

Langchain Integration with Google Gemini

```
In [4]: %pip install -qU "langchain[google-genai]"
```

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

```
In [ ]: # 1. Importing required libraries
import getpass #Allows you to securely input sensitive information (Like passwords or API keys) without showing it or
import os #Provides a way to interact with the operating system, such as reading or setting environment variables.

# 2. Setting the Google API Key if not already set
if not os.environ.get("GOOGLE_API_KEY"): #Checks if the environment variable GOOGLE_API_KEY is already set.
    os.environ["GOOGLE_API_KEY"] = getpass.getpass("Enter API key for Google Gemini:")

# 3. Importing the chat model initializer
from langchain.chat_models import init_chat_model #imports the init_chat_model function from Langchain.chat_models

# 4. Initializing the Google Gemini model
model = init_chat_model("gemini-2.0-flash", model_provider="google_genai") #initializes a chat model with the ID "gen
```

```
In [3]: %pip install langchain-google-genai
```

Defaulting to user installation because normal site-packages is not writeable
Note: you may need to restart the kernel to use updated packages.

Requirement already satisfied: langchain-google-genai in c:\users\amruta\appdata\roaming\python\python311\site-packages (2.1.5)
Requirement already satisfied: filetype<2.0.0,>=1.2.0 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from langchain-google-genai) (1.2.0)
Requirement already satisfied: google-ai-generativelanguage<0.7.0,>=0.6.18 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from langchain-google-genai) (0.6.18)
Requirement already satisfied: langchain-core<0.4.0,>=0.3.62 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from langchain-google-genai) (0.3.66)
Requirement already satisfied: pydantic<3,>=2 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from langchain-google-genai) (2.11.7)
Requirement already satisfied: google-api-core[grpc]!=2.0.*,!2.1.*,!2.10.*,!2.2.*,!2.3.*,!2.4.*,!2.5.*,!2.6.*,!2.7.*,!2.8.*,!2.9.*,<3.0.0,>=1.34.1 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from google-ai-generativelanguage<0.7.0,>=0.6.18->langchain-google-genai) (2.25.1)
Requirement already satisfied: google-auth!=2.24.0,!2.25.0,<3.0.0,>=2.14.1 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from google-ai-generativelanguage<0.7.0,>=0.6.18->langchain-google-genai) (2.40.3)
Requirement already satisfied: proto-plus<2.0.0,>=1.22.3 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from google-ai-generativelanguage<0.7.0,>=0.6.18->langchain-google-genai) (1.26.1)
Requirement already satisfied: protobuf!=4.21.0,!4.21.1,!4.21.2,!4.21.3,!4.21.4,!4.21.5,<7.0.0,>=3.20.2 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from google-ai-generativelanguage<0.7.0,>=0.6.18->langchain-google-genai) (6.31.1)
Requirement already satisfied: langsmith>=0.3.45 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from langchain-core<0.4.0,>=0.3.62->langchain-google-genai) (0.4.1)
Requirement already satisfied: tenacity!=8.4.0,<10.0.0,>=8.1.0 in c:\programdata\anaconda3\lib\site-packages (from langchain-core<0.4.0,>=0.3.62->langchain-google-genai) (8.2.2)
Requirement already satisfied: jsonpatch<2.0,>=1.33 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from langchain-core<0.4.0,>=0.3.62->langchain-google-genai) (1.33)
Requirement already satisfied: PyYAML>=5.3 in c:\programdata\anaconda3\lib\site-packages (from langchain-core<0.4.0,>=0.3.62->langchain-google-genai) (6.0)
Requirement already satisfied: packaging<25,>=23.2 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from langchain-core<0.4.0,>=0.3.62->langchain-google-genai) (24.2)
Requirement already satisfied: typing-extensions>=4.7 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from langchain-core<0.4.0,>=0.3.62->langchain-google-genai) (4.14.0)
Requirement already satisfied: annotated-types>=0.6.0 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from pydantic<3,>=2->langchain-google-genai) (0.6.0)
Requirement already satisfied: pydantic-core==2.33.2 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from pydantic<3,>=2->langchain-google-genai) (2.33.2)
Requirement already satisfied: typing-inspection>=0.4.0 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from pydantic<3,>=2->langchain-google-genai) (0.4.1)
Requirement already satisfied: googleapis-common-protos<2.0.0,>=1.56.2 in c:\users\amruta\appdata\roaming\python\pyth

