```
!pip install gradio langchain langchain_community langchain_milvus transformers pymilvus
```

Requirement already satisfied: gradio in /usr/local/lib/python3.11/dist-packages (5.39.0)
Requirement already satisfied: langchain in /usr/local/lib/python3.11/dist-packages (0.3.27)
Collecting langchain_community
  Downloading langchain_community-0.3.27-py3-none-any.whl.metadata (2.9 kB)
Collecting langchain_milvus
  Downloading langchain_milvus-0.2.1-py3-none-any.whl.metadata (3.8 kB)
Requirement already satisfied: transformers in /usr/local/lib/python3.11/dist-packages (4.54.1)
Collecting pymilvus
  Downloading pymilvus-2.6.0-py3-none-any.whl.metadata (5.8 kB)
Requirement already satisfied: aiofiles<25.0,>=22.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (24.1.0)
Requirement already satisfied: anyio<5.0,>=3.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (4.10.0)
Requirement already satisfied: brotli>=1.1.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (1.1.0)
Requirement already satisfied: fastapi<1.0,>=0.115.2 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.116.1)
Requirement already satisfied: ffmpy in /usr/local/lib/python3.11/dist-packages (from gradio) (0.6.1)
Requirement already satisfied: gradio-client==1.11.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (1.11.0)
Requirement already satisfied: groovy~=0.1 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.1.2)
Requirement already satisfied: httpx<1.0,>=0.24.1 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.28.1)
Requirement already satisfied: huggingface-hub<1.0,>=0.33.5 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.34.3)
Requirement already satisfied: jinja2<4.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (3.1.6)
Requirement already satisfied: markupsafe<4.0,>=2.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (3.0.2)
Requirement already satisfied: numpy<3.0,>=1.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (2.0.2)
Requirement already satisfied: orjson~=3.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (3.11.1)
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Requirement already satisfied: pandas<3.0,>=1.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (2.2.2)
Requirement already satisfied: pillow<12.0,>=8.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (11.3.0)
Requirement already satisfied: pydantic<2.12,>=2.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (2.11.7)
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Requirement already satisfied: python-multipart>=0.0.18 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.0.20)
Requirement already satisfied: pyyaml<7.0,>=5.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (6.0.2)
Requirement already satisfied: ruff>=0.9.3 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.12.7)
Requirement already satisfied: safehttpx<0.2.0,>=0.1.6 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.1.6)
Requirement already satisfied: semantic-version~=2.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (2.10.0)
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Requirement already satisfied: typer<1.0,>=0.12 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.16.0)
Requirement already satisfied: typing-extensions~=4.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (4.14.1)
Requirement already satisfied: uvicorn>=0.14.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.35.0)
Requirement already satisfied: fsspec in /usr/local/lib/python3.11/dist-packages (from gradio-client==1.11.0->gradio) (2025.3.0)
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Requirement already satisfied: langchain-text-splitters<1.0.0,>=0.3.9 in /usr/local/lib/python3.11/dist-packages (from langchain) (0
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Requirement already satisfied: SQLAlchemy<3,>=1.4 in /usr/local/lib/python3.11/dist-packages (from langchain) (2.0.42)
Requirement already satisfied: requests<3,>=2 in /usr/local/lib/python3.11/dist-packages (from langchain) (2.32.3)
Requirement already satisfied: aiohttp<4.0.0,>=3.8.3 in /usr/local/lib/python3.11/dist-packages (from langchain_community) (3.12.15)
Requirement already satisfied: tenacity!=8.4.0,<10,>=8.1.0 in /usr/local/lib/python3.11/dist-packages (from langchain_community) (8.
Collecting dataclasses-json<0.7,>=0.5.7 (from langchain_community)
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Requirement already satisfied: filelock in /usr/local/lib/python3.11/dist-packages (from transformers) (3.18.0)
Requirement already satisfied: regex!=2019.12.17 in /usr/local/lib/python3.11/dist-packages (from transformers) (2024.11.6)
Requirement already satisfied: tokenizers<0.22,>=0.21 in /usr/local/lib/python3.11/dist-packages (from transformers) (0.21.4)
Requirement already satisfied: safetensors>=0.4.3 in /usr/local/lib/python3.11/dist-packages (from transformers) (0.5.3)
Requirement already satisfied: tqdm>=4.27 in /usr/local/lib/python3.11/dist-packages (from transformers) (4.67.1)
Requirement already satisfied: setuptools>69 in /usr/local/lib/python3.11/dist-packages (from pymilvus) (75.2.0)

```
!pip install replicate
```

