

```
!pip install langchain_community langchainhub chromadb langchain==0.1.20 langchain-openai langchain-chroma
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```

```
Requirement already satisfied: six>=1.9.0 in /usr/local/lib/python3.12/dist-packages (from kubernetes>=28.1.0->chromadb) (1.17
Requirement already satisfied: python-dateutil>=2.5.3 in /usr/local/lib/python3.12/dist-packages (from kubernetes>=28.1.0->chr
Requirement already satisfied: google-auth>=1.0.1 in /usr/local/lib/python3.12/dist-packages (from kubernetes>=28.1.0->chromad
Requirement already satisfied: websocket-client!=0.40.0,!=0.41.*,!0.42.*,>=0.32.0 in /usr/local/lib/python3.12/dist-packages
Requirement already satisfied: requests-oauthlib in /usr/local/lib/python3.12/dist-packages (from kubernetes>=28.1.0->chromadb
Requirement already satisfied: urlib3<2.4.0,>=1.24.2 in /usr/local/lib/python3.12/dist-packages (from kubernetes>=28.1.0->chr
Requirement already satisfied: durationpy>=0.7 in /usr/local/lib/python3.12/dist-packages (from kubernetes>=28.1.0->chromadb)
Requirement already satisfied: jsonpatch<2.0,>=1.33 in /usr/local/lib/python3.12/dist-packages (from langchain-core<0.2.0,>=0.:
Requirement already satisfied: requests-toolbelt<2.0.0,>=1.0.0 in /usr/local/lib/python3.12/dist-packages (from langsmith<0.2.(
Requirement already satisfied: coloredlogs in /usr/local/lib/python3.12/dist-packages (from onnxruntime>=1.14.1->chromadb) (15
Requirement already satisfied: flatbuffers in /usr/local/lib/python3.12/dist-packages (from onnxruntime>=1.14.1->chromadb) (25
Requirement already satisfied: protobuf in /usr/local/lib/python3.12/dist-packages (from onnxruntime>=1.14.1->chromadb) (5.29.
Requirement already satisfied: sympy in /usr/local/lib/python3.12/dist-packages (from onnxruntime>=1.14.1->chromadb) (1.13.3)
Requirement already satisfied: distro<2,>=1.7.0 in /usr/local/lib/python3.12/dist-packages (from openai<2.0.0,>=1.24.0->langch
Requirement already satisfied: jiter<1,>=0.4.0 in /usr/local/lib/python3.12/dist-packages (from openai<2.0.0,>=1.24.0->langcha
Requirement already satisfied: sniffio in /usr/local/lib/python3.12/dist-packages (from openai<2.0.0,>=1.24.0->langchain-opena
Requirement already satisfied: importlib-metadata<8.8.0,>=6.0 in /usr/local/lib/python3.12/dist-packages (from opentelemetry-ap
Requirement already satisfied: googleapis-common-protos~1.57 in /usr/local/lib/python3.12/dist-packages (from opentelemetry-e
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Requirement already satisfied: backoff>=1.10.0 in /usr/local/lib/python3.12/dist-packages (from posthog>=2.4.0->chromadb) (2.2
Requirement already satisfied: annotated-types>=0.6.0 in /usr/local/lib/python3.12/dist-packages (from pydantic>1.9->chromadb
Requirement already satisfied: pydantic-core==2.33.2 in /usr/local/lib/python3.12/dist-packages (from pydantic>1.9->chromadb)
Requirement already satisfied: typing-inspection>=0.4.0 in /usr/local/lib/python3.12/dist-packages (from pydantic>1.9->chroma
Requirement already satisfied: charset_normalizer<4,>=2 in /usr/local/lib/python3.12/dist-packages (from requests<3,>=2->langc
Requirement already satisfied: markdown-it-py>=2.2.0 in /usr/local/lib/python3.12/dist-packages (from rich>=10.11.0->chromadb)
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in /usr/local/lib/python3.12/dist-packages (from rich>=10.11.0->chromadb)
Requirement already satisfied: greenlet>=1 in /usr/local/lib/python3.12/dist-packages (from SQLAlchemy<3,>=1.4->langchain_com
Requirement already satisfied: regex>=2022.1.18 in /usr/local/lib/python3.12/dist-packages (from tiktoken<1,>=0.7->langchain-o
Requirement already satisfied: huggingface-hub<1.0,>=0.16.4 in /usr/local/lib/python3.12/dist-packages (from tokenizers<=0.20.:
Requirement already satisfied: click>=8.0.0 in /usr/local/lib/python3.12/dist-packages (from typer>=0.9.0->chromadb) (8.3.0)
Requirement already satisfied: shellingham>=1.3.0 in /usr/local/lib/python3.12/dist-packages (from typer>=0.9.0->chromadb) (1.
Requirement already satisfied: httptools>=0.6.3 in /usr/local/lib/python3.12/dist-packages (from uvicorn[standard]>=0.18.3->ch
Requirement already satisfied: python-dotenv>=0.13 in /usr/local/lib/python3.12/dist-packages (from uvicorn[standard]>=0.18.3-
Requirement already satisfied: uvloop>=0.15.1 in /usr/local/lib/python3.12/dist-packages (from uvicorn[standard]>=0.18.3->chrom
Requirement already satisfied: watchfiles>=0.13 in /usr/local/lib/python3.12/dist-packages (from uvicorn[standard]>=0.18.3->ch
Requirement already satisfied: websockets>=10.4 in /usr/local/lib/python3.12/dist-packages (from uvicorn[standard]>=0.18.3->ch
Requirement already satisfied: cachetools<6.0,>=2.0.0 in /usr/local/lib/python3.12/dist-packages (from google-auth>=1.0.1->kube
Requirement already satisfied: pyasn1-modules>=0.2.1 in /usr/local/lib/python3.12/dist-packages (from google-auth>=1.0.1->kube
Requirement already satisfied: rsa<5,>=3.1.4 in /usr/local/lib/python3.12/dist-packages (from google-auth>=1.0.1->kubernetes>=;
Requirement already satisfied: filelock in /usr/local/lib/python3.12/dist-packages (from huggingface-hub<1.0,>=0.16.4->tokeniz
Requirement already satisfied: fsspec>=2023.5.0 in /usr/local/lib/python3.12/dist-packages (from huggingface-hub<1.0,>=0.16.4-
Requirement already satisfied: hf-xet<2.0.0,>=1.1.3 in /usr/local/lib/python3.12/dist-packages (from huggingface-hub<1.0,>=0.16.4-
Requirement already satisfied: zipp>=3.20 in /usr/local/lib/python3.12/dist-packages (from importlib-metadata<8.8.0,>=6.0->ope
Requirement already satisfied: jsonpointer>=1.9 in /usr/local/lib/python3.12/dist-packages (from jsonpatch<2.0,>=1.33->langcha
Requirement already satisfied: mdurl~>0.1 in /usr/local/lib/python3.12/dist-packages (from markdown-it-py>=2.2.0->rich>=10.11.(
Requirement already satisfied: mypy-extensions>=0.3.0 in /usr/local/lib/python3.12/dist-packages (from typing-inspect<1,>=0.4.(
Requirement already satisfied: humanfriendly>=0.1 in /usr/local/lib/python3.12/dist-packages (from coloredlogs->onnxruntime>=1
Requirement already satisfied: oauthlib>=3.0.0 in /usr/local/lib/python3.12/dist-packages (from requests-oauthlib->kubernetes>:
Requirement already satisfied: mpmath<1.4,>=1.1.0 in /usr/local/lib/python3.12/dist-packages (from sympy->onnxruntime>=1.14.1-
Requirement already satisfied: pyasn1<0.7.0,>=0.6.1 in /usr/local/lib/python3.12/dist-packages (from pyasn1-modules>=0.2.1->go
```

