

# Finsight AI: An AI-Powered Personal Finance Management System using MERN Stack

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## Abstract

Personal finance management has become increasingly important in the modern digital world. Many users face difficulties in tracking expenses, budgeting effectively, and understanding their financial behavior. Traditional finance tracking applications provide limited analytics and lack intelligent recommendations. This paper presents FinSight AI, an AI-powered personal finance management system developed using the MERN stack architecture. The system allows users to securely manage transactions, budgets, and financial records while receiving AI-generated financial insights and recommendations. The application integrates JWT-based authentication, dashboard analytics, budgeting features, and conversational AI assistance. MongoDB Atlas is used for cloud database management, while Vercel and Render are used for deployment. The proposed system improves financial awareness through intelligent analytics and AI-driven recommendations.

**Keywords:** Personal Finance Management; Artificial Intelligence; MERN Stack; Expense Tracking; Financial Analytics; Budget Management

## I. INTRODUCTION

Managing personal finances efficiently has become one of the major challenges faced by individuals in the digital era. People frequently spend money without maintaining proper records of their expenses, leading to overspending and poor financial planning. Existing financial management systems mainly focus on recording transactions and generating basic reports. However, they often fail to provide intelligent analysis and personalized financial guidance. Artificial Intelligence has emerged as a powerful technology capable of improving user decision-making through intelligent data analysis. Integrating AI with finance management systems can help users identify spending patterns, improve budgeting, and gain better financial awareness. FinSight AI is developed as an intelligent personal finance management platform that combines expense tracking, budgeting, dashboard analytics, and AI-powered financial insights into a single web application. The project uses MERN stack technologies and cloud deployment to provide a scalable and responsive solution.

## II. OBJECTIVES OF THE PROJECT

The major objectives of the proposed system are:

- To develop a secure personal finance management system.
- To enable users to track income and expenses effectively.
- To provide category-wise and monthly financial analytics.
- To implement intelligent AI-based financial recommendations.
- To create a responsive and scalable cloud-based platform.
- To improve financial awareness among users.

### III. LITERATURE REVIEW

Several finance management applications such as Mint, Walnut, and Goodbudget are available for expense tracking and budgeting. These systems mainly provide transaction recording and basic graphical analysis. Research studies indicate that integrating Artificial Intelligence into finance applications can significantly improve budgeting and financial planning. Existing systems generally lack intelligent conversational assistants and AI-driven analytics. Many applications fail to provide personalized financial recommendations based on spending patterns. The proposed system addresses these limitations by integrating AI-generated financial insights and cloud-based analytics into a modern web platform. Studies on AI-powered recommendation systems also demonstrate that intelligent analysis can improve user decision-making and financial discipline. Therefore, integrating AI with finance management creates opportunities for smarter financial planning.

### IV. METHODOLOGY

The proposed system follows a full-stack web application architecture using MERN stack technologies. **Frontend Development:** The frontend is developed using React.js and Tailwind CSS to provide a modern and responsive user interface. Users can manage transactions, budgets, and dashboard analytics through interactive components. **Backend Development:** The backend is developed using Node.js and Express.js. REST APIs are implemented for authentication, transaction management, budgeting, and AI interaction. **Database Management:** MongoDB Atlas is used as the cloud database for storing user accounts, transactions, and budgets. **Authentication:** JWT-based authentication is implemented to secure protected routes and ensure user-specific data access. **AI Integration:** Groq AI API is integrated to generate financial insights and recommendations by analyzing user transaction data and spending behavior.

### V. RESULTS AND DISCUSSION

The developed system successfully provides a secure and intelligent finance management solution. Users can register, log in, add transactions, manage budgets, and view dashboard analytics. The dashboard provides: • Total income and expenses • Monthly analytics • Category-wise spending analysis • Interactive charts and visualizations The AI assistant analyzes user transactions and provides personalized financial recommendations and budgeting suggestions. Compared to traditional finance management systems, the proposed platform improves financial awareness and decision-making through AI-powered analytics.

### VI. CHALLENGES FACED

Several technical challenges were encountered during the development of FinSight AI. 1. **Secure Data Management:** Ensuring that users could only access their own financial records required JWT-based authentication and protected middleware. 2. **AI Integration:** Generating meaningful AI responses based on financial transactions required careful prompt optimization and API integration. 3. **Dashboard Analytics:** Implementing real-time analytics and chart visualizations required efficient backend calculations and frontend rendering. 4. **Deployment Challenges:** Connecting MongoDB Atlas, frontend deployment on Vercel, and backend deployment on Render introduced environment variable and CORS configuration challenges.

### VII. ADVANTAGES OF THE SYSTEM

• Secure and scalable architecture • Responsive user interface • AI-powered financial recommendations • Cloud-based deployment • Interactive dashboard analytics • Personalized financial insights • User-friendly budgeting system

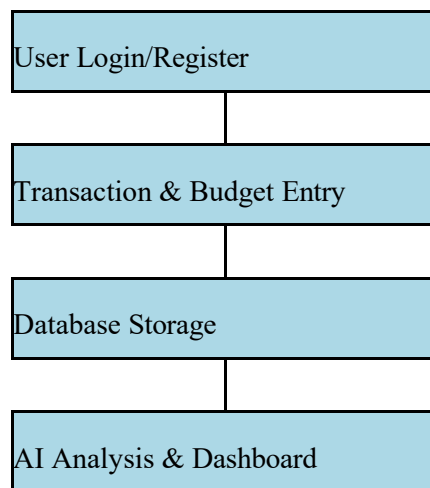
### VIII. FUTURE SCOPE

The project can be enhanced with additional features such as: • Machine learning-based expense prediction • Budget alerts and notifications • OCR-based receipt scanning • Mobile application support • Investment tracking • Export reports in PDF and CSV formats • Advanced AI-driven financial planning

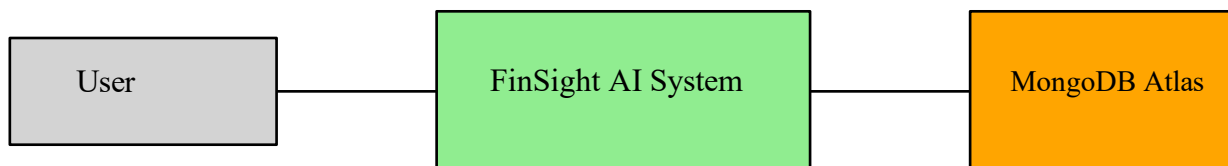
## IX. CONCLUSION

FinSight AI successfully combines Artificial Intelligence with modern full-stack web technologies to create an intelligent personal finance management system. The platform provides expense tracking, budgeting, dashboard analytics, and AI-generated financial insights within a secure and scalable environment. The project demonstrates practical implementation of MERN stack technologies, cloud deployment, and AI integration for solving real-world financial management problems. The developed system has strong future potential and can be extended into a complete AI-driven financial planning ecosystem.

## X. SYSTEM FLOWCHART



## XI. DATA FLOW DIAGRAM (DFD)



## XII. TECHNOLOGIES USED

Technology	Purpose
React.js	Frontend Development
Tailwind CSS	UI Design
Node.js	Backend Runtime
Express.js	REST API Development
MongoDB Atlas	Cloud Database
JWT	Authentication
Groq API	AI Integration
Vercel	Frontend Deployment
Render	Backend Deployment



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