Financial Advisor Chatbot
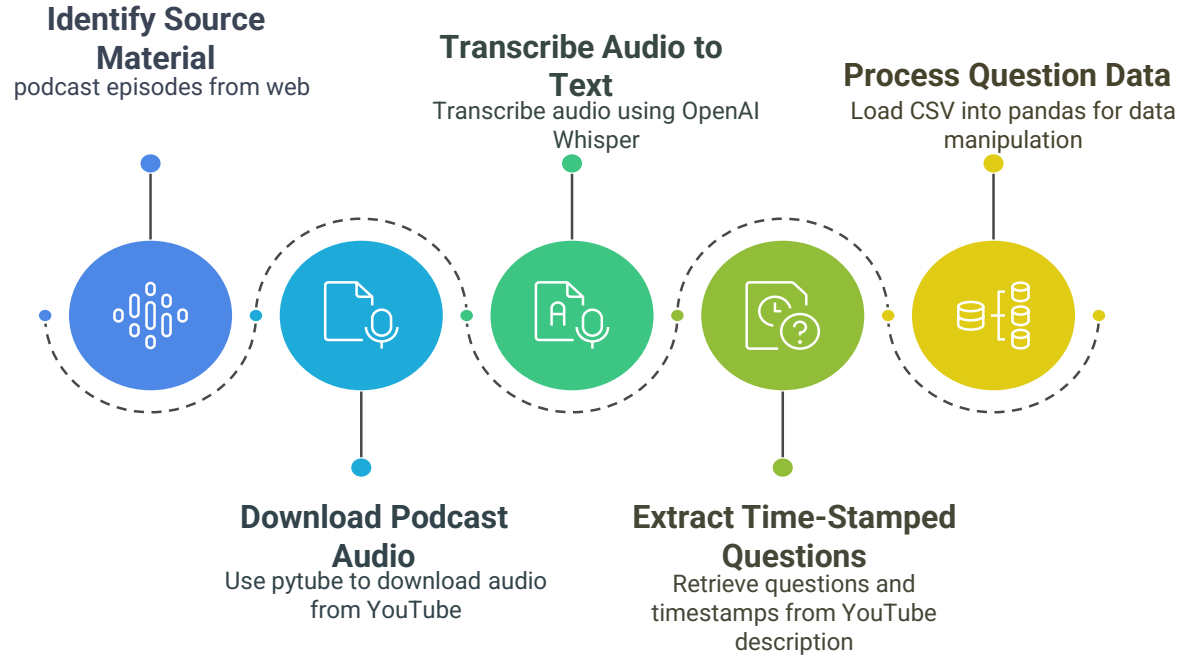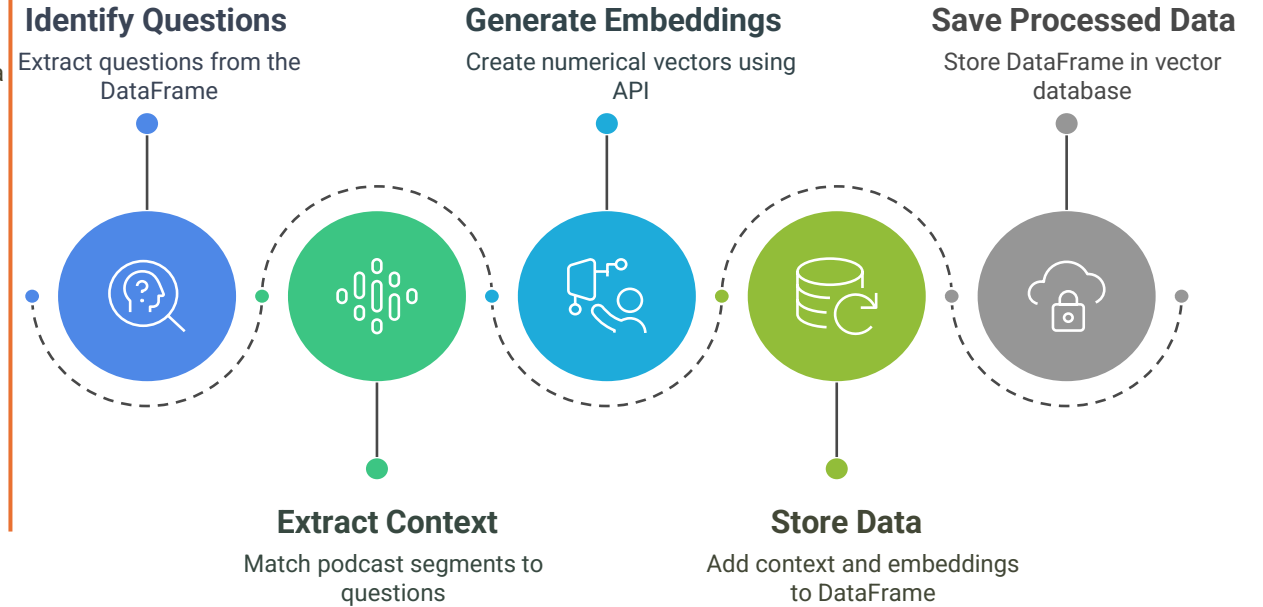
