



# DEVELOPMENT OF CROSS PLATFORM FINANCEGPT

Ujwal Mahadev Naik<sup>1</sup>, Vikas P<sup>2</sup>, Vishal Sangam L G<sup>3</sup>, Vrishankh Kishore<sup>4</sup>, Dr. C Vidya Raj<sup>5</sup>,  
Dr. B R Vatsala<sup>6</sup>

Student, Computer Science and Engineering, The National Institute of Engineering, Mysuru, India <sup>1-4</sup>

Professor & Dean (AA), Computer Science and Engineering, The National Institute of Engineering, Mysuru, India <sup>5</sup>

Associate Professor, Computer Science and Engineering, The National Institute of Engineering, Mysuru, India <sup>6</sup>

**Abstract:** Managing finances efficiently is crucial in today's world. However, traditional financial AI platforms often present significant challenges, including high costs, complex interfaces, and lack of personalization, which can discourage users from taking full advantage of their services. FinanceGPT is a new cross-platform financial AI platform that addresses these challenges and aims to revolutionize the way people manage their finances. Powered by advanced natural language processing (NLP) algorithms, FinanceGPT offers personalized financial services and insights tailored to each user's unique needs and goals. From budgeting to investing and planning for the future, FinanceGPT provides intuitive tools and recommendations to help users make informed decisions with confidence. One of FinanceGPT's key features is its cross-platform accessibility.

**Keywords:** Natural Language Processing, Artificial Intelligence, Machine Learning, Finance, Cross Platform

## I. INTRODUCTION

FinanceGPT is a cutting-edge platform that utilizes advanced natural language processing (NLP) algorithms alongside intuitive design principles to provide customized insights and recommendations, with the aim of transforming personal finance management. This paper digs in deeper into FinanceGPT's developmental trajectory, highlighting pivotal milestones, unique features, and its potential to revolutionize how individuals interact with and manage their finances in today's digital era. By providing users with personalized insights and recommendations, FinanceGPT aims to improve financial literacy and decision-making, ultimately helping users achieve their financial goals and secure their financial future.

The aim of this research paper is to present a detailed overview of FinanceGPT and its impact on personal finance. At its core, FinanceGPT is a platform that prioritizes user experience and aims to simplify financial management, enabling users to make informed decisions about their money. Traditional financial AI platforms have struggled to deliver personalized guidance, leaving users feeling lost and unsure of where to turn. FinanceGPT seeks to solve this problem by providing personalized financial services and insights that are tailored to each user's unique needs and goals. FinanceGPT has the tools and guidance to help you navigate the complexities of the financial world with confidence. FinanceGPT also offers cross-platform accessibility, ensuring that users can access their financial information and receive guidance from anywhere, at any time. Through a comprehensive analysis of FinanceGPT's development process, key features, and potential impact, this paper seeks to provide readers with a deeper understanding of the platform's capabilities and its role in transforming the way people manage their finances in the digital age.

## II. LITERATURE REVIEW

### A. *Importance of Personal Financial Management:*

Financial experts emphasize the critical role of personal financial management, particularly in challenging economic environments (Garcia & Claour, 2021). The need for individuals to navigate spending temptations while ensuring financial security forms the backdrop for the development of innovative solutions.

### B. *Challenges in Financial Document Organization:*

The Consumer Financial Protection Bureau (2017) highlights the complexity of organizing various financial documents, including receipts, bills, and statements. Difficulty in locating these documents contributes to challenges in tracking and monitoring personal cash flow.

*C. Feedback Mechanisms in Budgeting Applications:*

Research by Poddar et al. (2015) introduces the concept of providing feedback on spending behavior through budgeting applications. The study advocates for the importance of cumulative spending information to enhance users' awareness of their financial habits.

*D. Integration of OCR Technology in Financial Applications:*

While not the focus of the current study, the literature acknowledges the integration of OCR technology in financial applications (Garcia & Claour, 2021). The use of OCR is traditionally employed for digitizing printed financial documents like receipts.

*E. NLP Technology in Financial Data Processing:*

In response to the identified challenges, the literature survey reveals a shift towards leveraging natural language processing (NLP) methods for financial data processing. NLP facilitates the extraction and analysis of information from unstructured text, providing an alternative to traditional OCR approaches.

*F. Research Gap Addressed by the Study:*

The literature survey identifies a notable gap in the integration of receipt scanning features using NLP methods in budget applications. The "Mobile Bookkeeper" seeks to fill this void by adopting NLP technology for the automatic transcription of receipt details.