Collecting replicate
  Downloading replicate-1.0.7-py3-none-any.whl.metadata (29 kB)
Requirement already satisfied: httpx<1,>=0.21.0 in /usr/local/lib/python3.11/dist-packages (from replicate) (0.28.1)
Requirement already satisfied: packaging in /usr/local/lib/python3.11/dist-packages (from replicate) (25.0)
Requirement already satisfied: pydantic>1.10.7 in /usr/local/lib/python3.11/dist-packages (from replicate) (2.11.7)
Requirement already satisfied: typing_extensions>=4.5.0 in /usr/local/lib/python3.11/dist-packages (from replicate) (4.14.1)
Requirement already satisfied: anyio in /usr/local/lib/python3.11/dist-packages (from httpx<1,>=0.21.0->replicate) (4.10.0)
Requirement already satisfied: certifi in /usr/local/lib/python3.11/dist-packages (from httpx<1,>=0.21.0->replicate) (2025.8.3)
Requirement already satisfied: httpcore==1.* in /usr/local/lib/python3.11/dist-packages (from httpx<1,>=0.21.0->replicate) (1.0.9)
Requirement already satisfied: idna in /usr/local/lib/python3.11/dist-packages (from httpx<1,>=0.21.0->replicate) (3.10)
Requirement already satisfied: h11>=0.16 in /usr/local/lib/python3.11/dist-packages (from httpcore==1.*->httpx<1,>=0.21.0->replicate)
Requirement already satisfied: annotated-types>=0.6.0 in /usr/local/lib/python3.11/dist-packages (from pydantic>1.10.7->replicate) (0
Requirement already satisfied: pydantic-core==2.33.2 in /usr/local/lib/python3.11/dist-packages (from pydantic>1.10.7->replicate) (2.
Requirement already satisfied: typing-inspection>=0.4.0 in /usr/local/lib/python3.11/dist-packages (from pydantic>1.10.7->replicate)
Requirement already satisfied: sniffio>=1.1 in /usr/local/lib/python3.11/dist-packages (from anyio->httpx<1,>=0.21.0->replicate) (1.3
Downloading replicate-1.0.7-py3-none-any.whl (48 kB)
━━━ 48.6/48.6 kB 650.6 kB/s eta 0:00:00
Installing collected packages: replicate
Successfully installed replicate-1.0.7

```
!pip install sentence-transformers
```

```python
import os
import gradio as gr
import tempfile
from langchain_milvus import Milvus
from langchain_community.llms import Replicate
from langchain_community.document_loaders import TextLoader
from langchain.text_splitter import CharacterTextSplitter
from transformers import AutoTokenizer
from langchain.prompts import PromptTemplate
from langchain.chains import RetrievalQA, LLMChain
from langchain.chains.combine_documents.stuff import StuffDocumentsChain
from langchain_community.embeddings import HuggingFaceEmbeddings

# Replicate token and model setup
os.environ['REPLICATE_API_TOKEN'] = "r8_3HHrig1gtQF2CZjxSVBiyGXIHrx33Yc2ee1BI"
model_path = "ibm-granite/granite-3.3-8b-instruct"
tokenizer = AutoTokenizer.from_pretrained(model_path)
model = Replicate(model=model_path, replicate_api_token=os.environ['REPLICATE_API_TOKEN'])

# 📦 Temporary Milvus DB
db_file = tempfile.NamedTemporaryFile(prefix="milvus_", suffix=".db", delete=False).name
embeddings = HuggingFaceEmbeddings(model_name="all-MiniLM-L6-v2")

vector_db = Milvus(
    embedding_function=embeddings,
    connection_args={"uri": db_file},
    auto_id=True,
    index_params={"index_type": "AUTOINDEX"},
)

# 📄 Financial Literacy Content
filename = "finance_literacy.txt"
with open(filename, "w") as f:
    f.write("""
UPI: Unified Payments Interface (UPI) is a real-time payment system developed by NPCI. It allows users to link bank accounts and make insta

Avoiding Online Scams: Never share your OTP, UPI PIN, or passwords. Beware of links promising free rewards. Use official banking apps only.

Interest Rates: Interest is the cost of borrowing money. Loans usually have an interest rate. Compare rates from different banks before ap

Budgeting: Create a monthly budget by listing your income and expenses. Prioritize needs over wants. Track your spending to save money.
```

Budgeting: Create a monthly budget by listing your income and expenses. Prioritize needs over wants. Track your spending to save money.

Digital Wallets: Apps like PhonePe, Google Pay, Paytm allow you to pay bills, recharge, and send money securely.

