Build a Chatbot on Your CSV Data With LangChain and OpenAI

Chat with your CSV files with a memory chatbot 🤖 | Made with Langchain 🦜 and OpenAI 🧠

Yvann · Follow

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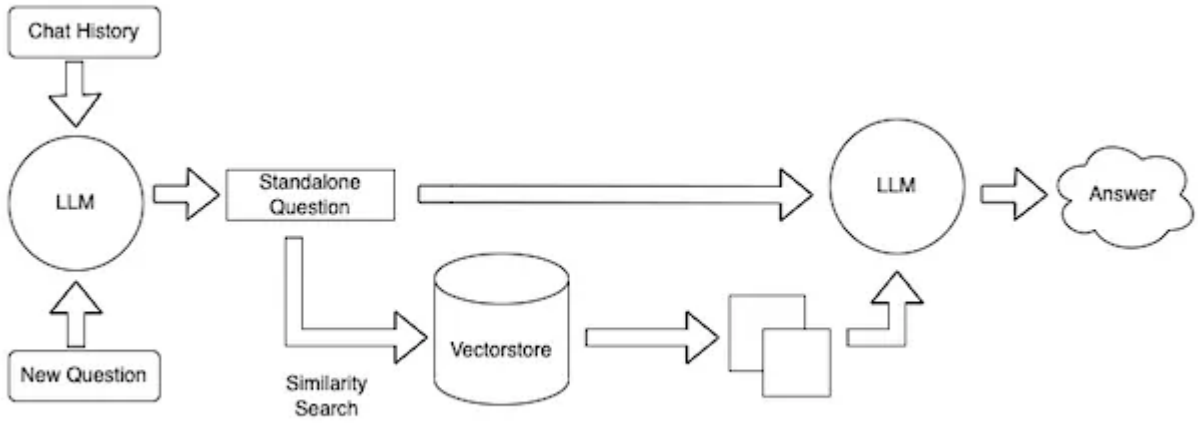
image made with StableDiffusion

> *In this article, we'll see how to build a simple chatbot 🤖 with memory that can answer your questions about your own CSV data.*

Hi everyone! In the past few weeks, I have been experimenting with the fascinating potential of large language models to create all sorts of things, and it's time to share what I've learned!

We'll use LangChain 🦜 to link `gpt-3.5` to our data and Streamlit to create a user interface for our chatbot.

Unlike ChatGPT, which offers limited context on our data (we can only provide a maximum of 4096 tokens), our chatbot will be able to process CSV data and manage a large database thanks to the use of embeddings and a vectorstore.



A diagram of the process used to create a chatbot on your data, from LangChain Blog

The code

Now let's get practical! We'll develop our chatbot on CSV data with very little Python syntax.

> ***Disclaimer**: This code is a simplified version of the chatbot I created, it is not optimized to reduce OpenAI API costs, for a more performant and optimized chatbot, feel free to check out my GitHub project : yvann-hub/Robby-chatbot or just test the app at Robby-chatbot.com 🚀.*

- First, we'll install the necessary libraries:

```
pip install streamlit streamlit_chat langchain openai faiss-cpu tiktoken
```

- Import the libraries needed for our chatbot:

```
import streamlit as st
from streamlit_chat import message
from langchain.embeddings.openai import OpenAIEmbeddings
from langchain.chat_models import ChatOpenAI
from langchain.chains import ConversationalRetrievalChain
from langchain.document_loaders.csv_loader import CSVLoader
from langchain.vectorstores import FAISS
import tempfile
```

- We ask the user to enter their OpenAI API key and download the CSV file on which the chatbot will be based.
- To test the chatbot at a lower cost, you can use this lightweight CSV file: `fishfry-locations.csv`

```
user_api_key = st.sidebar.text_input(
    label="#### Your OpenAI API key 👇",
    placeholder="Paste your openAI API key, sk-",
    type="password")

uploaded_file = st.sidebar.file_uploader("upload", type="csv")
```

