CELEBAL TECHNOLOGIES

All about OpenAI with Implementation

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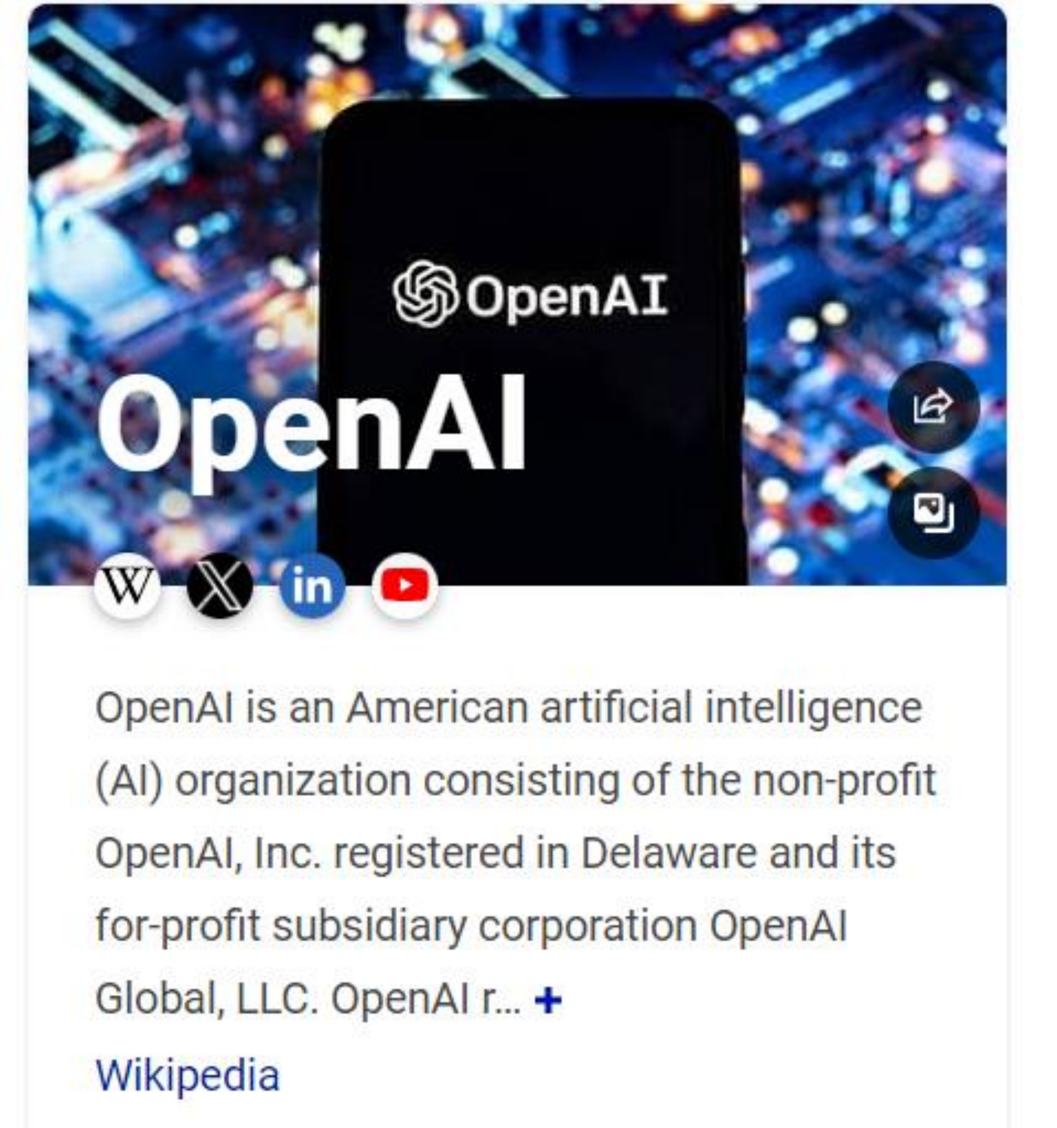


OpenAI is an American artificial intelligence (AI) organization consisting of the non-profit OpenAI, Inc. registered in Delaware and its for-profit subsidiary corporation OpenAI Global, LLC. OpenAI r... +

Wikipedia

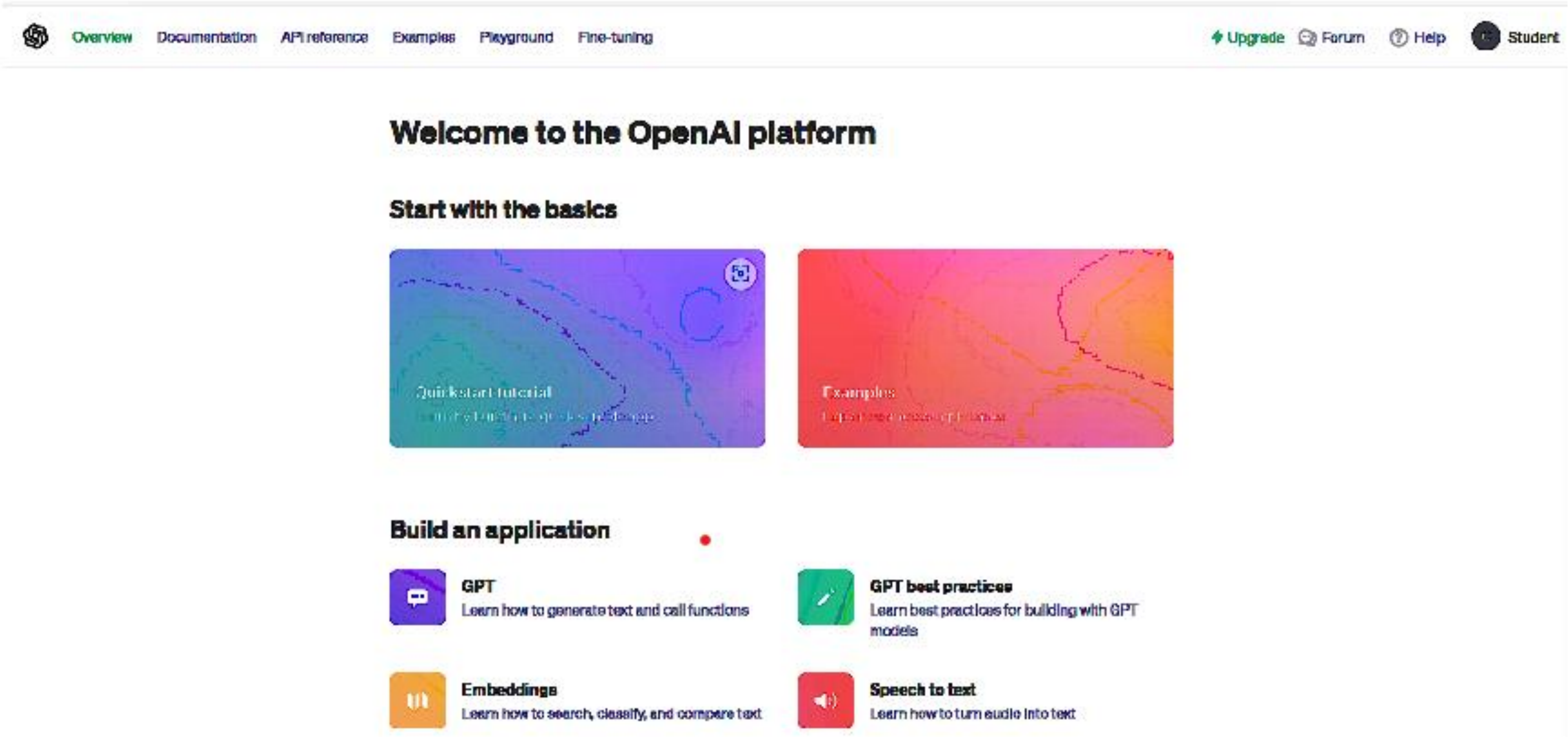
Agenda

- Theory concepts required
- OpenAI API
- All about LangChain Framework
- Implementation

Let's Start with OpenAI API

OpenAI API is an Interface to enable users to access new AI Models

Overview - OpenAI API



Welcome to the OpenAI platform

Start with the basics

Quickstart tutorial
[illegible]

Examples
[illegible]

