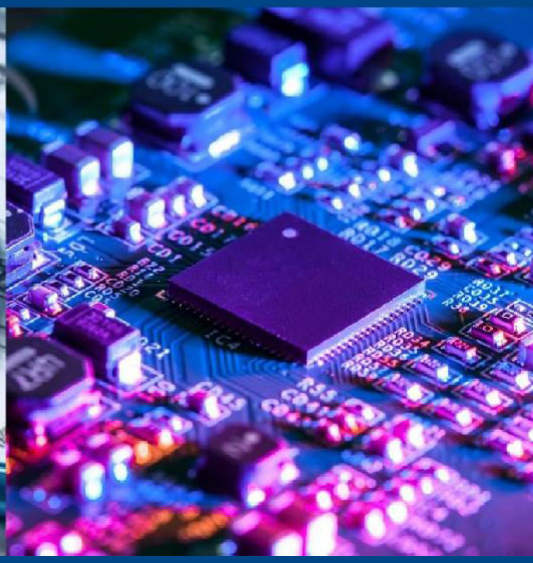
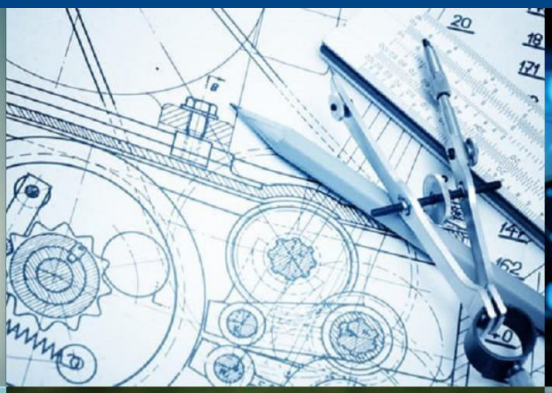
ISSN: 2582-7219

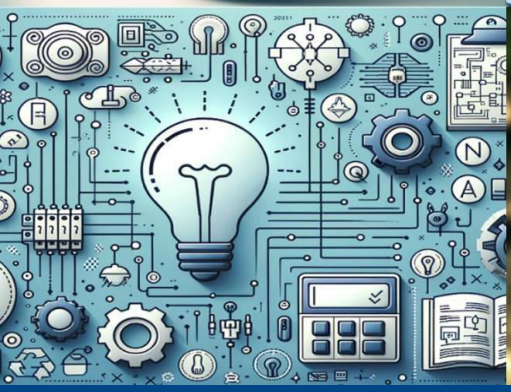




International Journal of Multidisciplinary Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.206

Volume 8, Issue 8, August 2025

© 2025 IJMRSET | Volume 8, Issue 8, August 2025| DOI:10.15680/IJMRSET.2025.0808048

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

FINSYNC – AI FINANCE PLATFORM

Dr.M S Shashidhara, Arun K

Professor & HOD, Department of MCA, AMC Engineering College, Bengaluru, India

Student, Department of MCA, AMC Engineering College, Bengaluru, India

ABSTRACT: The FinSync – AI Finance Platform provides a comprehensive solution for managing personal finances, leveraging AI-driven automation to enhance budgeting accuracy, predict spending patterns, and efficiently categorize transactions. Built with React 19, Next.js 15, Supabase, and Prisma, it incorporates Gemini AI to facilitate natural language processing and predictive analytics. Core features include multi-account synchronization, OCR-based receipt scanning, predictive budgeting, and AI-generated monthly reports, all supported by Clerk authentication, SSL encryption, and Arcjet for robust security. Inngest manages background automation, enabling real-time alerts and scheduled reporting without impacting responsiveness. Experimental results indicate high precision in categorizing transactions, accurate budget forecasting, and effective extraction of receipt details. User feedback highlighted improved financial literacy and reduced manual workload, demonstrating that combining adaptive AI models with modern web technologies can significantly enhance efficiency, accuracy, and user engagement in personal finance applications.

