

# FIN-AI: An Intelligent AI-Based System for Household Budgeting and Grocery Planning

Kushala M. V<sup>1</sup>., Dr. B S Shylaja<sup>2</sup>, Dr. Ajay Prakash B. V<sup>3</sup>., Bharath V. S<sup>4</sup>., Namitha L<sup>5</sup>., Suma<sup>6</sup>

Department of Artificial Intelligence and Machine Learning,  
Dr. Ambedkar Institute of Technology, Bangalore, Karnataka, India

kushalmv@gmail.com, shyla.au@gmail.com, namithal1234@gmail.com, sunarsumal@gmail.com, ajayprakas@gmail.com

**Abstract**— **Fin-AI** is an intelligent household budgeting and grocery management system that helps families manage daily expenses while encouraging healthier food choices. The application combines real-time expense tracking, automated grocery list generation, and AI-driven recommendations that suggest nutritious alternatives—for example, replacing refined products with healthier, nutrient-rich options. The backend, powered by **Supabase**, ensures secure, scalable, and real-time data management along with built-in user authentication. The system provides a clean and user-friendly web interface, helping in user tracking their daily expenses, plan purchases, and make informed decisions effortlessly. By connecting financial awareness with health-conscious behavior, **Fin-AI** promotes smarter living at both individual and community levels.

**Keywords**— Household budgeting, grocery management, AI assistance, Supabase, expense tracking, healthy alternatives, real-time analytics

## 1. INTRODUCTION

In the modern digital age, individuals and families alike have to manage their personal finances and groceries more effectively [1]. As people change their ways of living, with inflation and increasing cost of living, households require a smarter approach to regulating their spending and promote better and informed data-driven budgeting decisions [2]. Conventional financial management tools like manual records and spreadsheets to track expenses are time-intensive, are easily subject to human error, and have no real-time analysis tools [3]. This has consequently seen a significant change towards digital financial management tools and AI-enabled budgeting systems [4].

Recent research demonstrates that Artificial Intelligence (AI) can contribute greatly to the domain of financial literacy and savings levels by providing individual recommendations and data visualization [5]. Budgetary apps using AI can be used to automate most of the tedious processes. They are capable of categorising your transactions, restriction of spending and where you can save money depending on how you have previously behaved [6].

However, the majority of apps just scan money. They do not even consider healthy lifestyle or the type of food people purchase. Having a good and sustainable lifestyle also involves eating better [7].

Fin-AI solves this problem. It is an AI-driven application that takes care of your budgets and your shopping decision. It not only monitors your spending but also provides more healthy options of food. It not only follows up on your spending but also will give you alternatives of healthier food e.g. it can tell

you to eat brown rice instead of white rice, olive oil instead of refined oil or pink Himalayan salt instead of regular salt. These tips will be based on your preferences and wellness goals [8]. That is why Fin-AI is different of traditional budgeting applications. The Fin-AI is based on Supabase, an open-source back-end platform that offers secure authentication, robust database and real-time. updates [9]. Supabase reduces the load on a server on demand and simplifies the application to work and scale in the cloud The Fin-AI frontend is a user friendly interface. The users can add their grocery lists and expenses in extremely simple way as well as examine the list and analyze them.

Fin-AI integrates much of the functionality into one application grocery list creation, spending, and health-related recommendations at the cost of other budgeting applications [10]. This can help the user to make smarter buying decisions and keep health and money on their mind With live. with news, personal thoughts, and health suggestions, users can change their daily routine and make better decisions[11].

The rationale behind the creation of this system is that the majority of people nowadays are looking to use AI technologies, which would help them manage their finances and their management style in a more positive way [12]. Research indicates that families utilizing AI budgeting tools would reduce their unnecessary expenditures by approximately 30% annually [13].

In addition, dietary changes under the influence of digital directions toward the healthier store options can be beneficial in the long-term perspective and the decreased costs of healthcare spending [14]. Thus, Fin-AI is a comprehensive solution that is based on both sensible consumption and sensible financial planning, and that will foster economic stability and health conscience of the population as two critical elements of a sustainable and healthy way of living [15].