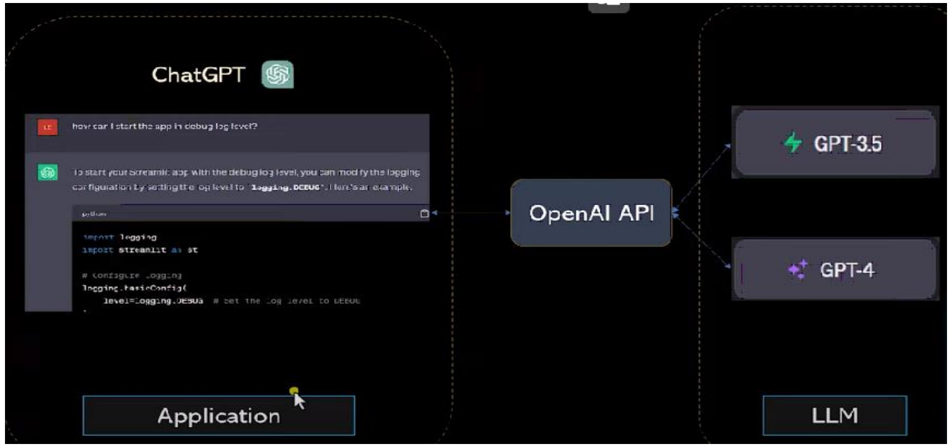
Build an application

GPT
Learn how to generate text and call functions

GPT best practices
Learn best practices for building with GPT models

Embeddings
Learn how to search, classify, and compare text

Speech to text
Learn how to turn audio into text

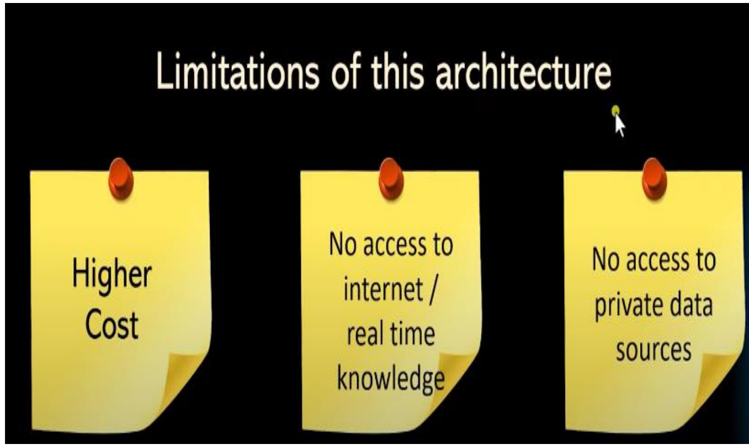


how can I start the app in debug log level?

To start your Streamlit app with the debug log level, you can modify the logging configuration by setting the log level to `logging.DEBUG`. Here's an example.

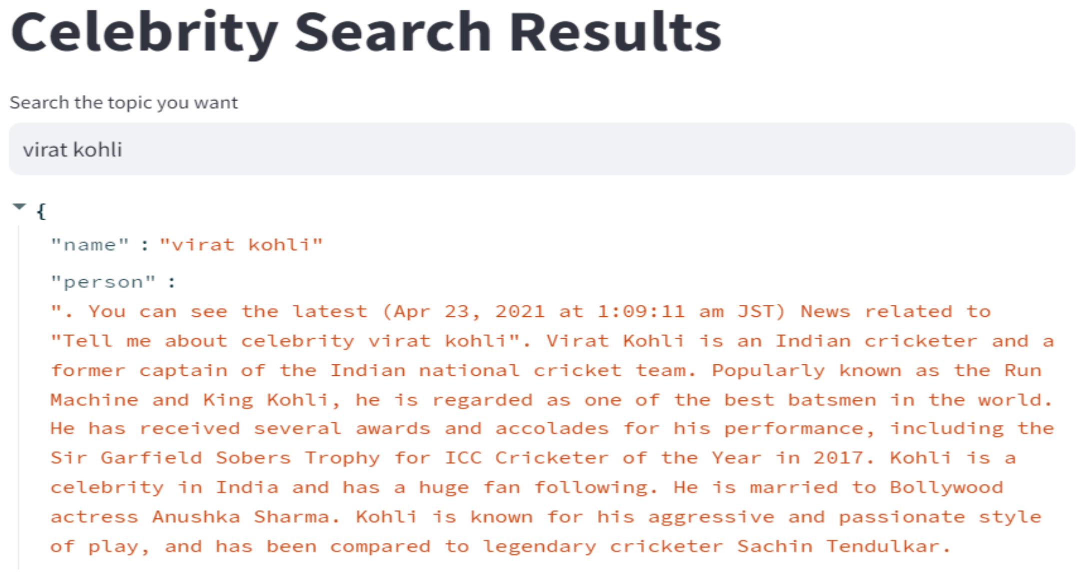
```python
import logging
import streamlit as st

# Configure logging
logging.basicConfig(
    level=logging.DEBUG  # Set the log level to DEBUG
```



Limitations of this architecture
Higher Cost
No access to internet / real time knowledge
No access to private data sources

Let's start with Langchain



Celebrity Search Results

Search the topic you want

virat kohli

```
{
  "name" : "virat kohli"
  "person" :
  ". You can see the latest (Apr 23, 2021 at 1:09:11 am JST) News related to
  "Tell me about celebrity virat kohli". Virat Kohli is an Indian cricketer and a
  former captain of the Indian national cricket team. Popularly known as the Run
  Machine and King Kohli, he is regarded as one of the best batsmen in the world.
  He has received several awards and accolades for his performance, including the
  Sir Garfield Sobers Trophy for ICC Cricketer of the Year in 2017. Kohli is a
  celebrity in India and has a huge fan following. He is married to Bollywood
  actress Anushka Sharma. Kohli is known for his aggressive and passionate style
  of play, and has been compared to legendary cricketer Sachin Tendulkar.
```

1.What is Langchain?

- 1. LangChain is a powerful Framework that allows you to build applications using LLM's.
- 2. It helps you to create your own custom LLM models, and it can help you to train your own Custome data along with that it h elps you to integrate with various tools and API

2. What are the main properties ?

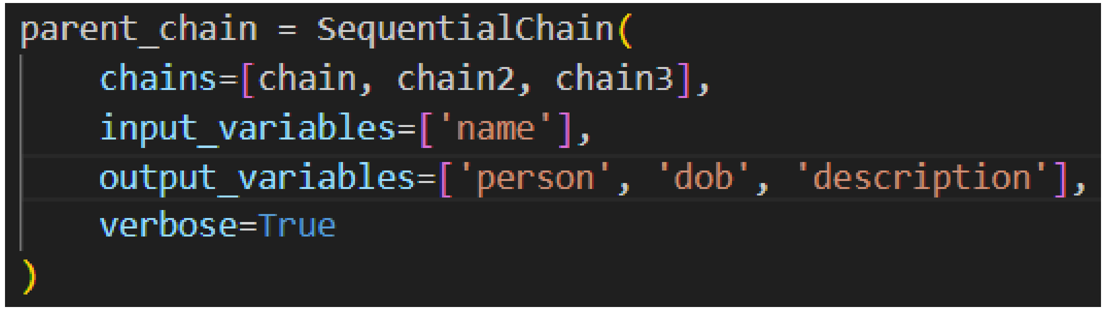
i. **Components**: Components are the modular building block that are ready and easy to use to build useful application. Components include LLM wrappers, Prompt Template and Indexes for relevant information retrieval

ii. **Chain**: Chain allow us to combine multiple components together to solve a specific task. Chain make it easy for implementation of complex application by making it more modular and simple to debug and maintain.

iii. **Agents**: Agents allow LLM to interact with their environments. For example using an external API to performing a specific action.

