LangGraph Crash Course #10 - Reflexion Agent - Introduction

Harish Neel | AI
7.72K subscribers

Subscribe

90 Share Clip

4,335 views Feb 18, 2025 #python #artificialintelligence #langgraph
In this beginner-friendly playlist, I'll show you how to use LangGraph to build powerful AI-agents from scratch

Reflexion Agent System

Reflexion Agents in LangGraph

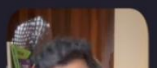
Recap of what we saw previously:

Reflection Agent System consists of a generator and a reflector component

Although, iteratively making a post better is significantly better than just prompting ChatGPT, the content generated is still not grounded in live data

It could be hallucination or outdated content and we have no way of knowing

Reflexion Agent System address this exact drawback



Reflexion Agents in LangGraph

What is Reflexion Agent System:

The reflexion agent, similar to reflection agent, not only critiques it's own responses but also fact checks it with external data by making API calls (Internet Search)

In the Reflection agent pattern, we had to rely on the training data of LLMs but in this case, we're not limited to that.

Reflexion Agents in LangGraph

What is Reflexion Agent System:

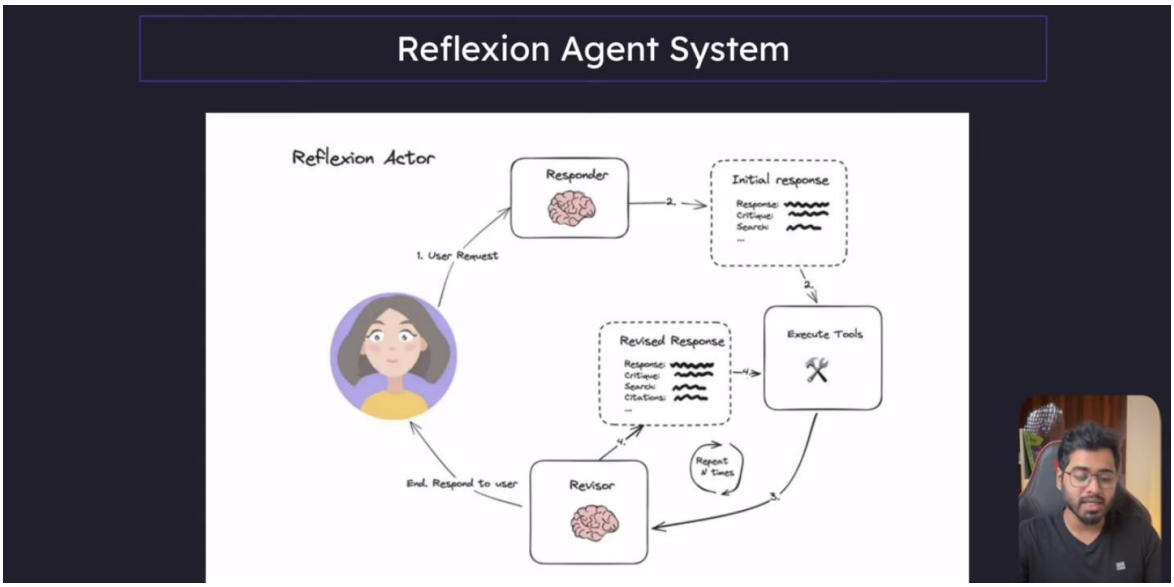
The main component of Reflexion Agent System is the "actor"

The "actor" is the main agent that drives everything - it reflects on it's responses and re-executes.