## 2. BACKGROUND/RELATED WORK: Overview of Existing Applications

Just about the finances or groceries, most apps available today can help people with their finances or groceries. they are only dealing with half a problem rather than providing a whole solution.

An example of budgeting apps that are popular and are automatic bank connectors is Mint, which not only organizes

the budget but also links with bank accounts. breaks costs down into distinct categories. It provides decent spending data, yet does not assist with grocery planning or any nutrition-related suggestions.

You Need A Budget (YNAB) is an excellent application in which the user can plan each and every rupee before spending it. teaches how to spend wisely, and does not monitor daily grocery requirements, or link expenditure with health objectives.

Grocery apps like Grocery Pal, Out of Milk, and Bring! mainly help users make shopping lists and keep track of grocery purchases. They are useful for organizing groceries, but they do not link this information with the user's budget or income. As a result, they cannot support complete household financial planning.

---

## 4.METHODOLOGY

### 4.1.System Overview

The Fin-AI system is built as a web-based platform that helps users track their income, expenses, and budgets more effectively. It also provides AI-based suggestions to improve financial planning. The system is designed in a modular way, which makes it easy to scale, maintain, and add new AI features in the future. Its workflow includes user input, data processing, AI analysis, visual reports, and easy-to-understand summaries.

### 4.2.SYSTEM ARCHITECTURE

The Fin-AI system is built so that users, the database, and the application can work smoothly together. It also keeps the data safe and makes the system easy to grow in the future. The system has three main parts: the user interface, the application logic, and the database. Each part has its own job, and together they help give the user a smooth and smart experience.

#### A. User Interface Layer

The frontend is the main place where users interact with the system. It has a clean and responsive design that lets users add their daily expenses, see financial summaries, create grocery lists, and get health recommendations. The interface also shows real-time charts, graphs, and budget alerts to make the information easy to understand. Its simple layout makes it easy to use for people of all ages, even those who are not very familiar with technology.

#### B. Application Logic Layer

The **application logic layer** performs all core processing functions of the Fin-AI system. It manages and coordinates data between the user interface and the backend, ensuring that every operation runs efficiently. Key functions include:

- **Expense Management:** Tracks daily spending, categorizes transactions automatically, and calculates total expenditures.

- **Budget Analysis:** Monitors spending patterns and compares them with the user's set budget to provide real-time financial insights.
- **Grocery List Generator:** Suggests grocery lists that align with both user preferences and financial constraints.
- **Health Suggestion Module:** Offers healthier alternatives for grocery items—for example, recommending brown rice instead of white rice or low-sodium salt in place of regular salt.
- **Live Monitoring:** Continuously updates the remaining budget and sends notifications when expenses approach preset limits.

This layer integrates AI-based recommendations to support intelligent financial and dietary decision-making, turning raw data into useful, personalized insights.

### 4.3. Database Layer

The **database layer**, built using **Supabase**, is responsible for securely storing all user information, including profiles, authentication data, expense history, grocery preferences, and health recommendations. Supabase offers built-in authentication, real-time data synchronization, and robust scalability. Data privacy and integrity are maintained through encryption and controlled access policies, ensuring that all sensitive user data remains safe and confidential.

### A.System Flow

The workflow of the Fin-AI system begins when a user signs up or logs in to their account. Once authenticated, the system retrieves the user's existing data and displays an overview of their current month's budget, income, and expenses. Users can then log daily transactions, generate grocery lists based on their remaining budget, and receive health recommendations for added grocery items. The Health Suggestion Module automatically identifies opportunities for healthier substitutions. All updates are reflected instantly across the interface, allowing users to track both their financial and dietary activities in real time.