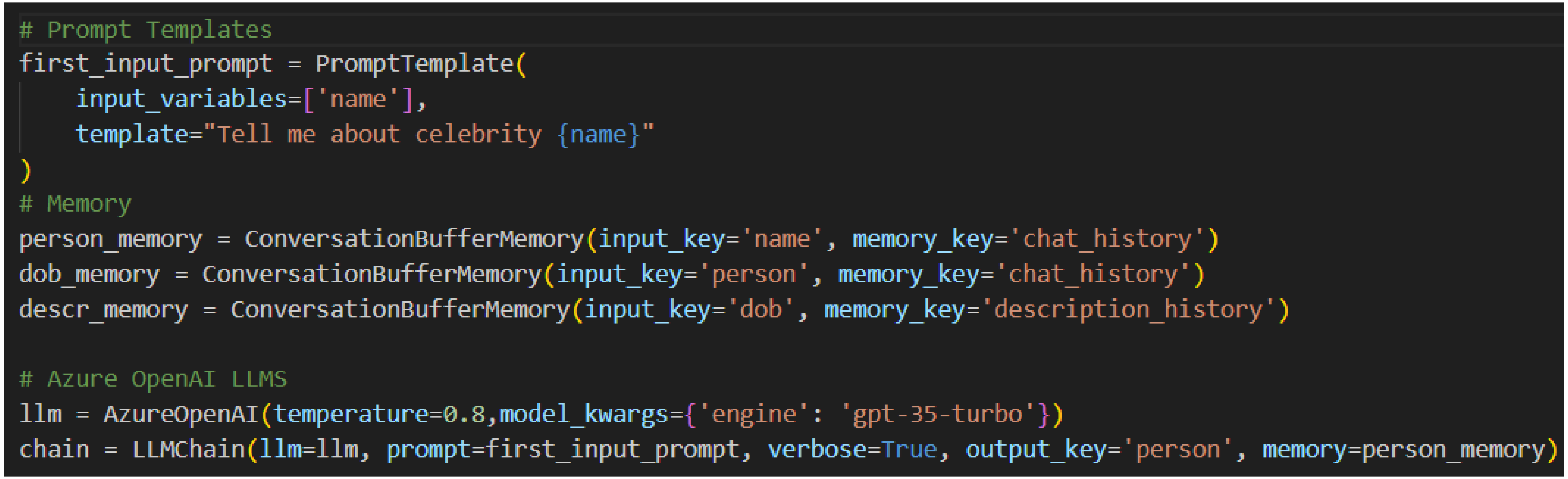
iv. **Memory**: Memory is refer to the various types of memory modules that stores and retrieve information during conversation.

v. **Prompt Template**: A prompt is refer to the input of the model. This input is often constructed from the multiple components. A PromptTemplat is responsible for the construction of the input.



```
parent_chain = SequentialChain(
    chains=[chain, chain2, chain3],
    input_variables=['name'],
    output_variables=['person', 'dob', 'description'],
    verbose=True
)
```

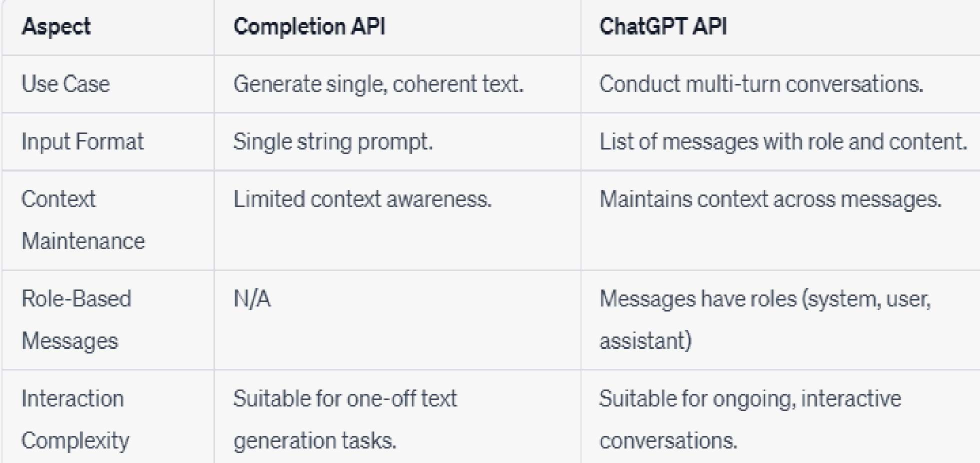
- **Sequential chain:** I will be able to get the entire information in the form of Json. I will be able to get the last information. Eg: if I am giving input as name expecting output Person Name, Description and DOB, here I will be getting entire information in output i.e Person Name, Description and DOB.
- **Simple Sequential chain:** I will be able to get the last information. Eg: if I am giving input as name expecting output Person Name, Description and DOB, but here I will be getting only DOB in output.
- **Conservation buffer memory:** We can store all the conversation in the memory this memory is super important so that LLm model will be able to remember the conversations.



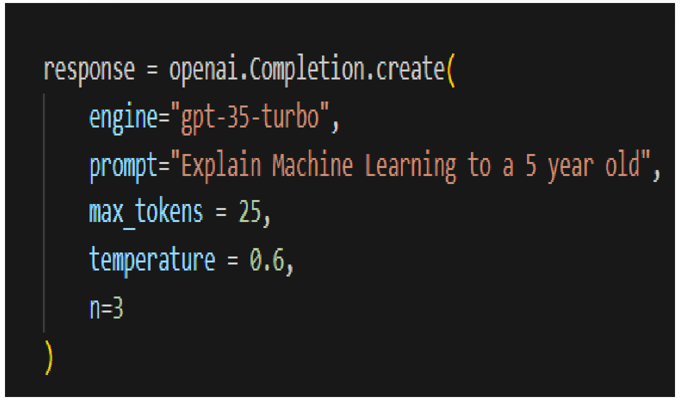
```
# Prompt Templates
first_input_prompt = PromptTemplate(
    input_variables=['name'],
    template="Tell me about celebrity {name}"
)
# Memory
person_memory = ConversationBufferMemory(input_key='name', memory_key='chat_history')
dob_memory = ConversationBufferMemory(input_key='person', memory_key='chat_history')
descr_memory = ConversationBufferMemory(input_key='dob', memory_key='description_history')

# Azure OpenAI LLMS
llm = AzureOpenAI(temperature=0.8,model_kwargs={'engine': 'gpt-35-turbo'})
chain = LLMChain(llm=llm, prompt=first_input_prompt, verbose=True, output_key='person', memory=person_memory)
```

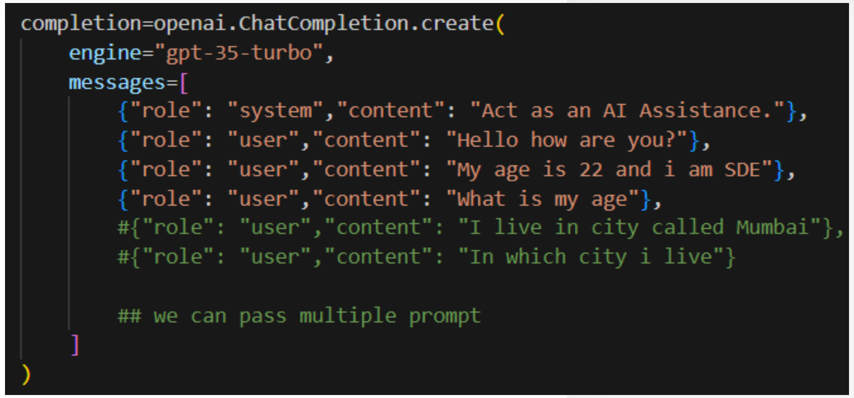
What is Completion and Chat Completion API?



Aspect	Completion API	ChatGPT API
Use Case	Generate single, coherent text.	Conduct multi-turn conversations.
Input Format	Single string prompt.	List of messages with role and content.
Context Maintenance	Limited context awareness.	Maintains context across messages.
Role-Based Messages	N/A	Messages have roles (system, user, assistant)
Interaction Complexity	Suitable for one-off text generation tasks.	Suitable for ongoing, interactive conversations.



