**Project Report: Financial Analysis Chatbot**

**1. Overview**

I have developed an AI-powered **Retrieval-Augmented Generation (RAG) chatbot** that provides **financial insights** on **Microsoft, Apple, and Tesla** based on **10-K filings** and historical financial data. The chatbot is designed to help users understand **key financial trends, company performance, and revenue patterns** using **simplified, jargon-free language**.

**2. How It Works**

* **Data Extraction:** The chatbot processes a single **HTML file** containing financial data.
* **Embedding & Retrieval:**
  + **LangChain embeddings** convert the extracted text into vector representations.
  + **FAISS vector store** is used to **retrieve the most relevant** financial data based on user queries.
  + A **history-aware retriever** ensures contextual continuity in conversations.
* **Response Generation:**
  + The **LLM (OpenAI GPT-based)** model generates responses using the retrieved financial insights.
  + Responses are designed to be **concise, easy to understand, and informative**.
* **Interactive Dialogue:**
  + Users receive **follow-up questions** to guide further exploration.
  + The chatbot suggests **related financial metrics** to encourage deeper analysis.
* **Visualization Guidance:**
  + While the chatbot does not generate graphs, it **suggests** how charts (e.g., line graphs for revenue trends, bar charts for liabilities vs. assets) could improve data comprehension.

**3. Predefined Queries and Capabilities**

The chatbot can answer:

**1. Revenue trends:** *"How did Tesla’s revenue change over the last three years?"*  
**2. Net income analysis:** *"What was Microsoft’s net income in 2023?"*  
**3. Financial comparisons:** *"Compare Apple’s total assets in 2022 vs. 2024."*  
 4. **Growth trends:** *"How has Microsoft’s revenue grown year over year?"*  
 5. **Summarized insights:** *"Summarize Tesla’s financial performance in 2023."*

**4. Limitations**

🔹 **Limited to predefined data:** The chatbot only provides insights based on the uploaded HTML file; it does not fetch real-time financial updates.  
🔹 **No real-time graph generation:** While it describes useful visualizations, it does not create charts.  
🔹 **Context length constraints:** Long conversations may lose older context, affecting responses in extended interactions.

**5. Future Enhancements**

🔹 **Live Data Integration:** Connect to APIs for real-time stock and financial updates.  
🔹 **Graph Generation:** Implement Matplotlib or Plotly for **automated chart creation**.  
🔹 **Expanded Financial Coverage:** Include more companies and additional financial reports.

**Conclusion**

This chatbot provides an **interactive, user-friendly, and finance-focused AI assistant** that simplifies financial analysis for **Microsoft, Apple, and Tesla**. By leveraging **RAG techniques, embeddings, and LLM capabilities**, it offers **accurate, easy-to-understand** financial insights while promoting user engagement through **follow-up queries and suggested topics**.