

Smart Expense Tracker With Goal Forecasting And User Behavior Clustering Using AI

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Abstract- *Managing personal finances effectively has become a necessity in today's fast-paced lifestyle. While several expense tracking applications exist, most focus only on recording income and expenses, offering basic summaries without deeper analysis or intelligent goal management. Such limitations make it difficult for users to understand their spending habits, stay motivated toward long-term goals, or receive accurate forecasts for achieving them. Without advanced tracking and insights, users often end up with scattered financial data that lacks actionable meaning. Many existing tools fail to address crucial aspects such as precise goal forecasting, clear visualizations of category-wise spending, and the ability to analyze and adapt to user behavior over time. They often lack secure multi-user access and intelligent clustering of users with similar spending patterns. As a result, users miss the opportunity to gain personalized recommendations that could guide them toward better financial decisions. Our project bridges these gaps by providing a secure and intelligent platform for financial management. Users can set personal goals, log expenses under predefined categories, and instantly see their monthly savings along with an accurate time forecast to reach their goals in years, months, and days. The system offers engaging visual insights through pie charts and applies AI-based clustering to identify spending behavior trends. By combining forecasting, analytics, and behavioral intelligence, the system transforms simple expense logging into a proactive tool for financial planning and goal achievement.*

Keywords- AI-Based Clustering, Django Framework, Expense Monitoring, Financial Analytics, Goal Forecasting, Machine Learning, Smart Expense Tracker, User Behavior Analysis.

I. INTRODUCTION

Financial management has become a key necessity in today's digital era, where individuals need to balance income, expenses, and savings effectively. However, many existing expense tracking systems focus only on manual data entry and basic charts, offering no intelligent insights or predictive analysis. This often leaves users unaware of their financial habits and unprepared for long-term planning.

The proposed Smart Expense Tracker with Goal Forecasting and User Behavior Clustering Using AI overcomes these challenges by introducing automation and intelligence in financial tracking. The system automatically records income and expenses, calculates monthly savings, and predicts the time required to achieve financial goals. It also integrates AI-based clustering (K-Means algorithm) to categorize users as *Saver*, *Spender*, or *Balanced*, based on their spending behavior.

Through interactive data visualization and real-time goal forecasting, the system provides meaningful insights and personalized recommendations for better financial planning. Built using the Django framework, it ensures data security, accuracy, and an efficient user experience. Overall, this project transforms traditional expense tracking into an intelligent financial management tool that supports smarter decisions and long-term goal achievement.

II. METHODOLOGY

The system is developed using the Django Framework in Python, ensuring scalability and secure database management. The architecture follows a client-server model, where all transactions are processed and stored in a centralized Django database.

A. System Architecture

The architecture comprises five key modules:

1. **User Authentication and Financial Data Management:** Handles secure registration, login, and personal data storage. Each user's financial data is isolated within their account.
2. **Goal Setting and Forecasting:** Users can define financial goals, such as travel or asset purchase. The system calculates required savings and forecasts how long it will take to achieve the goal.
3. **User Behavior Clustering:** The K-Means algorithm is applied to analyze the relationship between

income, expenses, and savings. Users are grouped into categories that reflect spending behavior.

- Visualization:** Data is presented in dynamic pie charts and bar graphs using Matplotlib for a clearer understanding of income-expenditure balance.
- Personalized Recommendations:** Based on clustering results, users receive automated financial advice to optimize spending and improve saving habits.

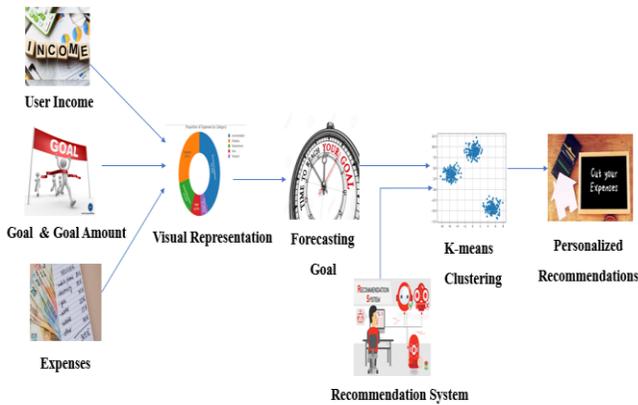


Figure1ArchitectureDiagram

B. Data Flow

- User logs in and inputs income and expense details.
- Data is validated and stored in the Django backend.
- The forecasting module calculates estimated savings and time to reach goals.
- Clustering is performed periodically based on user financial history.
- Results are visualized and displayed as reports and alerts.