Development Phases of Financial Advisor
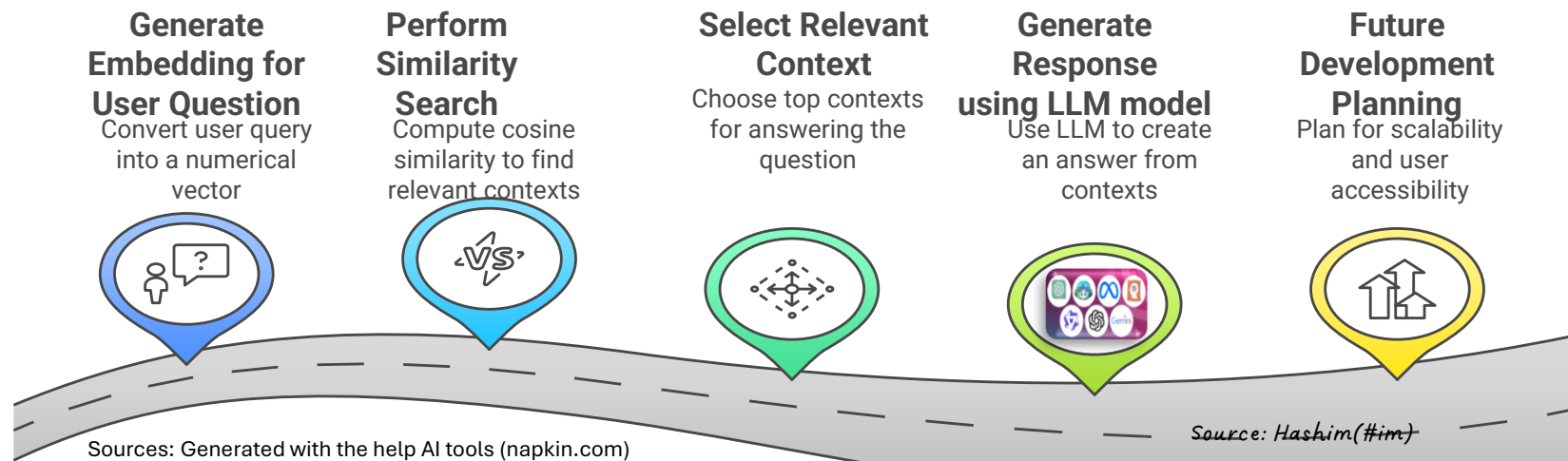
Data Acquisition and Preparation from Podcast Phase 1