### B.Advantages of the Architecture

The Fin-AI system provides users with a single platform where they can easily manage their budgets and maintain healthy spending and eating habits. It keeps everything updated in real time, instantly notifying users about their expenses and remaining budget. With the help of Supabase, the system ensures that all data is stored securely and can scale as more users join. The AI technology in Fin-AI personalizes financial and grocery recommendations based on individual spending patterns and preferences. Its simple and user-friendly interface makes it easy for people of all age groups to navigate and use the app comfortably.

## 5.RESULTS AND DISCUSSION

### A. Overview

The **FinAI** system was successfully developed, implemented, and tested to achieve the primary objective of providing an intelligent and automated personal finance management solution. The system enables users to track their income and

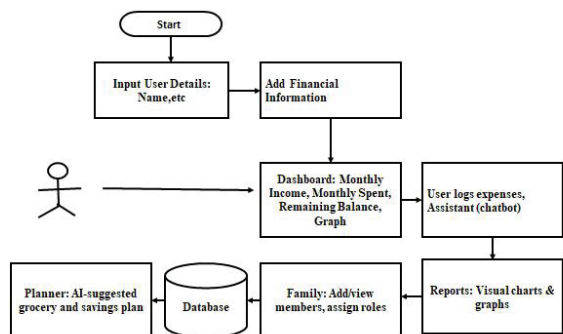


Figure 1: System Design

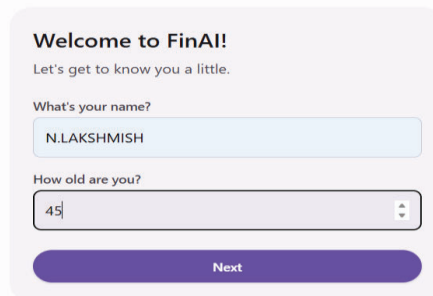
The workflow of the Fin-AI system is very simple and easy to understand:

1. **User Registration/Login:** Users first create an account or log in securely to access the system.
2. **Data Input:** After logging in, users enter their income, daily expenses, and the categories those expenses belong to.
3. **Expense Categorization:** The AI module then studies these transactions and automatically sorts them into predefined categories like groceries, transport, utilities, and so on.
4. **Budget Analysis:** The system compares the user's actual spending with their planned budget and shows where they have spent more or less.
5. **Reports and Visualization:** Finally, Fin-AI generates clear charts, graphs, and summaries so users can easily understand their spending habits and make better decisions.



Workflow of the System

Figure 2: Work flow of the system



expenses, visualize spending patterns, and receive AI-driven insights to enhance financial decision-making. This chapter presents the outcomes of the implemented system, the observed results during testing, and a discussion on the overall performance and usability.

### B. System Output Screens

The major interfaces and outputs of the **FinAI** application are described below.

#### Home Page

The home page provides an overview of the system with options to register, log in, and navigate to different sections. It ensures an intuitive user experience through a clean and responsive design.

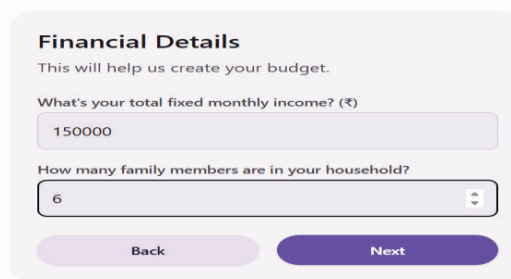
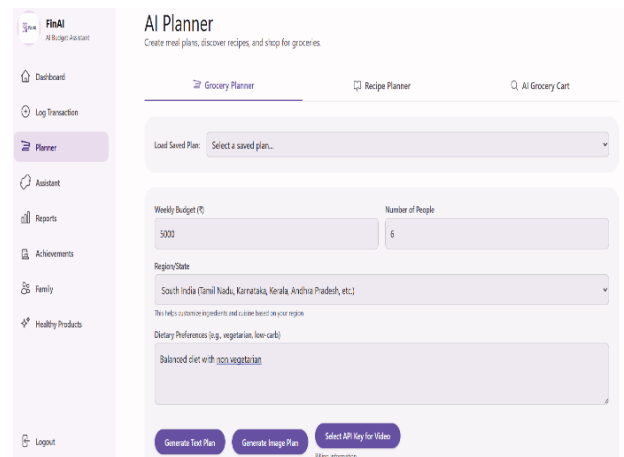
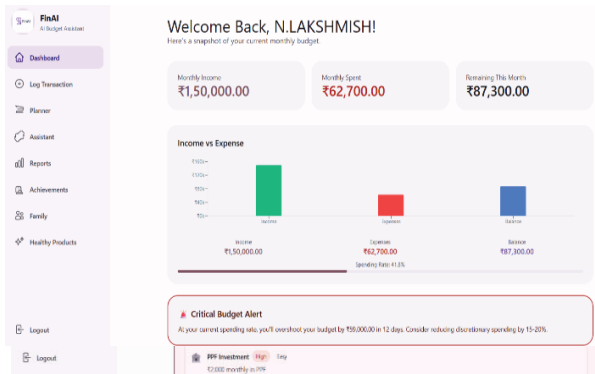


