intelligent, and efficient financial management with minimal manual effort from users.**

IV. SECURITY IMPLEMENTATION

1. Authentication Mechanisms: Firebase Authentication:

MoneyMap implements a secure authentication system powered by **Firebase Authentication**, providing reliable user identity management and secure access to the platform. The system supports multiple authentication methods such as **email and password login as well as Google account authentication**, allowing users to access the application through trusted login mechanisms. The authentication workflow includes security measures such as **email verification, secure session management, and encrypted credential handling** to prevent unauthorized access. Firebase also manages authentication tokens and session validation, ensuring that only verified users can access their financial data. By utilizing Firebase's secure authentication framework, the application ensures that sensitive financial information remains protected while maintaining a smooth and user-friendly login experience.

2. API Security and Access Control:

To protect the application from unauthorized access and misuse, MoneyMap implements secure **API communication and access control mechanisms**. All interactions between the frontend and backend services are handled through protected API routes that verify the user's authentication status before processing requests. This ensures that only authenticated users can perform operations such as adding transactions, viewing financial insights, or accessing account data. The system also monitors request activity to prevent excessive or suspicious operations that could potentially affect system performance. These security practices help maintain system stability while protecting sensitive financial records from unauthorized access.

3. Input Validation and Data Protection:

MoneyMap applies strict **input validation and data protection mechanisms** to ensure the integrity of user-submitted data. All transaction details, financial inputs, and configuration settings are validated before being processed or stored in the **Firestore database**. This validation ensures that only properly formatted data enters the system, preventing errors and reducing the risk of malicious input. In addition, secure communication protocols and controlled database access policies help protect user information from potential threats such as unauthorized data modification or injection attacks. These security measures ensure that financial data remains accurate, reliable, and securely managed throughout the system.

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V. EXPERIMENTAL RESULTS AND ANALYSIS