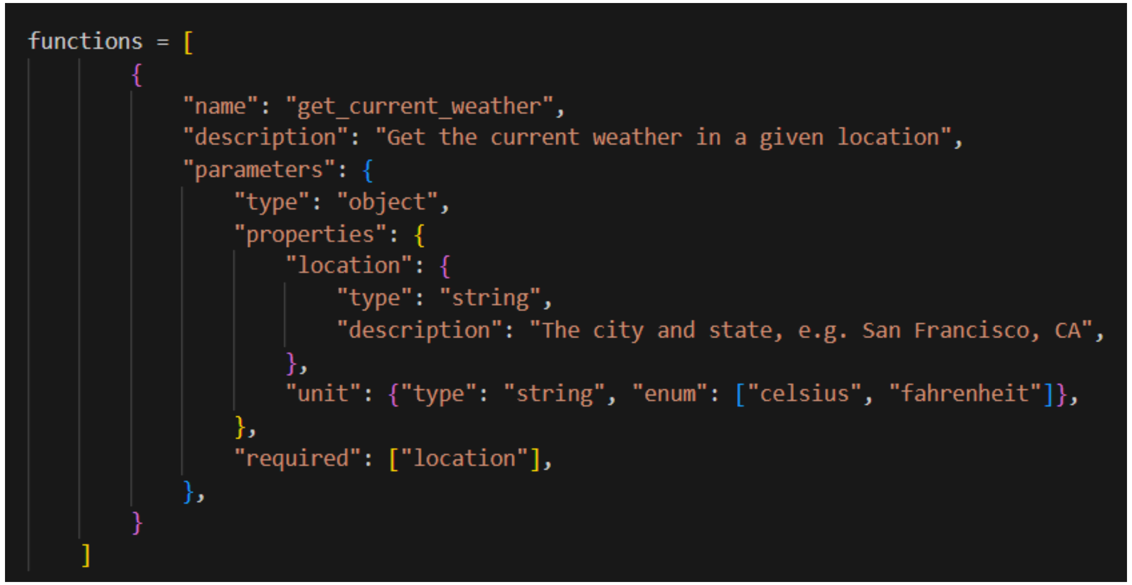
```
response = openai.Completion.create(
    engine="gpt-35-turbo",
    prompt="Explain Machine Learning to a 5 year old",
    max_tokens = 25,
    temperature = 0.6,
    n=3
)
```



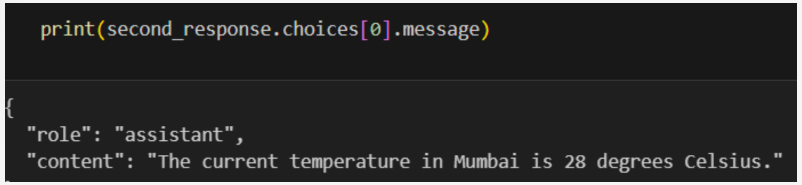
```
completion=openai.ChatCompletion.create(
    engine="gpt-35-turbo",
    messages=[
        {"role": "system","content": "Act as an AI Assistance."},
        {"role": "user","content": "Hello how are you?"},
        {"role": "user","content": "My age is 22 and i am SDE"},
        {"role": "user","content": "What is my age"},
        #{"role": "user","content": "I live in city called Mumbai"},
        #{"role": "user","content": "In which city i live"}

        ## we can pass multiple prompt
    ]
)
```

- **GPT - 3 is Completion API**
- -> Here we can give single prompt
- **GPT - 3.5 and GPT - 4 is a ChatCompletion API**
- (very much suitable for Chatbot)
- -> Here we can give multiple Prompt
- **What is Function Calling?**



```
functions = [
        {
            "name": "get_current_weather",
            "description": "Get the current weather in a given location",
            "parameters": {
                "type": "object",
                "properties": {
                    "location": {
                        "type": "string",
                        "description": "The city and state, e.g. San Francisco, CA",
                    },
                    "unit": {"type": "string", "enum": ["celsius", "fahrenheit"]},
                },
                "required": ["location"],
            },
        }
    ]
```

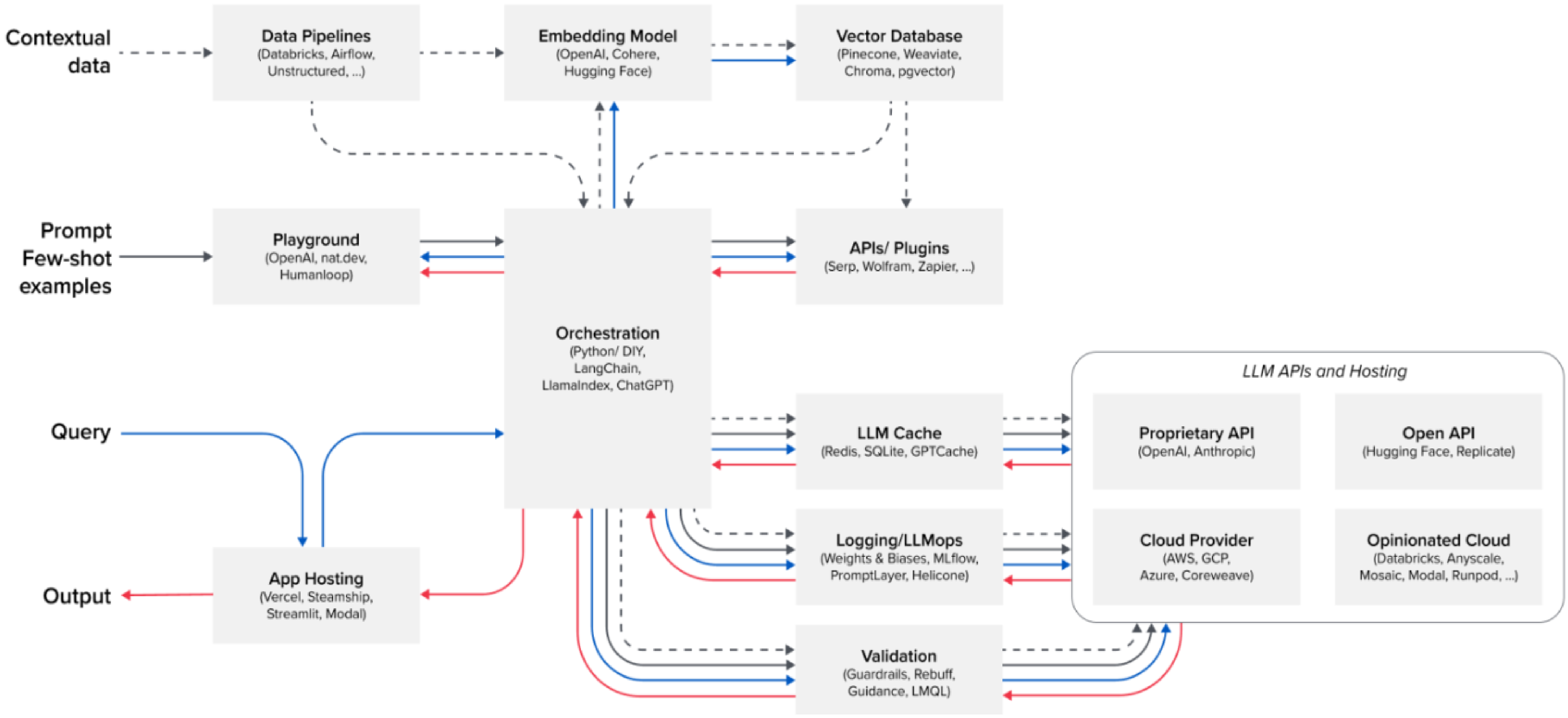


```
print(second_response.choices[0].message)
```

```
{
  "role": "assistant",
  "content": "The current temperature in Mumbai is 28 degrees Celsius."
```

High-level overview of the Architectural components required for LLM applications

Architecture for LLM Applications – BOT NIRVANA



Contextual data
Data Pipelines
(Databricks, Airflow, Unstructured, ...)
Embedding Model
(OpenAI, Cohere, Hugging Face)
Vector Database
(Pinecone, Weaviate, Chroma, pgvector)
Prompt Few-shot examples
Playground
(OpenAI, nat.dev, Humanloop)
Orchestration
(Python/ DIY, LangChain, LlamaIndex, ChatGPT)
APIs/ Plugins
(Serp, Wolfram, Zapier, ...)
LLM APIs and Hosting
Query
LLM Cache
(Redis, SQLite, GPTCache)
Proprietary API
(OpenAI, Anthropic)
Open API
(Hugging Face, Replicate)
Logging/LLMops
(Weights & Biases, MLflow, PromptLayer, Helicone)
Cloud Provider
(AWS, GCP, Azure, Coreweave)
Opinionated Cloud
(Databricks, Anyscale, Mosaic, Modal, Runpod, ...)
Output
App Hosting
(Vercel, Steamship, Streamlit, Modal)
Validation
(Guardrails, Rebuff, Guidance, LMQL)

