Finance_Research

March 18, 2025

1 Installing libraries

```
[ ]: %pip install langchain-text-splitters langchain-community langgraph
```

```
Requirement already satisfied: langchain-text-splitters in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (0.3.6)
Requirement already satisfied: langchain-community in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (0.3.18)
Requirement already satisfied: langgraph in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (0.3.2)
Requirement already satisfied: langchain-core<1.0.0,>=0.3.34 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langchain-text-splitters) (0.3.40)
Requirement already satisfied: langchain<1.0.0,>=0.3.19 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langchain-community) (0.3.19)
Requirement already satisfied: SQLAlchemy<3,>=1.4 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langchain-community) (2.0.38)
Requirement already satisfied: requests<3,>=2 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langchain-community) (2.32.3)
Requirement already satisfied: PyYAML>=5.3 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langchain-community) (6.0.2)
Requirement already satisfied: aiohttp<4.0.0,>=3.8.3 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langchain-community) (3.11.13)
Requirement already satisfied: tenacity!=8.4.0,<10,>=8.1.0 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langchain-community) (9.0.0)
Requirement already satisfied: dataclasses-json<0.7,>=0.5.7 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langchain-community) (0.6.7)
Requirement already satisfied: pydantic-settings<3.0.0,>=2.4.0 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langchain-community) (2.8.1)
Requirement already satisfied: langsmith<0.4,>=0.1.125 in
```

```
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langchain-community) (0.3.11)
Requirement already satisfied: httpx-sse<1.0.0,>=0.4.0 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langchain-community) (0.4.0)
Requirement already satisfied: numpy<2,>=1.26.4 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langchain-community) (1.26.4)
Requirement already satisfied: langgraph-checkpoint<3.0.0,>=2.0.10 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langgraph) (2.0.16)
Requirement already satisfied: langgraph-prebuilt<0.2,>=0.1.1 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langgraph) (0.1.1)
Requirement already satisfied: langgraph-sdk<0.2.0,>=0.1.42 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langgraph) (0.1.53)
Requirement already satisfied: aiohappyeyeballs>=2.3.0 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
aiohttp<4.0.0,>=3.8.3->langchain-community) (2.4.6)
Requirement already satisfied: aiosignal>=1.1.2 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
aiohttp<4.0.0,>=3.8.3->langchain-community) (1.3.2)
Requirement already satisfied: async-timeout<6.0,>=4.0 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
aiohttp<4.0.0,>=3.8.3->langchain-community) (4.0.3)
Requirement already satisfied: attrs>=17.3.0 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
aiohttp<4.0.0,>=3.8.3->langchain-community) (25.1.0)
Requirement already satisfied: frozenlist>=1.1.1 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
aiohttp<4.0.0,>=3.8.3->langchain-community) (1.5.0)
Requirement already satisfied: multidict<7.0,>=4.5 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
aiohttp<4.0.0,>=3.8.3->langchain-community) (6.1.0)
Requirement already satisfied: propcache>=0.2.0 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
aiohttp<4.0.0,>=3.8.3->langchain-community) (0.3.0)
Requirement already satisfied: yarl<2.0,>=1.17.0 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
aiohttp<4.0.0,>=3.8.3->langchain-community) (1.18.3)
Requirement already satisfied: marshmallow<4.0.0,>=3.18.0 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
dataclasses-json<0.7,>=0.5.7->langchain-community) (3.26.1)
Requirement already satisfied: typing-inspect<1,>=0.4.0 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
dataclasses-json<0.7,>=0.5.7->langchain-community) (0.9.0)