It can do this with or without tools to improve based on self-critique that is grounded in external data

It's main sub-components include:

1. Tools/tool execution
2. Initial responder: generate an initial response & self-reflection
3. Revisor: re-respond & reflect based on previous reflections

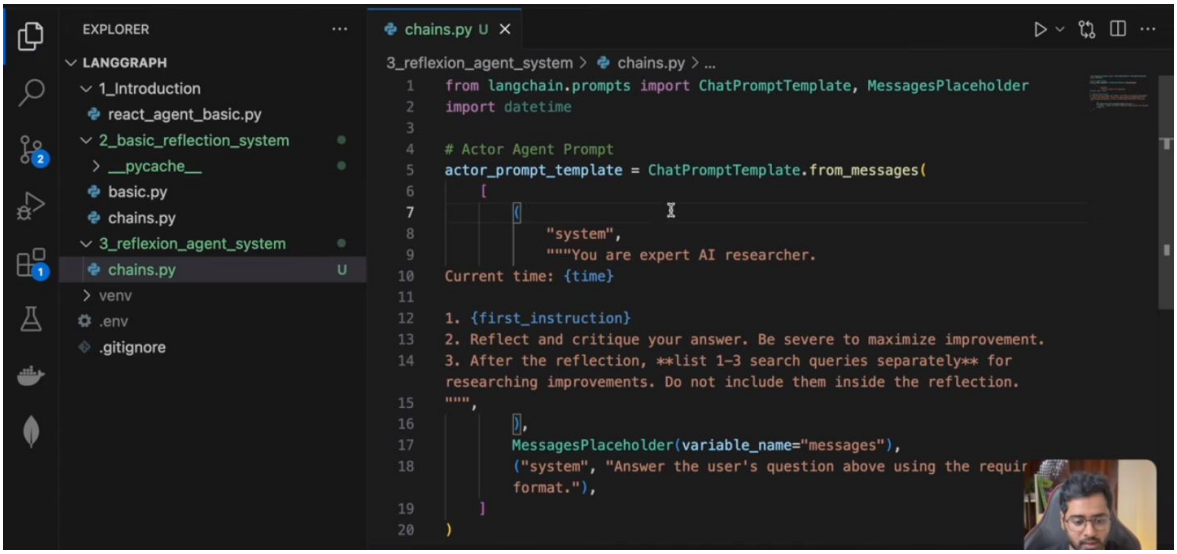


LangGraph Crash Course #11 - Reflexion Agent - Building Responder Chain

Harish Neel | AI
7.72K subscribers
Subscribe

92 Share Clip Save

4,652 views Feb 19, 2025 #python #artificialintelligence #langgraph
In this beginner-friendly playlist, I'll show you how to use LangGraph to build powerful AI-agents from scratch



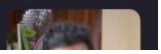
This is how we build the **Responder** agent and it's expected output format in the Reflexion Actor above.

LLM Response Parser System

The system converts unstructured LLM outputs into well-defined Python objects through a series of structured parsing steps, ensuring data validation and consistent formatting.

What are the key components?

1. Chat Prompt Template
2. Function Calling with Pydantic Schema
3. Pydantic Parser



We can then ground and convert the initial response into a structured format/schema as below.

LLM Response Parser System

2. Function Calling with Pydantic Schema

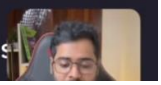
Function calling:

Similar to how we make tools available to the LLM, we can also send a schema to the LLM and force it to structure it's JSON output according to the schema

Pydantic:

A Python library that defines data structures using classes

Provides automatic validation of JSON data against these class definitions



We will define a schema and then add it as a tool for the LLM to call and use to structure the response as we want