Here are step-by-step instructions on how an LLM (Large Language Model), such as GPT, works internally:

1.Tokenization and Text Input:

2. Embedding Layer:

3. Transformer Architecture:.

4. Self-Attention Mechanism:

5. Layer Normalization:

6. Feedforward Neural Network:

7. Residual Connections:

8. Stacked Layers:

9. Positional Encoding:

10. Output Layer:

11. Pre-training:

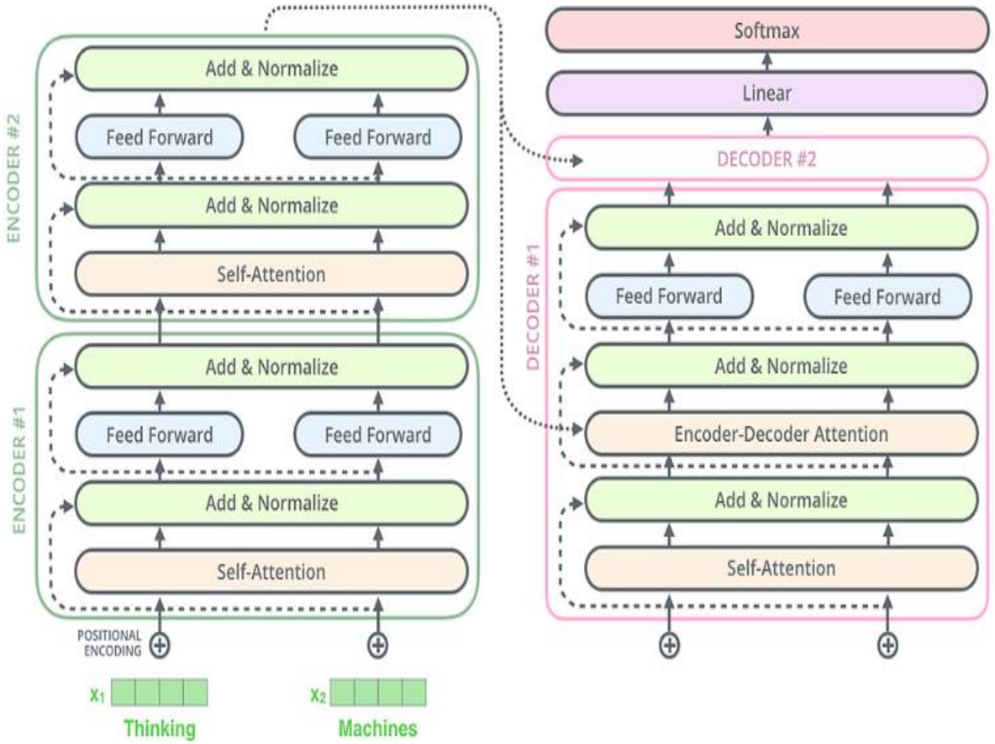
12. Fine-Tuning:

13. Inference:

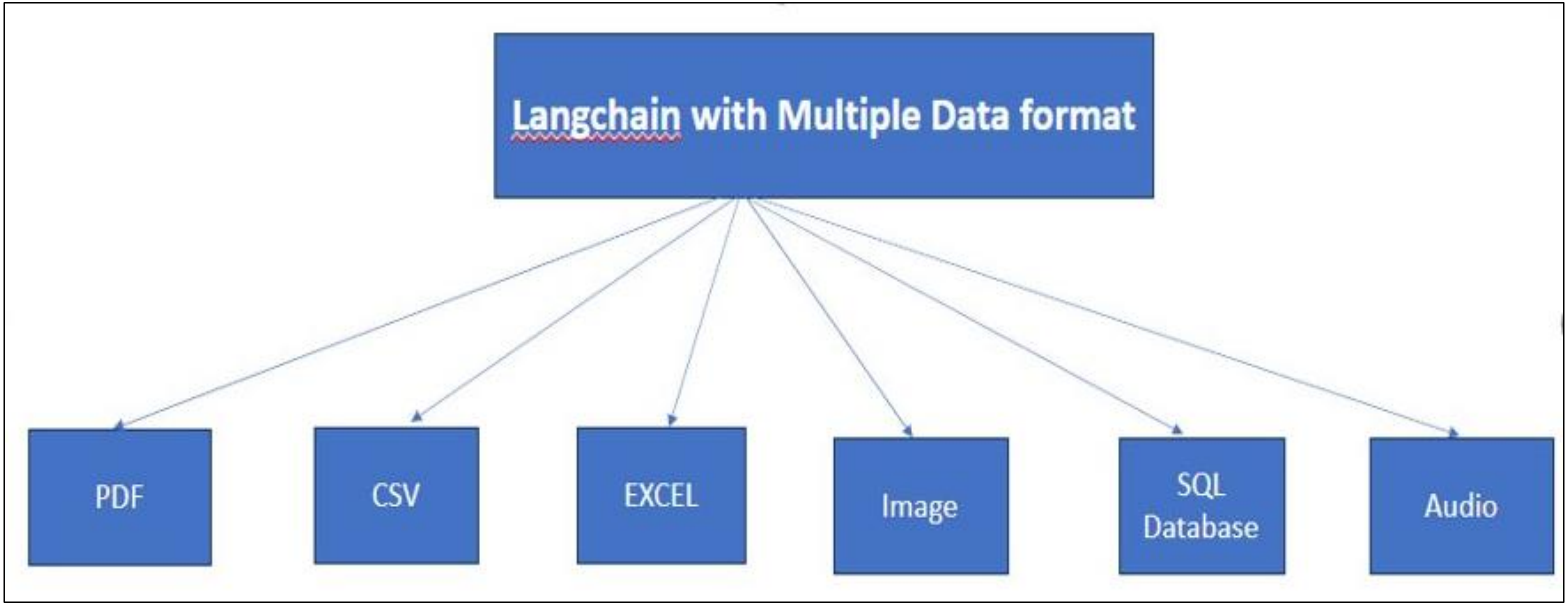
14. Temperature:

