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AI-Powered Personal Finance Advisor

Kubra F[1], Wabisa Nahid B[2], Hammad Khan S[3] ,Krushi P[4]

[1]*Student, SG Balekundri Institute of Technology, Belagavi, Karnataka, India*
[2]*Student, SG Balekundri Institute of Technology, Belagavi, Karnataka, India*
[3]*Student, SG Balekundri Institute of Technology, Belagavi, Karnataka, India*
[4]*Student, SG Balekundri Institute of Technology, Belagavi, Karnataka, India*

Abstract –

This research presents a smart web-based finance management application designed to make handling personal money easier and more comfortable for everyday users. The platform helps individuals record daily expenses, organize budgets, and make informed investment choices without unnecessary complexity. By examining income trends, spending behaviour, and personal risk levels through intelligent data analysis techniques such as K-means clustering, the system delivers tailored financial insights and recommendations. It also connects to live market updates, including NIFTY 50 stock information, and displays expenses through a simple, interactive dashboard that is easy to follow. Developed using Python and streamlit the application promotes greater financial awareness and healthier spending habits. By automating financial evaluations, it reduces manual effort, saves time, and improves planning accuracy, providing a practical and user-friendly solution for everyday personal finance management.

1. INTRODUCTION

This study introduces a smart web-based application designed to make personal finance management simple and stress-free for users. The platform helps individuals record daily expenses, organize budgets, and make smarter investment choices without requiring advanced financial knowledge. It examines income trends, spending behaviour, and personal risk levels using data analysis techniques such as K-means clustering to offer customized financial insights. The system also connects to live market updates, including NIFTY 50 stock information, and presents expense details through a clear and interactive dashboard that is easy to follow. Developed using Python and streamlit, the application emphasizes ease of use and efficiency, supporting better financial planning and everyday money management.

The system further helps users stay financially disciplined by sending alerts for budget limits, bill reminders, and financial goals. It regularly reviews financial activity and generates automatic Excel reports that summarize income, expenses, savings, and future suggestions. Designed with simplicity, reliability, and security in mind, the platform enables real-time financial tracking, intelligent analysis, and safe data handling through Flask-based APIs, making it a practical and dependable tool for everyday personal finance management.

1.1 Research Objectives

The main objectives of this research project are:

- To develop a cloud-based application that securely stores user financial details and personal data in an organized and easily retrievable manner.
- To simplify personal money management by allowing users to record income and expenses online through a convenient digital interface.
- To automatically analyze monthly spending patterns and identify users who exceed budget limits or fail to meet savings goals.
- To create a clean, responsive, and easy-to-use interface using modern web technologies that ensures a smooth, comfortable, and effective experience for users.
- To provide timely alerts, notifications, and downloadable Excel reports to keep users informed about their financial status and progress.

1.2 Operational Modes

User-Facing Features

- Simple and user-friendly online input for income and expense details
- Real-time notifications for budget limits and unusual spending
- Monthly summaries showing expenses, savings, and overall financial status
- AI-driven insights to support smarter financial decision-making
- Option to add personal notes for irregular or special expenses

Backend Features

- AI-driven monthly analysis of user financial data
- Secure storage and efficient data processing
- Real-time alerts for budgets and reminders
- Secure cloud deployment for reliable access and data protection.

2 SYSTEM ARCHITECTURE AND METHODOLOGY

The personal finance adviser is built on a modern, cloud-based structure that smoothly connects the system's internal processes with what users experience on the screen. Through a secure web platform, users can easily enter income details, track daily expenses, and receive personalized financial guidance without facing technical complexity.

Behind the scenes, the system handles essential tasks such as validating user inputs, processing financial data, and securely storing information. User details including income, expenses, budgets, and financial goals are safely maintained and updated in real time whenever changes are made. The platform also sends timely alerts to inform users when they are nearing budget limits or missing financial targets.

A smart analytical module continuously reviews financial activity to understand spending patterns, identify overspending, and evaluate savings progress. Based on this analysis, the system generates clear summaries, practical recommendations, and detailed financial reports that can be downloaded in Excel format for easy reference.
The application interface is developed using Python and Streamlit, providing a clean, simple, and user-friendly experience. Users can quickly view financial overviews, progress charts, insights, and reports with minimal effort. Seamless coordination between all system components ensures fast response times, accurate data handling, and a reliable experience across different devices.