- If a CSV file is uploaded by the user, we load it using the CSVLoader class from LangChain

```
if uploaded_file :
   #use tempfile because CSVLoader only accepts a file_path
    with tempfile.NamedTemporaryFile(delete=False) as tmp_file:
        tmp_file.write(uploaded_file.getvalue())
        tmp_file_path = tmp_file.name

    loader = CSVLoader(file_path=tmp_file_path, encoding="utf-8", csv_args={
                'delimiter': ','})
    data = loader.load()
```

- The LangChain `CSVLoader` class allows us to split a CSV file into unique rows. This can be seen by displaying the content of the data:

```
st.write(data)
```

```
0:"Document(page_content='venue_name: McGinnis Sisters\nvenue_type: Market\nver
1:"Document(page_content='venue_name: Holy Cross (Reilly Center)\nvenue_type: C
```

- Cutting the CSV file now allows us to provide it to our `vectorstore` (FAISS) using OpenAI embeddings.
- Embeddings allow transforming the parts cut by CSVLoader into vectors, which then represent an index based on the content of each row of the given file.
- In practice, when the user makes a query, a search will be performed in the vectorstore, and the best matching index(es) will be returned to the LLM, which will rephrase the content of the found index to provide a formatted response to the user.
- I recommend deepening your understanding of vectorstore and embeddings concepts for better comprehension.

```
embeddings = OpenAIEmbeddings()
vectorstore = FAISS.from_documents(data, embeddings)
```

- We then add the `ConversationalRetrievalChain` by providing it with the desired chat model `gpt-3.5-turbo` (or gpt-4) and the FAISS vectorstore storing our file transformed into vectors by `OpenAIEmbeddings()`.
- This chain allows us to have a chatbot with memory while relying on a `vectorstore` to find relevant information from our document.

```
chain = ConversationalRetrievalChain.from_llm(
llm = ChatOpenAI(temperature=0.0,model_name='gpt-3.5-turbo'),
retriever=vectorstore.as_retriever())
```

- This function allows us to provide the user's question and conversation history to `ConversationalRetrievalChain` to generate the chatbot's response.
- `st.session_state['history']` stores the user's conversation history when they are on the Streamlit site.

> *If you want to add improvements to this chatbot you can check my GitHub* 👀

```
def conversational_chat(query):

    result = chain({"question": query,
    "chat_history": st.session_state['history']})
    st.session_state['history'].append((query, result["answer"]))

    return result["answer"]
```

- We initialize the chatbot session by creating st.session_state['history'] and the first messages displayed in the chat.
- `['generated']` corresponds to the chatbot's responses.
- `['past']` corresponds to the messages provided by the user.
- Containers are not essential but help improve the UI by placing the user's question area below the chat messages.

```
if 'history' not in st.session_state:
    st.session_state['history'] = []

if 'generated' not in st.session_state:
    st.session_state['generated'] = ["Hello ! Ask me anything about " + upl

if 'past' not in st.session_state:
    st.session_state['past'] = ["Hey ! 👋"]
```

```
#container for the chat history
response_container = st.container()
#container for the user's text input
container = st.container()
```

- Now that the `session.state` and containers are configured.
- We can set up the UI part that allows the user to enter and send their question to our `conversational_chat` function with the user's question as an argument.

