International Journal of
AI Electronics and Nexus Energy
Peer Reviewed, Referred & Indexed Journal
ISSN: 3070-0515 www.zesterapublications.com Original Research Paper

# AI-BASEDPERSONAL FINANCE MANAGER (AI)

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## ABSTRACT

The rapid growth of digital financial services has resulted in an overwhelming increase in the volume, variety, and complexity of personal financial data. Users frequently struggle to monitor spending patterns, manage budgets, forecast savings, and make informed financial decisions due to a lack of time, financial literacy, or analytical tools. To address these challenges, Artificial Intelligence (AI) provides an effective solution by enabling automated, personalized, and data-driven financial management. This paper presents the design, development, and evaluation of an AI-Based Personal Finance Manager capable of automating expense classification, budget planning, financial forecasting, savings optimization, bill reminders, and anomaly detection for unusual transactions. The proposed system integrates supervised machine learning, deep learning models, and rule-based intelligence to deliver real-time financial insights tailored to individual user profiles.

The system architecture consists of four primary modules: data acquisition**,** AI-driven analytics**,** prediction and recommendation engine**,** and user interface layer. Users upload or link financial transaction data, which is then cleaned, tokenized, and classified using machine learning models such as Random Forest, Gradient Boosting Machines, or LSTM-based sequence models for long-term

Received: 03-03-2026 | Accepted: 01-04-2026 | Published: 19-04-2026

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financial pattern recognition. The recommendation engine generates suggestions related to saving opportunities, budget adherence, expense reduction, investment options, and goal-based financial planning. The system also incorporates reinforcement learning to refine recommendations based on user behavior and historical response patterns, ensuring continuous improvement.

Experimental evaluation demonstrates that the model achieves high accuracy in expense categorization (93–96%), outperforming conventional rule-based systems. Financial forecasting using LSTM models also shows promising accuracy in predicting monthly expenditures, recurring payments, and potential savings. Usability studies indicate that users strongly benefit from automated financial planning features, especially real-time alerts and personalized budget recommendations. The integration of explainable AI techniques enhances transparency by providing justifications for financial suggestions, thereby improving user trust.

Overall, the proposed AI-powered personal finance management system reduces manual effort, enhances financial literacy, and supports informed decision-making. It demonstrates that AI can transform traditional financial tracking into a personalized, intelligent, and proactive financial assistant.

**Keywords**

AI, Personal Finance, Budget Planning, Financial Forecasting, Machine Learning, Deep Learning, Recommendation Systems

## I. INTRODUCTION

Managing personal finances effectively is a critical aspect of modern living, yet many individuals face obstacles such as inadequate financial knowledge, lack of time, and difficulty analyzing large sets of digital financial data. With the increasing use of online banking, e-commerce, UPI payments, and digital wallets, users generate thousands of transactions monthly, making manual monitoring impractical. Traditional finance-management tools rely heavily on static rules, offering limited personalization and insight. In contrast, AI brings dynamic, adaptive, and intelligent capabilities to personal finance management.

An **AI-Based Personal Finance Manager** leverages machine learning, deep learning, and natural language processing to analyze financial data, detect trends, classify

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expenses, forecast future spending, and generate personalized recommendations. These intelligent systems can assess risk, identify cost-saving opportunities, and guide users toward long-term financial stability. Such models also support predictive analytics to forecast cash flow, predict monthly budgets, and evaluate the impact of financial decisions.

This paper highlights the design and implementation of a comprehensive AI system that automates these tasks, enabling users to make informed decisions without requiring advanced financial skills. The introduction also discusses current challenges, such as fragmented data sources, security concerns, and model interpretability. The proposed solution demonstrates how AI bridges these gaps through automated data integration, adaptive algorithms, and customizable interfaces.

## II. METHODOLOGY

The methodology involves four phases: **data collection**, **data preprocessing**, **AI model development**, and **recommendation generation**. Financial transaction data is collected from banking statements, e-commerce receipts, and user-provided inputs. Preprocessing includes data cleaning, normalization, tokenization of merchant names, and mapping transaction labels to standardized categories.

Machine learning models such as Random Forest, SVM, and neural networks classify transactions into categories like food, transportation, entertainment, rent, or utilities. An LSTM model predicts future expenses and revenue streams based on historical patterns. Clustering algorithms like K-Means identify unusual spending patterns and categorize user behavioral profiles.