Identify Source Material
podcast episodes from web

Transcribe Audio to Text
Transcribe audio using OpenAI Whisper

Process Question Data
Load CSV into pandas for data manipulation

Download Podcast Audio
Use pytube to download audio from YouTube

Extract Time-Stamped Questions
Retrieve questions and timestamps from YouTube description

Podcast Transcript Embedding Process Phase 2

Identify Questions
Extract questions from the DataFrame

Generate Embeddings
Create numerical vectors using API

Save Processed Data
Store DataFrame in vector database

Extract Context
Match podcast segments to questions

Store Data
Add context and embeddings to DataFrame

Question-Answering System Implementation Phase 3

Generate Embedding for User Question
Convert user query into a numerical vector

Perform Similarity Search
Compute cosine similarity to find relevant contexts

Select Relevant Context
Choose top contexts for answering the question

Generate Response using LLM model
Use LLM to create an answer from contexts

Future Development Planning
Plan for scalability and user accessibility

Business Problem Statement:
Need for a **customizable, intelligent question-answering system** that can leverage up-to-date information sources, retrieve relevant insights efficiently, handle sensitive data with control, and deliver responses that reflect expert-level communication—ultimately enhancing client trust and decision-making.
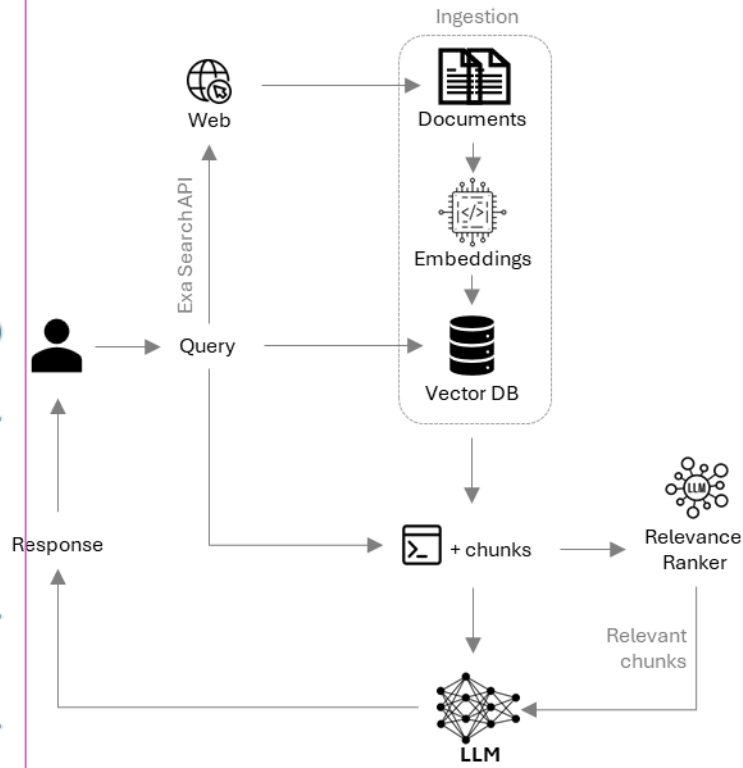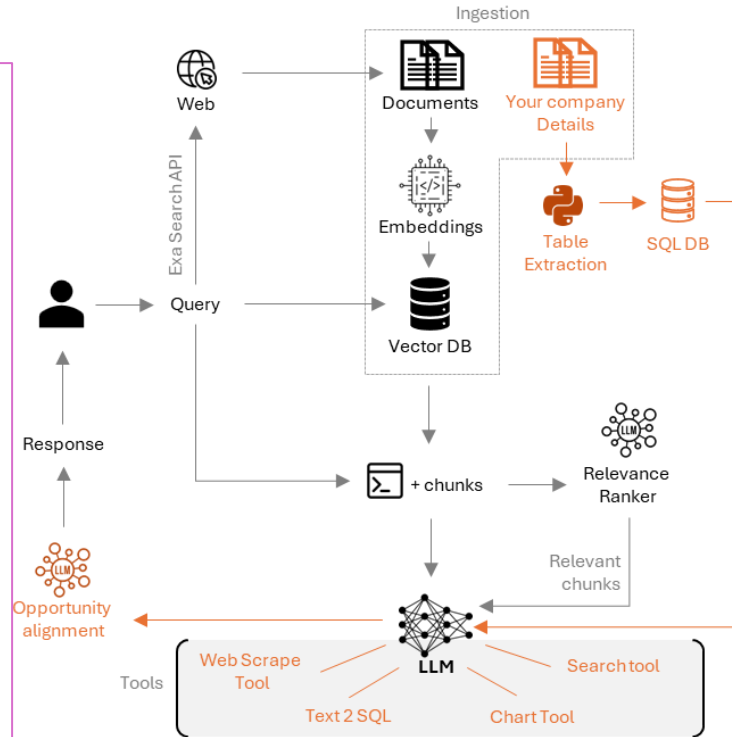
Corrective RAG - Agentic Framework

