Financial Research Agent - 52-Week High Stock Analysis

Introduction

The **Deep Research Agent** is an AI-powered tool designed to analyze **52-week high stocks in the Indian stock market** and provide **structured financial insights**. It uses **financial APIs** to fetch stock data, **Zephyr-7B LLM** to summarize insights, and **FAISS-based RAG** to enhance Q&A capabilities.
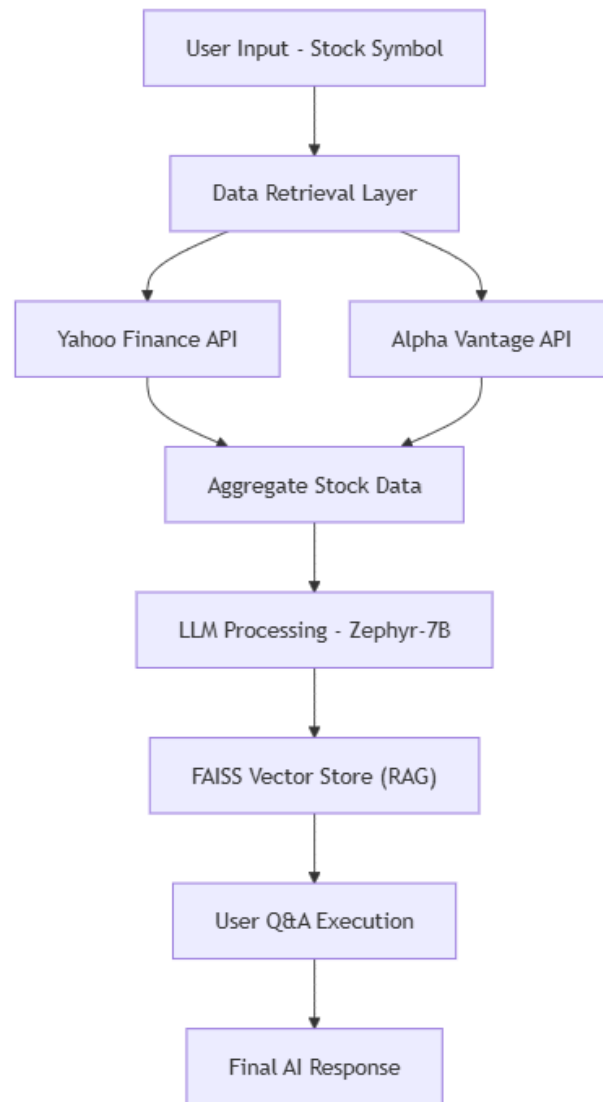
Technical Stack

- **Financial Data APIs**: Alpha Vantage, Yahoo Finance

- **Machine Learning**: Zephyr-7B via Hugging Face

- **Vector Database (RAG)**: FAISS for information retrieval

- **Agent Orchestration**: LangChain with tools for automated data processing

Components & Workflow

1. User Input → User provides a stock symbol (e.g., *RELIANCE.NS*).
2. Stock Data Retrieval → Fetches historical & financial data using:

- Yahoo Finance API (52-week high, last month's performance).

- Alpha Vantage API (daily price movements).

3. LLM Processing (Zephyr-7B) → Summarizes stock data into structured insights.
4. FAISS Vector Store (RAG) → Stores stock summaries for later retrieval.
5. User Q&A (RAG + LLM) → Answers user questions using retrieved stock insights and LLM-generated analysis.

Agent Interaction Diagram

The diagram below illustrates how different components interact in the AI research agent.

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          │   User Input - Stock Symbol  │
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          ┌─────────────────────────────┐
          │     Data Retrieval Layer     │
          └─────────────────────────────┘
               │                   │
               ▼                   ▼
   ┌───────────────────┐  ┌───────────────────┐
   │ Yahoo Finance API │  │ Alpha Vantage API │
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               │                   │
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          ┌─────────────────────────────┐
          │     Aggregate Stock Data     │
          └─────────────────────────────┘
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          ┌─────────────────────────────┐
          │  LLM Processing - Zephyr-7B  │
          └─────────────────────────────┘
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          ┌─────────────────────────────┐
          │    FAISS Vector Store (RAG)  │
          └─────────────────────────────┘
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          ┌─────────────────────────────┐
          │      User Q&A Execution      │
          └─────────────────────────────┘
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          ┌─────────────────────────────┐
          │      Final AI Response       │
          └─────────────────────────────┘
```

📊 Example Run

```
Enter a stock symbol: RELIANCE.NS

📈 Short Summary of Last Month:

    📊 **RELIANCE.NS - Last Month Summary** 📊
    - **High:** 1281.00
    - **Low:** 1156.00
    - **Close Price:** 1276.35
    - **% Change:** 3.88%
    - **Total Trading Volume:** 243,133,879
```

📊 Summarized Stock Data (LLM Generated):

```
  **Example Output:**
  - Market sentiment: Bullish trend with a high trading volume, indicating strong investor interest.
- Investment risks: The stock's price is close to its 52-week high, which could indicate a potential market correc
tion or profit-taking by investors. Additionally, the company's financial performance and future growth prospects
should be closely monitored before making any investment decisions.
- Final recommendation: Based on the current market conditions and analysis, we recommend a buy rating for RELIANC
E.NS with a target price of $1320. However, investors are advised to conduct their own research and consult with f
inancial advisors before making any investment decisions.
```

💬 Q&A Example

User Query:

```
Ask a question about the stock data (or type 'exit' to quit): What are the key risks of investing in RELIANCE.NS?
```

Agent Response:

```
  **Your Response:**
  Thank you for your question regarding RELIANCE.NS. After analyzing the stock data, I can provide some insights into the key risks associated with investing i
n this company.

  Firstly, one major risk to consider is the high debt levels of RELIANCE Industries Limited (RIL), which currently stand at INR 265 billion ($3.7 billion) as
of March 2021. This level of debt could potentially put a strain on the company's cash flows, making it more difficult for RIL to meet its interest payments or r
epay principal when due. As a result, there is a risk that RIL may have to restructure its debt or default on its obligations, which would negatively impact the
value of the company's equity.

  Secondly, another potential risk is the intense competition faced by RIL in many of its core business segments, such as petrochemicals, telecommunications, a
nd retail. With several large players operating in these markets, there is a risk that RIL may lose market share or face pricing pressures, which could lead to l
ower profitability and margins over time. Additionally, there is a risk that regulatory changes or policy shifts could negatively affect RIL's operations in thes
e areas, further exacerbating any competitive pressures.

  Thirdly, there is also a risk related to the cyclical nature of certain industries in which RIL operates, such as oil and gas. For example, during periods of
low oil prices, RIL's earnings from its refining and marketing segment may be negatively affected, as demand for refined products declines and margins compress.
Similarly, during economic downturns, consumer spending patterns may shift away from discretionary items like luxury goods, which could hurt RIL's retail segmen
t.

  Overall, while RIL has a strong track record of growth and profitability, investors should be aware of these risks and monitor the company's performance clos
ely to ensure that it remains financially sound and able to weather any challenges that arise in the future.
Ask a question about the stock data (or type 'exit' to quit): █
```

Conclusion & Future Improvements

✅ **Current Capabilities:** The agent successfully fetches, analyzes, and answers questions about stock market trends.

✅ **Future Enhancements:**

- **Improved LLM model (Mistral-7B or GPT-4o)** for better summarization.

- **Additional stock indicators (RSI, MACD, Moving Averages)**.

- **Real-time data fetching for live market updates.**

This AI agent provides **valuable financial insights** with automated analysis, making stock research **faster and more efficient**.