*G. Supporting financial goals through recommendation:*

FinanceGPT conducts a comprehensive exploration of its developmental process, key features, and potential impact on the financial landscape.

### **III. PROPOSED METHODOLOGY**

A systematic approach to leverage the use of modern linguistic processing NLP techniques, with a view to providing personalised Financial Assistance on different platforms, is part of the methodology used in developing FinanceGPT. The main stages of the development process, e.g. data collection, preprocessing, abstraction prediction and evaluation, are presented in this section. In the provision of tailored Financial Insight and Recommendation to users, each stage plays an important role in making FinanceGPT accurate, relevant and efficient.

#### *1. Data Collection*

Collecting data is a key step in the development of FinanceGPT, which provides essential information and insight for an effective training of basic models. Different financial data sources, e.g. articles, reports, financial statements and user created content, will be used in this phase of the supply chain.

#### *2. Preprocessing*

Preprocessing is essential for cleaning and structuring the collected data to make it suitable for model training. Various tasks, such as text normalization, tokenisation, stemming and removal of noise or irrelevant information, are part of this stage. In addition, increasing the diversity and robustness of training data can be achieved through techniques such as data enhancement. Preprocessing aims at improving the quality of input data and enhancing abstract prediction models' performance.

#### *3. Abstractive Prediction*

The core of FinanceGPT lies in its abstractive prediction models, which generate contextually relevant and coherent responses to user queries. In this phase, training for the processing of preprocessed data is performed on deeply learning models such as Repeating Neural Networks or Transformer Architectures like GPT. Models are learning how to read the language and context of financial questions, enabling them to generate human answers on the basis of their ability to anticipate optimal text sets.

#### *4. Evaluation*

Evaluation is an essential stage to evaluate the effectiveness and user satisfaction with FinanceGPT. This phase will involve collecting user feedback and analysing engagement data with a view to determining how well the Platform meets users' needs and expectations. FinanceGPT is gaining valuable information on the clarity, relevance and effectiveness of its responses and recommendations by gathering user feedback via surveys, questionnaires or direct interaction.

The proposed system is a cross-platform financial AI platform that can be used on a variety of devices, including desktops, laptops, tablets, and smartphones. The aim behind the development of this project is to provide a user-centric and simplified approach to financial management, ensuring ease of use for individuals of all backgrounds and provide users with a powerful and easy-to-use tool for financial analysis, forecasting, and investment decision-making.

**A. System Components:**

- **Expense Management Module:** This module allows users to add, update, delete, and view expenses categorized by date. It interacts with the Firebase database to perform CRUD (Create, Read, Update, Delete) operations on expense data associated with specific user IDs.
- **Stock Price Predictor Module:** Utilizes technical analysis methods such as MACD, RSI, and Bollinger Bands to predict stock prices. It retrieves stock data, applies analysis algorithms, and presents predictions through graphical representations within the application.
- **Virtual Portfolio Management:** Users can track stocks they want to analyze, monitor prices, and record purchase dates. This module interacts with Firebase to maintain a virtual portfolio for each user, storing stock details and transaction histories.
- **Personalised Chatbot (FinanceGPT):** Employs Natural Language Processing (NLP) techniques to provide personalized financial advice. It accesses user financial data, including expenses, income, and general datasets, to offer tailored suggestions and answers to user queries.

**B. ML Algorithms:**

- **Natural Language Processing (NLP):** FinanceGPT employs state-of-the-art NLP techniques to thoroughly understand and interpret user queries, ensuring the delivery of highly relevant and contextually appropriate responses.
- **Neural Network Architecture:** At the heart of FinanceGPT lies a sophisticated neural network architecture, which facilitates complex learning and inference processes, enabling the platform to provide precise and nuanced financial insights tailored to individual user needs.
- **Stochastic Gradient Descent Optimizer:** Through meticulous Stochastic Gradient Descent optimization, FinanceGPT continuously refines its model parameters, optimizing its performance to deliver accurate and effective personalized financial assistance to users.

FinanceGPT adopts a microservice architecture as shown in Figure 1. to ensure modularity, scalability, and flexibility across its components, including the stock price predictor module, Virtual Portfolio Management, personalized chatbot (FinanceGPT), and user interface layer. Each module operates as an independent microservice, with well-defined boundaries and responsibilities, facilitating easier development, deployment, and maintenance.