LLM Response Parser System

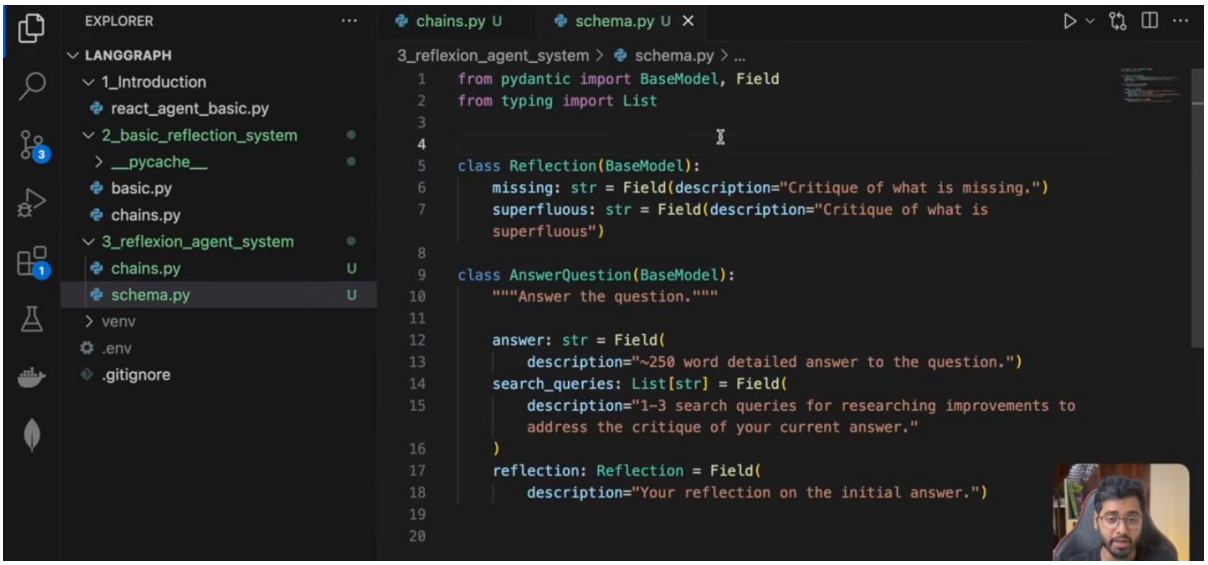
3. Pydantic Parser

Takes the JSON output from the LLM's function call

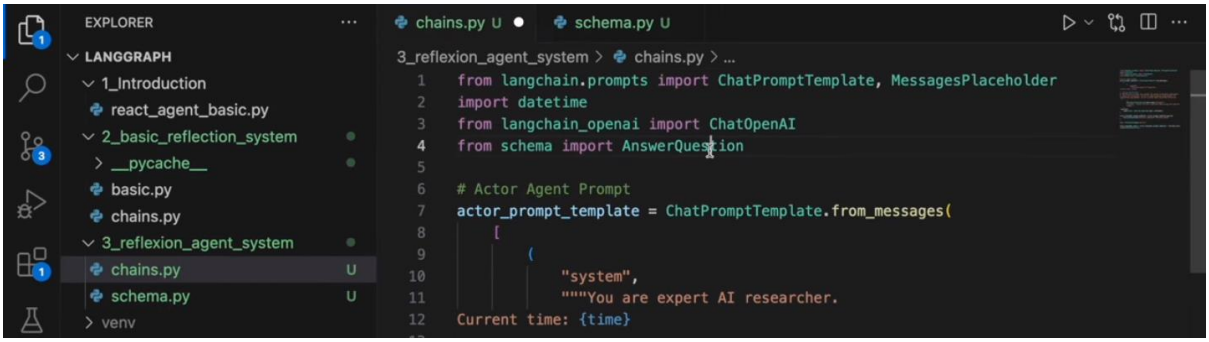
Validates it against the defined Pydantic schema (class definition)

