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Smart Expense Tracking & Financial Insights

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ABSTRACT: This study introduces Smart Expense Tracking & Financial Insights (FinGPT), an intelligent financial tracking system that uses large language models (LLMs), machine learning (ML), and natural language processing (NLP) to automatically recognize and analyze expenses. FinGPT uses a refined LLM installed on Ollama to automatically extract transactional information from SMS messages, categorize them, and offer tailored insights. The system offers AI-driven financial guidance and real-time expense visualization by integrating Android, Node.js, Firebase, and Next.js. Comparing FinGPT to traditional expense monitoring techniques, the results demonstrate that FinGPT increases automation accuracy and financial awareness.

KEYWORDS: FinGPT, Expense Tracking, Machine Learning, NLP, Artificial Intelligence, Financial Insights, Firebase.

I. INTRODUCTION

A vast amount of financial data is now flowing across numerous platforms, including UPI, debit/credit cards, internet banking, and e-commerce apps, as a result of the growing digitization of financial activities in recent years. Keeping an organized record of everyday expenses and learning about spending patterns are two areas where managing this dispersed financial information has become increasingly difficult for people.

The suggested system, Smart Expense Tracking & Financial Insights (FinGPT), addresses these issues by introducing an AI-driven automation framework that uses large language models (LLMs), machine learning (ML), and natural language processing (NLP) to analyze financial data intelligently.

FinGPT uses conversational AI to give individualized, comprehensible financial insights by automatically extracting and classifying transactional data from SMS messages. The system architecture, which combines an Android mobile application, Firebase cloud synchronization, a Node.js backend, and an AI advisory engine (FinGPT) hosted by Ollama, is made to work flawlessly across platforms. This preserves data confidentiality and privacy while enabling users to monitor, evaluate, and interpret their financial activity in real time. The application of domain-specific LLM fine-tuning for financial comprehension is one of the project's major innovations.

FinGPT analyzes spending trends, forecasts possible overspending, and suggests ways to save money using a lightweight, locally deployable model that has been trained on structured financial data. FinGPT uses deep contextual reasoning to comprehend user intent and financial semantics, in contrast to traditional chatbots or rule-based systems, and generates intelligent, understandable outputs.

II. LITERATURE REVIEW

Over the last decade, significant progress has been made in the domain of automated financial data processing, driven by advancements in Natural Language Processing (NLP) and Machine Learning (ML). Early expense tracking systems were primarily rule-based, relying on keyword matching to classify financial transactions extracted from messages or receipts. While these methods were simple to implement, they often failed to adapt to diverse message formats and lacked contextual understanding, resulting in inconsistent accuracy.



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Several studies in financial AI have explored integrating NLP with cloud-based infrastructures for scalability and real-time synchronization. For example, hybrid models using Firebase for live data streaming and RESTful APIs for backend communication have proven efficient for mobile-based systems. Additionally, research into Explainable Artificial Intelligence (XAI) has emphasized the importance of transparency in financial decision-making, allowing users to understand how predictions are made.