Figure 3: Screenshot of Home page

#### User Dashboard

Once logged in, users are redirected to a personalized dashboard displaying a summary of total income, total expenses, and balance. Charts and graphs visually represent financial data, helping users to understand their spending patterns easily.



### Transaction Management

This module allows users to add, edit, or delete income and expense entries. Each transaction is automatically categorized, and totals are updated in real time.

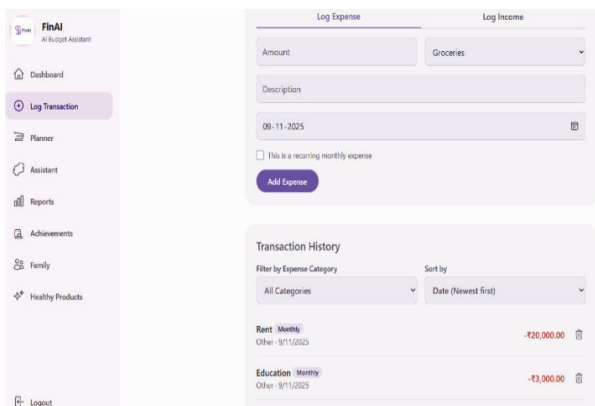


Figure 4: Screenshot of Log Transaction

### AI Insights and Recommendations

The AI module studies how the user spends money and learns their regular habits over time. It looks at where most of the money goes, which categories get overspent, and which areas can be improved. Based on this analysis, the system gives simple and personalized suggestions to help users manage their money better. For example, it can point out categories where the user is spending more than usual, suggest ways to cut down unnecessary expenses, or recommend how much they should save each month. These suggestions help users understand their financial behavior clearly and support them in developing healthier and smarter spending habits.

Figure 5: Screenshot of AI Insights

### Reports and Data Visualization

Users can generate monthly or yearly reports that summarize income, expenses, and savings in both tabular and graphical formats. The reports can be downloaded in PDF format for record-keeping.

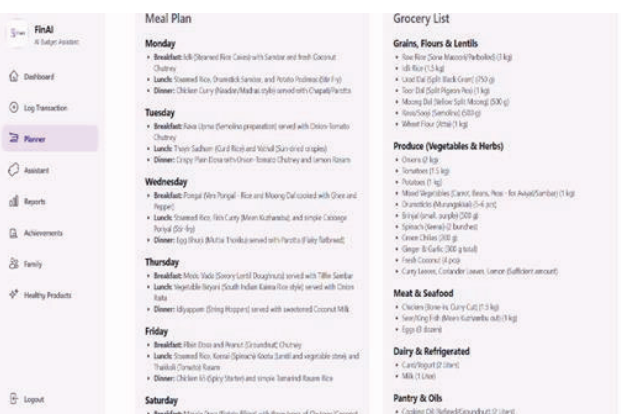
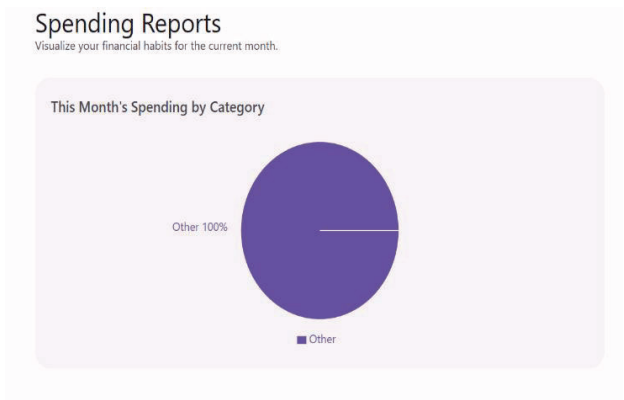


