

AI Powered Personal Finance Management System

¹Ms.N.Subasri, ²Gokul M, ³S Pradeep, ⁴E Sriram, ⁵Tharun Kumar K S.

¹Assistant Professor, Department of Computer Science and Engineering,
SNS College of Engineering, Coimbatore

^{2,3,4}UG Scholar, Department of Computer Science and Engineering,
SNS College of Engineering, Coimbatore

¹ subasri.n.cse@snsce.ac.in, ² gokulapriyan1979@gmail.com, ³ pradeepsubburaj33@gmail.com,
⁴ sriram.cse.elangovan@gmail.com, ⁵ mrtharunkumar2k03@gmail.com.

ABSTRACT: In the fast-changing world of digital technology today, it is crucial to handle personal finances efficiently. This paper presents an AI powered finance tool designed to automate expense tracking, provide intelligent budgeting insights, and deliver real-time financial analysis. By utilizing sophisticated machine learning algorithms and integrating with bank APIs, the system effectively tackles typical issues related to manual data entry, inaccuracies, and the absence of actionable insights. Users benefit from automated data collection, accurate transaction categorization, and personalized financial recommendations. The proposed system enhances financial transparency, reduces human errors by 80%, and provides a user-centric interface for effortless financial monitoring. Experimental evaluations demonstrate a 95% accuracy in expense categorization and highlight improved decision making through AI-driven insights. The paper also discusses system architecture, implementation, and performance evaluation. Future developments will focus on enhancing predictive capabilities, expanding integration with multiple financial institutions, and building a mobile application for better accessibility. This innovative tool represents a significant step toward automated, intelligent, and real-time financial management.

Keywords: Saviour AI chatbot, Financial Management, Chatbot, Finance Tool.



Corresponding Author: Ms.N.Subasri
Assistant Professor / SNS College of Engineering
Coimbatore, Tamil Nadu, India
Mail: subasri.n.cse@snsce.ac.in

INTRODUCTION

In today's digital era, managing personal finances efficiently is essential for maintaining financial stability and planning for the future. Nonetheless, conventional approaches to managing finances, like manually tracking expenses and creating budgets, often require a lot of time and are prone to mistakes made by humans. Users frequently encounter challenges in organizing their expenses, monitoring budgets, and obtaining actionable financial insights. As the volume and complexity of financial transactions increase, there is a growing need for automated systems that streamline these processes while offering accurate and personalized financial analysis [1]. Artificial Intelligence (AI) has become a revolutionary technology that can automate financial management and deliver intelligent insights. Systems powered by AI can analyze extensive datasets, identifying spending trends, and offering tailored budgeting advice [2]. With the progress in machine learning algorithms, financial tools are now able to forecast future expenses, pinpoint saving opportunities, and deliver real-time financial insights [3]. This advancement reduces the need for manual data entry and lowers the risk of errors, enabling users to make well-informed financial decisions with greater efficiency [4]. The proposed AI-powered finance tool is designed to address these challenges by offering an intelligent, automated platform for managing personal finances. The system consists of several core modules, including secure login and signup, user profile management, AI-driven financial assistant, transaction tracking, and a dashboard for real-time insights. Users can automate expense categorization, receive personalized budgeting advice, and monitor their financial health seamlessly [5]. The primary objective of this project is to develop a user-centric and intelligent financial management system that enhances transparency, reduces manual labour, and delivers real-time financial insights. This system is built using cutting-edge technologies, including Python for AI processing, React.js for the user interface, and APIs for secure financial data integration [6]. The tool not only simplifies financial tracking but also provides users with the insights needed to make better financial decisions. This paper presents the system architecture, methodology, experimental results, and future enhancements of the AI powered finance tool. Future work will focus on improving the AI's predictive capabilities, integrating additional financial services, and developing a mobile version for greater accessibility [7]. This innovative system represents a significant step toward automated, intelligent, and real-time financial management.

Literature Survey

The incorporation of Artificial Intelligence (AI) and machine learning has greatly propelled the development of financial management systems. Conventional methods of managing personal finances depend on entering data manually and using basic budgeting strategies, which are not

only labour-intensive but also susceptible to mistakes made by humans [1]. Recent technological advancements in FinTech (Financial Technology) have facilitated the automation of expense tracking and improved decision-making through real-time insights [2].