1. Screenshots of the Application:

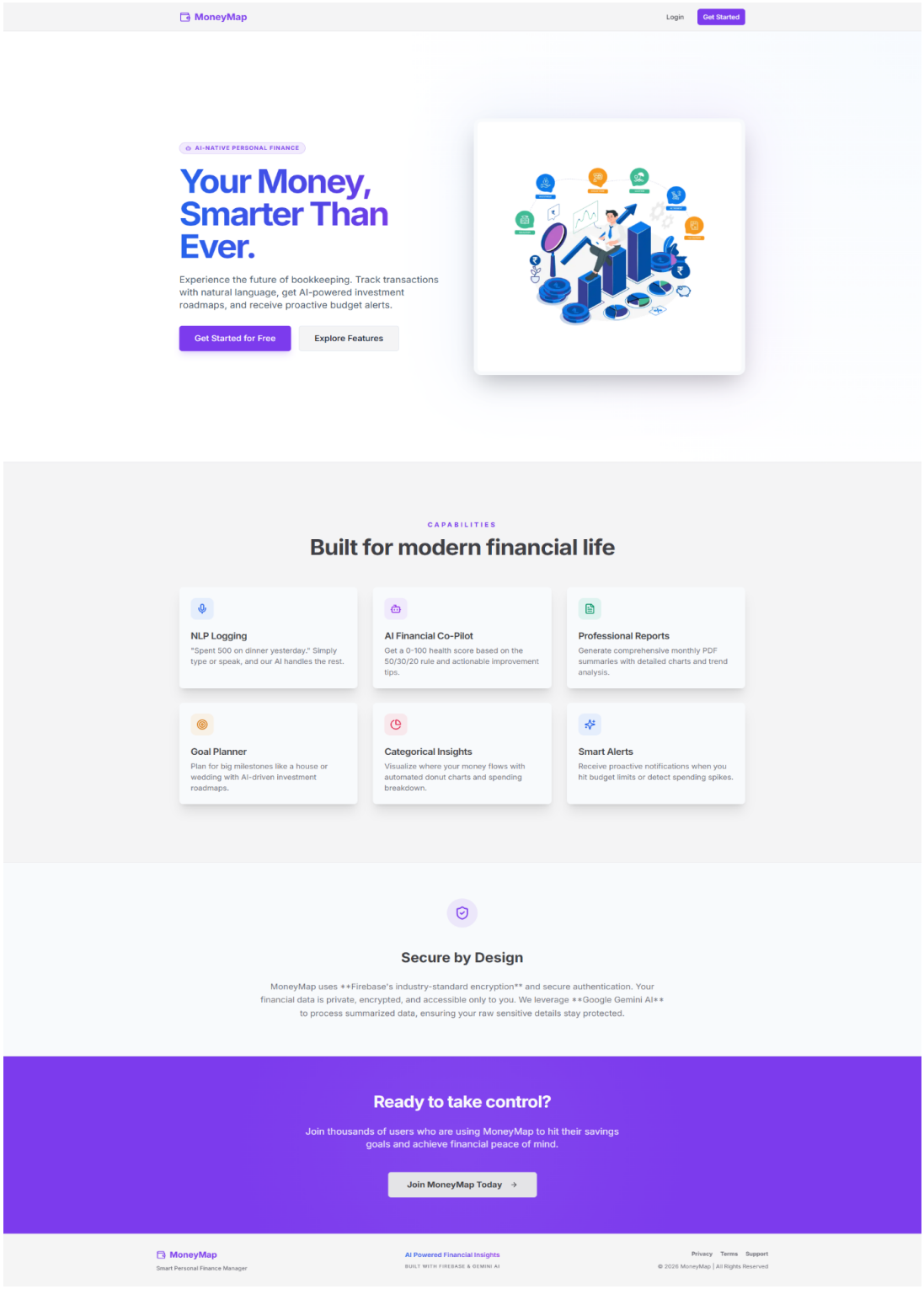

Fig.2. Landing Page

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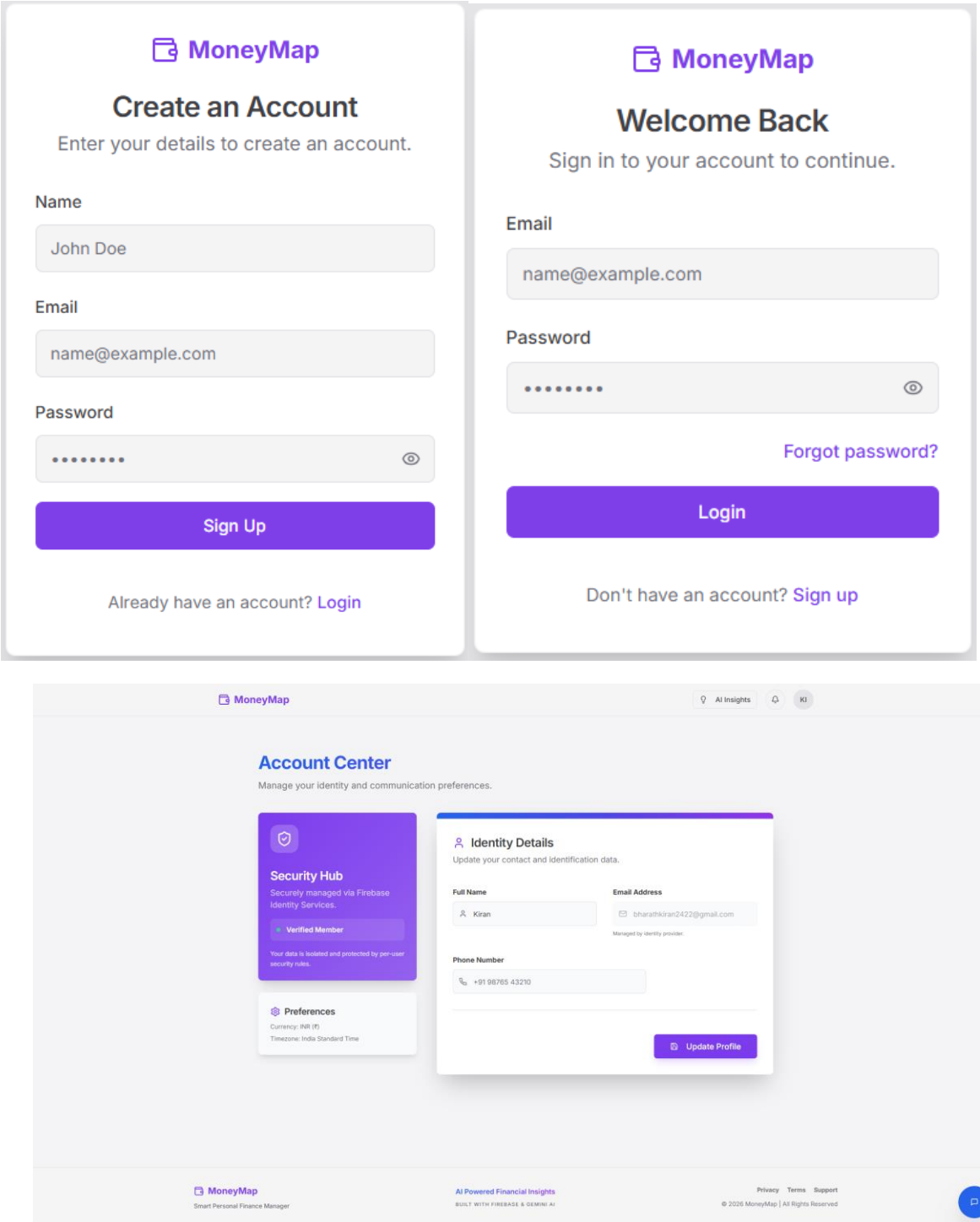

