Finchat: LLM-Powered Finance Assistant for WhatsApp Integration

S.Thanigaivel, M. Ragupathi.

ME CSE Operations Research

Abstract

The project *Finchat* aims to develop a finance assistant chatbot integrated with WhatsApp, leveraging Large Language Model (LLM) technology to provide users with finance-related information and insights. The chatbot utilizes the OpenAI API for natural language processing and a custom-built LAMA-3 8B model for generating finance insights. The workflow involves extracting user queries, retrieving historical financial data, preprocessing data for model input, and delivering personalized responses to users via WhatsApp.

1 Introduction

Chatbots have become instrumental in delivering personalized services and information in the digital age. This project introduces *Finchat*, a finance assistant chatbot designed to interact with users via WhatsApp, offering real-time finance analysis and recommendations. By integrating advanced LLM technologies, such as the OpenAI API and a custom LAMA-3 8B model, *Finchat* aims to enhance user engagement and provide valuable financial insights.

2 Problem Statement

The increasing complexity of financial markets and the need for quick access to relevant financial data pose challenges for users seeking accurate and personalized information. Therefore, there is a need for an intelligent chatbot solution that can understand user queries, retrieve pertinent financial data, and deliver meaningful insights in real time through a familiar platform like WhatsApp.

3 Objectives

The objectives of this project are:

- Develop a robust chatbot system capable of interpreting user queries related to finance.
- Integrate LLM technologies (OpenAI and LAMA-3 8B model) to extract insights from historical financial data.
- Enable seamless interaction between users and the chatbot via the WhatsApp Business API.
- Provide personalized and accurate finance recommendations and analysis to users.

4 Proposed System Architecture

The proposed system architecture delineates the steps for processing a user's finance-related query on WhatsApp, leveraging LLM technologies and financial APIs to deliver insights and responses efficiently.

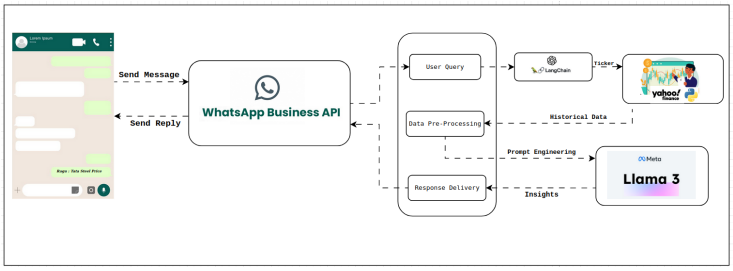

Figure 1: System Architecture

The system workflow begins with a user typing a text query in WhatsApp, utilizing the WhatsApp Business API for communication. The incoming message is then processed to extract and isolate the user's specific query. Subsequently, the OpenAI API is employed to identify relevant financial ticker symbols, such as AAPL (Apple Inc.), within the user's query. Using the extracted ticker symbol, the system retrieves historical financial data, such as stock prices, from Yahoo Finance (yfinance) via its API. The retrieved data undergoes preprocessing to prepare it for input into the LLM, including prompt engineering to structure the input appropriately. The preprocessed data along with the crafted prompt are then passed to the LAMA-3 8B model, a custom LLM designed for finance insights. The LAMA-3 8B model processes the input data and prompts it to generate insights or recommendations related to the user's query. Finally, the system responds to the user's query by sending the generated insights or

analysis results back via the WhatsApp Business API. This integrated workflow seamlessly utilizes LLM technologies and financial APIs to deliver timely and relevant information to users on the WhatsApp platform.

5 Results and Analysis

The analysis of Finchat's performance highlights notable user engagement but identifies areas requiring improvement. While the LLM generally delivers accurate responses, response delays due to computational constraints impact efficiency. Understanding user behavior patterns underscores the need to optimize chatbot responses for a better user experience. To enhance Finchat's real-world impact, addressing response delays through increased computational resources and LLM refinement is crucial. These improvements will maximize Finchat's effectiveness in providing users timely and accurate finance-related insights. For detailed information on setting up and testing the FinChat project, including results and analysis, refer to the repository: https://github.com/ragu8/FinChat

6 Conclusion

Finchat presents a robust finance assistant chatbot that leverages state-of-the-art language models and integrates seamlessly with WhatsApp to provide personalized finance insights efficiently. By combining advanced LLM technologies with real-time data retrieval, Finchat enhances user engagement and delivers accurate financial recommendations effortlessly. This project emphasizes the importance of intelligent chatbot solutions in meeting the evolving needs of users seeking quick and relevant financial information.