Creates instances of Pydantic classes with the validated data

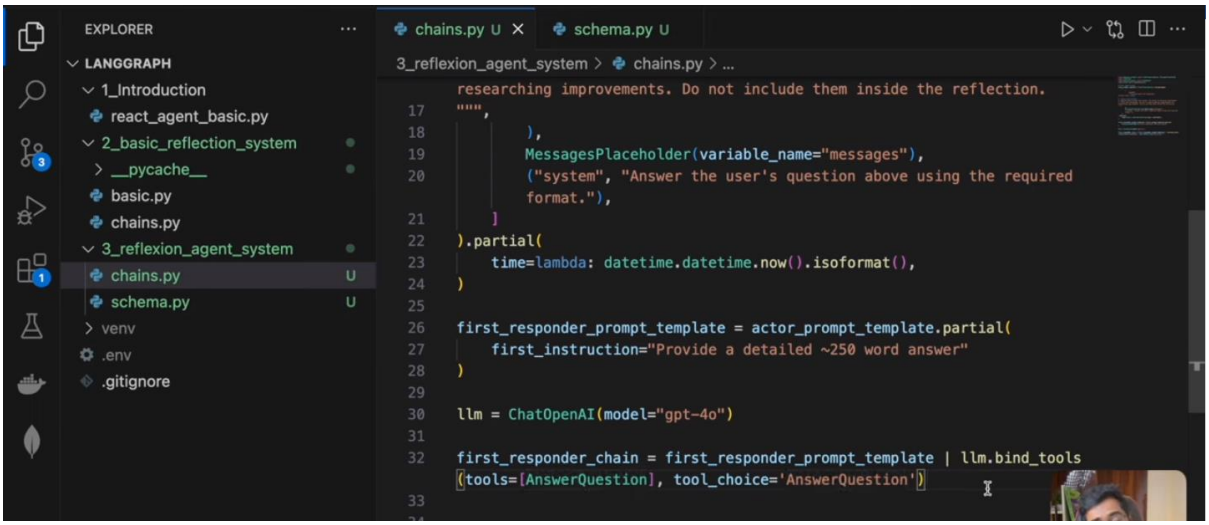
If the LLMs output does not match with the defined schema, it will throw an error



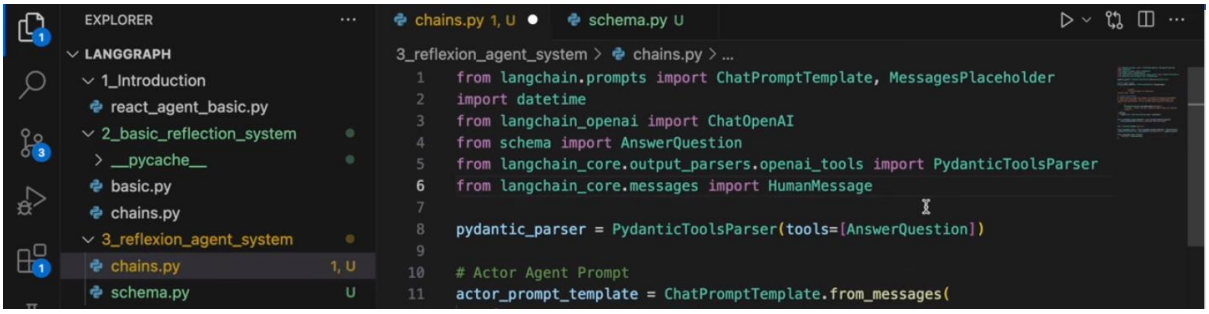
This is how we further ground the response of the Responder LLM's response. We are going to ask for what is missing and what is unneeded or superfluous.



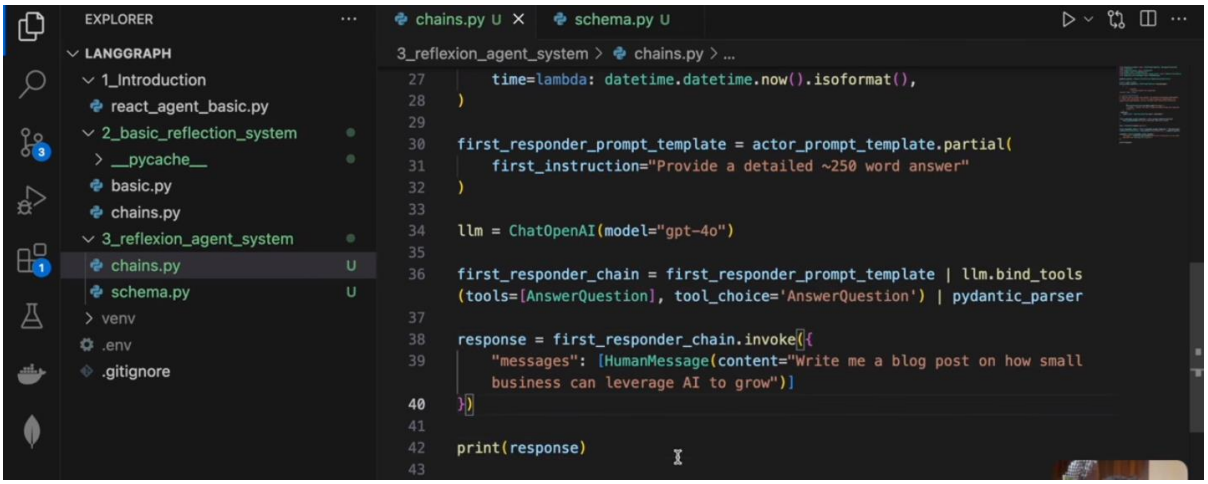
Import ChatOpenAI and the AnswerQuestion as above, then use them as below