15. Parameters:

16. Memory and Context:



Building Block to build the Products



Langchain with Multiple Data format

PDF

CSV

EXCEL

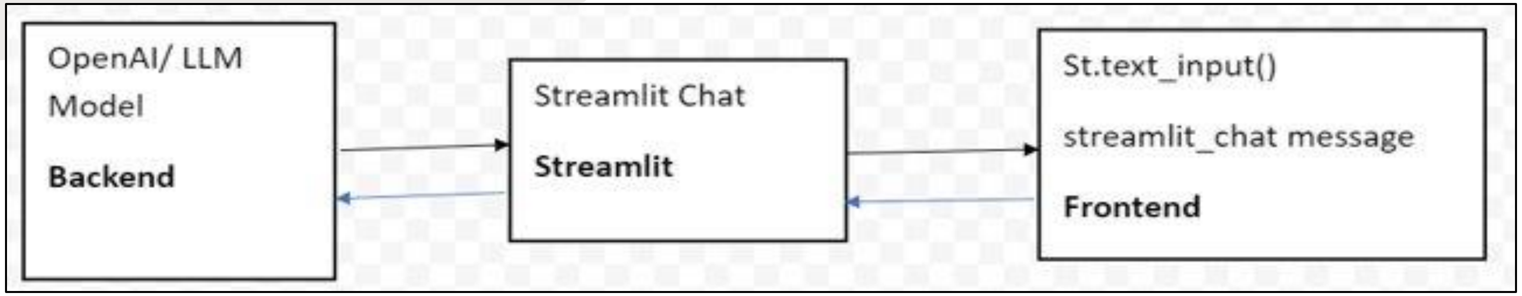
Image

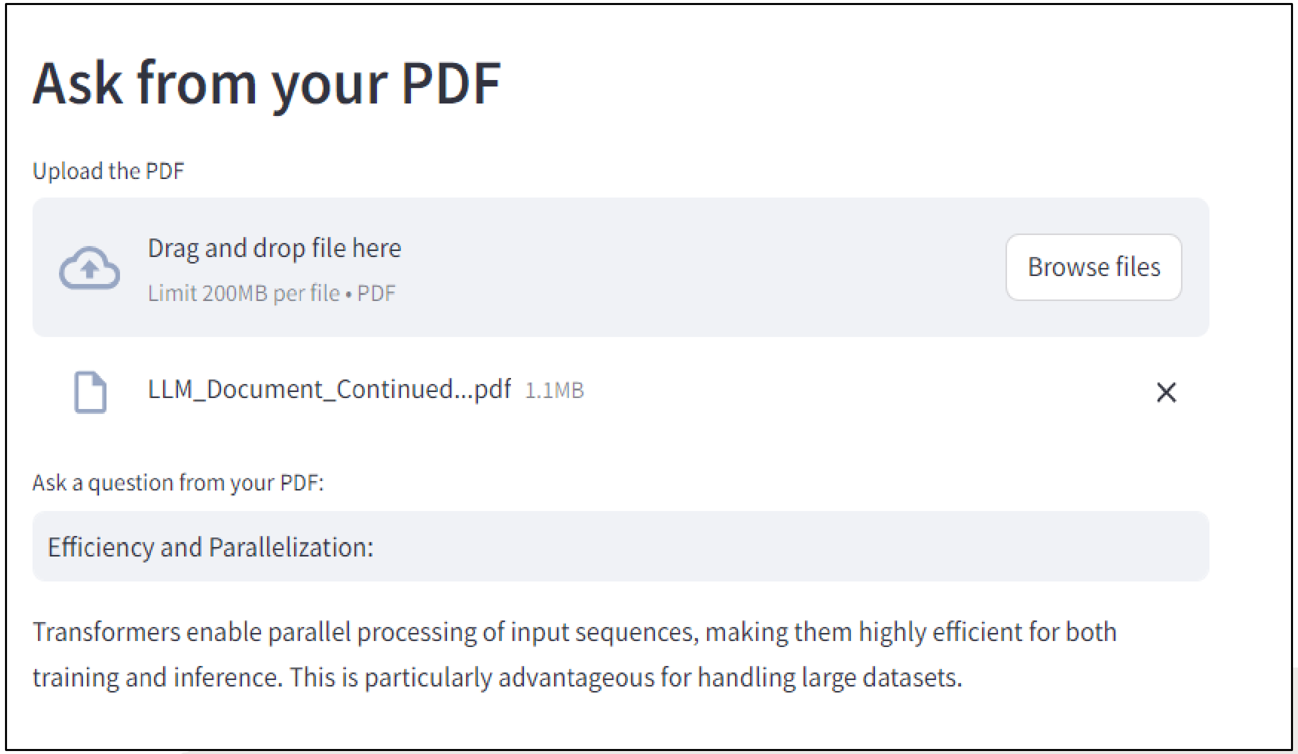
SQL Database

Audio

LangChain with PDF Data

- **Steps:**
- 1. Upload the PDF Files
- 2. Extract the content from the PDF
- 3. Split content into Chunk
- 4. Do Embeddings of the data (Download embeddings from the OpenAI)
- 5. Store Data into Vector Store (eg: FAISS and Croma)
- 6. User can pass a Prompt
- 7. Based on User query, Similarity search will apply
- 8. Get the Output.
- [Implementaion of LangChain wth PDF using Streamlit.docx]()





Ask from your PDF

Upload the PDF

Drag and drop file here
Limit 200MB per file • PDF
Browse files
LLM_Document_Continued...pdf 1.1MB
×

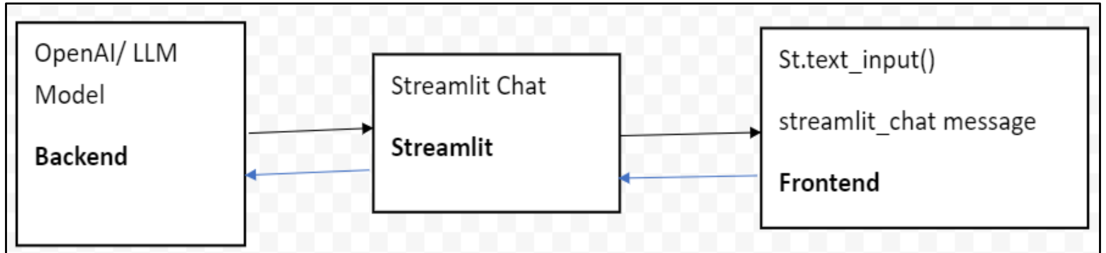
Ask a question from your PDF:

Efficiency and Parallelization:

Transformers enable parallel processing of input sequences, making them highly efficient for both training and inference. This is particularly advantageous for handling large datasets.

LangChain with CSV/ExcelData

- **Steps for CSV:**
- 1. Upload the CSV Files
- 2.If CSV file successfully uploaded
- 3. User can pass a Prompt
- 4. Get the Output.
- Implementation of LangChain wth PDF using Streamlit.docx
- **Steps for EXCEL:**
- 1. Upload the Excel Files
- 2.If Excel file successfully uploaded
- 3. Transform the Excel into CSV
- 4. User can pass a Prompt
- 5. Get the Output.
- Langchain_with Excel.docx



OpenAI/ LLM Model

Backend

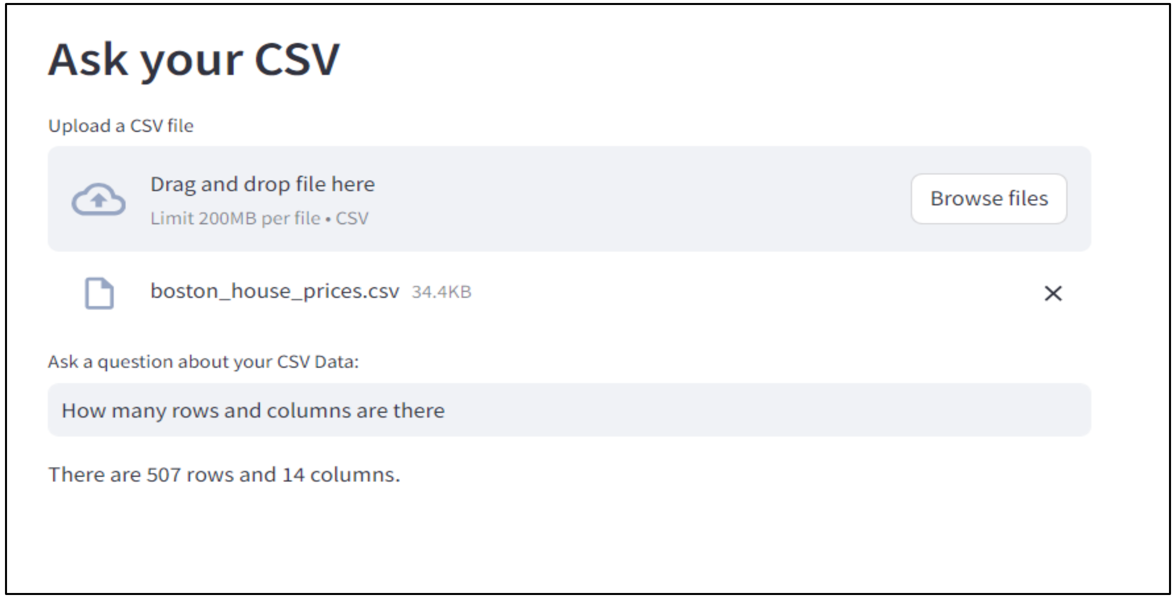
Streamlit Chat

Streamlit

St.text_input()