Requirement already satisfied: pydantic<3.0.0,>=2.7.4 in
```

```
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langchain<1.0.0,>=0.3.19->langchain-community) (2.10.6)
Requirement already satisfied: jsonpatch<2.0,>=1.33 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langchain-core<1.0.0,>=0.3.34->langchain-text-splitters) (1.33)
Requirement already satisfied: packaging<25,>=23.2 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langchain-core<1.0.0,>=0.3.34->langchain-text-splitters) (24.2)
Requirement already satisfied: typing-extensions>=4.7 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langchain-core<1.0.0,>=0.3.34->langchain-text-splitters) (4.12.2)
Requirement already satisfied: msgpack<2.0.0,>=1.1.0 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langgraph-checkpoint<3.0.0,>=2.0.10->langgraph) (1.1.0)
Requirement already satisfied: httpx>=0.25.2 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langgraph-sdk<0.2.0,>=0.1.42->langgraph) (0.28.1)
Requirement already satisfied: orjson>=3.10.1 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langgraph-sdk<0.2.0,>=0.1.42->langgraph) (3.10.15)
Requirement already satisfied: requests-toolbelt<2.0.0,>=1.0.0 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langsmith<0.4,>=0.1.125->langchain-community) (1.0.0)
Requirement already satisfied: zstandard<0.24.0,>=0.23.0 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
langsmith<0.4,>=0.1.125->langchain-community) (0.23.0)
Requirement already satisfied: python-dotenv>=0.21.0 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from pydantic-
settings<3.0.0,>=2.4.0->langchain-community) (1.0.1)
Requirement already satisfied: charset-normalizer<4,>=2 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
requests<3,>=2->langchain-community) (3.4.1)
Requirement already satisfied: idna<4,>=2.5 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
requests<3,>=2->langchain-community) (3.10)
Requirement already satisfied: urllib3<3,>=1.21.1 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
requests<3,>=2->langchain-community) (2.3.0)
Requirement already satisfied: certifi>=2017.4.17 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
requests<3,>=2->langchain-community) (2025.1.31)
Requirement already satisfied: greenlet!=0.4.17 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
SQLAlchemy<3,>=1.4->langchain-community) (3.1.1)
Requirement already satisfied: anyio in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
httpx>=0.25.2->langgraph-sdk<0.2.0,>=0.1.42->langgraph) (4.8.0)
Requirement already satisfied: httpcore==1.* in
```

```
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
httpx>=0.25.2->langgraph-sdk<0.2.0,>=0.1.42->langgraph) (1.0.7)
Requirement already satisfied: h11<0.15,>=0.13 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
httpcore==1.*->httpx>=0.25.2->langgraph-sdk<0.2.0,>=0.1.42->langgraph) (0.14.0)
Requirement already satisfied: jsonpointer>=1.9 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
jsonpatch<2.0,>=1.33->langchain-core<1.0.0,>=0.3.34->langchain-text-splitters)
(3.0.0)
Requirement already satisfied: annotated-types>=0.6.0 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
pydantic<3.0.0,>=2.7.4->langchain<1.0.0,>=0.3.19->langchain-community) (0.7.0)
Requirement already satisfied: pydantic-core==2.27.2 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
pydantic<3.0.0,>=2.7.4->langchain<1.0.0,>=0.3.19->langchain-community) (2.27.2)
Requirement already satisfied: mypy-extensions>=0.3.0 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from typing-
inspect<1,>=0.4.0->dataclasses-json<0.7,>=0.5.7->langchain-community) (1.0.0)
Requirement already satisfied: exceptiongroup>=1.0.2 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
anyio->httpx>=0.25.2->langgraph-sdk<0.2.0,>=0.1.42->langgraph) (1.2.2)
Requirement already satisfied: sniffio>=1.1 in
c:\users\harry\miniconda3\envs\finance_chatbot\lib\site-packages (from
anyio->httpx>=0.25.2->langgraph-sdk<0.2.0,>=0.1.42->langgraph) (1.3.1)
Note: you may need to restart the kernel to use updated packages.
```