Fig.3 Registration, Login, Profile Pages

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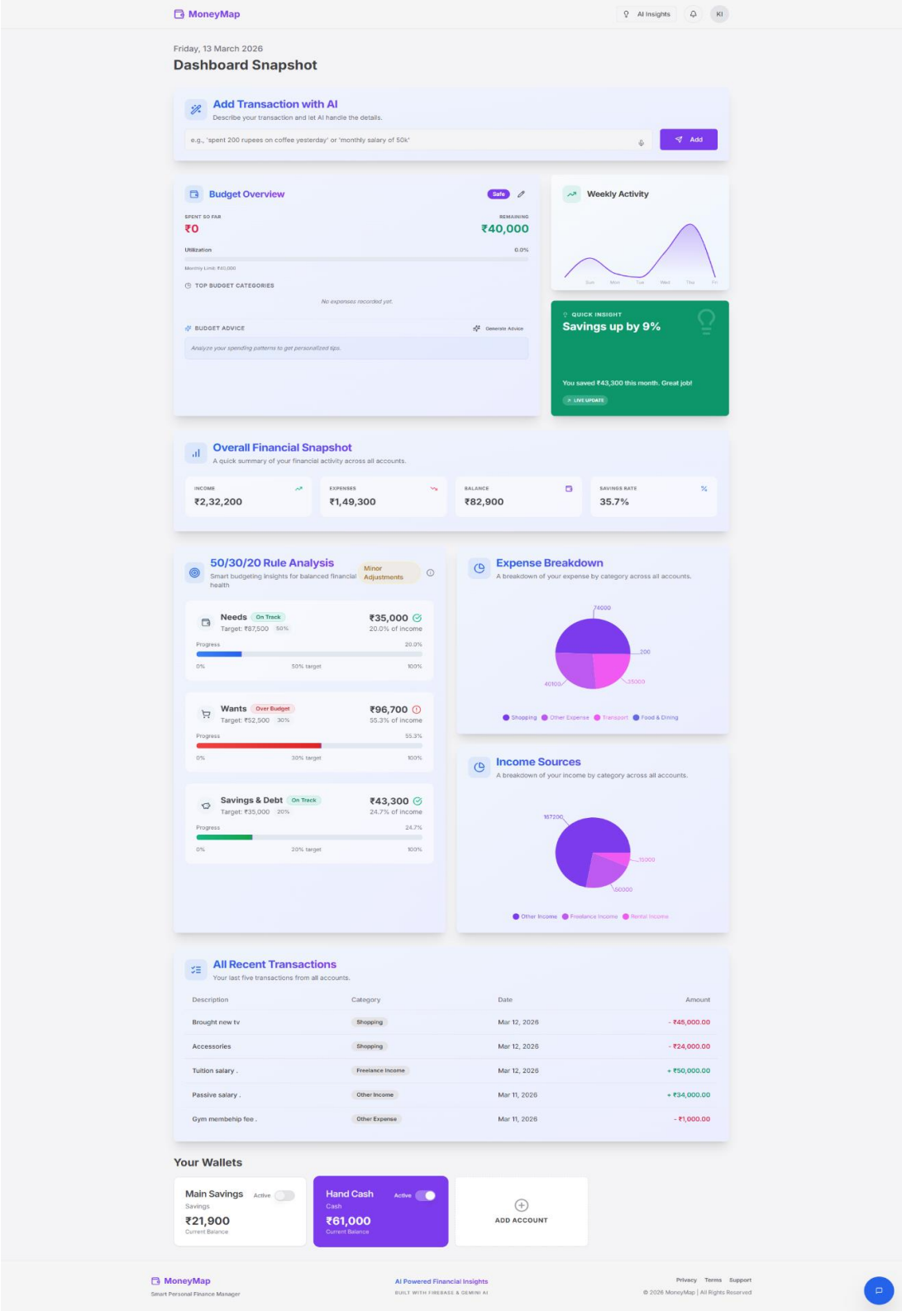