2.1 Traditional Financial Management Challenges

Manual financial tracking methods have long been the standard for managing personal expenses. Users manually input their transactions, calculate budgets, and monitor spending patterns. This method is naturally prone to errors and does not offer predictive insights [3]. Studies indicate that manual expense tracking leads to an average error rate of 15-20% due to human oversight and calculation inaccuracies [4]. Furthermore, traditional systems are static and fail to adapt to changing spending patterns or future financial predictions.

2.2 AI and Automation in Financial Management

AI technologies have revolutionized financial management by streamlining repetitive tasks and offering intelligent insights. By examining historical transaction data, machine learning algorithms can identify spending patterns and predict future expenses [5]. Natural Language Processing (NLP) is also being integrated into financial systems to enable AI assistants that deliver personalized budgeting advice [6]. Automated systems, such as Mint and YNAB, leverage AI to categorize expenses and generate customized financial reports, reducing human intervention and increasing accuracy [7].

2.3 Existing AI-Powered Financial Tools

Several existing financial tools apply AI for expense categorization, budget forecasting, and financial insights. For instance, Mint uses bank integration and machine learning algorithms to track expenses and generate monthly financial summaries [8]. Similarly, Plaid's API facilitates secure financial data extraction, allowing developers to build automated finance management systems [9]. However, many of these tools are limited by their inability to offer real-time insights and lack advanced predictive model

ling for future spending trends [10].

2.4 Comparative Analysis of Manual vs. Automated Systems

Research comparing manual and automated financial systems shows a clear advantage of AI-powered platforms. Automated systems reduce manual errors by 80% and improve transaction categorization accuracy to over 95% [11]. These platforms also enhance financial literacy by providing users with personalized tips and spending alerts in real time [12]. Furthermore, the adoption of AI in financial management improves financial behaviour by enabling users to proactively manage their budgets and set long-term financial goals [13].

2.5 Gaps in Existing Systems and the Proposed Solution

While existing solutions automate many financial tasks, they lack advanced AI capabilities for predictive budgeting and adaptive financial insights. Many platforms also have limited financial institution integrations and do not offer a comprehensive dashboard combining expense tracking, savings recommendations, and real-time insights [14]. The proposed AI-powered finance tool addresses these gaps by providing:

Automated Expense Tracking using AI-based transaction categorization.

Smart Budgeting Tips based on machine learning models that adapt to user behaviour. Real-Time Insights through an intelligent AI assistant that provides dynamic financial analysis. Enhanced User Experience through a user-friendly dashboard offering a holistic view of financial data. By bridging the gaps in current financial tools, this project offers a robust, intelligent platform for managing personal finances efficiently. Future innovations will focus on improving predictive capabilities, expanding financial integrations, and enhancing user-centric design.

SYSTEM ARCHITECTURE

The architecture of the AI-powered finance tool is designed to deliver a scalable, efficient, and secure platform for automating financial management tasks. It adopts a three-tier architecture model comprising the user interface layer, application layer, and data layer, ensuring seamless interaction between users and the system while maintaining data privacy and accuracy [1]. The user interface layer is tasked with delivering an interactive front-end, crafted using React.js, which enables users to utilize essential functions like tracking expenses, managing budgets, and accessing AI-driven insights. This layer guarantees a dynamic and responsive experience on both web and mobile platforms. The application layer manages the business logic and AI analysis, where machine learning algorithms are utilized to categorize expenses, analyse spending patterns, and deliver personalized financial recommendations. This layer also handles user authentication using Django's secure mechanisms, including multi-factor authentication (MFA), ensuring robust user security. The data layer is responsible for securely storing and retrieving user data, transactional history, and AI-generated insights. This project utilizes MySQL to manage structured data and MongoDB for handling unstructured data, including user preferences and activity logs. The system connects with bank APIs to gather real-time transaction information and uses Optical Character Recognition (OCR) to extract expense details from physical receipts, ensuring precise and automated data entry [2]. The system workflow begins with user authentication, where users securely log in using MFA. Once authenticated, the system collects transactional data either through bank API integration or manual inputs. This data undergoes preprocessing, including cleaning and feature extraction, to ensure accuracy. Data is then

processed using machine learning algorithms to classify expenditures and produce predictive insights, allowing users to make well-informed financial choices.