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on311\site-packages (from google-api-core[grpc]!=2.0.*,!2.1.*,!2.10.*,!2.2.*,!2.3.*,!2.4.*,!2.5.*,!2.6.*,!2.7.*,!2.8.*,!2.9.*,<3.0.0,>=1.34.1->google-ai-generativelanguage<0.7.0,>=0.6.18->langchain-google-genai) (1.70.0)
Requirement already satisfied: requests<3.0.0,>=2.18.0 in c:\programdata\anaconda3\lib\site-packages (from google-api-core[grpc]!=2.0.*,!2.1.*,!2.10.*,!2.2.*,!2.3.*,!2.4.*,!2.5.*,!2.6.*,!2.7.*,!2.8.*,!2.9.*,<3.0.0,>=1.34.1->google-ai-generativelanguage<0.7.0,>=0.6.18->langchain-google-genai) (2.31.0)
Requirement already satisfied: grpcio<2.0.0,>=1.33.2 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from google-api-core[grpc]!=2.0.*,!2.1.*,!2.10.*,!2.2.*,!2.3.*,!2.4.*,!2.5.*,!2.6.*,!2.7.*,!2.8.*,!2.9.*,<3.0.0,>=1.34.1->google-ai-generativelanguage<0.7.0,>=0.6.18->langchain-google-genai) (1.73.0)
Requirement already satisfied: grpcio-status<2.0.0,>=1.33.2 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from google-api-core[grpc]!=2.0.*,!2.1.*,!2.10.*,!2.2.*,!2.3.*,!2.4.*,!2.5.*,!2.6.*,!2.7.*,!2.8.*,!2.9.*,<3.0.0,>=1.34.1->google-ai-generativelanguage<0.7.0,>=0.6.18->langchain-google-genai) (1.73.0)
Requirement already satisfied: cachetools<6.0,>=2.0.0 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from google-auth!=2.24.0,!2.25.0,<3.0.0,>=2.14.1->google-ai-generativelanguage<0.7.0,>=0.6.18->langchain-google-genai) (5.5.2)
Requirement already satisfied: pyasn1-modules>=0.2.1 in c:\programdata\anaconda3\lib\site-packages (from google-auth!=2.24.0,!2.25.0,<3.0.0,>=2.14.1->google-ai-generativelanguage<0.7.0,>=0.6.18->langchain-google-genai) (0.2.8)
Requirement already satisfied: rsa<5,>=3.1.4 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from google-auth!=2.24.0,!2.25.0,<3.0.0,>=2.14.1->google-ai-generativelanguage<0.7.0,>=0.6.18->langchain-google-genai) (4.9.1)
Requirement already satisfied: jsonpointer>=1.9 in c:\programdata\anaconda3\lib\site-packages (from jsonpatch<2.0,>=1.33->langchain-core<0.4.0,>=0.3.62->langchain-google-genai) (2.1)
Requirement already satisfied: httpx<1,>=0.23.0 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from langsmith>=0.3.45->langchain-core<0.4.0,>=0.3.62->langchain-google-genai) (0.28.1)
Requirement already satisfied: orjson<4.0.0,>=3.9.14 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from langsmith>=0.3.45->langchain-core<0.4.0,>=0.3.62->langchain-google-genai) (3.10.18)
Requirement already satisfied: requests-toolbelt<2.0.0,>=1.0.0 in c:\programdata\anaconda3\lib\site-packages (from langsmith>=0.3.45->langchain-core<0.4.0,>=0.3.62->langchain-google-genai) (1.0.0)
Requirement already satisfied: zstandard<0.24.0,>=0.23.0 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from langsmith>=0.3.45->langchain-core<0.4.0,>=0.3.62->langchain-google-genai) (0.23.0)
Requirement already satisfied: anyio in c:\programdata\anaconda3\lib\site-packages (from httpx<1,>=0.23.0->langsmith>=0.3.45->langchain-core<0.4.0,>=0.3.62->langchain-google-genai) (3.5.0)
Requirement already satisfied: certifi in c:\programdata\anaconda3\lib\site-packages (from httpx<1,>=0.23.0->langsmith>=0.3.45->langchain-core<0.4.0,>=0.3.62->langchain-google-genai) (2023.7.22)
Requirement already satisfied: httpcore==1.* in c:\users\amruta\appdata\roaming\python\python311\site-packages (from httpx<1,>=0.23.0->langsmith>=0.3.45->langchain-core<0.4.0,>=0.3.62->langchain-google-genai) (1.0.7)
Requirement already satisfied: idna in c:\programdata\anaconda3\lib\site-packages (from httpx<1,>=0.23.0->langsmith>=0.3.45->langchain-core<0.4.0,>=0.3.62->langchain-google-genai) (3.4)
Requirement already satisfied: h11<0.15,>=0.13 in c:\users\amruta\appdata\roaming\python\python311\site-packages (from httpcore==1.*->httpx<1,>=0.23.0->langsmith>=0.3.45->langchain-core<0.4.0,>=0.3.62->langchain-google-genai) (0.14.0)
Requirement already satisfied: pyasn1<0.5.0,>=0.4.6 in c:\programdata\anaconda3\lib\site-packages (from pyasn1-module>=0.2.1->google-auth!=2.24.0,!2.25.0,<3.0.0,>=2.14.1->google-ai-generativelanguage<0.7.0,>=0.6.18->langchain-google-genai) (0.4.8)