System Architecture Overview

- Input Layer:
  Collects user personal and financial details
  Accepts daily income and expense entries
- Processing Layer:
  Analyzes spending behavior
  Identifies budget deviations
  Calculates financial summaries and insights
  Prepares data for reports
- Backend Layer:
  Manages system operations using server-side logic
  Stores and secures all financial data in the database
- Frontend Layer:
  Provides a simple and user-friendly web interface
  Uses JavaScript to display real-time financial updates
- Data Flow:
  Users enter income details, expenses, or financial goals through the web application.
  The backend processes the input and securely stores it in the database.
  The system analyzes financial data and updates insights, alerts, and report information.
  The frontend displays updated summaries, recommendations, and downloadable reports to users.

2.1 Dataset Preparation

The dataset used for the AI Powered Personal Finance Adviser was prepared to represent real-world personal financial activities of users. Financial records were created using essential details such as user profiles, income sources, expense categories, payment dates, and budget limits. Transactions were recorded across different expense types so that the system could clearly identify spending behavior and financial patterns.

To ensure realistic usage scenarios, data entries were collected over multiple months, reflecting varied income levels and spending habits. Each record was carefully reviewed, cleaned, and standardized so that dates, amounts, categories, and user identifiers followed a consistent format. This consistency helps the system accurately analyze trends and generate meaningful financial insights.

Financial data was then organized into daily transaction logs, monthly expense summaries, savings evaluations, and final advisory report details. This structured dataset preparation enables the system to produce reliable outputs, generate clear Excel-based financial reports, and support features such as automated alerts and personalized financial recommendations for users

2.2 Software Implementation

- **Backend Logic**
  The backend component manages the core functionality of the system, including validating user inputs, processing financial transactions, and analyzing spending data. It performs calculations related to monthly expenses, savings summaries, and AI-based financial insights. The backend also generates downloadable Excel reports and triggers notifications whenever important financial updates need to be communicated to the user.

- **Database Management**
  The database stores all structured financial information required by the system, such as user profiles, income details, expense records, budget settings, and financial history. Data is organized in a well-structured and optimized format, enabling quick retrieval and secure updates while maintaining data integrity.

- **Notification Service**
  This module is responsible for sending automated alerts and reminders to users. Notifications are used to inform users about budget limits, unusual spending, monthly summaries, and report availability. This service ensures timely communication and helps users stay aware of their financial status throughout the usage period.

3. RESULTS AND PERFORMANCE ANALYSIS

The Personal Finance Advisor was tested across all its major features, and the evaluation showed that it ran efficiently, responded accurately, and felt intuitive for users trying to manage their money. It handled essential tasks such as recording expenses, planning savings goals, offering investment knowledge, and displaying financial summaries in a clean and organized interface. Users could quickly add daily spending by choosing a category and entering an amount in a simple form. Each new entry was immediately added to the monthly overview, helping users track spending in real time. Input validation prevented wrong entries like zero amounts, which kept the stored data meaningful and accurate.

The main dashboard used visual elements such as pie charts and bar graphs to present spending trends clearly. Expenses for food, rent, shopping, entertainment, and other areas were automatically calculated and shown to the user. These graphics helped people understand their spending behaviour and made financial analysis more engaging for younger users. Savings goals were another strong feature. Users could create goals, set deadlines, and monitor progress through tables and progress indicators. Whether someone was saving for a birthday celebration or an international trip, the system calculated monthly contributions and projected savings, giving a clear roadmap for reaching the goal.

The account balance section displayed both monthly and historical records of income, expenses, and total savings. Charts and tables made it easy to compare results between months, and running balances were updated accurately. Even when multiple entries and calculations were made, the system-maintained consistency and correctness. Performance testing confirmed that the platform ran smoothly under regular use. Pages opened quickly, and switching between modules like budgeting tools, savings trackers, and investment education felt responsive. The backend processed data inputs without lag, demonstrating readiness for real-world usage. User feedback was positive. The layout was easy to navigate, and users could complete common tasks like logging expenses, tracking savings progress, or learning basic investment concepts without confusion. The built-in advice feature added a personalized touch, allowing users to ask financial questions and receive helpful suggestions in a friendly tone. Overall, the Personal Finance Advisor proved to be a reliable and practical solution. Its accurate calculations, live updates, and user-friendly design make it suitable for helping people, especially young adults, build healthy financial habits and gain confidence in managing their money.