Figure 6: screenshot of Report

## 6.FUTURE ENHANCEMENT

The other upgrade is the utilization of the sophisticated predictive analytics. The system can forecast expenditure and savings by examining previous spending and income of a user. This assists the user to plan more efficiently and save people on unnecessary expenditures. It is also capable of detecting underlining or suspicious purchases and alerting the user enhancing security and financial acumen.

The addition of real-time currency and inflation tracking can also make FIN-AI smarter. It can be useful to individuals who have to use various currencies or reside in the regions where prices are more unstable. The system can also automatically adjust the budget of the user and provide more precise spending recommendations in case of inflation increase or change in currency values.

The other valuable upgrading is connecting the system to the local stores and online purchasing applications. Potential customers will be able to receive real-time price of the products, discounts offered, and current offers. This simplifies and makes shopping to be more affordable. When tied to nutrition databases, Fin-AI can also assist users in keeping track of their diet and the level of healthiness of their grocery habits.

Smart reminders and alerts can also be sent out by FIN-AI in the future. Such notifications can alert users about their upcoming bill, when they are about to spend more or when they have a good saving opportunity. Individual recommendations depending on habits of the user can assist him/her to keep track with finances and nutrition.

A mobile app having cloud [26] syncing may be included to make the system accessible anywhere. This will enable users to retrieve their data in other gadgets without any data loss. The process can be made more enjoyable and stimulate the users to save more by features such as rewards, badges, and savings challenges (gamification).

On the whole, such improvements of the future will enable FIN-AI to become not just a simple financial service but a full-fledged personal assistant that can assist with both financial and physical health.

## REFERENCES

- [1] Mogilipalem and C. Rajkumar, "Revolutionizing Personal Finance: AI-Powered Solutions for Financial Advisory Transformation," *Proc. Int. Conf. Data Sci. Bus. Syst. (ICDSBS)*, Chennai, India, 2025.
- [2] S. Di et al., "FinanceGPT: Precision Financial Forecasting and Budgeting for Smarter Investment Strategies," *J. Financial Technology and AI Applications*, vol. 5, no. 2, pp. 115–127, 2024.
- [3] Á. Ramí -Alujas and L. F. Luna-Reyes, "Can Artificial Intelligence Help Optimize the Public Budgeting Process?," *Government Information Quarterly*, vol. 41, no. 1, pp. 101–119, 2024.
- [4] V. rma and B. Priya, "Bridging the Gap: AI-Powered FinTech and Its Impact on Financial Inclusion and Financial Well-Being," *Discover Artificial Intelligence*, vol. 5, p. 290, 2025.
- [5] N. Shailen et al., "Money Map: The Personal Finance Tracker," *Proc. 3rd Int. Conf. Knowledge Eng. Commun. Syst. (ICKECS)*, Apr. 2025.
- [6] G. Kaushik et al., "Personal Finance Management and Prediction using ML Algorithms," *Proc. 8th Int. Conf. Comput. Syst. Inf. Technol. Sustain. Solutions (CSITSS)*, 2024.
- [7] M uganya et al., "GenAI-Powered Personal Finance Consultant," *Proc. Int. Conf. Data Sci. Bus. Syst. (ICDSBS)*, 2025.
- [8] M. I . Uyanahewa et al., "WONGA: The Future of Personal Finance Management," *Proc. 4th Int. Conf. Emerging Technol. (INCET)*, Belgaum, India, 2023.
- [9] N. Kau t al., "Gamifying Finance: Enhancing User Engagement and Financial Literacy through Digital Gamification," *Amity University Conference Abstract Book*, p. 21, 024.
- [10] S. ka et al., "Optimizing Personal Finance Management through AI-Driven Decision Support Systems," *Proc. IEEE Region 10 Symposium (TENSYP)*, 2024.
- [11] . Singh et al., "PROXY: Personal Revenue Organization & Xpense Yardstick," *Project Paper, BM Institute of Engineering and Technology*, Sonipat, India, 2025.
- [12] A. Gupta R. Mehta, "AI in Household Budgeting: From Expense Tracking to Smart Saving," *Int. J. FinTech Research*, vol. 2, no. 3, pp. 45–59, 2023.