Fig.4.Dashboard Page

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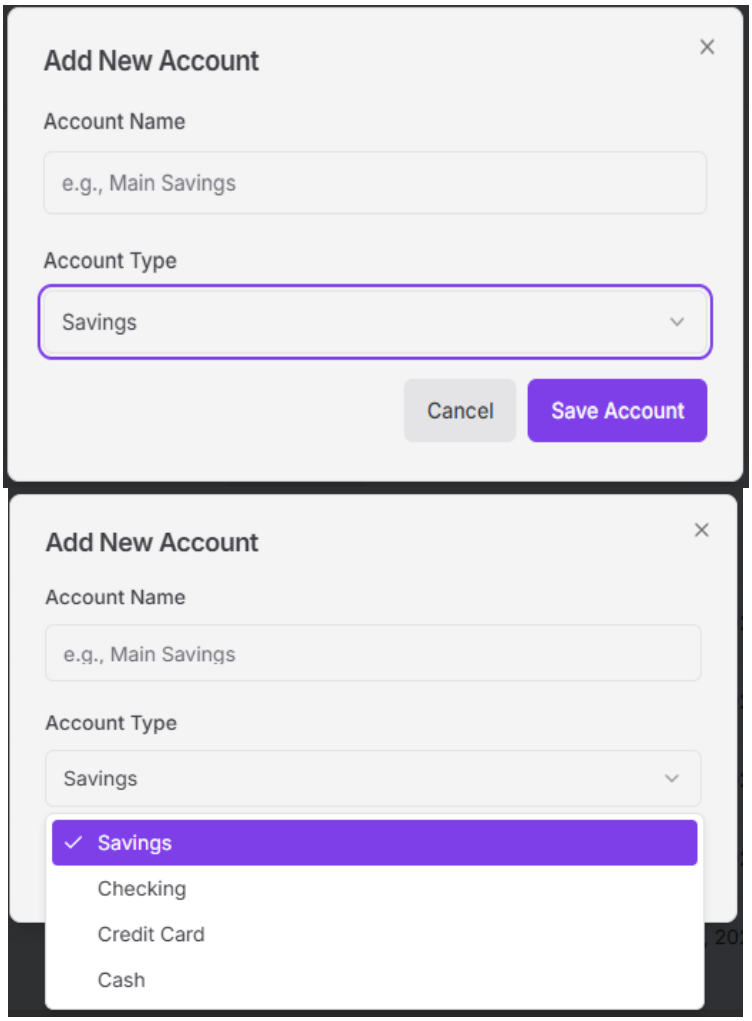