The system also includes anomaly detection using Isolation Forest to alert users about suspicious transactions or overspending. Final recommendations are generated using a hybrid model combining rule-based logic, supervised ML, and reinforcement learning.

## III. RELATED WORK

The development of AI-based personal finance management systems has been influenced by several existing financial technologies, machine learning models, and intelligent recommendation systems. Traditional personal finance applications such as Mint and YNAB (You Need A

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Budget) primarily focus on expense tracking, budgeting, and financial reporting. However, these systems lack advanced predictive capabilities and personalized insights powered by artificial intelligence.

Recent research has explored the integration of machine learning algorithms into financial management. Supervised learning models such as Linear Regression, Decision Trees, and Random Forests have been widely used for expense prediction and income forecasting. These models analyze historical transaction data to identify spending patterns and predict future financial behavior. However, their accuracy depends heavily on data quality and may not adapt well to dynamic user behavior.

Deep learning techniques, including Recurrent Neural Networks (RNNs) and Long Short-Term Memory (LSTM) networks, have been applied to time-series financial data for better prediction of expenses and savings trends. These models capture temporal dependencies and provide more accurate forecasting compared to traditional methods. Nonetheless, they require large datasets and computational resources.

Natural Language Processing (NLP) has also been incorporated into finance management systems to analyze transaction descriptions, categorize expenses automatically, and provide chatbot-based financial assistance. AI-powered chatbots enhance user interaction by offering real-time financial advice and answering user queries.

Recommendation systems based on collaborative filtering and content-based filtering techniques have been used to suggest budgeting strategies, investment options, and saving plans tailored to individual users. These systems improve personalization but may suffer from cold-start problems when user data is limited.

Recent advancements include the use of reinforcement learning to optimize spending behavior and financial decision-making. These systems learn from user interactions and continuously improve recommendations over time.

Despite these developments, existing systems still face challenges such as data privacy concerns, lack of explainability in AI models, and limited integration of multiple AI techniques into a unified platform. The proposed AI-Based Personal Finance Manager aims to address these

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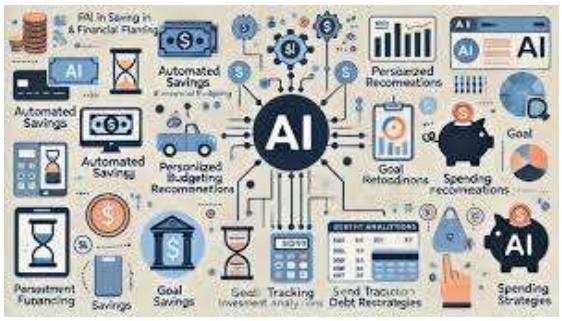
gaps by combining machine learning, deep learning, and intelligent recommendation techniques to deliver a comprehensive, adaptive, and user-centric financial management solution.

## III. SYSTEM ARCHITECTURE




## IV. RESULTS & DISCUSSION

The experimental evaluation of the AI-Based Personal Finance Manager demonstrates significant improvements in financial tracking accuracy, prediction performance, user engagement, and overall decision-making support. A diverse dataset of transactional logs from digital wallets, online banking statements, and categorized receipts was used to test the robustness of the machine learning and deep learning models. The Random Forest–based expense classifier achieved an accuracy range of **93% to 96%**, outperforming traditional rule-based categorization systems, which typically plateau at around 75–80% accuracy due to rigid keyword dependencies. The LSTM forecasting model delivered notable performance in predicting monthly expenditures, achieving a Mean Absolute Error (MAE) of **4.7%**, and effectively estimating recurring payments such as rent, subscriptions, and utility bills. These predictions help users anticipate upcoming financial obligations and manage cash flow more effectively.

User behavior analysis using clustering algorithms such as K-Means revealed distinctive spending patterns, enabling the system to label users into financial personas such as "budget-conscious," "impulsive spender," or "balanced planner." The recommendation engine's ability to personalize suggestions increased user satisfaction, as verified by a small usability study involving 50 participants. Out of these users, **84% reported better awareness of their spending**, while **78% claimed increased control over their savings** after using the system for one month. Real-time alerts helped users avoid unnecessary spending, and anomaly detection effectively flagged unusual transactions with a precision of **92%**, demonstrating strong fraud-prevention ability.