Traced and observed using comet Opik
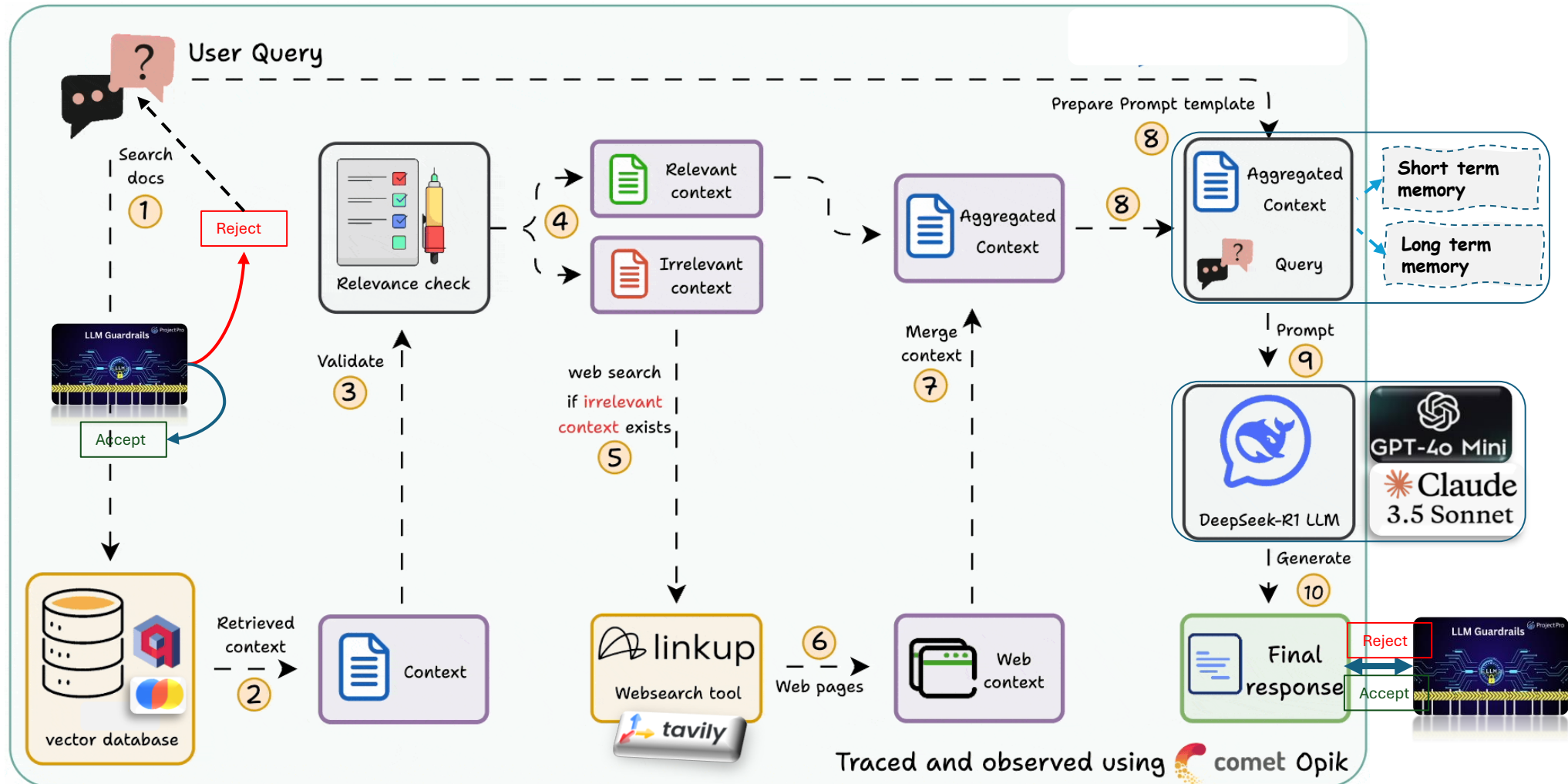
Sources: Images taken from DailyDoeseOfDS.com, Projectpro.com And modified