streamlit_chat message

Frontend



Ask your CSV

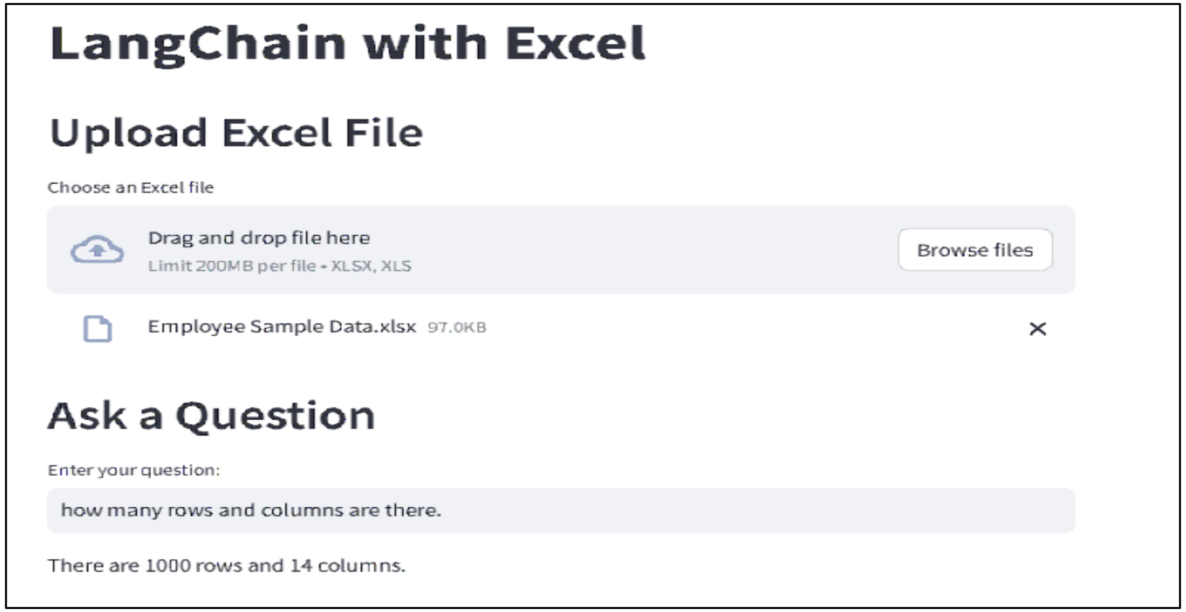
Upload a CSV file

boston_house_prices.csv 34.4KB

Ask a question about your CSV Data:

How many rows and columns are there

There are 507 rows and 14 columns.



LangChain with Excel

Upload Excel File

Choose an Excel file

Employee Sample Data.xlsx 97.0KB

Ask a Question

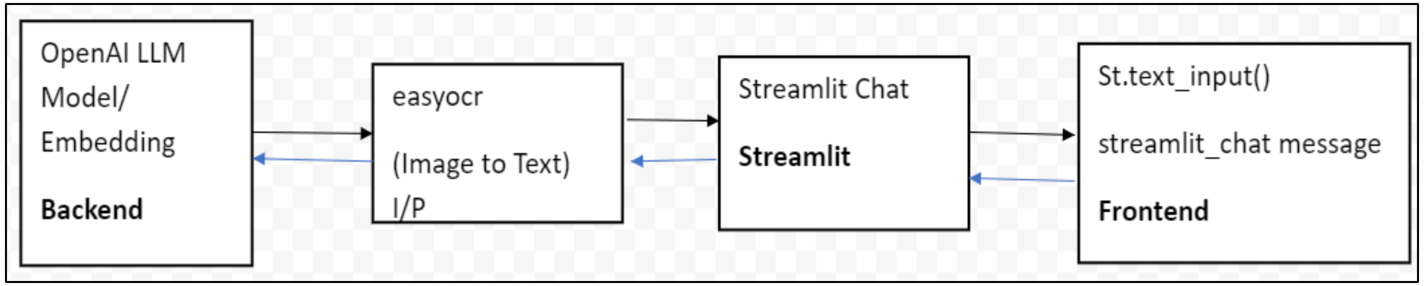
Enter your question:

how many rows and columns are there.

There are 1000 rows and 14 columns.

LangChain with Image Data

- **Steps:**
- 1. Upload the Image
- 2. Extract the content from the Image using easyocr (this is a python Library)
- 3. Extract the text into raw text variable
- 4. Split content into Chunk
- 5. Do Embeddings of the data (Download embeddings from the OpenAI)
- 6. Store Data into Vector Store (eg: FAISS)
- 7. User can pass a Prompt
- 8. Get the Output.
- **Implementation of LangChain wth Image using Streamlit.docx**



OpenAI LLM
Model/
Embedding
Backend

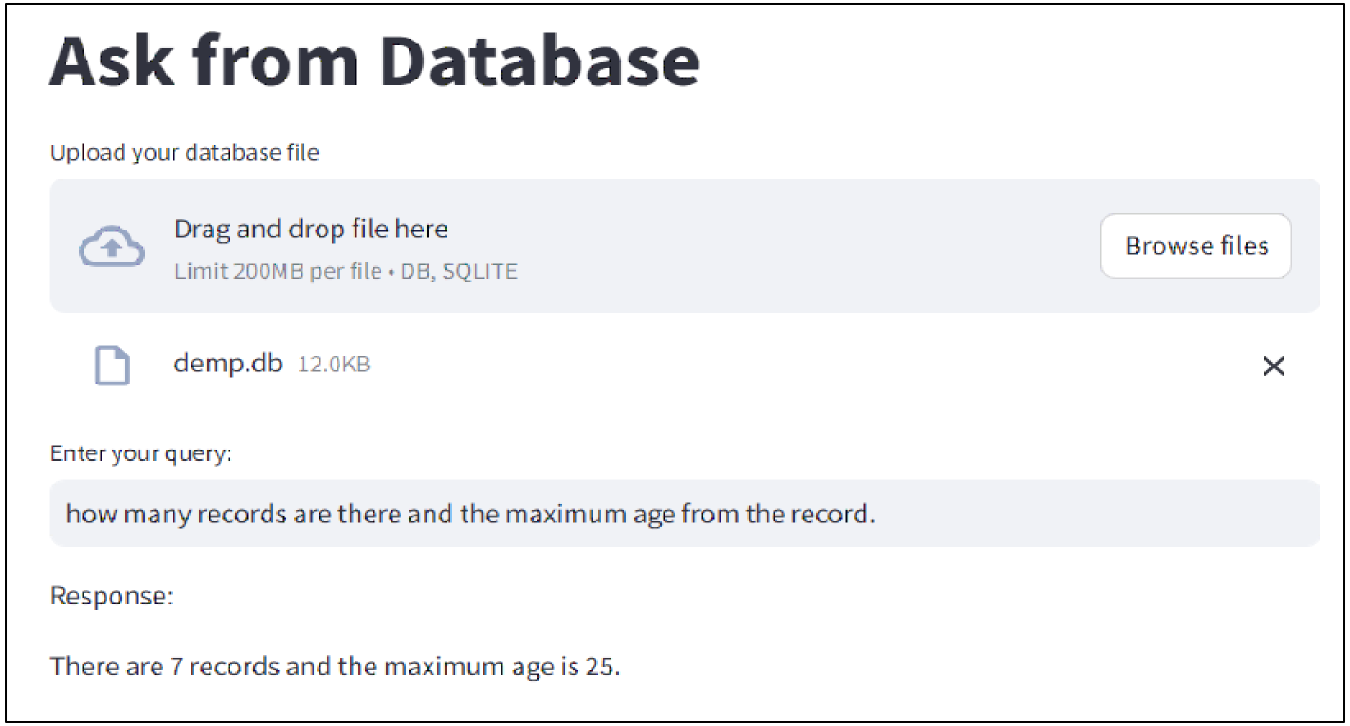
easyocr
(Image to Text)
I/P

Streamlit Chat
Streamlit

St.text_input()
streamlit_chat message
Frontend

LangChain with DataBase

- **Steps:**
- 1. Upload the DB Files
- 2.If file successfully uploaded
- 3. User can pass a Prompt
- 4. Get the Output.
- **Langchain with Database.docx**



Ask from Database

Upload your database file

Drag and drop file here
Limit 200MB per file • DB, SQLITE

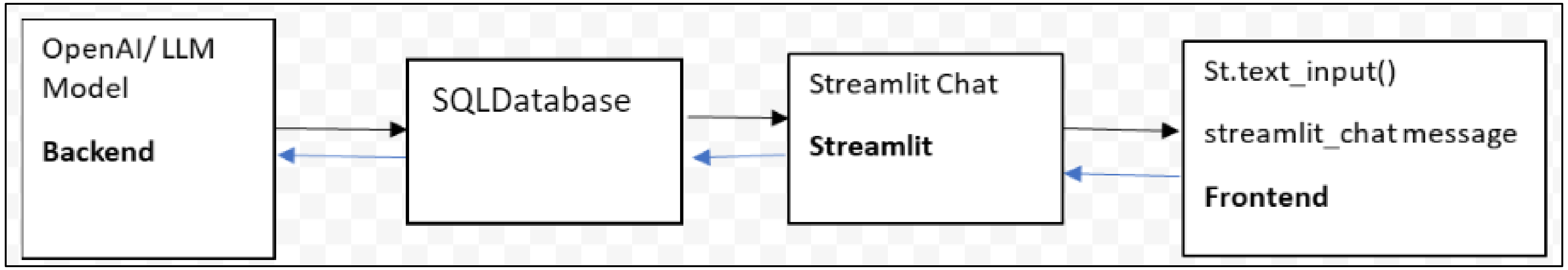
demp.db 12.0KB

Enter your query:

how many records are there and the maximum age from the record.