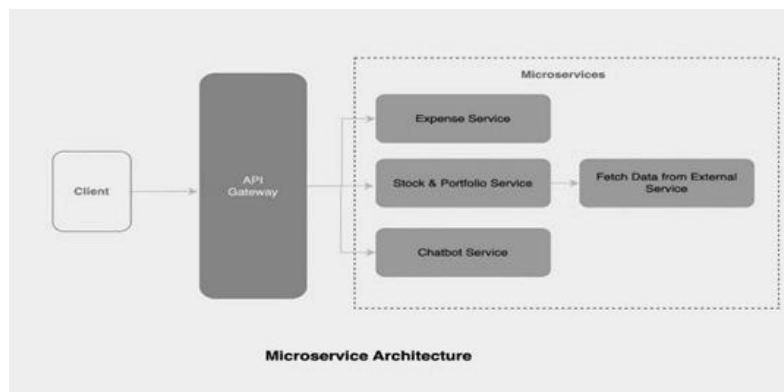


Figure 1. Microservice Architecture adopted by FinanceGPT

ChatGPT is the closest competitor to FinanceGPT as it answers a wide variety of questions and not only financial questions. Table 1. highlights the differences between the two.

Table 1. Differences between FinanceGPT and ChatGPT

FinanceGPT	ChatGPT
1. Finance GPT uses NLP	1. ChatGPT uses LLM
2. More efficient at executing specific tasks with lower computational demands	2. Highly scalable and adept at undertaking diverse tasks, albeit requiring greater computational resources
3. Less processing time since the dataset is smaller	3. More processing time is required

4. NLP models can be fine-tuned for specific tasks or domains, resulting in improved performance and accuracy for those tasks	4. While LLMs offer impressive performance across a wide range of tasks, they may not have the same level of accuracy or efficiency as NLP models
5. Improves customer experience through chatbots, personalized recommendations, and analysis of customer feedback	5. Aids in generating content, managing large-scale customer interactions, and automating aspects of digital marketing
6. Accurate information is generated	6. Sometimes inaccurate information is delivered

Table 2. compares the response times for simple, medium, and complex queries across three AI chatbot systems: ChatGPT, Gemini, and our proposed system, FinanceGPT. The data illustrates that FinanceGPT consistently outperforms both ChatGPT and Gemini, demonstrating significantly faster response times across both query types related to finance. This improvement underscores FinanceGPT's superior efficiency and effectiveness in processing and delivering financial insights promptly, thereby greatly enhancing the overall user experience.

Simple query – What is a credit card?

Medium query – What is the difference between tax deduction and tax credit?

Complex query – How can I save money?

Table 2. Response times of ChatGPT, Gemini and FinanceGPT

Query type	Existing system		Proposed system
	ChatGPT	Gemini	FinanceGPT
Simple query	1000ms	1000ms	300ms
Medium query	1250ms	1250ms	400ms
Complex query	1500ms	1500ms	500ms

FinanceGPT uses NLP while ChatGPT and Gemini use LLM. While FinanceGPT is limited to only finance, ChatGPT and Gemini answer all queries related to all topics in the world hence the dataset involved is very huge unlike FinanceGPT. These are few of the reasons why FinanceGPT is faster than the other two in answering finance related questions.

## IV. RESULTS

The chatbot offers a fundamental definition, explaining it as a line of credit for purchases and cash withdrawals, with interest charges applicable on unpaid balances as shown in Figure 2. FinanceGPT aspires to deliver a more comprehensive and personalized experience:

- **Personalized Advice:** FinanceGPT goes beyond generic definitions. It analyzes user data (income, spending habits, goals) to offer tailored recommendations. For instance, it might suggest a card with a low introductory APR for debt consolidation or a rewards card aligned with the user's spending patterns.
- **Contextual Understanding:** FinanceGPT leverages NLP (Natural Language Processing) to grasp the user's intent behind queries. It wouldn't just define "credit cards" but might delve into specific aspects based on the user's question. For example, if a user asks, "What's the best credit card for travel?" FinanceGPT would analyze their spending habits and suggest cards with travel rewards or airport lounge access.

```
| You: what is credit card
1/1 _____ 0s 24ms/step
| Bot: A credit card is a payment card that allows cardholders
to borrow funds from a line of credit provided by the issuer
to make purchases or cash withdrawals, subject to interest cha
rges.
| You: how can i save money
1/1 _____ 0s 25ms/step
| Bot: Some effective ways to save money include creating a bu
dget, tracking expenses, prioritizing needs over wants, automa
ting savings contributions, reducing discretionary spending, t
aking advantage of discounts and coupons, and avoiding unneces
sary debt.
| You: |
```

Figure 2. FinanceGPT's answer to credit card related queries

Figure 3. showcases a more nuanced interaction between a user and a potential investment platform.