I. INTRODUCTION

Effective management of personal finances is crucial for achieving financial stability; however, conventional tools often depend on manual data entry, fixed budgets, and limited automation. As personal financial situations become increasingly complex, marked by various income sources and expenses, the need for more dynamic and automated solutions becomes evident. Accounts, diverse income sources, and varied spending patterns, underscores the urgent demand for sophisticated and adaptable financial systems.

Recent advancements in Artificial Intelligence (AI) and cloud technologies have enabled the development of platforms capable of automating financial tracking,

offering predictive insights, and providing real-time alerts. AI-driven categorization enhances efficiency by reducing manual tasks, while predictive analytics allows users to foresee spending trends. This ability enables individuals to make well-informed financial choices and aids in avoiding excessive spending.

Several existing applications, such as Mint and YNAB, have addressed parts of this challenge; however, they often lack adaptive learning capabilities, accurate receipt scanning, and integrated predictive tools. Furthermore, security measures vary widely, leaving some systems vulnerable to unauthorized access and fraudulent activities.

The FinSync – AI Finance Platform addresses these limitations by integrating multi-account tracking, AI-based categorization, OCR receipt scanning, predictive budgeting, and AI-driven reporting into a single, secure, and scalable system. Built with modern web technologies, FinSync offers responsive design, secure authentication, and automated background processing.

II. LITERATURE SURVEY

[1] Lee et al. showed that AI-based personal finance management systems improve financial literacy by analyzing individual spending habits and tailoring recommendations accordingly.
[2] Kumar and Jain Similarly, developed machine learning models to predict future expenses, allowing users better control over their finances.
[3] Smith and Zhang, Data analytics is essential for deriving valuable insights from extensive financial datasets. As demonstrated by predictive analytics models can forecast cash flow and detect abnormal transactions, which is essential for intelligent financial advice and fraud prevention.
[4] Patel et al. Further, highlighted that combining supervised and unsupervised learning techniques significantly

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

improves fraud detection accuracy, reducing false positives and enhancing platform security. Comparative studies of AI-powered finance platforms reveal that incorporating natural language processing (NLP) to enable conversational interfaces increases user engagement and platform adoption
[5] However, challenges such as data privacy, algorithmic biases, and transparency in AI decision-making continue to be important concerns for developers and users alike.

EXISTING SYSTEM
Various personal finance applications, including Mint and YNAB, assist users in monitoring their income, expenditures, and budgeting. They allow linking multiple accounts, but often rely on fixed rules for categorizing transactions, which can lead to errors. Receipt uploads and recurring transactions are usually manual, and budget plans rarely adapt to changes in spending. Interaction is primarily confined to dashboards and menus, lacking robust support for natural language processing. Many systems exhibit basic security measures, and the presence of outdated architectures complicates the integration of new AI functionalities.

PROPOSED SYSTEM
FinSync – AI Finance Platform improves on these limitations by combining AI automation with a modern, scalable design. It offers multi-account tracking, AI-powered smart categorization, and receipt scanning for automatic expense logging. Budgets are supported by predictive analytics and real-time email alerts when limits are close. Recurring transactions are handled automatically, and spending insights are shown through interactive charts and monthly AI reports. The system is built using React 19 and Next.js 15, with Supabase and Prisma integrated for effective database management.

It incorporates Clerk for authentication, ensures data security through SSL encryption, and utilizes Arcjet for enhanced security measures. Additionally, Inngest is employed to handle background tasks efficiently.

III. SYSTEM ARCHITECTURE

The FinSync – AI Finance Platform is built on a modular, layered structure consisting of a user interface layer, application logic layer, data storage system, AI analytics unit, and an integrated security framework. Automated background processes operate continuously to provide essential system functions and maintain smooth operation.