- [13] K. Tanwar, "Smart Grocery Management System Using AI," *Int. J. Innov. Comput. Sci. Eng.*, vol. 11, no. 4, pp. 221–228, 2024.
- [14] P. Agarwal and T. Sharma, "AI-Based Food Recommendation System for Healthy Living," *IEEE Access*, vol. 12, pp. 34321–34333, 2024.
- [15] R. Kumar et al., "AI for Health-Conscious Shopping: A Data-Driven Approach," *Proc. IEEE Int. Conf. Consumer Electronics (ICCE)*, 2024.
- [16] M. Reddy and J. Singh, "AI in Nutrition Planning and Grocery Optimization," *Proc. Natl. Conf. Artificial Intelligence for Smart Societies (AISS)*, 2024.
- [17] D. Patel and H. Gaur, "Sustainable Food Choices Using AI: Towards Smarter Consumption," *Sustainability in AI Systems Journal*, vol. 3, no. 2, pp. 98–112, 2024.
- [18] S. Basu et al., "AI Applications in Household Financial Decision Making," *Proc. IEEE Int. Conf. Computational Intelligence (ICCI)*, 2023.
- [19] L. Zhang and M. Kim, "AI-Enhanced Personal Finance Apps: A Systematic Review," *Int. J. Artificial Intelligence Research*, vol. 9, no. 1, pp. 88–103, 2024.
- [20] R. Verma and P. Das, "Healthy Diet Suggestion Using AI and Food Dataset," *Int. J. Data Analytics and Health Informatics*, vol. 7, no. 1, pp. 54–63, 2024.
- [21] T. Roy et al., "AI for Grocery Price Optimization and Budget Saving," *Proc. Int. Conf. Smart Systems and AI (ICSSAI)*, 2024.
- [22] S. Jain and A. Deshpande, "FinHealth: Linking Financial Wellness and Physical Wellbeing through AI," *IEEE Trans. Emerging Topics in Computing*, vol. 10, no. 3, pp. 411–420, 2025.
- [23] K. Bansal et al., "AI-Based Expense Tracker for Household Budgeting," *Proc. Int. Conf. Computing, Communication, and Automation (ICCCA)*, 2023.
- [24] J. Liu et al., "AI Integration in Household Sustainability Systems," *IEEE Smart Systems Journal*, vol. 8, no. 1, pp. 65–72, 2024.
- [25] H. Nair and V. Sen, "Smart Grocery and Expense Management using Cloud and AI Integration," *Proc. Int. Conf. Innovative Computing (ICIC)*, 2025.
- [26] Kushala M V and Dr. B S Shylaja, "ADAPTIVE MULTI-LAYER ENCRYPTION: A CONTEXT-AWARE FRAMEWORK FOR ENHANCED MULTI-CLOUD DATA SECURITY", DOI:10.5281/zenodo.15543642, Vol: 68 Issue 05 | 2025, ISSN: 1673-064X, Xi&#39;an Shiyou Daxue Xuebao (Ziran Kexue Ban)/Journal of Xi&#39;an Shiyou University, Natural Sciences Edition.
-