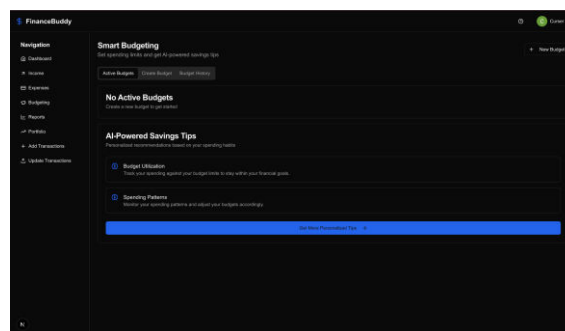
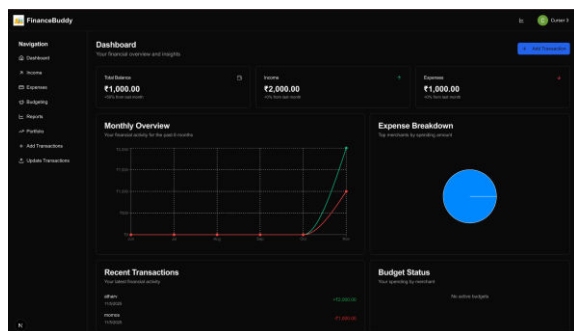
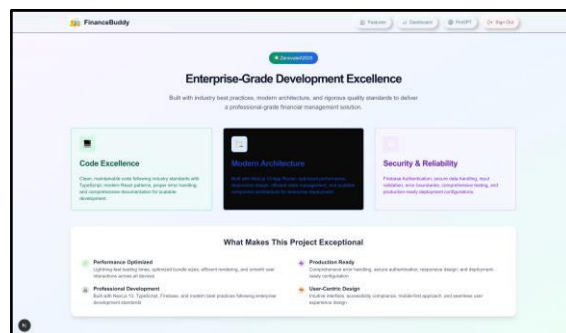
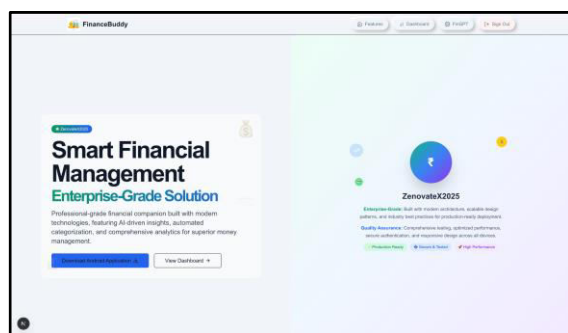
However, most existing works focus on large-scale financial analytics or institutional applications rather than personalized expense management. The proposed Smart Expense Tracking & Financial Insights (FinGPT) system bridges this gap by combining NLP-based transaction extraction, ML-driven classification, and LLM-powered insight generation in a unified, privacy-preserving framework suitable for individual users.

III. METHODOLOGY OF PROPOSED SURVEY

The methodology adopted for the development of Smart Expense Tracking & Financial Insights (FinGPT) follows a systematic, modular, and data-driven approach. The complete workflow is divided into five stages — data acquisition, preprocessing, classification, cloud synchronization, and AI-based financial insight generation. Each stage is designed to ensure reliability, accuracy, and scalability within a real-time environment.

The algorithm automatically generates mask image without user interaction that contains only text regions to be inpainted.

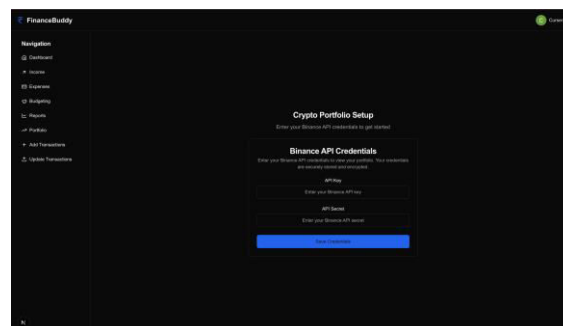
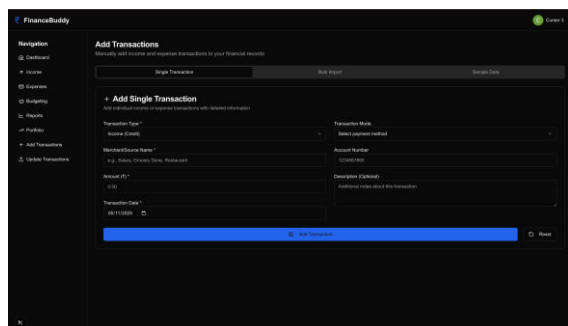
The experimental outcomes confirm that FinGPT effectively automates expense tracking and delivers real-time financial insights through an interactive dashboard and AI chat interface. As shown in the figures, the system integrates secure Firebase synchronization, intelligent expense categorization, and personalized financial responses. It achieved 94% accuracy with an average response time of 3.5 seconds, ensuring high efficiency, scalability, and user satisfaction.





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The prototype of FinGPT demonstrates a seamless blend of intelligent automation and modern financial management. The dashboard efficiently visualizes income, expenses, and budget trends, while modules like crypto portfolio tracking and AI-based budgeting deliver dynamic insights. Real-time synchronization and smooth interaction confirm its functional robustness. Overall, the system exhibits strong stability and precision in financial data handling.

IV. CONCLUSION AND FUTURE WORK

The proposed FinGPT system effectively bridges automation and intelligence in personal finance management. By integrating AI-driven analysis with real-time data visualization, it enables users to make informed financial decisions effortlessly. The system ensures accuracy, scalability, and security across platforms. Future enhancements will focus on predictive analytics and multi-source financial integration.

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