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Requirement already satisfied: charset-normalizer<4,>=2 in c:\programdata\anaconda3\lib\site-packages (from requests<3.0.0,>=2.18.0->google-api-core[grpc]!=2.0.*,!2.1.*,!2.10.*,!2.2.*,!2.3.*,!2.4.*,!2.5.*,!2.6.*,!2.7.*,!2.8.*,!2.9.*,<3.0.0,>=1.34.1->google-ai-generativelanguage<0.7.0,>=0.6.18->langchain-google-genai) (2.0.4)
Requirement already satisfied: urllib3<3,>=1.21.1 in c:\programdata\anaconda3\lib\site-packages (from requests<3.0.0,>=2.18.0->google-api-core[grpc]!=2.0.*,!2.1.*,!2.10.*,!2.2.*,!2.3.*,!2.4.*,!2.5.*,!2.6.*,!2.7.*,!2.8.*,!2.9.*,<3.0.0,>=1.34.1->google-ai-generativelanguage<0.7.0,>=0.6.18->langchain-google-genai) (1.26.16)
Requirement already satisfied: sniffio>=1.1 in c:\programdata\anaconda3\lib\site-packages (from anyio->httpx<1,>=0.2.3.0->langsmith>=0.3.45->langchain-core<0.4.0,>=0.3.62->langchain-google-genai) (1.2.0)
```

In [6]: `model.invoke("Hello, world!")`

Out[6]: AIMessage(content='Hello there! How can I help you today?', additional_kwargs={}, response_metadata={'prompt_feedback': {'block_reason': 0, 'safety_ratings': []}, 'finish_reason': 'STOP', 'model_name': 'gemini-2.0-flash', 'safety_ratings': []}, id='run--74bbbf7a-b70b-41d5-9b98-e3d89e979856-0', usage_metadata={'input_tokens': 4, 'output_tokens': 11, 'total_tokens': 15, 'input_token_details': {'cache_read': 0}})

Prompt Templates

Prompt templates help to translate user input and parameters into instructions for a language model.

1. String PromptTemplates

These prompt templates are used to format a single string, and generally are used for simpler inputs.

In [7]: `from langchain_core.prompts import PromptTemplate`
`prompt_template = PromptTemplate.from_template("Tell me a joke about {topic}")`
`prompt_template.invoke({"topic": "cats"})`

Out[7]: `StringPromptValue(text='Tell me a joke about cats')`

2. ChatPromptTemplates

These prompt templates are used to format a list of messages. These "templates" consist of a list of templates themselves.