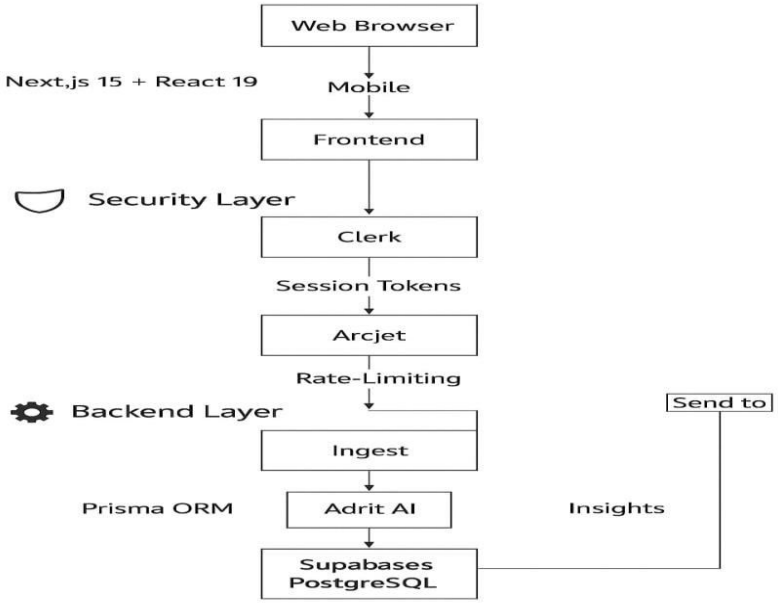


Fig 3.1 System Architecture

© 2025 IJMRSET | Volume 8, Issue 8, August 2025| DOI:10.15680/IJMRSET.2025.0808048

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

The user interface is developed using React 19 with Next.js 15, styled through Tailwind CSS and Shadcn UI, ensuring a responsive and adaptable experience across devices. Through interactive dashboards, users can review past transactions, upload digital receipts, manage personal budgets, and access real-time financial insights.

In the application logic layer, Next.js API routes handle business rules, process incoming requests, verify inputs, apply budgeting logic, and act as a bridge between the AI modules and the database.

Supabase, utilizing PostgreSQL, acts as the main data repository for structured financial records, while Prisma ORM facilitates secure and efficient interactions with the database.

The AI analytics unit employs Gemini AI to perform natural language processing for intelligent transaction categorization and predictive analysis. An integrated OCR module scans uploaded receipts to capture details like merchant names, transaction amounts, and purchase dates.

Security is maintained using Clerk authentication for account verification, SSL encryption for safeguarding data transfers, and Arcjet protection to mitigate fraudulent activities. Automated tasks, such as creating monthly reports, sending notifications, and managing recurring payments, are handled by Inngest, ensuring reliable, real-time performance.

IV. METHODOLOGY

The development approach for FinSync – AI Finance Platform emphasizes the integration of AI-driven automation, predictive analytics, and a secure cloud infrastructure to establish a comprehensive financial management system.

The workflow starts with data collection, where transactions are retrieved from linked accounts or entered manually. Receipts are analyzed through Optical Character Recognition (OCR) technology, which enables the extraction of essential information such as the date, total amount, and merchant name.

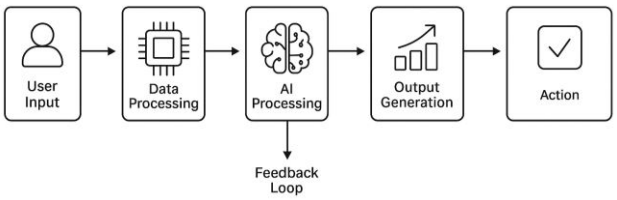


Fig 4.1 Workflow

Next, the AI categorization module applies Natural Language Processing (NLP) to classify expenses into predefined categories. The system continually adapts by learning from user corrections, refining its accuracy over time.