Source: Hashim(#im)

Agentic Framework

KBase prompt + Prompting+ Corrective RAG

Web
Exa Search API
Query
Documents
Embeddings
Vector DB
Ingestion
+ chunks
Relevance Ranker
Relevant chunks
Response
LLM

Agentic RAG + Hybrid Retrieval

Web
Exa Search API
Query
Response
Ingestion
Documents
Your company Details
Embeddings
Table Extraction
SQL DB
Vector DB
+ chunks
Relevance Ranker
Relevant chunks
Opportunity alignment
LLM
Tools
Web Scrape Tool
Text 2 SQL
Chart Tool
Search tool

Modular RAG + Contextual Understanding

LLM Evaluation & Observability
Conv. History
Query Rewrite
Guardrails
Web
Exa Search API
Query
Response
Ingestion
Documents
Your company Details
Embeddings
Table Extraction
SQL DB
Vector DB
+ chunks
Relevance Ranker
Relevant chunks
LLM as a judge
Opportunity alignment
LLM
Tools
Web Scrape Tool
Text 2 SQL
Chart Tool
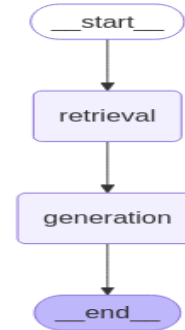Search tool
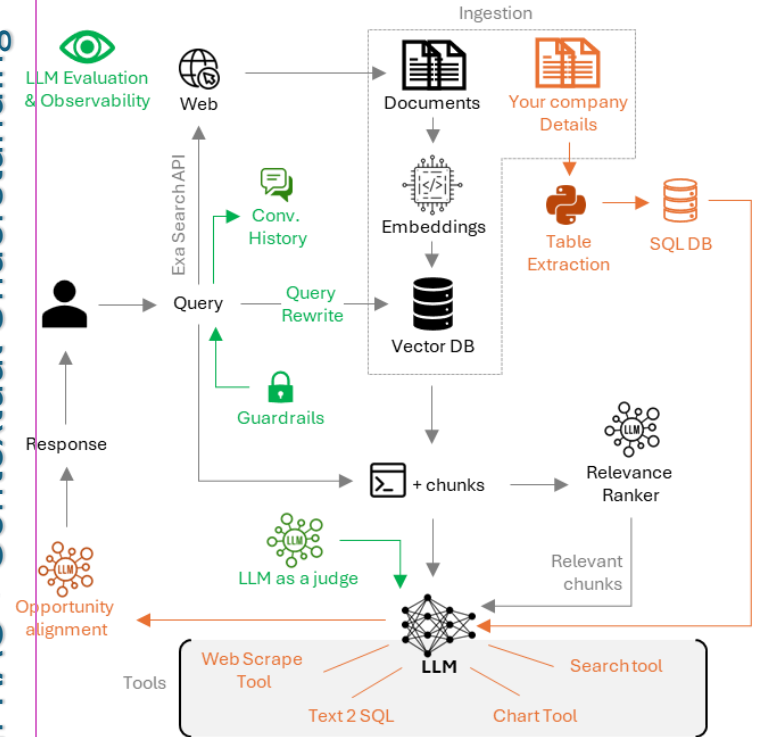
Source: Hashim(#im)