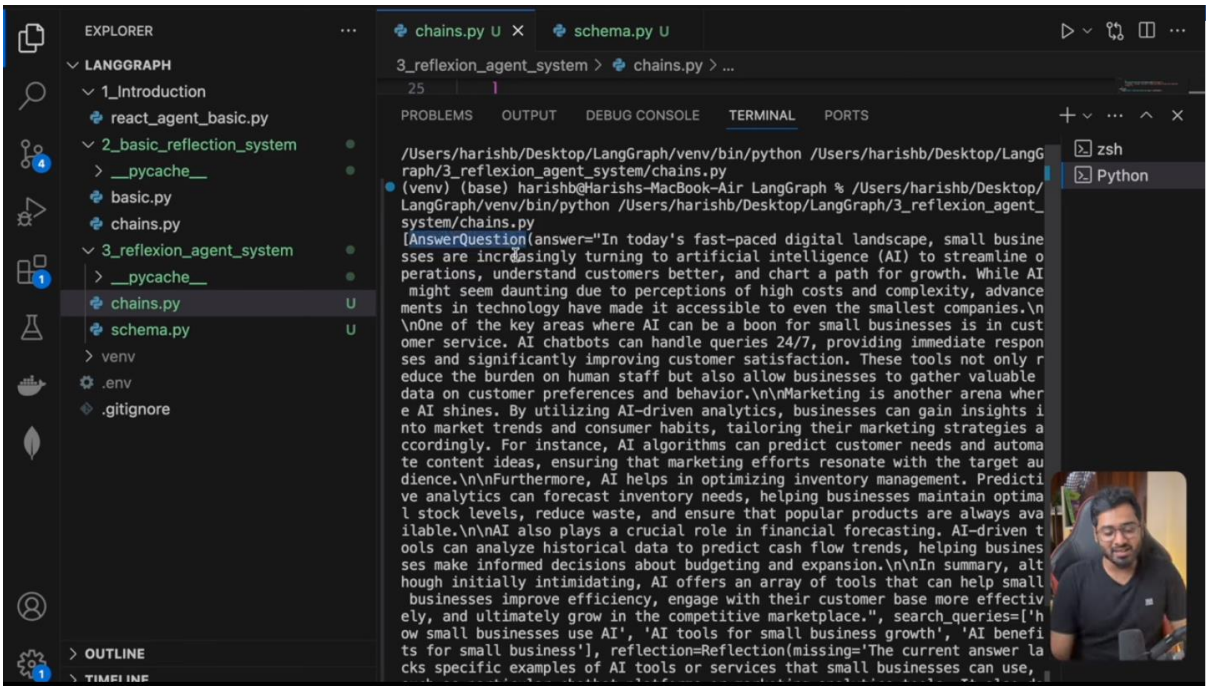
The use of **tool_choice** above is going to force the LLM to call and use the AnswerQuestion tool to structure its response.