2 Langsmith initialization

Setting up Langsmith for application tracing

[2]:

```python
import getpass
import os

# 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
os.environ['LANGSMITH_TRACING'] = 'true'
os.environ['LANGSMITH_API_KEY'] = getpass.getpass('Enter your Langsmith API Key:
  ↪')
```

3 Initializing Chat Model

Here, I am using groq to call for the llm chatbots

3.1 Installing groq library from langchain

[3]:

```
%pip install -qU "langchain[groq]" langchain
```

```
Note: you may need to restart the kernel to use updated packages.
```

[3]:

```
from langchain.chat_models import init_chat_model

# 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
if not os.environ.get('GROQ_API_KEY') :
    os.environ['GROQ_API_KEY'] = getpass.getpass('Enter you groq API Key: ')

llm = init_chat_model(model = 'llama3-8b-8192', model_provider = 'groq')
```

4 Initializing Embeddings Model

Here I am going for the Embedding model by hugging face which is 'all-MiniLM-L6-v2'

4.1 Installing the hugging face library from langchain

[5]:

```
pip install -qU langchain-huggingface
```

```
Note: you may need to restart the kernel to use updated packages.
```

[6]:

```
from langchain_huggingface import HuggingFaceEmbeddings

embeddings_model = HuggingFaceEmbeddings(model_name = 'all-MiniLM-L6-v2')
```

```
c:\Users\harry\miniconda3\envs\Finance_Chatbot\lib\site-
packages\tqdm\auto.py:21: TqdmWarning: IProgress not found. Please update
jupyter and ipywidgets. See
https://ipywidgets.readthedocs.io/en/stable/user_install.html
  from .autonotebook import tqdm as notebook_tqdm
```

5 Initializing Vector Store

From langchain core, currently I will use the in memory Vector Store. Later on will choose one of FAISS, Pinecone, ChromaDB, PGVector, …

[7]:

```
pip install -qU langchain-core
```

```
Note: you may need to restart the kernel to use updated packages.
```

[8]:

```
from langchain_core.vectorstores import InMemoryVectorStore

vector_store = InMemoryVectorStore(embeddings_model)
```

6 Creating the RAG Pipeline

6.1 Importing the libraries

[9]:

```
import bs4
from langchain import hub
from langchain_community.document_loaders import WebBaseLoader
from langchain_core.documents import Document
from langchain_text_splitters import RecursiveCharacterTextSplitter
from langgraph.graph import START, StateGraph
from typing import List, TypedDict
```

```
USER_AGENT environment variable not set, consider setting it to identify your
requests.
```

[10]:

```
# Setting the USER_AGENT Environment Variable
if not os.environ.get('USER_AGENT'):
    os.environ['USER_AGENT'] = 'FinanceAgent-1.0'
```

6.2 Web Scrapping the content

[11]:

```
# Defining web scrapping content from the web
loader = WebBaseLoader(
    web_paths = (
        'https://www.cnbc.com/2025/02/27/stock-market-today-live-updates.html',
        'https://apnews.com/article/
 ↪stocks-markets-rates-tariffs-ai-a80355efea6fd7454df04d68cf3a79a1'
    ),
    bs_kwargs = dict(
        parse_only = bs4.SoupStrainer(
            class_ = ('BrandPageWrapper-contentWrapper', 'Page-content')
        )
    ),
)

# Loading the scrapped content
docs = loader.load()
print(docs)
```

```
[Document(metadata={'source': 'https://www.cnbc.com/2025/02/27/stock-market-
today-live-updates.html'}, page_content=''), Document(metadata={'source':
'https://apnews.com/article/stocks-markets-rates-tariffs-
ai-a80355efea6fd7454df04d68cf3a79a1'}, page_content='\n\n\nBusiness\nStock
market today: Wall Street rallies, and Dow jumps 600 to make a dreary February
not so bad\n\n\n\n\n\nStock market today: Wall Street rallies, and Dow jumps 600
to make a dreary February not so
bad\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n1 of 5\xa0|\xa0\nThe New
York Stock Exchange is seen in New York, Wednesday, Feb. 26, 2025. (AP
Photo/Seth Wenig)\nRead
```