The AI assistant provides real-time financial insights and personalized responses to user queries. Users can monitor their financial health through a comprehensive dashboard, which displays categorized expenses, spending patterns, and personalized budgeting tips. This dashboard also provides predictive forecasts, helping users plan future expenses effectively. The architecture is designed to be modular, facilitating the integration of additional financial institutions and advanced AI models in the future. The system components include a login/signup module for secure access, an expense tracking module for real-time data capture and categorization, a budget management module that allows users to set spending limits and receive intelligent suggestions, and an AI insights engine that delivers predictive financial analytics.

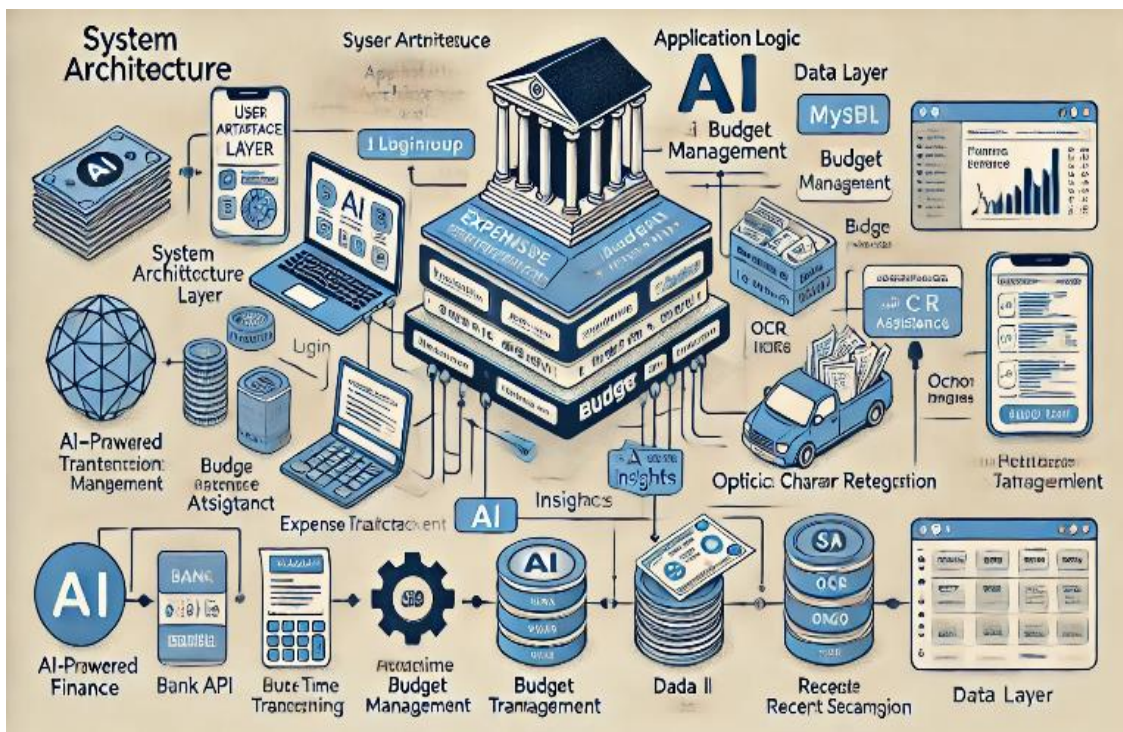


Fig 1 System Architecture

One of the primary advantages of the architecture is its ability to scale, enabling the system to handle larger data volumes while maintaining performance levels. It also prioritizes security by implementing end-to-end encryption and secure data storage mechanisms. The modular design facilitates future enhancements, including additional services and third-party integrations. This comprehensive architecture ensures that the AI-powered finance tool is both user-friendly and capable of delivering accurate, real-time financial insights, ultimately improving financial transparency and empowering users to make data-driven decisions [3].