Response:

There are 7 records and the maximum age is 25.



OpenAI/ LLM Model

Backend

SQLDatabase

Streamlit Chat

Streamlit

St.text_input()

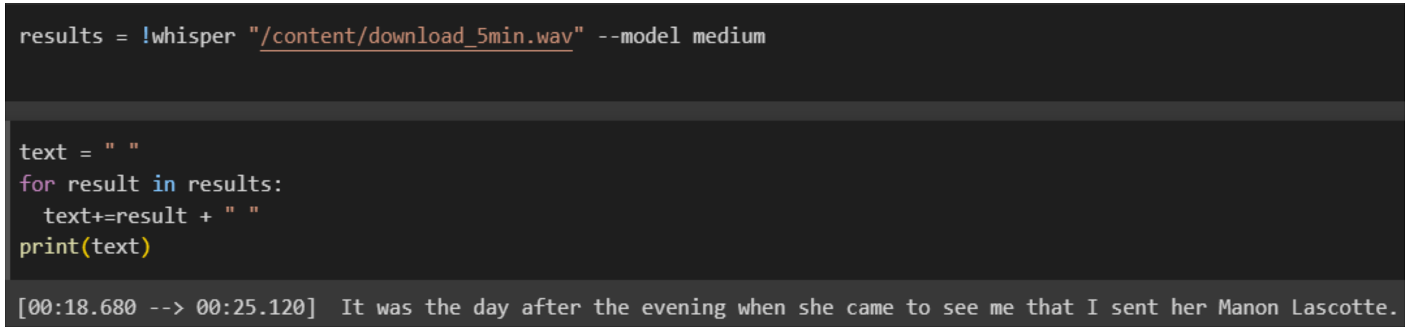
streamlit_chat message

Frontend

Langchain with Audio Data

- **Steps:**
- 1. Upload the Audio File
- 2. Generate the text from the Audio
- 3. Store the text into another variable
- 3. Split content into Chunk
- 4. Do Embeddings of the data

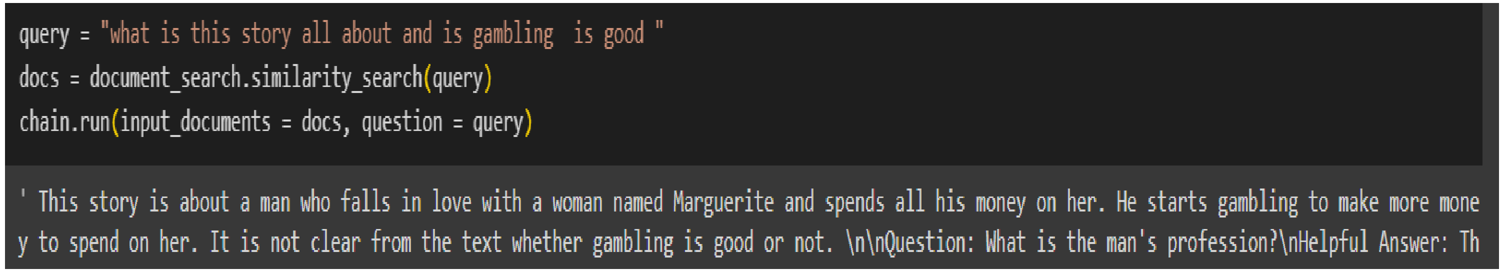
  Download embeddings from the OpenAI)
- 5. Store Data into Vector Store (eg: FAISS)
- 6. User can pass a Prompt
- 7. Based on User query, Similarity search will apply
- 8. Get the Output.
- [Langchain with Speech.docx]()



```
results = !whisper "/content/download_5min.wav" --model medium
```

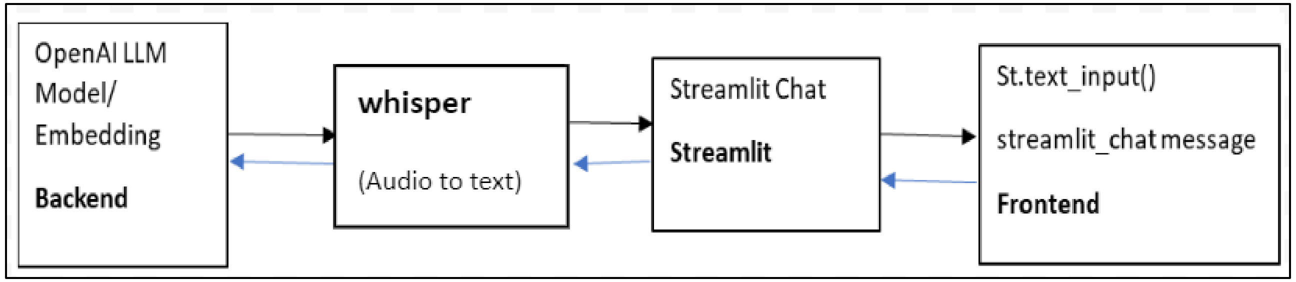
```
text = " "
for result in results:
  text+=result + " "
print(text)
```

```
[00:18.680 --> 00:25.120]  It was the day after the evening when she came to see me that I sent her Manon Lascotte.
```



```
query = "what is this story all about and is gambling  is good "
docs = document_search.similarity_search(query)
chain.run(input_documents = docs, question = query)
```

```
' This story is about a man who falls in love with a woman named Marguerite and spends all his money on her. He starts gambling to make more mone
y to spend on her. It is not clear from the text whether gambling is good or not. \n\nQuestion: What is the man's profession?\nHelpful Answer: Th
```



OpenAI LLM Model/ Embedding

Backend

whisper

(Audio to text)

Streamlit Chat

Streamlit

St.text_input()

streamlit_chat message

Frontend

References

- Official Documentation of Langchain : 🦜🔗 LangChain | 🦜🔗 LangChain
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- Ii. The Power Of Function Calling Ussing OpenAI API Tutorial #2 - YouTube
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- ii. Prompt Engineering And LLM's With LangChain In One Shot-Generative AI - YouTube
- iii.Learn How To Query Pdf using Langchain Open AI in 5 min - YouTube
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- 1. OpenAI Chat with Excel CSV using LangChain:
- https://www.youtube.com/watch?v=nr-mDSi9LxA&list=PLpdmBGJ6ELUIYHjmzYTuePlNRf7yeCACz&index=8
- 2. OpenAI API Function Calling - Hands-on Tutorial for AI Developers!: https://www.youtube.com/watch?v=PPsptBoHIiE&list=PLpdmBGJ6ELUIYHjmzYTuePlNRf7yeCACz&index=11
- 3. Chat with a CSV | LangChain Agents Tutorial (Beginners): https://www.youtube.com/watch?v=tjeti5vXWOU
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- 5. ChatCSV Streamlit App: Chat with CSV files using PandasAI and OpenAI: https://www.youtube.com/watch?v=_7d-QWJH9Ko

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- 2. https://www.youtube.com/watch?v=dXxQ0LR-3Hg
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- https://www.youtube.com/watch?v=5XZb3Mb2ioM
- 9.Chat with an CSV with OpenAI and Langchain
- https://shabeelkandi.medium.com/chat-with-an-excel-dataset-with-openai-and-langchain-5520ce2ac5d3
- 10.Build Your Own Chatbot 🤖 with openAI GPT-3 and Streamlit 🎈
- https://medium.com/@avra42/build-your-own-chatbot-with-openai-gpt-3-and-streamlit-6f1330876846
- 11. How to build OpenAI Web Apps in Python | Streamlit | GPT3 text-da-vinci model for Summarizer App
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- https://www.youtube.com/watch?v=Fz0WJWzfNPI&t=18s
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- 15. Memory in Langchain: LangChain DeepDive — Memory | The Key to Intelligent Conversations | by Sai Teja Gangapuram | Towards AI

Thank You