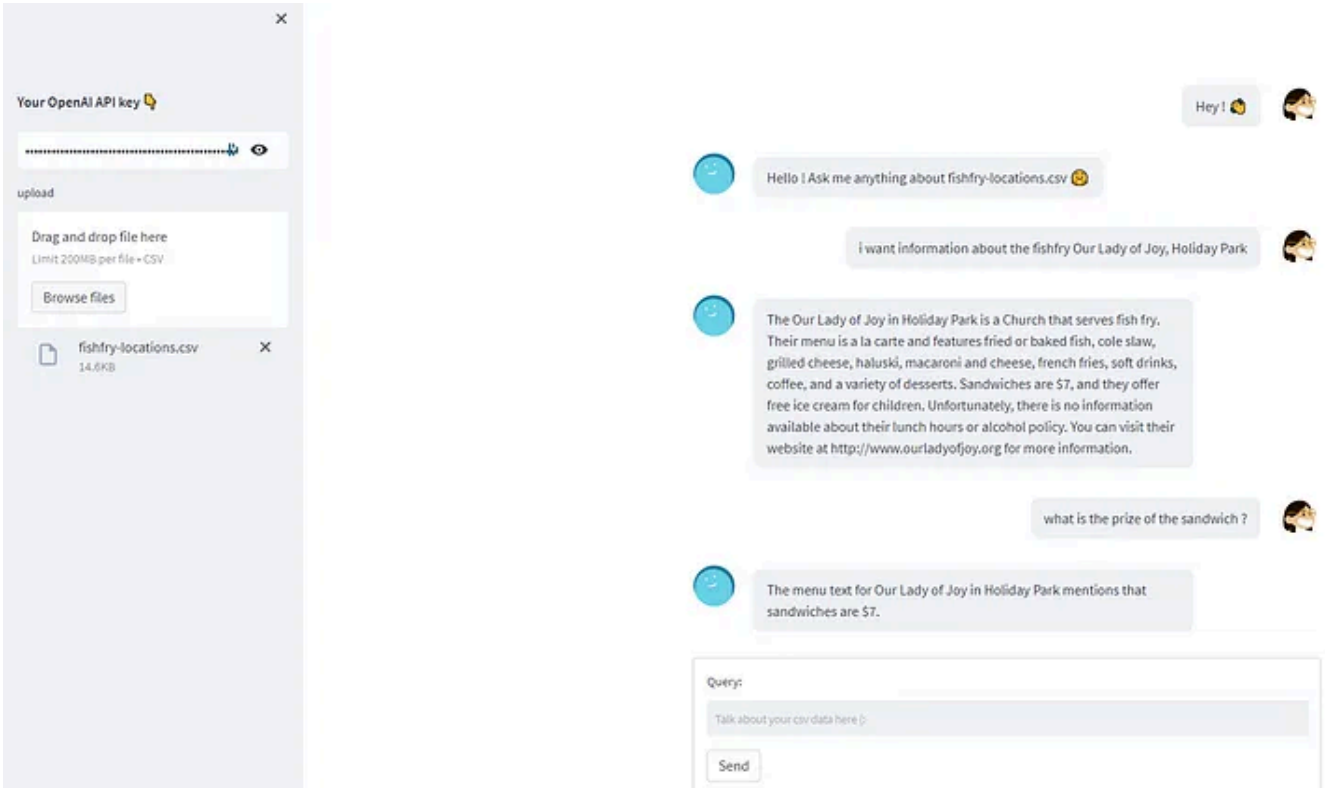
```
with container:
    with st.form(key='my_form', clear_on_submit=True):

        user_input = st.text_input("Query:", placeholder="Talk about your c
        submit_button = st.form_submit_button(label='Send')

    if submit_button and user_input:
        output = conversational_chat(user_input)

        st.session_state['past'].append(user_input)
        st.session_state['generated'].append(output)
```

- This last part allows displaying the user's and chatbot's messages on the Streamlit site using the `streamlit_chat` module.

```
if st.session_state['generated']:
    with response_container:
        for i in range(len(st.session_state['generated'])):
            message(st.session_state["past"][i], is_user=True, key=str(i) +
            message(st.session_state["generated"][i], key=str(i), avatar_st
```

- All that's left is to launch the script:

```
streamlit run name_of_your_chatbot.py #run with the name of your file
```



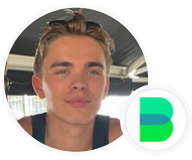
The result after launch the last command

Et voilà! You now have a beautiful chatbot running with LangChain, OpenAI, and Streamlit, capable of answering your questions based on your CSV file!

I hope this article will help you to create nice things, do not hesitate to contact me on **Twitter** or at barbot.yvann@gmail.com if you need.

You also can find the full project on my GitHub.