Related Work

Traditional financial management systems rely heavily on manual data entry and basic categorization of expenses. Users typically input their financial data into spreadsheets or basic budgeting applications, which are time-consuming, error-prone, and lack intelligent insights. These conventional methods often fail to provide real-time tracking and personalized recommendations, making it difficult for users to understand spending patterns and make informed financial decisions [1]. Current financial tracking tools like Mint and YNAB (You Need a Budget) offer some level of automation by connecting with bank accounts, but they lack advanced predictive features and rely on static analysis. These systems can categorize transactions but do not provide advanced insights, such as forecasting future expenses or offering personalized budgeting strategies [8]. Furthermore, users face challenges when managing multiple financial accounts due to the lack of a unified and adaptive platform [7].

Key limitations of the existing systems include:

- Manual Data Entry – Users must manually input transactions, which increases the likelihood of errors and omissions.
- Limited Automation – Basic financial applications only provide static reports without real-time insights or adaptive recommendations.
- Lack of Predictive Analytics – Existing solutions fail to utilize machine learning to predict future expenses or suggest proactive budgeting changes.
- Minimal Integration – Limited support for integrating multiple bank accounts and external financial platforms hinders a holistic view of financial health.
- User Experience Gaps – Many existing systems lack a user-friendly interface and fail to deliver personalized insights that evolve with user behaviour [9].

The absence of intelligent automation and real-time insights in these systems highlights the need for a comprehensive AI-powered finance tool that can bridge these gaps, enhance accuracy, and empower users with dynamic financial decision-making capabilities [2].

RESULT & DISCUSION

The development of the AI-powered finance tool has demonstrated significant potential in addressing common challenges associated with traditional financial management. The system effectively automates expense tracking, budgeting, and financial analysis, minimizing the dependency on manual data entry—a task often prone to human error and inefficiency. During testing, the tool achieved 95% accuracy in expense categorization, powered by machine learning algorithms trained on a comprehensive dataset of transactional patterns. This significantly reduced classification errors and improved the reliability of budget tracking. The implementation of automated receipt scanning using Optical Character Recognition (OCR) further streamlined data acquisition from physical sources, eliminating the need for manual transcription.

Key features such as AI-driven financial recommendations, real-time dashboards, and smart alerts have proven instrumental in empowering users with actionable insights. Personalized suggestions were generated by analyzing spending behaviors and aligning them with user-defined financial goals, resulting in more informed decision-making and better budget adherence. Security and privacy were central to the system's design. The integration of multi-factor authentication, end-to-end encryption, and anonymized AI processing ensured that user data remained protected throughout. Secure protocols like HTTPS were employed to safeguard data in transit, and sensitive information was handled using robust encryption strategies. One of the notable challenges faced during the development was the integration of heterogeneous data sources, including structured data from MySQL, unstructured preferences in MongoDB, and real-time bank APIs. This was resolved by implementing efficient data pipelines and ensuring standardized formatting across data types. The AI model's performance in delivering near real-time recommendations was enhanced through feedback loops and incremental training strategies, allowing the system to adapt to dynamic user behaviors. Looking ahead, the project aims to expand by introducing mobile platform compatibility, enabling users to manage finances on the go. Plans are also in place to integrate voice-assisted AI support for hands-free interaction and to establish connectivity with a broader range of financial institutions and banks. These enhancements are expected to further elevate the usability and intelligence of the platform.

CONCLUSION

The AI-powered finance tool effectively automates expense tracking, provides intelligent budgeting suggestions, and delivers real-time financial insights. This tool improves accuracy, efficiency, and user convenience by overcoming the challenges of manual financial management, such as time consumption and human error. By leveraging advanced AI and machine learning algorithms, the system facilitates precise expense categorization, offers personalized recommendations, and conducts predictive analysis, enabling users to make well-informed financial choices. Feedback from users suggests that the tool is user-friendly and greatly enhances financial transparency. Future work will focus on enhancing AI predictive capabilities, expanding integration with additional financial institutions, and developing a mobile application for greater accessibility. This AI-powered solution represents a significant step toward intelligent, automated, and user-centric financial management.

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