```
#sk-proj-JQ54V2jlgrSvTA6BhleEm3uBsg_pZePdh6mhIh3GCUsHZTOYn8S9WCXTMN441NtNzC9fjrnQvgT3B1bkFJz3GPS85CS3AhYeFWB7mnTiMdhrPvpQFmXMTaY
```

Double-click (or enter) to edit

```
from google.colab import userdata
import os
os.environ['OPENAI_API_KEY'] = userdata.get('OPENAI_API_KEY')
```

```
import os
!pip install PyPDF2 pypdf
import PyPDF2
from langchain_community.document_loaders import PyPDFLoader

directory_path = "/content/drive/MyDrive/DOCS"
```

```
pdf_files = [os.path.join(directory_path, f) for f in os.listdir(directory_path) if f.lower().endswith(".pdf")]
```

```
all_documents = []
for pdf_path in pdf_files:
    loader = PyPDFLoader(pdf_path)
    docs = loader.load_and_split()
    all_documents.extend(docs)
```

```
Requirement already satisfied: PyPDF2 in /usr/local/lib/python3.12/dist-packages (3.0.1)
Requirement already satisfied: pypdf in /usr/local/lib/python3.12/dist-packages (6.1.3)
```

```
from langchain_openai import OpenAIEMBEDDINGS
import chromadb
from langchain_community.vectorstores import Chroma
from google.colab import userdata
userdata.get('OPENAI_API_KEY')
```

```
'sk-proj-isVLXNL5myi0NI80qZPsN-sbnbELoL12YWiqC5NlBHFCX2dla6LNh4aeOinR9W6_bTxfH4F9dT3B1bkFJX09yVkt_V7Z_XwPodKTD32-ZoJQSmze1YgIf
KPH0u7x7kw5T_kxk6M7vn5fh04t0Cn1MAoewllIA'
```