Langchain | OpenAI | AI | Large Language Models | Streamlit



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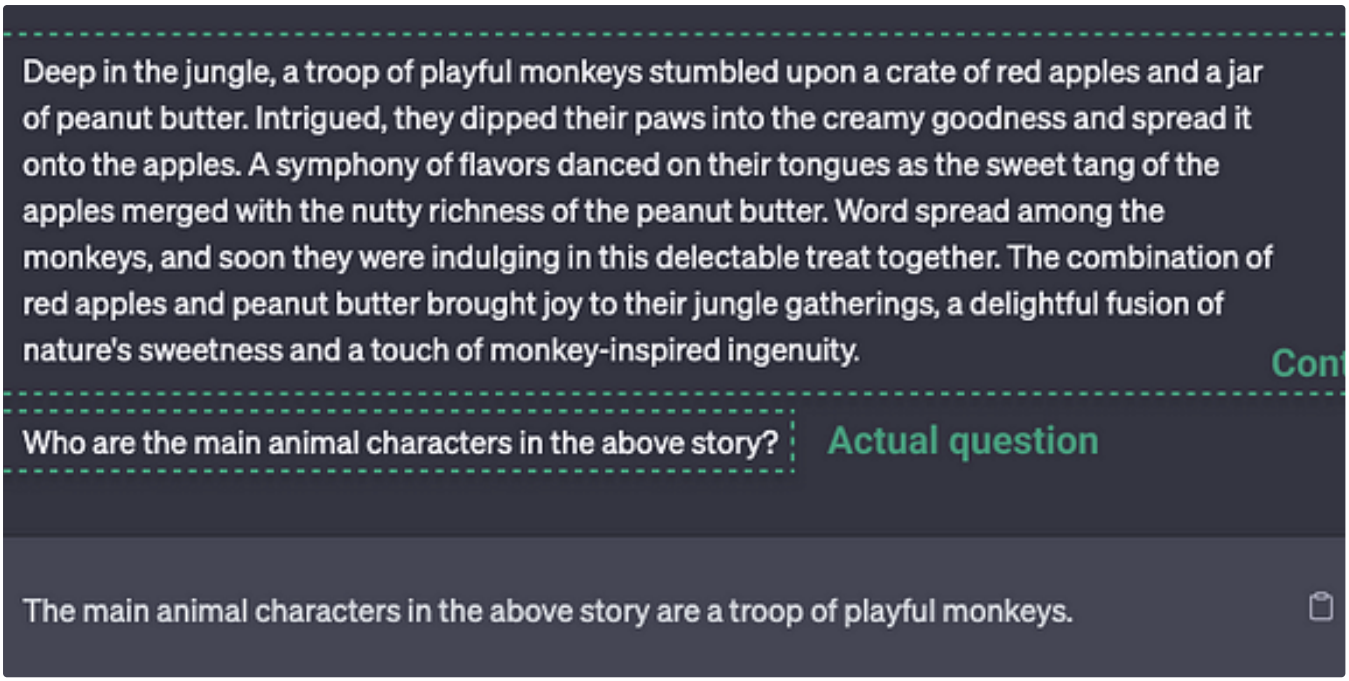

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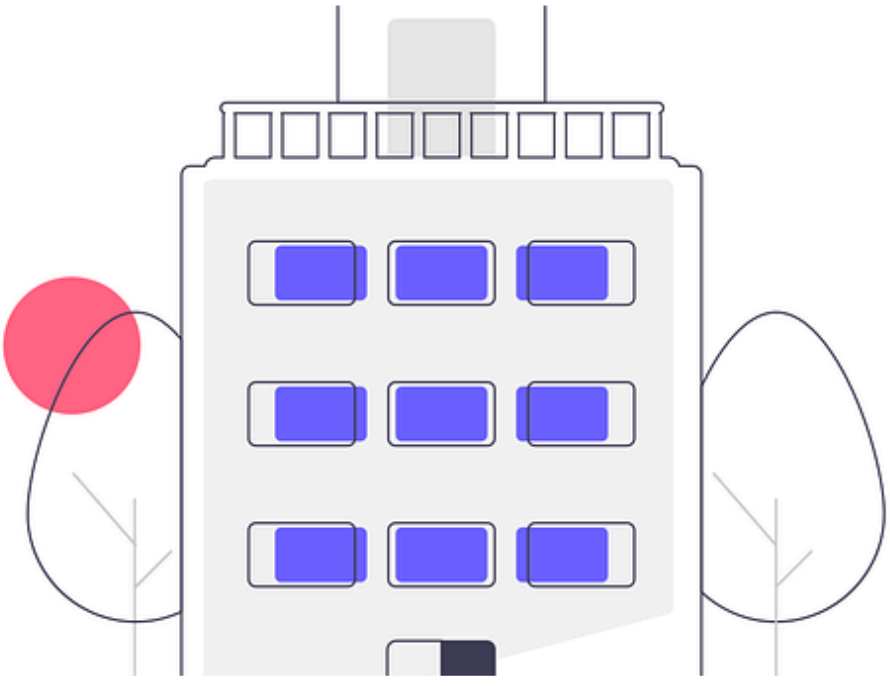