```
In [8]: from langchain_core.prompts import ChatPromptTemplate

prompt_template = ChatPromptTemplate([
    ("system", "You are a helpful assistant"),
    ("user", "Tell me a joke about {topic}")
])

prompt_template.invoke({"topic": "cats"})
```

Out[8]: ChatPromptValue(messages=[SystemMessage(content='You are a helpful assistant', additional_kwargs={}, response_metadata={}), HumanMessage(content='Tell me a joke about cats', additional_kwargs={}, response_metadata={})])

3. MessagesPlaceholder

This prompt template is responsible for adding a list of messages in a particular place.

```
In [9]: from langchain_core.prompts import ChatPromptTemplate, MessagesPlaceholder
from langchain_core.messages import HumanMessage

prompt_template = ChatPromptTemplate([
    ("system", "You are a helpful assistant"),
    MessagesPlaceholder("msgs")
])

prompt_template.invoke({"msgs": [HumanMessage(content="hi!")]})
```

Out[9]: ChatPromptValue(messages=[SystemMessage(content='You are a helpful assistant', additional_kwargs={}, response_metadata={}), HumanMessage(content='hi!', additional_kwargs={}, response_metadata={})])

```
In [10]: from langchain_core.messages import HumanMessage

model.invoke([HumanMessage(content="Hi! I'm Bob")])
```

Out[10]: AIMessage(content="Hi Bob! It's nice to meet you. How can I help you today?", additional_kwargs={}, response_metadata={'prompt_feedback': {'block_reason': 0, 'safety_ratings': [], 'finish_reason': 'STOP', 'model_name': 'gemini-2.0-flash', 'safety_ratings': []}, id='run--49277c5b-cfc7-4d40-ae09-82fe9babbf96-0', usage_metadata={'input_tokens': 6, 'output_tokens': 19, 'total_tokens': 25, 'input_token_details': {'cache_read': 0}})

```
In [11]: model.invoke([HumanMessage(content="What's my name?")])
```

```
Out[11]: AIMessage(content="As a large language model, I have no memory of past conversations. Therefore, I do not know your name. You haven't told me!", additional_kwargs={}, response_metadata={'prompt_feedback': {'block_reason': 0, 'safety_ratings': []}, 'finish_reason': 'STOP', 'model_name': 'gemini-2.0-flash', 'safety_ratings': []}, id='run--cb5c3b41-b381-4efc-8d83-5eecff8a14a6-0', usage_metadata={'input_tokens': 6, 'output_tokens': 31, 'total_tokens': 37, 'input_token_details': {'cache_read': 0}})
```

```
In [12]: from langchain_core.messages import AIMessage

model.invoke(
    [
        HumanMessage(content="Hi! I'm Bob"),
        AIMessage(content="Hello Bob! How can I assist you today?"),
        HumanMessage(content="What's my name?"),
    ]
)
```

```
Out[12]: AIMessage(content='Your name is Bob. You just told me! 😊', additional_kwargs={}, response_metadata={'prompt_feedback': {'block_reason': 0, 'safety_ratings': []}, 'finish_reason': 'STOP', 'model_name': 'gemini-2.0-flash', 'safety_ratings': []}, id='run--543cae63-ea9b-497f-ae68-aec319c4d5d9-0', usage_metadata={'input_tokens': 22, 'output_tokens': 12, 'total_tokens': 34, 'input_token_details': {'cache_read': 0}})
```

```
In [ ]:
```