The Framework for Building LLM Applications

What is OpenAI?

An Artificial Intelligence research and development company that builds powerful AI models

Founded : 2015, San Francisco

Mission: Ensure that Artificial Intelligence (AGI) benefits all humanity

Products: OpenAI Models, ChatGPT, Sora

What they build ?

- **GPT series** (Generative Pre-trained Transformers)
- **Multimodal models** (text + image understanding)
- Applications:
  - Chatbots, AI assistants, Code generators, Image Analysis, Document Summarizers, many more…

OpenAI builds **brain** → use that **brain** to build applications

OpenAI API Platform Models are NOT free

LangChain

The Framework for Building LLM Applications

What is LangChain ?

Opensource framework for building LLM Application

- Structure Prompts
- Create Multi-step workflows
- Add memory
- Connect tools
- Integrate databases
- Build Production-ready AI system.

Limitation of OpenAI?

Opensource framework for building LLM Application

- No Prompt Structure
- No Memory System
- No Workflow Management
- No Built-in tool integration
- No Built-in RAG support

```
"Explain " + topic + " in simple terms"
```

LangChain

Opensource framework for building LLM Application

- Prompt Templates
- Built-in Memory
- Chains (Workflow Automation)
- Tool Integration
  - Python, Database, Custom API tools
- RAG Made Easy
- Production Architecture Ready

→ Engine

→ Car system built around the engine

OpenAI & LangChain

Feature	OpenAI Only	LangChain
Simple Prompt	✅	✅
Prompt Templates	❌	✅
Memory	❌	✅
Multi-step Workflow	❌	✅
Tools	Manual	Built-in
RAG	Manual	Supported
Scalability	Hard	Easier

LangChain

First LangChain Program

```
pip install langchain
pip install langchain-openai
```

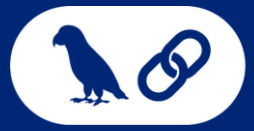
or

```
poetry add langchain langchain-openai
```

What is LangChain ?

Opensource framework for building LLM Application

- Modern Python features like Type Hints. → `name: str`
- Build on Starlette → Runs on ASGI (Asynchronous Server Gateway Interface)
- Uses Pydantic → for data validation



Prompt Template

Chat Prompt Template

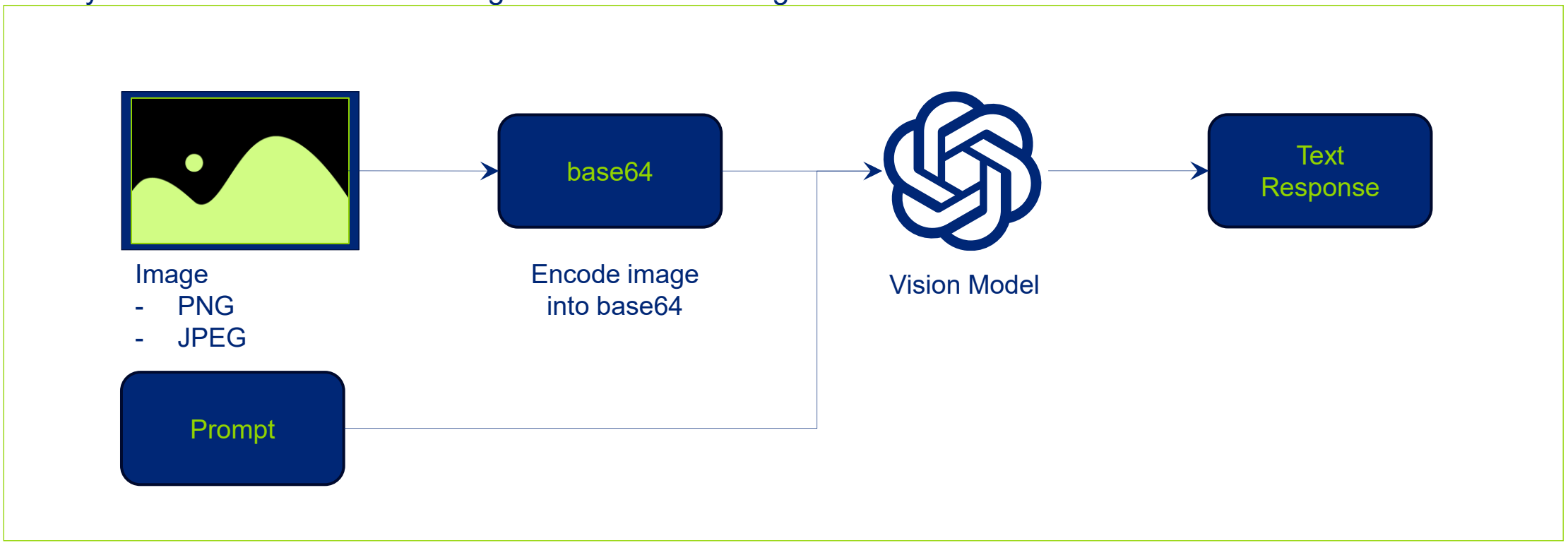
Dealing with Image

How to send image input to OpenAI models

LangChain

Opensource framework for building LLM Application

Always send **base64 encoded** image to vision model to generate text



Capstone Project

Intelligent Document Processing