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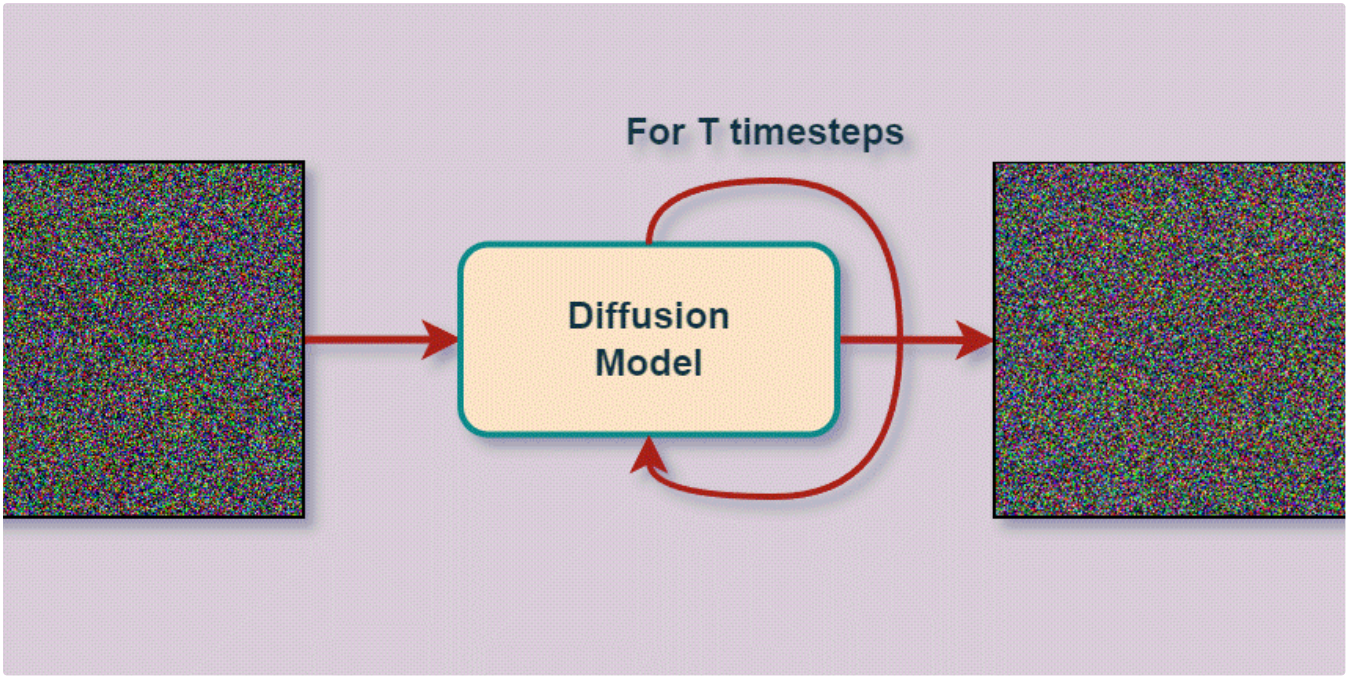