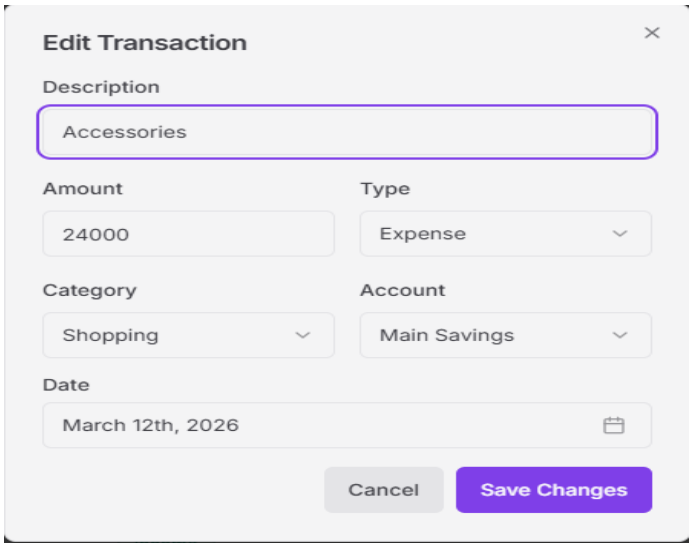

Fig.5. Add New Transaction Account and Edit Transactions

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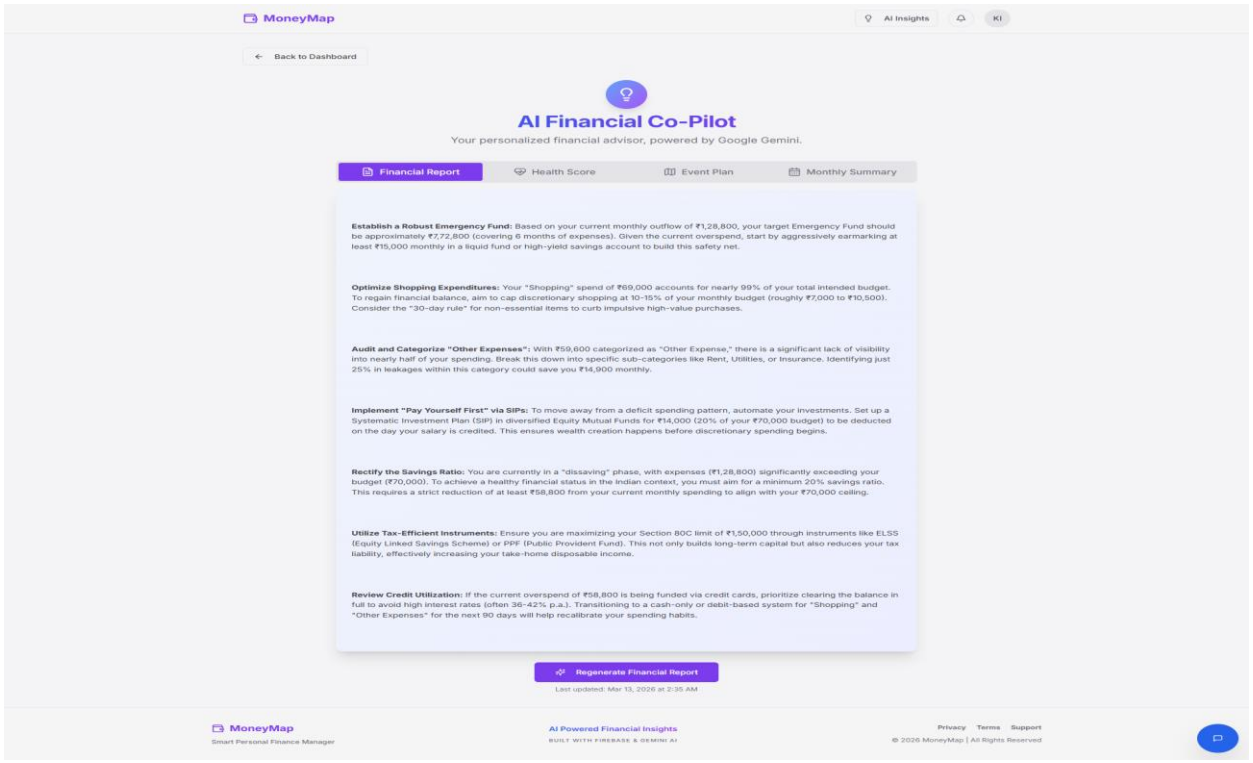