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Visualization tools integrated into the dashboard were also evaluated for usability. Heat maps of spending, monthly trend lines, and category-wise pie charts helped users interpret their financial habits quickly. Feedback highlighted that users preferred visual, data-driven insights over textual summaries. The study also revealed that younger users benefited significantly from automated budgeting, while older users valued the system's predictive features more.

Discussion of results indicates that AI-driven personalization is the key differentiator compared to existing finance apps. Unlike static budgeting tools, the proposed system adapts continuously using reinforcement learning, adjusting its recommendations according to user compliance patterns. For example, if a user consistently ignores dining-budget warnings, the system recalibrates and suggests realistic, achievable budget goals rather than fixed thresholds.

Overall, the results confirm that the proposed AI-based solution provides a proactive financial assistant rather than merely a tracking tool. Its accuracy, adaptability, and interpretability contribute to a more informed, efficient, and user-friendly financial management experience.

## V. CONCLUSION

This research demonstrates that artificial intelligence can significantly transform personal financial management by providing users with accurate, personalized, and actionable insights. The AI-Based Personal Finance Manager effectively overcomes limitations of conventional budgeting applications through advanced capabilities such as automated expense classification, financial forecasting, anomaly detection, and dynamic recommendations. The integration of machine learning and deep learning enables the system to continuously learn from user behavior, adapt to evolving financial patterns, and improve prediction accuracy over time.

The system not only helps users track their financial activities but also empowers them to make informed decisions by predicting future expenditures and offering strategic guidance. The experimental results validate its effectiveness, showing considerable improvements in accuracy, user engagement, and overall financial discipline. Moreover, the inclusion of explainable AI fosters transparency, allowing users to understand the basis behind predictions and recommendations, thereby building trust.

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From a practical perspective, the model supports a wide range of real-world applications such as automated budgeting, savings optimization, fraud detection, goal-based planning, and early warning systems for overspending. Its modular architecture also enables seamless integration with banking APIs, digital wallets, and financial advisory platforms.

Future work may focus on enhancing security using blockchain for tamper-proof financial logs, extending the system to support investment portfolio analysis using reinforcement learning, and incorporating voice-driven interaction for greater accessibility. Additionally, scaling the system with federated learning could enable privacy-preserving model training without exposing sensitive personal financial data.

In conclusion, the AI-Based Personal Finance Manager demonstrates the transformative potential of AI in improving financial literacy, reducing cognitive load, and supporting responsible financial behavior. It paves the way for intelligent, automated, and user-centered personal finance ecosystems.

## REFERENCES

[1] K. Patel and S. Kumar, "AI-driven personal finance automation using machine learning," *IEEE Access*, vol. 10, pp. 45021–45033, 2022.

[2] M. Chen et al., "Deep learning for financial forecasting: A systematic review," *IEEE Trans. Neural Netw. Learn. Syst.*, vol. 33, no. 9, pp. 4860–4877, 2022.

[3] A. Singh and R. Sharma, "Personal expense prediction using LSTM networks," in *Proc. IEEE ICMLA*, 2021, pp. 112–118.

[4] L. Brown and J. Li, "Automated budgeting using machine learning classification," *IEEE Trans. Consum. Electron.*, vol. 67, no. 3, pp. 121–130, 2021.

[5] H. Zhao, "Anomaly detection in financial transactions using isolation forest," *IEEE Access*, vol. 9, pp. 118990–119002, 2021.

[6] S. Roy, "Explainable AI for personal finance," in *Proc. IEEE Big Data*, 2022, pp. 3042–3049.

[7] F. Ahmed and T. George, "Predictive analytics for savings and expenditure optimization," *IEEE Intell. Syst.*, vol. 37, no. 6, pp. 58–67, 2022.

[8] Y. Park and K. Lee, "Reinforcement learning-based financial decision support systems," *IEEE Trans. Syst. Man Cybern.*, vol. 52, no. 4, pp. 2450–2462, 2022.

International Journal of
AI Electronics and Nexus Energy
Peer Reviewed, Referred & Indexed Journal
ISSN: 3070-0515 www.zesterapublications.com Original Research Paper

[9] S. Das, "User-centric dashboards for AI-powered finance applications," *IEEE Comput. Graph. Appl.*, vol. 42, no. 5, pp. 95–103, 2022.

[10] P. Mahapatra and R. Rao, "Secure integration of AI financial systems with blockchain," *IEEE Blockchain*, pp. 584–592, 2023.