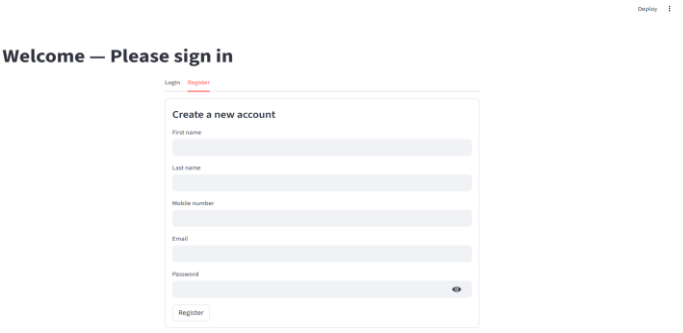


Figure 3.1: User Registration Phase

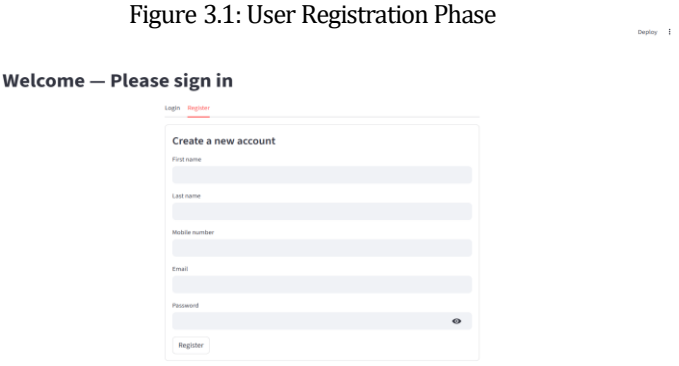


Figure 3.2: Login Page

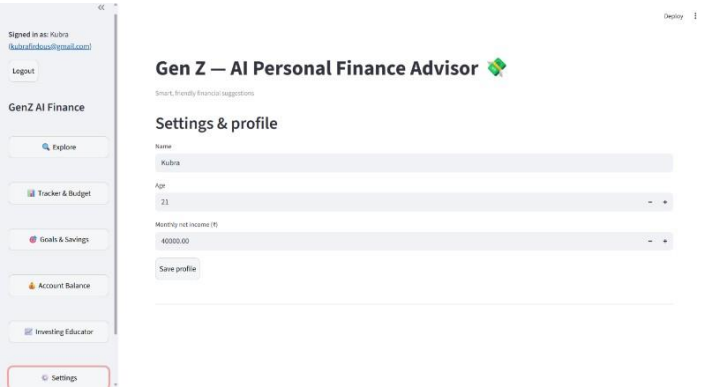
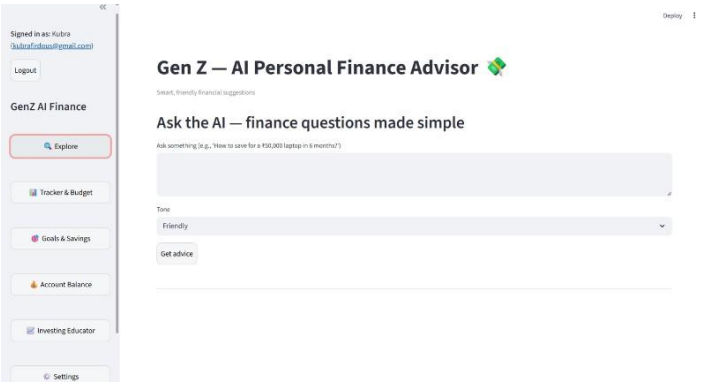