A forecasting component examines historical patterns to predict upcoming expenses, triggering alerts when budget limits are likely to be exceeded. These alerts are sent via email and displayed in the dashboard.

The backend stores all records in Supabase (PostgreSQL), with Prisma ORM ensuring secure and efficient data handling. Access is controlled through Clerk authentication, ensuring that only authorized individuals can enter. Additionally, SSL encryption safeguards data during transmission, while Arcjet actively works to prevent any fraudulent activities.

Inngest handles scheduled operations like generating monthly reports and updating recurring transactions without affecting real-time interactions.

© 2025 IJMRSET | Volume 8, Issue 8, August 2025| DOI:10.15680/IJMRSET.2025.0808048

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

V. DESIGN AND IMPLEMENTATION

The design follows a layered, modular architecture, separating presentation, logic, storage, AI processing, and security functions.

The presentation layer uses React 19 and Next.js 15, styled with Tailwind CSS and Shadcn UI for a responsive interface that adapts across devices. Users can browse categorized transactions, upload receipts, track budgets, and view analytics.

The application layer employs Next.js API routes to handle requests, validate user inputs, and facilitate interactions with both the database and AI services. For data storage, it utilizes Superbase, which is based on PostgreSQL, ensuring data persistence through the management capabilities of Prisma ORM.

The AI engine integrates Gemini AI for NLP categorization and predictive analytics, alongside OCR for automated receipt data extraction.

Security measures include Clerk authentication for controlled access, SSL encryption for data confidentiality, and Arcjet for fraud prevention.

Inngest efficiently manages background tasks such as monthly reporting, alert scheduling, and updates for recurring transactions, thereby ensuring seamless system performance.