More\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n2 of 5\xa0|\xa0\nAn American flag is displayed on the outside of the New York Stock Exchange in New York, Wednesday, Feb. 26, 2025. (AP Photo/Seth Wenig)\nRead More\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n3 of 5\xa0|\xa0\nA person walks in front of an electronic stock board showing Japan's Nikkei index at a securities firm Friday, Feb. 28, 2025, in Tokyo. (AP Photo/Eugene Hoshiko)\nRead More\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n4 of 5\xa0|\xa0\nPeople stand in front of an electronic stock board showing Japan's Nikkei index at a securities firm Friday, Feb. 28, 2025, in Tokyo. (AP Photo/Eugene Hoshiko)\nRead More\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n5 of 5\xa0|\xa0\nPeople stand in front of an electronic stock board showing Japan's Nikkei index at a securities firm Friday, Feb. 28, 2025, in Tokyo. (AP Photo/Eugene Hoshiko)\nRead More\n\n\n\n\n\n\n\n\n\n\n\n\n By\xa0\n STAN CHOE\n\n\n\n\xa0\n\n\n\n\nShare\n\n\n\n Share\n \n\n\n\n\n\n\n\n\n\nCopy\nLink copied\n\n\n\n\n\n\n\n\n Email\n \n\n\n \n\n\n\n\n\nFacebook\n\n\n\n\n\n\nX\n\n\n\n\n\n\n\n\nReddit\n\n\n\n\n\nLinkedIn\n\n\n\n\n\nPinterest\n\n\n\n\n\nFlipboard\n\n\n\n\n\n\n\n\n Print\n \n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\nNEW YORK (AP) - U.S. stocks rallied on Friday to close out their dreary February on a brighter note.The S&P 500 jumped 1.6% to trim its loss for the month, enough to make it the worst only since December instead of since April. It had dropped in five of the prior six days after weaker-than-expected reports on the economy and worries about President Donald Trump's tariffs knocked the index off its all-time high set last week.The Dow Jones Industrial Average rose 601 points, or 1.4%, and the Nasdaq composite climbed 1.6%.Much of the recent damage had focused on the market's biggest winners of recent years, whose momentum had seemed nearly impossible to stop at times. Stocks that flew in the frenzy around artificial-intelligence technology slumped sharply, for example. Bitcoin, meanwhile, dropped more than 20% from its record.Many of those beaten-down areas of the market jumped Friday to recover some of their losses. Nvidia, which has become one of the market's most influential stocks, rose 4% following its 8.5% tumble Thursday and was the strongest force lifting the S&P 500. Bitcoin bounced back above $84,000 after falling below $79,000 during the morning.\n\nStocks rose following an economic report released in the morning that included both some encouraging and discouraging trends\n\n\n\n\n\n\n\n RELATED COVERAGE\n \n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\nAmerica First? Not when it comes to stock markets worldwide this year\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\nStock market today: Wall Street falls sharply as Nvidia tumbles 8.5% and AI mania falters\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\nNvidia posted another strong quarterly report. What to know, by the numbers\n\n\n\n\n\n\n\n\n\nInflation across the country decelerated a bit and behaved pretty much exactly as economists expected, according to the measure that the Federal Reserve prefers to use. That's good news for the entire market because it could give the Federal Reserve leeway to continue cutting its main interest rate at some point later this year. \n\n\n\n\n\n\n\n\n\n\n\n\nThat, in turn, could help goose the economy. The Fed has been keeping rates on hold so far this year after cutting them sharply late last year, in large part because of concerns about potentially stubborn inflation. But Friday's report also said that U.S. households pulled back on their spending during January. That's dangerous because their strong spending has been a major reason the U.S. economy has avoided a recession despite high interest rates. \n\nU.S. consumers had already given big hints they're under pressure and worried. Inflation is still high, even if it's not as bad as its peak from 2022, and a widespread worry is that tariffs announced by Trump could push prices for the cost of living even higher. Wall Street hopes that all the talk about tariffs are merely a tool Trump is using to negotiate with other countries and that he'll ultimately pull back on them, which would mean less pain for the global economy than initially feared. But recent reports have nevertheless shown all the talk has already pushed U.S. consumers to brace for much higher inflation in the future. At some point, such worries could drive their behavior, which could drag on the economy even without tariffs.All the uncertainty around not only tariffs but also deregulation and other potential moves could mean "if the market doesn't see Trump moving towards more market-friendly policies, the level of trust could continue eroding," Bank of America economists wrote in a BofA Global Research report.\n\nOf course, much of January's drop in spending by U.S. households could have been the simple result of painfully cold weather around the country and other anomalies. But it also followed several signals of slowing growth for the U.S. economy, which closed 2024 running at a solid pace.Most stocks within the S&P 500 rose on Friday, led by AES after the energy company reported profit for the latest quarter that blew past analysts' expectations. CEO Andrés Gluski also said it's seeing strong demand from AI data centers and new U.S. manufacturing plants, and AES stock jumped 11.7%. Signet Jewelers rose 5.2% after an investment firm, Select Equity Group, amassed a nearly 10% ownership stake in the retailer and said it's pushing the board to sell the company or find another way to boost its stock price. They helped offset a 4.7% drop for Dell, which reported stronger profit for the latest quarter than analysts expected but fell short on its revenue. \n\nAll told, the S&P 500 rose 92.93 points to 5,954.50. The Dow Jones Industrial Average gained 601.41 to 43,840.91, and the Nasdaq composite jumped 302.86 to 18,847.28.In the bond market, Treasury yields sank again following the data on consumer spending and inflation. The yield on the 10-year Treasury fell to 4.20% from 4.26% late Thursday. It's down sharply from last month, when it was approaching 4.80%, as worries have grown about where the U.S. economy is heading. In stock markets abroad, indexes fell sharply in Asia as worries about tariffs continued. China's Commerce Ministry issued a statement Friday protesting Trump's decision to double tariffs on Chinese products to 20%, saying it violated international trade rules and would add to the "burden on American companies and consumers and undermine the stability of the global industrial chain."Indexes tumbled 3.3% in Hong Kong, 2% in Shanghai, 3.4% in Seoul and 2.9% in Tokyo. ___AP Business Writers Matt Ott and Elaine Kurtenbach contributed. \n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n   Most read\n   \n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\nWhat US lawmakers are saying about the White House clash between Trump and Zelenskyy\n\n\n\n\n\n\n\n\n\n\nNo new bombshells in Justice Department's release of Jeffrey Epstein files\n\n\n\n\n\n\n\n\n\n\nOscar-winner Gene Hackman, wife

```
Betsy Arakawa and their dog were dead for some time, warrant
shows\n\n\n\n\n\n\n\n\n\n\nZelenskyy leaves White House without signing minerals
deal after Oval Office blowup\n\n\n\n\n\n\n\n\n\n\nGene Hackman and his wife
tested negative for carbon monoxide, sheriff says\n\n\n\n\n\n\n\n\n\n\n\n\n')]
```