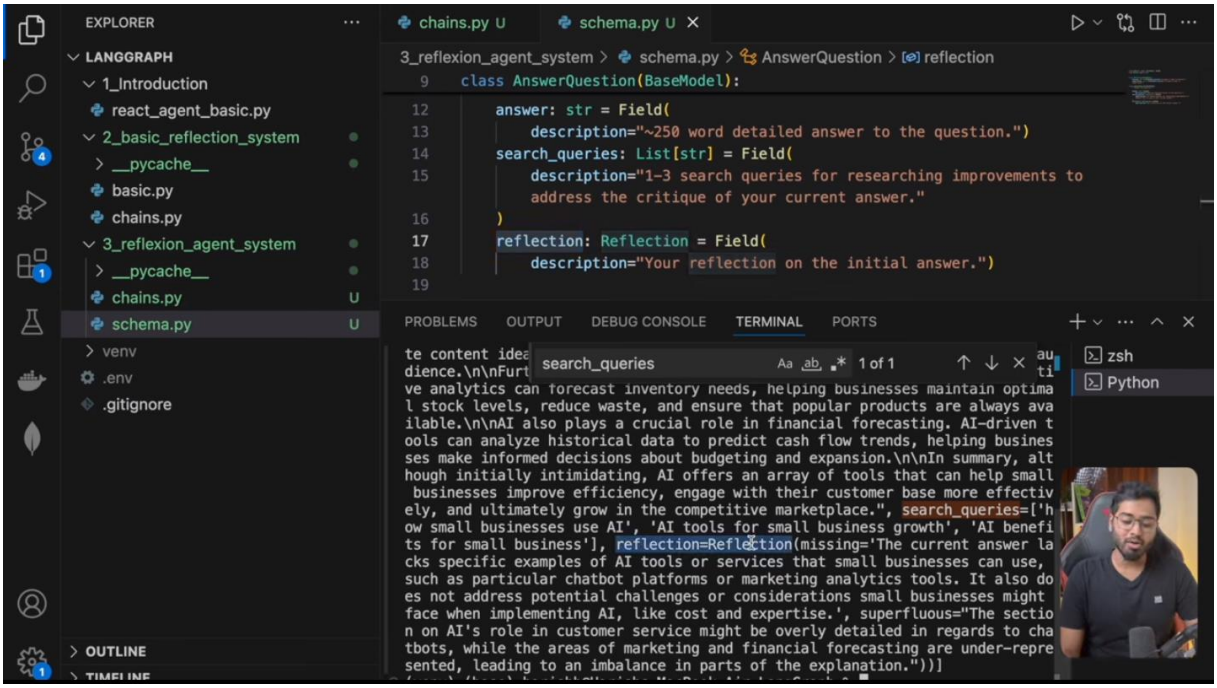


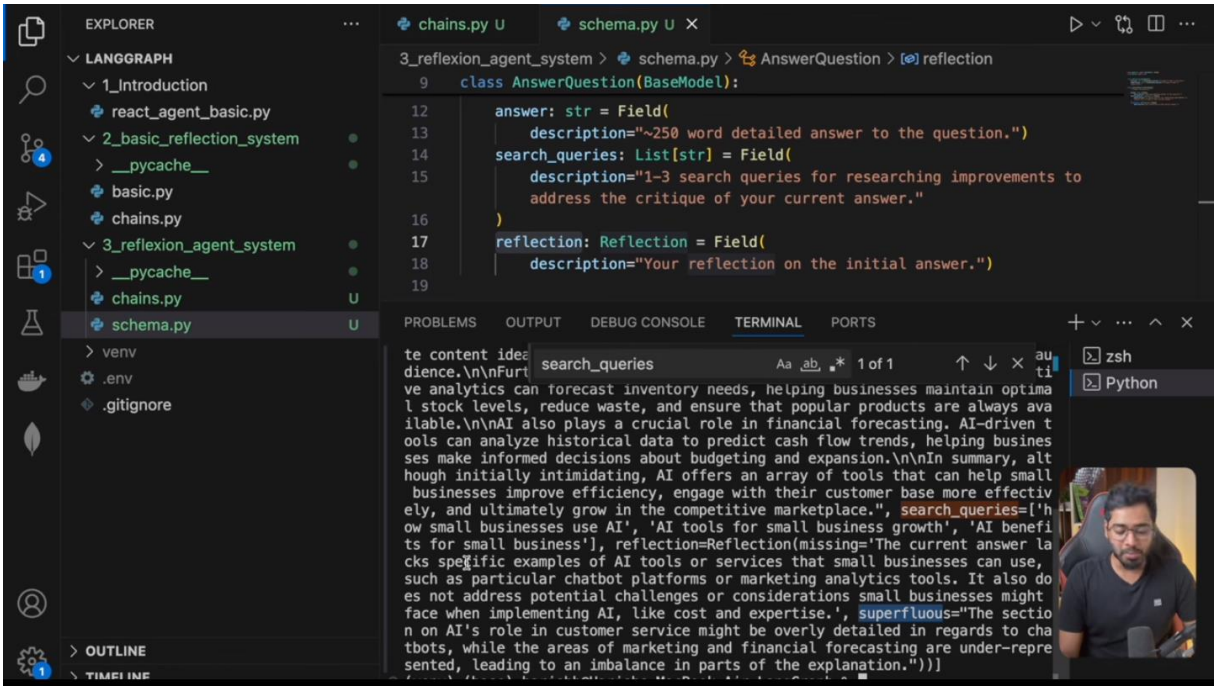
We also need to validate the response and use OpenAI's tool parser that will know how to extract the information