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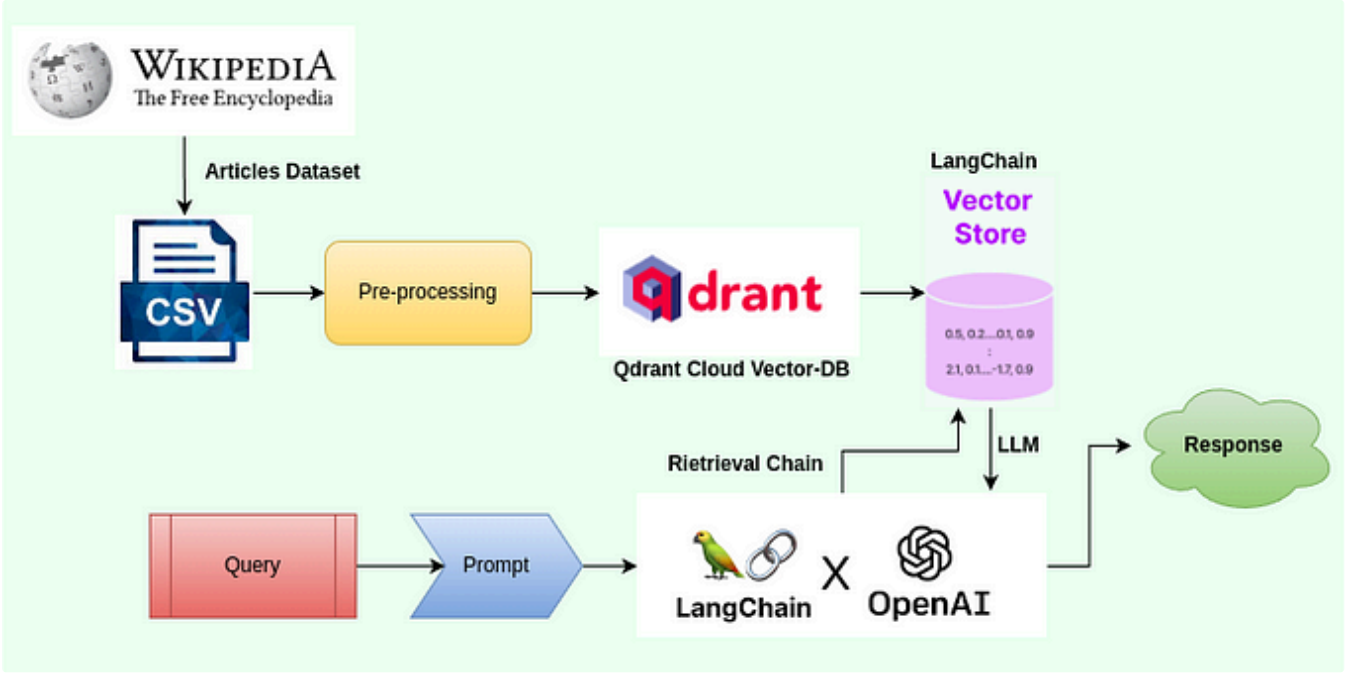

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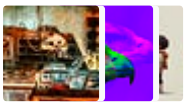

