



Business Case | Multimodal AI Chatbot with Youtube QA



Goal & Main Functionalities

- **Project goal:**
 - Develop an AI-powered system to analyze YouTube videos, process documents, and answer user queries
- **Key technologies used:**
 - OpenAI GPT
 - LangChain
 - ChromaDB
 - YouTube Transcript API
 - Streamlit
- **Main functionalities:**
 - Knowledge Base Search
 - YouTube Video Processing
 - PDF Document Analysis
 - New Information Integration



Key Functionalities

Knowledge Base Search

- Semantic search using vector embeddings
- Retrieval-Augmented Generation for accurate answers

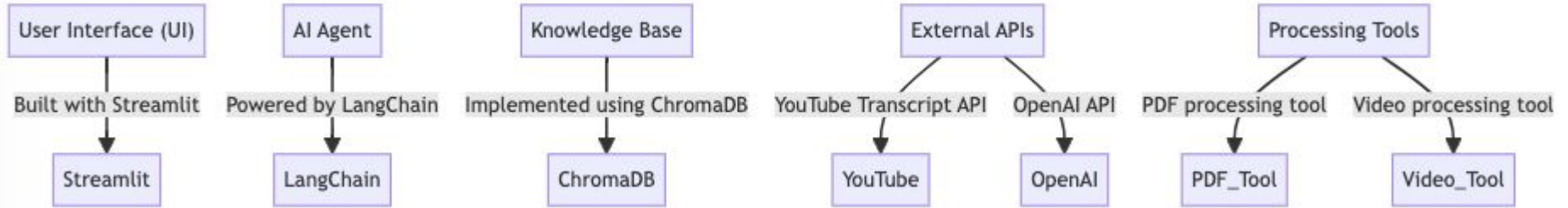
YouTube Video Processing

- Transcript extraction and cleaning
- Summarization of video content

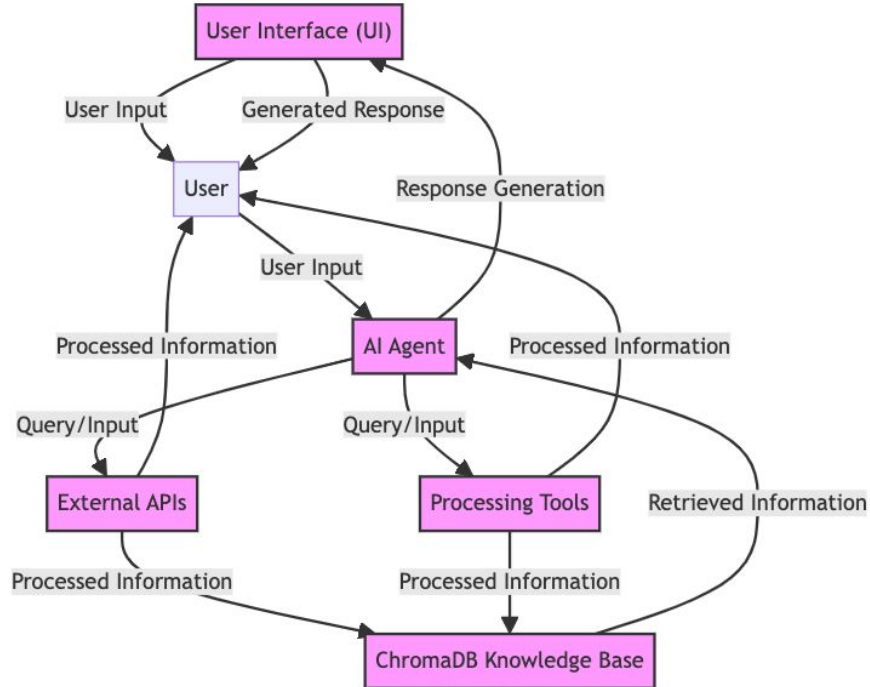
PDF Document Analysis

- Text extraction and preprocessing
- Chunking and embedding for efficient storage