Safe Loan Practices: Always read terms before taking a loan. Choose loans with lower interest and no hidden fees.

How to use BHIM app: Download, register with your mobile number linked to your bank, set UPI PIN, and start sending or requesting money.

Fraud Protection: Use two-factor authentication. Don't save card details on unknown websites. Report suspicious activity to your bank immed
""")

```python
# Load & Split Content
loader = TextLoader(filename)
documents = loader.load()
splitter = CharacterTextSplitter.from_huggingface_tokenizer(
    tokenizer=tokenizer,
    chunk_size=tokenizer.model_max_length // 2,
    chunk_overlap=0,
)
texts = splitter.split_documents(documents)
for i, doc in enumerate(texts):
    doc.metadata["doc_id"] = i + 1
vector_db.add_documents(texts)

#  Financial Literacy Prompt
template = """
You are a helpful Digital Financial Literacy Assistant.
User Question: {question}
Give a simple, culturally-inclusive explanation in easy language.
Include tips to stay safe, explain tools like UPI, wallets, loans, interest, scams, budgeting.
"""
prompt = PromptTemplate(template=template, input_variables=["question"])

# Chains
llm_chain = LLMChain(llm=model, prompt=prompt)
combine_chain = StuffDocumentsChain(llm_chain=llm_chain)

rag_chain = RetrievalQA(
    retriever=vector_db.as_retriever(),
    combine_documents_chain=combine_chain,
    return_source_documents=False
)

#  Gradio Interface
def ask_finance_agent(query):
    try:
        response = rag_chain.run(query)
        return response
    except Exception as e:
        return f"❌ Error: {str(e)}"

iface = gr.Interface(
    fn=ask_finance_agent,
    inputs=gr.Textbox(label="Ask a question about digital finance", placeholder="e.g. How to use UPI?"),
    outputs=gr.Textbox(label="Answer"),
    title="AI Agent for Digital Financial Literacy",
    description="Ask about UPI, loans, scams, budgeting, and digital tools. This assistant helps you stay safe and informed.",
    theme="default"
)

iface.launch(share=True)
```

tokenizer_config.json: 9.93k/? [00:00<00:00, 278kB/s]

vocab.json: 777k/? [00:00<00:00, 1.66MB/s]

merges.txt: 442k/? [00:00<00:00, 7.55MB/s]

tokenizer.json: 3.48M/? [00:00<00:00, 13.4MB/s]

added_tokens.json: 100%   207/207 [00:00<00:00, 4.67kB/s]

special_tokens_map.json: 100%   801/801 [00:00<00:00, 29.7kB/s]

/tmp/ipython-input-3987640662.py:22: LangChainDeprecationWarning: The class `HuggingFaceEmbeddings` was deprecated in LangChain 0.2.2
  embeddings = HuggingFaceEmbeddings(model_name="all-MiniLM-L6-v2")

modules.json: 100%   349/349 [00:00<00:00, 21.5kB/s]

config_sentence_transformers.json: 100%   116/116 [00:00<00:00, 12.2kB/s]

README.md: 10.5k/? [00:00<00:00, 955kB/s]

sentence_bert_config.json: 100%   53.0/53.0 [00:00<00:00, 4.91kB/s]

config.json: 100%   612/612 [00:00<00:00, 66.7kB/s]

model.safetensors: 100%   90.9M/90.9M [00:03<00:00, 36.6MB/s]

tokenizer_config.json: 100%   350/350 [00:00<00:00, 38.6kB/s]

vocab.txt: 232k/? [00:00<00:00, 11.8MB/s]

tokenizer.json: 466k/? [00:00<00:00, 24.6MB/s]

special_tokens_map.json: 100%   112/112 [00:00<00:00, 12.7kB/s]

config.json: 100%   190/190 [00:00<00:00, 17.5kB/s]

AI Agent for Digital Financial Literacy

Ask about UPI, loans, scams, budgeting, and digital tools. This assistant helps you stay safe and informed.

Ask a question about digital finance	Answer
how to set up upi	**Using PhonePe and Google Pay:**

Using PhonePe and Google Pay:

PhonePe and Google Pay are digital wallet apps that help you manage your finances easily and securely. Here's a simple guide on how to use them:

PhonePe:

1. **Download and Register:** Download the PhonePe app from Google Play Store or Apple App Store. Register using your mobile number, which should be linked to your bank account.

2. **Link Bank Account:** Verify your bank account by entering the details asked. This could be through an OTP (One Time Password) sent to your registered mobile number or through net banking.

Clear   **Submit**