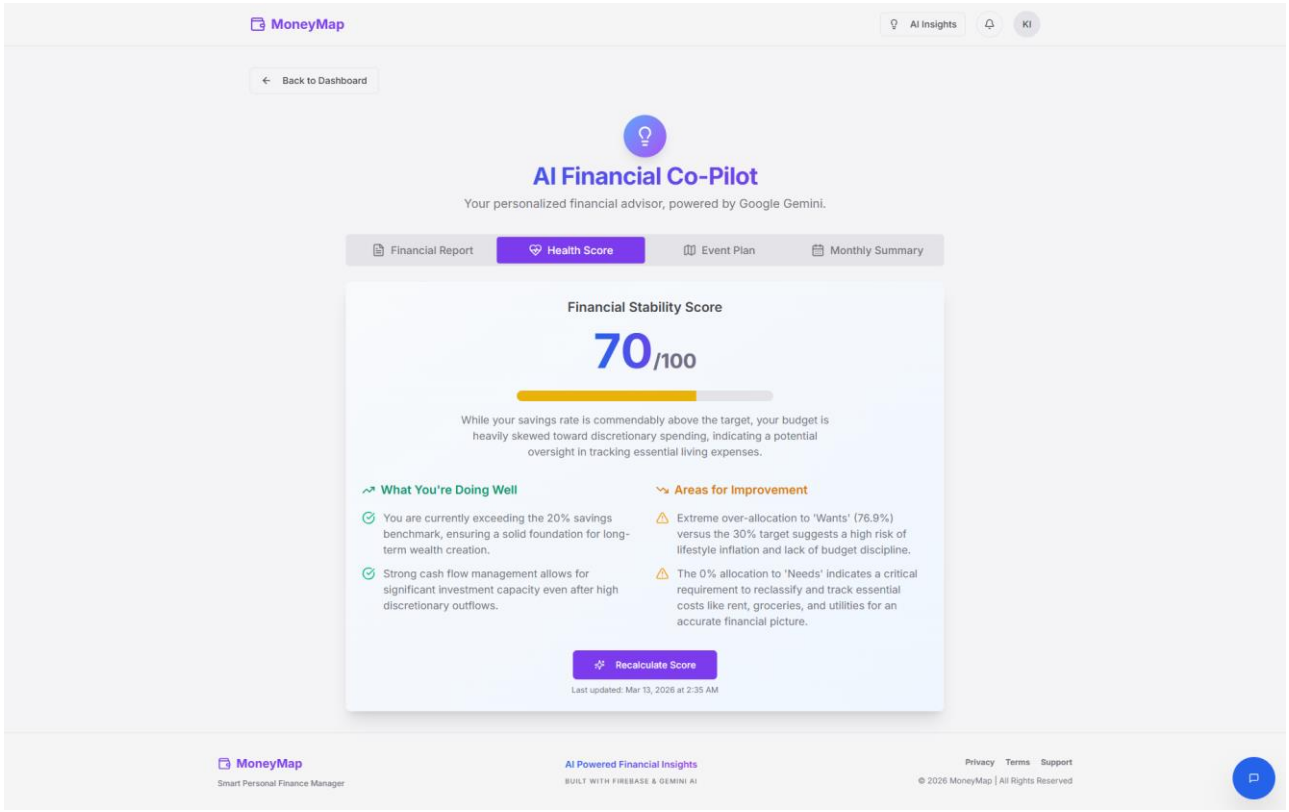

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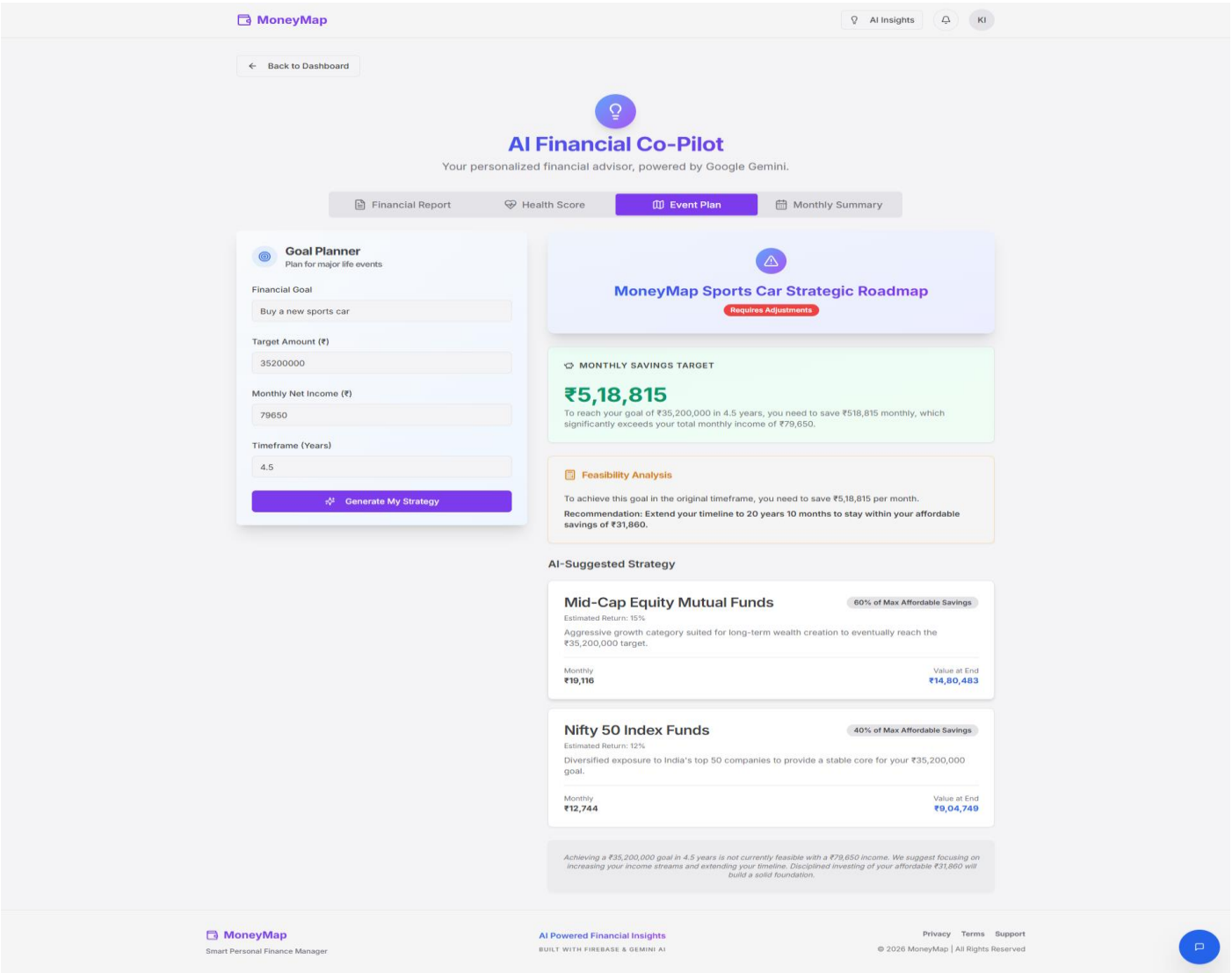