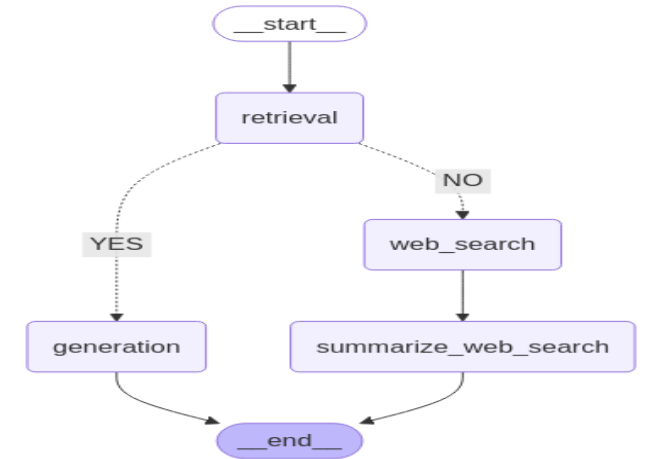Web search,
RAG,
Web search + RAG
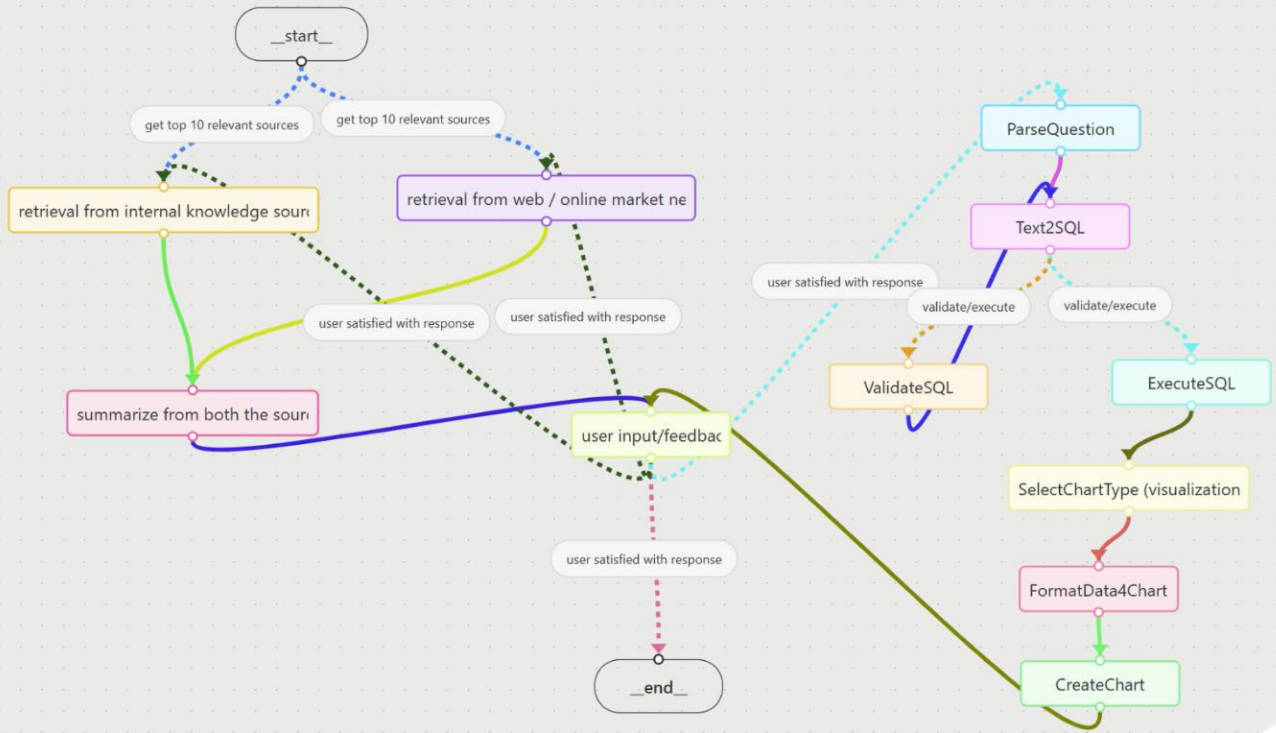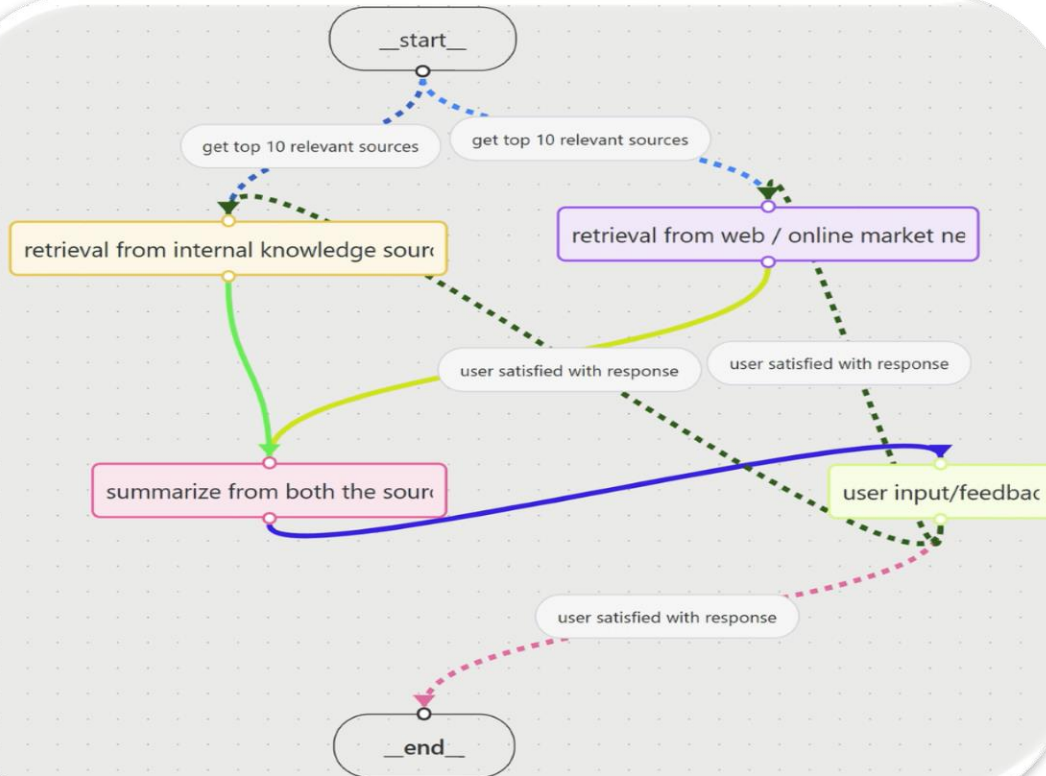(using langgraph)
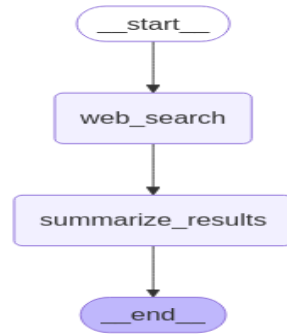
langgraph