Figure 3.3: Profile setting page



3.4: AI- Powered Financial Advice Interface

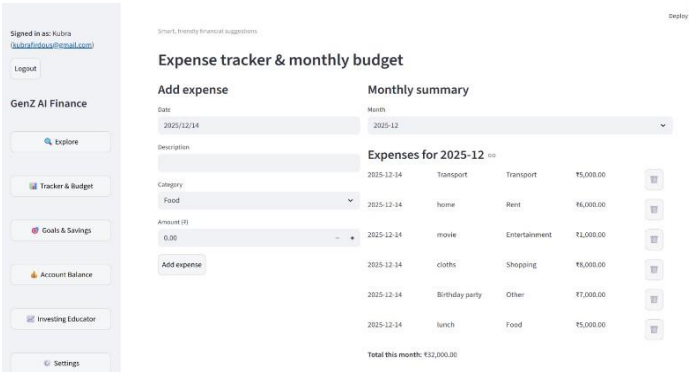


Figure 3.5: Expense Entry and Monthly Summary

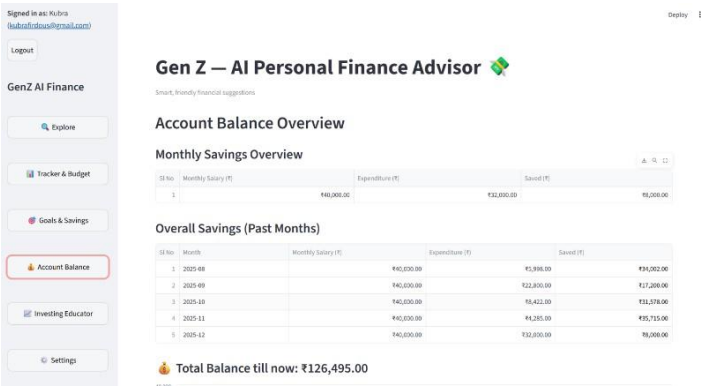


Figure 3.9: Account Balance Visualization

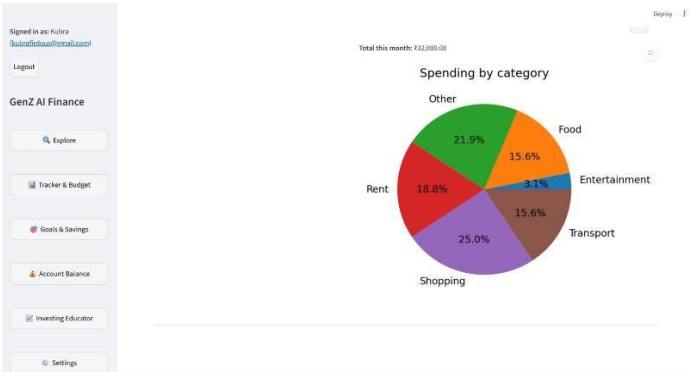


Figure 3.6: Spending by Category Visualization

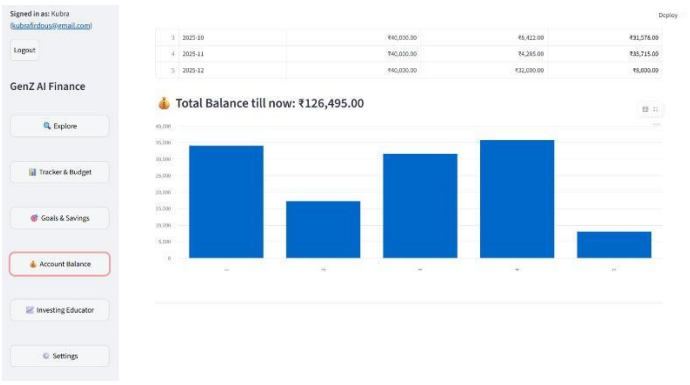


Figure 3.10: Monthly and overall savings summary

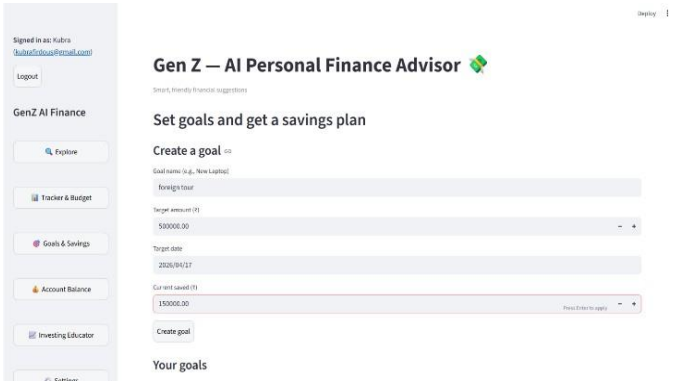


Figure 3.7: Goal Creation – Savings Planning Figure

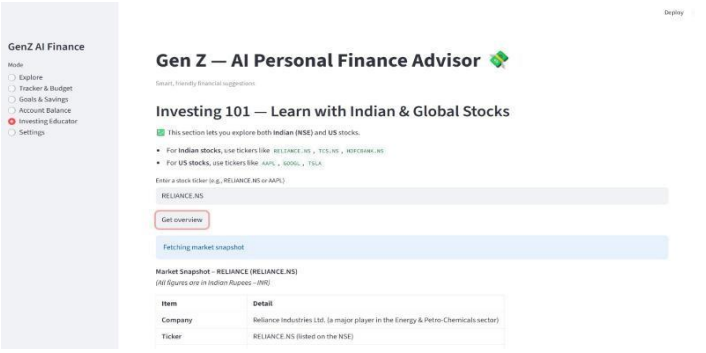


Figure 3.11:Investing 101 – Stock Overview Interface

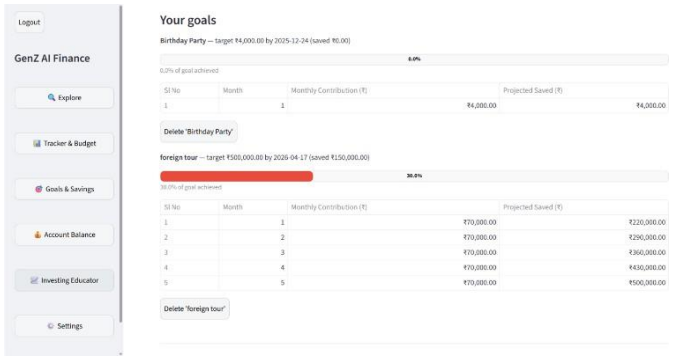


Figure 3.8: Goal Progress Overview

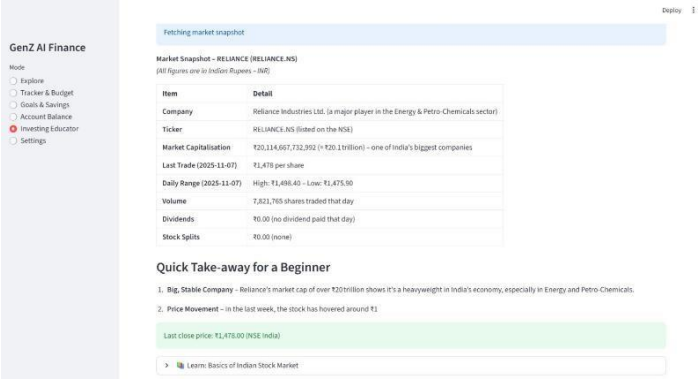


Figure 3.12: Market Snapshot – RELIANCE.NS

4. CONCLUSIONS

The AI Powered Personal Finance Adviser demonstrates how intelligent technology can simplify personal financial management and improve decision-making for users. By combining a structured backend system with an intuitive and user-friendly interface, the application enables users to efficiently track income, monitor expenses, and understand their spending behavior. The integration of AI-based analysis helps users gain meaningful insights and encourages better saving habits.

The system effectively conducts regular financial assessments, detects deviations from planned budgets, and produces detailed reports that highlight income, expenses, and overall financial trends. Automated alerts and notifications keep users updated on their financial condition, spending limits, and the availability of reports. Additionally, the option to generate Excel-based reports supports better financial planning and organized record management.

One of the key strengths of the system lies in its flexible and scalable architecture, which allows for easy future expansion. The design supports potential enhancements such as mobile application compatibility, more advanced AI models for personalized investment guidance, and integration with banking APIs. Throughout testing, the system demonstrated strong stability, accurate performance, and a user-friendly interface. Overall, the AI-powered personal finance advisor offers a dependable, efficient, and modern approach to managing personal finances in a more organized and intelligent manner.

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BIOGRAPHIES

Kubra Firdous a final-year Computer Science and Business System student. She is currently pursuing her degree at SG Balekundri Institute of Technology.

Wabisa Nahid Balekundri is a final-year Computer Science and Business System student. She is currently pursuing her degree at SG Balekundri Institute of Technology.

Hammad Khan Sanjeri is a final-year Computer Science and Business System student. He is currently pursuing his degree at SG Balekundri Institute of Technology.

Krushi Payannavar is a final-year Computer Science and Business System student. He is currently pursuing his degree at SG Balekundri Institute of Technology.