Fig.7. AI Insights(Financial Report, Health Score, Event Plan)

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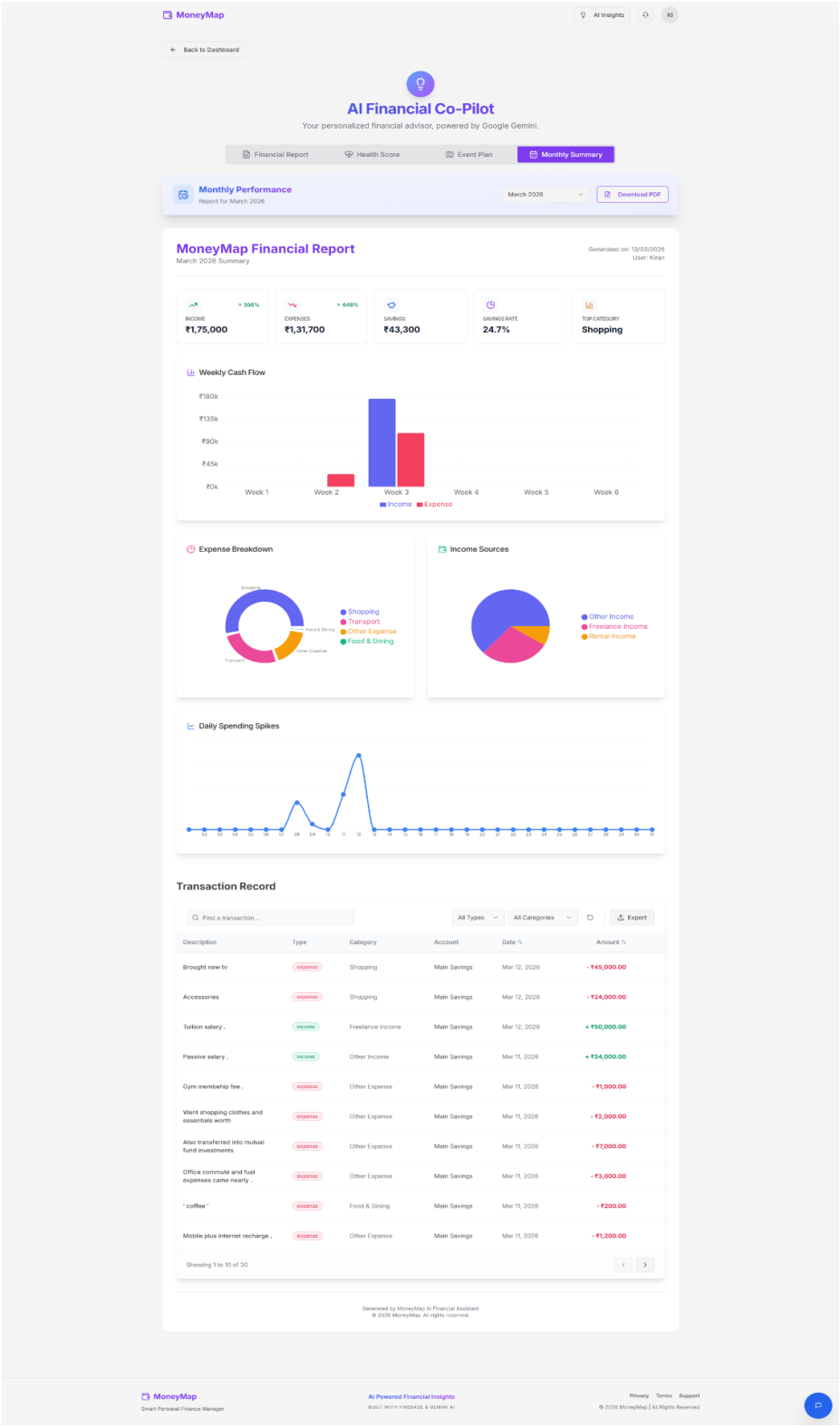