Web search
(external sources)

RAG
(internal sources)

RAG + Web search

Source: Hashim(#im)

Major problems with Financial Advisor Chatbot

How to address the limitations of general-purpose language models?

Use Python and OpenAI Embeddings
Enables customization and control over information and context

Feed Recent Information
Keeps the model updated with current events

Control Context
Ensures model answers are based on specific, relevant data

Utilize Private Data
Allows training on internal, non-public information

Structuring Unstructured Audio Data

Identify Need
Recognizing the challenge of processing unstructured audio data

Transcribe Audio
Converting raw audio recordings into text using OpenAI Whisper

Utilize Time Stamps
Using time-stamped questions from YouTube descriptions to identify segments

Manipulate Data
Employing Pandas to create data frames that link questions to text segments

Structure Data
Structuring data to calculate embeddings and answer queries

Enhancements for Financial Advisor Chatbot

Vector Database

Improves data storage and retrieval

4

Web Deployment

Makes the chatbot publicly accessible

3

User Interface

Provides a user-friendly web access

2

Batch Processing

Enables training on larger data sets

1

Enhanced Financial Advisor Chatbot

Prompt Engineering

Refines response style and quality

5

Real-time Data

Incorporates up-to-date financial information

6

Personalization

Tailors advice to user profiles

7

Complex Topics

Expands knowledge to technical documents

8

Source: Hashim(#im)

Thank you