```
from langchain_community.chat_models import ChatOllama
```

```
llm = ChatOllama(model="mistral")
```

```
OLLAMA_MODEL_LLM = "mistral"
OLLAMA_MODEL_EMBED = "nomic-embed-text"
```

```
llm = ChatOllama(model=OLLAMA_MODEL_LLM, temperature=0)
```

```
import os

# --- IMPORT ALL NECESSARY CLASSES ---
from langchain_community.embeddings import OllamaEmbeddings
from langchain_community.chat_models import ChatOllama
from langchain_community.vectorstores import Chroma
from langchain_core.prompts import ChatPromptTemplate
from langchain.chains.combine_documents import create_stuff_documents_chain
from langchain.chains.retrieval import create_retrieval_chain

# --- CONFIGURATION ---
OLLAMA_MODEL_LLM = "mistral"
OLLAMA_MODEL_EMBED = "nomic-embed-text"
# Make sure ollama is running on your machine, and these models are pulled

# --- INITIALIZE EMBEDDINGS ---
print(f"Initializing Embeddings using: {OLLAMA_MODEL_EMBED}")
embeddings = OllamaEmbeddings(model=OLLAMA_MODEL_EMBED)

# --- VECTOR STORE CREATION ---
# all_documents must be a list of LangChain Document objects
print("Creating/Loading Vector Database with Ollama Embeddings...")
vectordb = Chroma.from_documents(
    documents=all_documents,      # Make sure this list is defined elsewhere and properly loaded ESF docs
    embedding=embeddings
)

# --- LLM ---
print(f"Initializing Chat Model using: {OLLAMA_MODEL_LLM}")
llm = ChatOllama(model=OLLAMA_MODEL_LLM, temperature=0)

# --- RETRIEVER ---
retriever = vectordb.as_retriever(search_kwargs={"k": 3})

# --- ESG-SPECIFIC PROMPT ---
prompt = ChatPromptTemplate.from_template("""You are an ESG expert assistant. Answer the following question strictly based on t
If the answer is not present or uncertain, state that you do not know.

<ESG Context>
{context}

Question: {input}

Answer:""")
```

```
# --- CREATE ESG AGENT CHAINS ---
document_chain = create_stuff_documents_chain(llm, prompt)
retrieval_chain = create_retrieval_chain(retriever, document_chain)

# --- SAMPLE EXECUTION (Uncomment to run) ---
# response = retrieval_chain.invoke({"input": "What are the main ESG risks in the recent reports?"})
# print(f"Answer: {response['answer']}")
```

Initializing Embeddings using: nomic-embed-text
 Creating/Loading Vector Database with Ollama Embeddings...

```
ConnectionRefusedError                               Traceback (most recent call last)
/usr/local/lib/python3.12/dist-packages/urllib3/connection.py in _new_conn(self)
    197         try:
--> 198             sock = connection.create_connection(
    199                 (self._dns_host, self.port),
```

----- ♦ 25 frames -----

ConnectionRefusedError: [Errno 111] Connection refused

The above exception was the direct cause of the following exception:

```
NewConnectionError                               Traceback (most recent call last)
NewConnectionError: <urllib3.connection.HTTPConnection object at 0x789c4e974bf0>: Failed to establish a new connection: [Errno 111] Connection refused
```

The above exception was the direct cause of the following exception:

```
MaxRetryError                               Traceback (most recent call last)
MaxRetryError: HTTPConnectionPool(host='localhost', port=11434): Max retries exceeded with url: /api/embeddings (Caused by
NewConnectionError('<urllib3.connection.HTTPConnection object at 0x789c4e974bf0>: Failed to establish a new connection: [Errno
111] Connection refused'))
```

During handling of the above exception, another exception occurred:

```
ConnectionError                               Traceback (most recent call last)
ConnectionError: HTTPConnectionPool(host='localhost', port=11434): Max retries exceeded with url: /api/embeddings (Caused by
NewConnectionError('<urllib3.connection.HTTPConnection object at 0x789c4e974bf0>: Failed to establish a new connection: [Errno
111] Connection refused'))
```

During handling of the above exception, another exception occurred:

```
ValueError                                Traceback (most recent call last)
/usr/local/lib/python3.12/dist-packages/langchain_community/embeddings/ollama.py in _process_emb_response(self, input)
    168
    169     except requests.exceptions.RequestException as e:
--> 170         raise ValueError(f"Error raised by inference endpoint: {e}")
    171
    172     if res.status_code != 200:
```

ValueError: Error raised by inference endpoint: HTTPConnectionPool(host='localhost', port=11434): Max retries exceeded with ...

Next steps: [Explain error](#)

Start coding or [generate](#) with AI.