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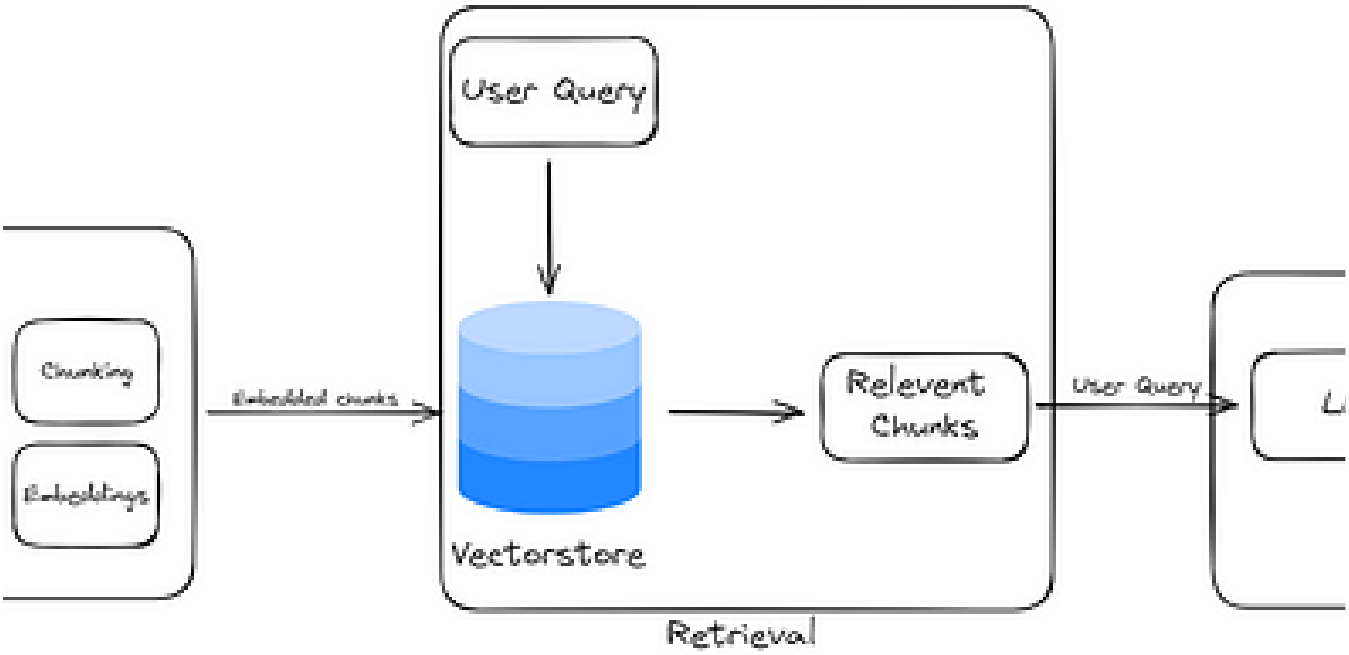

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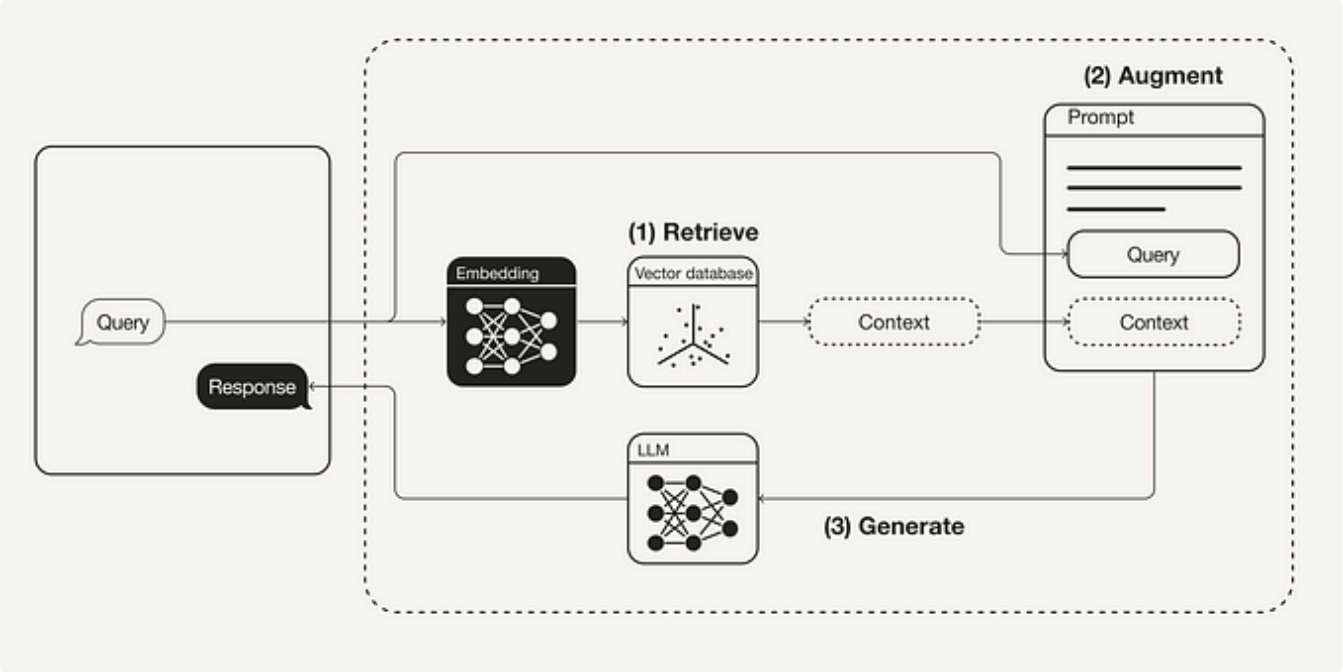