6.3 Splitting the loaded data from web scrapping

[12]:

```python
# Defining the splitter
text_splitter = RecursiveCharacterTextSplitter(chunk_size = 1000, chunk_overlap = 200)

# Splitting the documents
all_splits = text_splitter.split_documents(docs)
```

6.4 Indexing/Storing the chunks

[13]:

```python
_ = vector_store.add_documents(documents = all_splits)
```

6.5 Defining the Prompt for question Answering

[14]:

```python
# Defining the prompt for question-answering use case
prompt = hub.pull('rlm/rag-prompt')

print(prompt)
```

```
input_variables=['context', 'question'] input_types={} partial_variables={}
metadata={'lc_hub_owner': 'rlm', 'lc_hub_repo': 'rag-prompt',
'lc_hub_commit_hash':
'50442af133e61576e74536c6556cefe1fac147cad032f4377b60c436e6cdcb6e'} messages=[Hu
manMessagePromptTemplate(prompt=PromptTemplate(input_variables=['context',
'question'], input_types={}, partial_variables={}, template="You are an
assistant for question-answering tasks. Use the following pieces of retrieved
context to answer the question. If you don't know the answer, just say that you
don't know. Use three sentences maximum and keep the answer concise.\nQuestion:
{question} \nContext: {context} \nAnswer:"), additional_kwargs={})]
```

6.6 Defining the State Class

[15]:

```python
# States class comprises of 3 attributes :
# 1. question (Input)
# 2. context (Input)
# 3. answer (Output)
class State(TypedDict):
    question: str
    context: List[Document]
    answer: str
```

6.7 Defining application steps

[16]:

```
def retrieve(state: State) -> dict:
    retrieved_docs = vector_store.similarity_search(state['question'])
    return {'context': retrieved_docs}

def generate(state: State) -> dict:
    docs_content = '\n\n'.join([doc.page_content for doc in state['context']])
    messages = prompt.invoke({'question': state['question'], 'context':␣
 ↪docs_content})
    response = llm.invoke(messages)
    return {'answer': response.content}
```

6.8 Compiling the RAG piepline

[17]:

```
# Defining the state graph for the input question, retrieved documents and the␣
 ↪answer
graph_builder = StateGraph(State).add_sequence([retrieve, generate])
# Adding an edge from the START state to the retrieve state
graph_builder.add_edge(START, "retrieve")
# Compiling the graph
graph = graph_builder.compile()
```

6.9 Testing the RAG Model

[20]:

```
print(type(graph))
```

```
<class 'langgraph.graph.state.CompiledStateGraph'>
```

[18]:

```
question = "What is happening in the stock market today?"
response = graph.invoke({'question': question})

print(response['answer'])
```

```
According to the context, stocks rose following an economic report released in
the morning, with the S&P 500 jumping 1.6% and the Dow Jones Industrial Average
rising 601 points.
```

[31]:

```
question = "What is the sentiment of the market in 1 word?"
response = graph.invoke({'question': question})

print(response['answer'])
```

```
Bear.
```

[32]:

```
question = 'What was the sentiment before today in the market in 1 word?'
response = graph.invoke({'question': question})

print(response['answer'])
```

```
Bearish.
```

[33]:

```python
question = 'What is Football and how is it played?'

response = graph.invoke({'question': question})
print(response['answer'])
```

```
I don't know. The provided context does not mention football or any information
about how it is played. It appears to be a news article about the stock market
and economics.
```