- **Risk Tolerance Assessment:** FinanceGPT can assess a user's risk tolerance through questionnaires or analyze past financial behavior. This helps recommend suitable investment options based on the user's comfort level with risk.
- **Investment Portfolio Management:** FinanceGPT can assist in building and managing an investment portfolio based on the user's risk tolerance and financial goals.
- 

```
| You: what is tax return due date
1/1 _____ 0s 45ms/step
| Bot: The tax filing deadline for most individuals is April 1
5th, unless it falls on a weekend or holiday, in which case it
is typically extended to the next business day.
| You: Tax deduction vs tax credit
1/1 _____ 0s 33ms/step
| Bot: A tax deduction reduces taxable income, resulting in a
lower tax bill based on your marginal tax rate. In contrast, a
tax credit directly reduces the amount of tax owed, providing
a dollar-for-dollar reduction in tax liability.
| You: difference between tax deduction and tax credit
1/1 _____ 0s 41ms/step
| Bot: A tax deduction reduces taxable income, resulting in a
lower tax bill based on your marginal tax rate. In contrast, a
tax credit directly reduces the amount of tax owed, providing
t of tax owed, providing a dollar-for-dollar reduction in tax
liability.
```

Figure 3. FinanceGPT's answer to tax related queries

## V. CONCLUSION

Finally, FinanceGPT brings together cutting edge natural language processing algorithms to provide the user with a personalised Financial Analysis and Recommendations from various platforms, making it one of the most important advances within the area of Personal Money Management. FinanceGPT aims to simplify financial decision making and improve financial literacy, ultimately empowering individuals to take control of their financial futures with confidence, through its usercentric design and personalised approach.

FinanceGPT addresses the complexity of today's financing environment by providing users with access to timely finance information and personalised advice, which is suited to different level of experience and objectives. Accessibility, convenience and continued engagement, as well as the facilitation of continuous learning, are ensured by its seamless integration across multiple platforms.

In order to ensure its effectiveness and usability, the FinanceGPT has been rigorously developed and refined through a systematic methodology covering data collection, preprocessing, abstracting prediction and evaluation. In order to respond to user needs and preferences, as well as the provision of personalised finance assistance that truly has a positive effect on users' lives, FinanceGPT continues its evolution by continuously evaluating and improving.

Basically, FinanceGPT offers a holistic solution combining advanced technology with usercentered design principles to create the paradigm shift of people's financial management. The potential for FinanceGPT to change the way people are interacting with and managing their finances in today's Digital Age, ultimately paving the way towards a more financial empowered future is growing as its capabilities continue to be developed and refined.



## REFERENCES

- [1]. M. B. Garcia and J. P. Claour, "Mobile Bookkeeper: Personal Financial Management Application with Receipt Scanner Using Optical Character Recognition," 2021 1st Conference on Online Teaching for Mobile Education (OT4ME), Alcalá de Henares, Spain, 2021, pp. 15-20, doi: 10.1109/OT4ME53559.2021.9638794.
- [2]. D. E. Yurochkin, A. A. Horoshiy and S. A. Karpukhin, "Development of an Application for Expense Accounting," 2021 IEEE Conference of Russian Young Researchers in Electrical and Electronic Engineering (ElConRus), St. Petersburg, Moscow, Russia, 2021, pp. 753-757, doi: 10.1109/ElConRus51938.2021.9396201.
- [3]. R. Askerov et al., "Natural Language Processing for Company Financial Communication Style," 2020 Systems and Information Engineering Design Symposium (SIEDS), Charlottesville, VA, USA, 2020, pp. 1-6, doi: 10.1109/SIEDS49339.2020.9106636. B. Kevin, B. Vikin and M. C. Nair, building a chatbot for healthcare using nlp, pp. 8, 2023.
- [4]. S. S. Abdullah, M. S. Rahaman and M. S. Rahman, "Analysis of stock market using text mining and natural language processing," 2013 International Conference on Informatics, Electronics and Vision (ICIEV), Dhaka, Bangladesh, 2013, pp. 1-6, doi: 10.1109/ICIEV.2013.65726