System Architecture

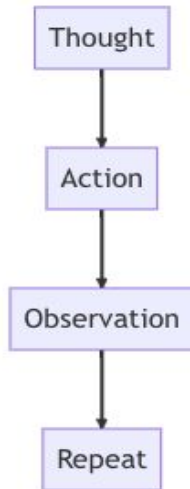


Data Flow Visualization

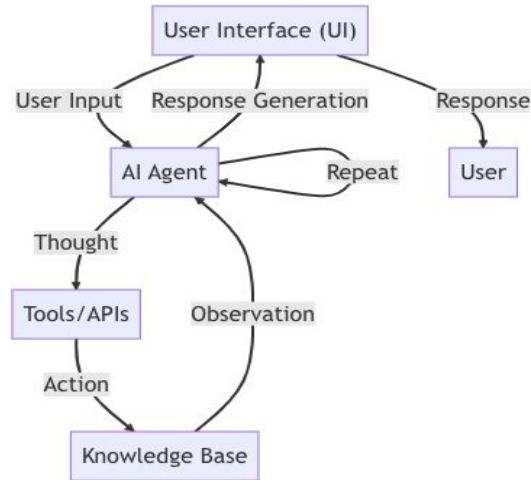


AI Agent Implementation

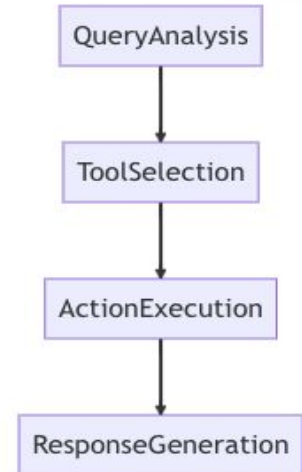
React Agent Architecture



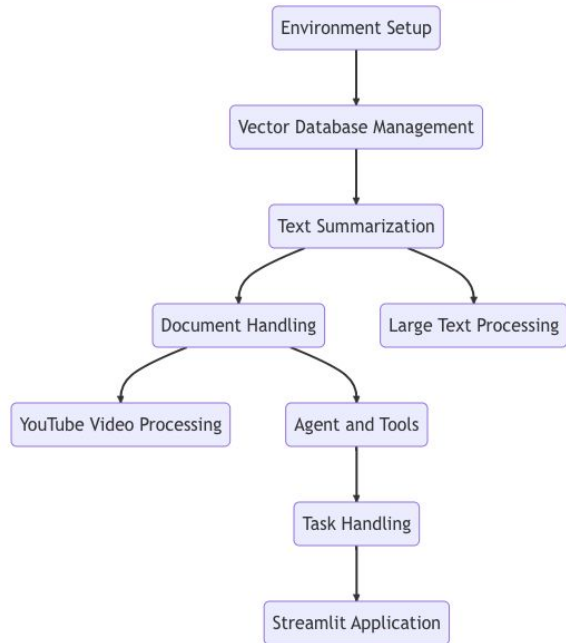
Tool-based Approach



Decision-making Process



Overview of the Functions





Achievements

- Successful integration of multiple AI technologies (OpenAI GPT, LangChain, ChromaDB)
- Implementation of a modular, tool-based AI agent architecture
- Creation of a knowledge base capable of storing and retrieving information from various sources
- Development of a user-friendly chat interface for complex AI interactions



Limitations

File Size Constraints:

- Unable to process large files, limiting the system's ability to handle extensive documents or lengthy videos

Deployment Issues:

- Encountering errors when attempting to deploy the application on Streamlit, hindering wider accessibility

Transcription and Processing Logic:

- Current logic for retrieving and processing video transcriptions needs improvement

Incomplete LangSmith Integration:

- LangSmith, a tool for debugging and monitoring LangChain applications, has not been fully implemented





Future Improvements

- Optimize Large File Handling
- Resolve Deployment Issues
- Enhance Transcription and Processing Logic
- Integrate LangSmith
- Enhance AI Accuracy and Reliability
- Performance Optimization
- Expand Multimodal Capabilities



Deployment (Local)

Tools

App deployment	 TensorFlow <small>/serving</small>
	 Streamlit

Access the project here: <http://localhost:8501/>

Thank you

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