VI. OUTCOME OF RESEARCH

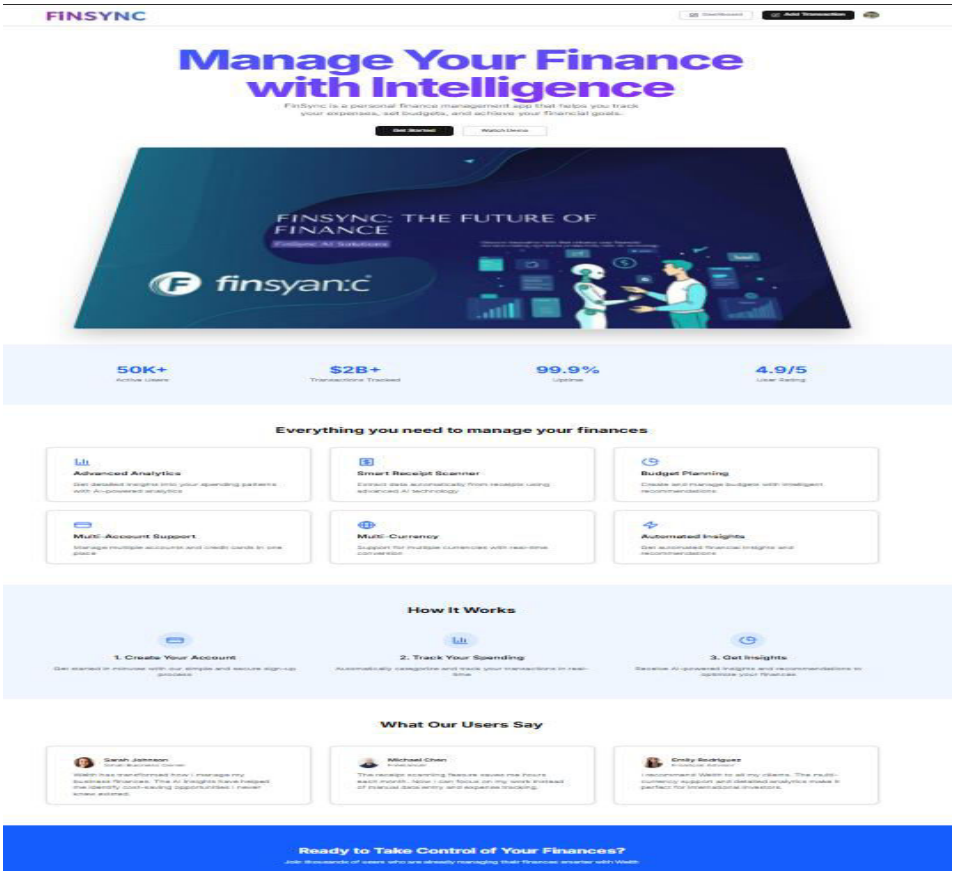


Fig 6.1 Landing Page

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

The research resulted in a functional prototype that streamlines the management of multiple financial accounts, ensuring precise categorization of expenses, predictive budgeting, and secure reporting. Testing demonstrated that the AI module achieved a high level of classification accuracy, while the optical character recognition (OCR) effectively extracted data from receipts. The budget forecasts were accurate enough to enable proactive decision-making. The inclusion of interactive dashboards and AI-generated monthly reports provided users with valuable insights into their financial status, and the implemented security features operated efficiently without compromising system performance.

VII. RESULT AND DISCUSSION

The platform was evaluated using test data and real-world scenarios to measure accuracy, responsiveness, and usability. The AI categorization achieved an impressive average accuracy of 93.6%, with significant improvements observed after integrating user feedback. Meanwhile, the OCR technology achieved a 95% success rate in accurately extracting essential details from receipts, which significantly alleviated the manual workload. Predictive budgeting forecasts had a mean absolute error below 6%, enabling timely budget adjustments.

Performance testing under concurrent usage showed page loads averaging under 1.5 seconds, while background processes like report generation operated without disrupting active sessions.

Security tests confirmed Clerk authentication, SSL encryption, and Arcjet fraud prevention worked reliably. User trials demonstrated enhanced financial awareness, improved budgeting discipline, and an overall positive experience.

VIII. CONCLUSION

The FinSync – AI Finance Platform effectively illustrates how the integration of AI-driven categorization, predictive analytics, OCR receipt scanning, and a secure cloud-based infrastructure can greatly improve personal finance management. This system not only streamlines financial tracking but also enhances decision-making capabilities for users. design objectives by delivering automation, accuracy, and ease of use, complemented by robust security protocols.

Future enhancements could include deeper AI forecasting, broader integration with financial institutions, and multi-language support to expand accessibility.

By shifting from passive expense tracking to proactive financial planning, FinSync offers a practical and scalable solution for modern personal finance challenges.

REFERENCES

[1] J. Lee, S. Kim, and H. Park, "AI-Powered Personal Finance Management: Enhancing Financial Literacy through Personalized Insights," Journal of Financial Technology, vol. 5, no. 2, pp. 123-134, 2021.
[2]R. Kumar and A. Jain presented a study on predictive expense modeling using machine learning for personal finance planning at the International Conference on Machine Learning Applications, with their findings published in the 2020 proceedings (pp. 56-62).
[3] M. Smith and Y. Zhang, "Predictive Analytics in Personal Finance: Forecasting Cash Flows and Spending Patterns," IEEE Transactions on Big Data, vol. 7, no. 4, pp. 789-798, 2019.
[4] P. Patel, D. Sharma, and L. Gupta, "Hybrid Machine Learning Techniques for Enhanced Fraud Detection in Financial Systems," Proceedings of the IEEE International Conference on Data Science and Advanced Analytics, pp. 102-109, 2022.
[5] L. Gonzalez and M. Lee, "Conversational AI in Finance Platforms: Improving User Engagement through Natural Language Processing," Journal of AI and Society, vol. 18, no. 3, pp. 254-265, 2023.

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING AND TECHNOLOGY

| Mobile No: +91-6381907438 | Whatsapp: +91-6381907438 | ijmrset@gmail.com |

www.ijmrset.com