final

September 10, 2024

1 Importing Libraries

[11]:
```
import os
from langchain_chroma import Chroma
from langchain_openai import ChatOpenAI
from langchain_openai import OpenAIEmbeddings
from langchain_core.prompts import ChatPromptTemplate
from langchain.chains import create_retrieval_chain
from langchain.chains.combine_documents import create_stuff_documents_chain
from langchain_community.document_loaders import PyPDFLoader
from langchain_text_splitters import RecursiveCharacterTextSplitter
```

2 Setup the LLM

[12]:
```
llm = ChatOpenAI(model="gpt-3.5-turbo", temperature=0)
```

3 Initialize the text splitter

[13]:
```
text_splitter = RecursiveCharacterTextSplitter(
    chunk_size=600, chunk_overlap=100, add_start_index=True
)
```

4 Load and Split the constitution pdf

[14]:
```
file_path = (
    "../constitution.pdf"
)
loader = PyPDFLoader(file_path)
constitution_pages = loader.load_and_split(text_splitter)
len(constitution_pages)
```

[14]: 773

5 Store in the VectorDB

[15]:
```
vectorstore = Chroma.from_documents(documents=constitution_pages,␣
↪embedding=OpenAIEmbeddings())
```

[16]:
```
retriever = vectorstore.as_retriever(search_type="similarity",␣
↪search_kwargs={"k": 5})
```

6 System Prompt for the Chain

[17]:
```
system_prompt = (
    """
    You are an assistant specialized in answering questions based solely on the␣
↪provided context.
    Use only the given context to form your responses.
    If the information is not provided or unclear, state explicitly that you␣
↪don't know.
    Keep your answers brief, limited to a maximum of three sentences.
    {context}
    """
)

prompt = ChatPromptTemplate.from_messages(
    [
        ("system", system_prompt),
        ("human", "{input}"),
    ]
)
```

7 Define the RAG Chain

[18]:
```
question_answer_chain = create_stuff_documents_chain(llm, prompt)
rag_chain = create_retrieval_chain(retriever, question_answer_chain)
```

8 Output

[19]:
```
response = rag_chain.invoke({"input": "What is the punishment for fraud?"})
print(response["answer"])
```

```
The punishment for fraud can include imprisonment for a term not exceeding three
months or a fine not exceeding ten thousand rupees, as per the provided context.
```