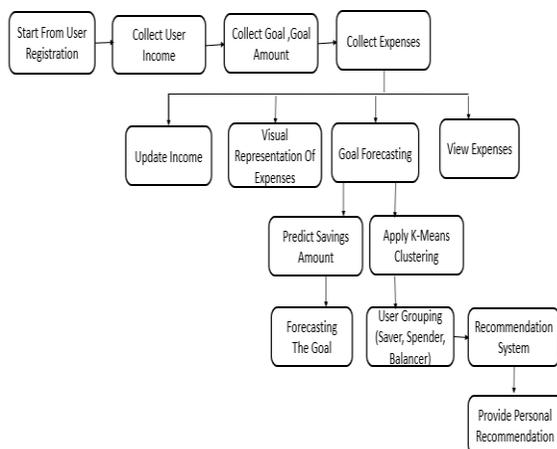


Figure 2 Data Flow Diagram

III. RESULTS AND DISCUSSION

The developed system was tested with multiple users over sample datasets. The system effectively automated goal forecasting and produced accurate predictions for goal completion time. The K-Means clustering module successfully categorized users into three financial behavior clusters — Saver, Balanced, and Spender.

A. Add Expense Module

Users can record daily expenses by selecting categories such as food, transport, or entertainment. Data is stored in real-time, updating charts and goal progress automatically.

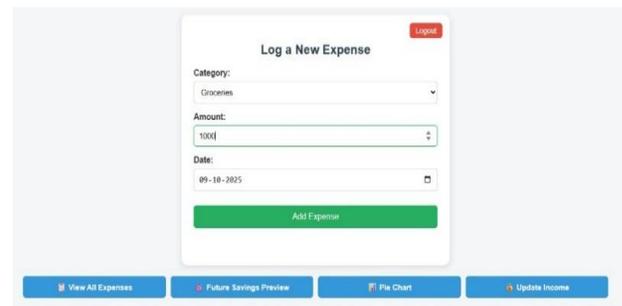


Figure3Add Expense

B. Goal Forecasting Module

This module predicts the time needed to achieve financial targets based on monthly savings trends. It provides dynamic status messages like “On Track” or “Needs Improvement ” to keep users motivated.

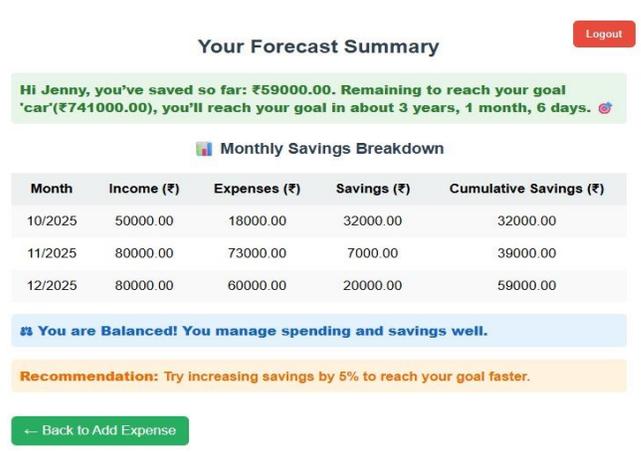


Figure4Goal Forecasting

C. Update Income Module

Users can modify income details anytime, which instantly recalculates goal forecasts and savings graphs without manual recalculation.

The system's automation capabilities reduce manual intervention by up to 80%, while AI-based clustering increases personalization and decision-making accuracy. Graphical insights allow users to visually monitor their spending and savings ratio, encouraging disciplined financial behavior.

Figure5 Update Income

IV. CONCLUSION

The Smart Expense Tracker with Goal Forecasting and User Behavior Clustering project successfully achieves its aim of providing an intelligent and secure platform for personal financial management. The system enables users to record income and expenses, set savings goals, and receive accurate forecasts for goal achievement timelines based on real-time financial data.

By integrating AI-based clustering (K-Means), the project goes beyond traditional tracking tools by categorizing users into behavioral groups such as Savers, Spenders, and Balanced Users. This classification allows the system to offer personalized recommendations and insights that help users make informed financial decisions.

The use of the Django framework ensures security, scalability, and efficient database management, while the inclusion of data visualizations like pie charts and trend graphs provides users with a clear picture of their financial status.

The project demonstrates that the combination of forecasting, analytics, and behavior intelligence can transform a simple expense tracker into a proactive tool that assists users in achieving long-term financial goals. Overall, the system meets its objectives by delivering accuracy, usability, and smart decision support.

V. FUTURE ENHANCEMENT

The Smart Expense Tracker with Goal Forecasting and User Behavior Clustering system can be further enhanced by integrating advanced automation, visualization, and predictive features to improve financial management efficiency. Future versions can include AI-powered automatic expense categorization, where the system analyzes transaction details and assigns them to relevant categories without manual input, reducing user effort and improving accuracy. Additionally, incorporating voice-based interaction or chatbot assistance can allow users to add expenses, update income, or check goal progress through simple voice commands or chat interfaces, increasing accessibility.

Enhanced data visualization dashboards with interactive charts and spending heatmaps could give users deeper insights into financial trends and monthly behavior patterns. Integration with bank APIs or UPI systems can enable automatic transaction import, eliminating manual data entry. To ensure data safety, features like two-factor authentication, encrypted backups, and cloud synchronization could be introduced for secure access across multiple devices. Moreover, predictive analytics could be extended to offer personalized financial planning suggestions, such as recommending savings targets, investment options, or spending limits based on past behavior. These enhancements would transform the system from a simple tracker into a smart, proactive financial advisor that supports long-term wealth management and decision-making.

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