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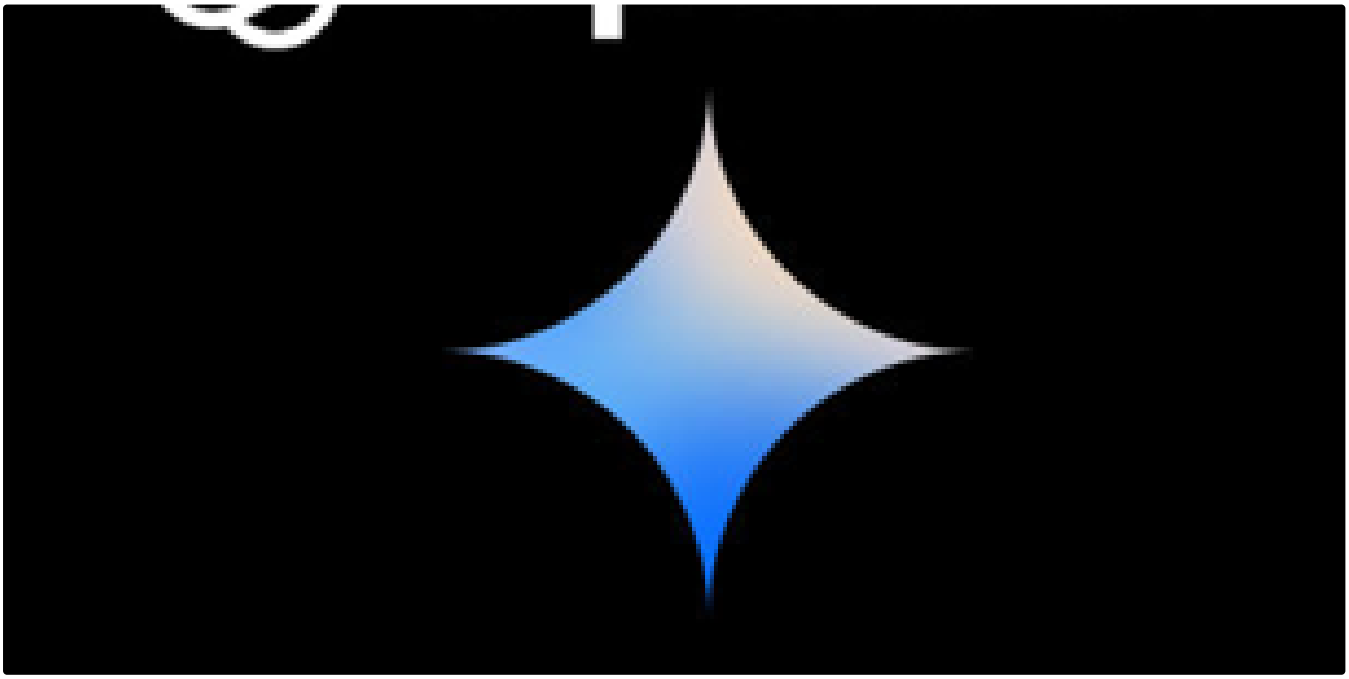

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