Fig.8.Account page

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2. Comparative Analysis:

Feature	Personal Finance Tracker [1]	Smart Expense Tracking [2]	Personal Finance Management App [3]	MoneyMap
NLP Transaction Logging	No	No	No	Yes (Google Gemini)
AI-Powered Insights	No	Yes (Predictions)	No	Yes (Personalized Insights)
Secure Authentication	Yes	No	No	Yes (Firebase Athentication)
Cross-Platform Support	Web-based	Not specified	Android Only	Yes (Next.js Web App)
Data Quality Dependence	No	Yes (Limiting Factor)	No	Reduced with AI Processing
Emerging Tech Integration	No	No	Limited	Yes (Generative AI, Cloud APIs)

Table.1. Comparison with other works

MoneyMap – AI Personal Finance Tracker stands out from other financial applications through its integration of Google Gemini Generative AI for intelligent transaction logging and financial insights. Unlike systems such as Smart Expense Tracking (ML) and Personal Finance Management App, which focus mainly on basic expense tracking or limited platforms, MoneyMap offers cross-platform accessibility using Next.js and secure user authentication through Firebase. With features like natural language transaction input, AI-driven financial analysis, and real-time dashboards, the system provides a more intelligent and user-friendly approach to personal finance management compared to traditional budgeting applications.

VI. CONCLUSION

MoneyMap – AI Personal Finance Tracker is a modern and intelligent financial management application designed to simplify expense tracking, budgeting, and financial analysis. With advanced features such as **AI-powered transaction logging using Google Gemini, automated budgeting, natural language input, and interactive financial dashboards**, users can efficiently manage their finances in a smarter way. The system ensures secure user access through **Firebase Authentication** and reliable data storage using **Firestore**, protecting sensitive financial information.

The platform also enhances usability by allowing users to record transactions through **natural language or voice commands**, while real-time analytics help users understand spending patterns and financial health. Comprehensive testing confirmed the stability and reliability of the system, ensuring smooth performance across different functionalities. Overall, MoneyMap provides a **smart, secure, and scalable solution for personal finance management**, enabling users to gain better control over their financial activities.

VII. FUTURE SCOPE

The future development of MoneyMap aims to expand its capabilities by integrating advanced AI-driven predictive analytics to forecast spending behavior and provide smarter budgeting recommendations. The platform can be further enhanced by incorporating biometric authentication and advanced security mechanisms to strengthen user data protection. Adding multi-currency support and international transaction tracking would allow the system to serve users from different regions more effectively.

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Additionally, integrating **Open Banking APIs** could enable real-time synchronization with bank accounts, allowing automatic transaction updates and reducing manual data entry. Future versions may also introduce **AI-based financial coaching and conversational chatbots**, helping users receive personalized financial advice. Compatibility with **voice assistants and smart devices** could further improve accessibility and user convenience. With continuous improvements in **AI, automation, and user experience**, MoneyMap has the potential to evolve into a fully intelligent personal financial assistant.

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