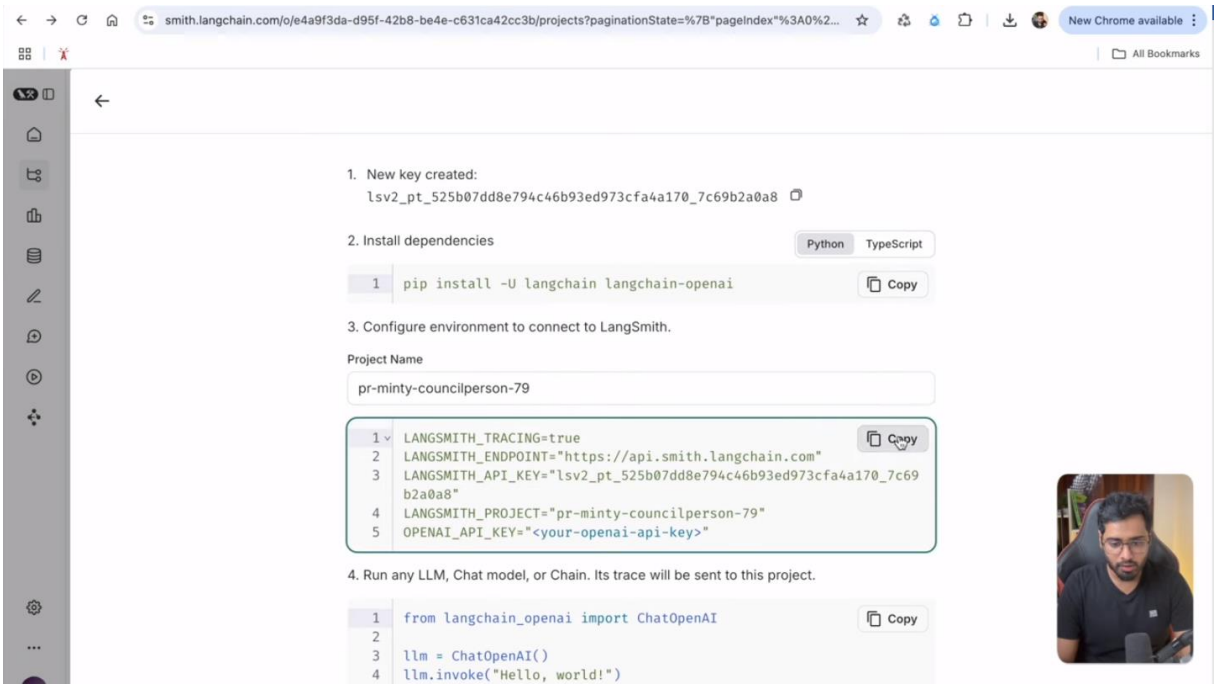
After parsing, we can now invoke this chain with a HumanMessage as the prompt

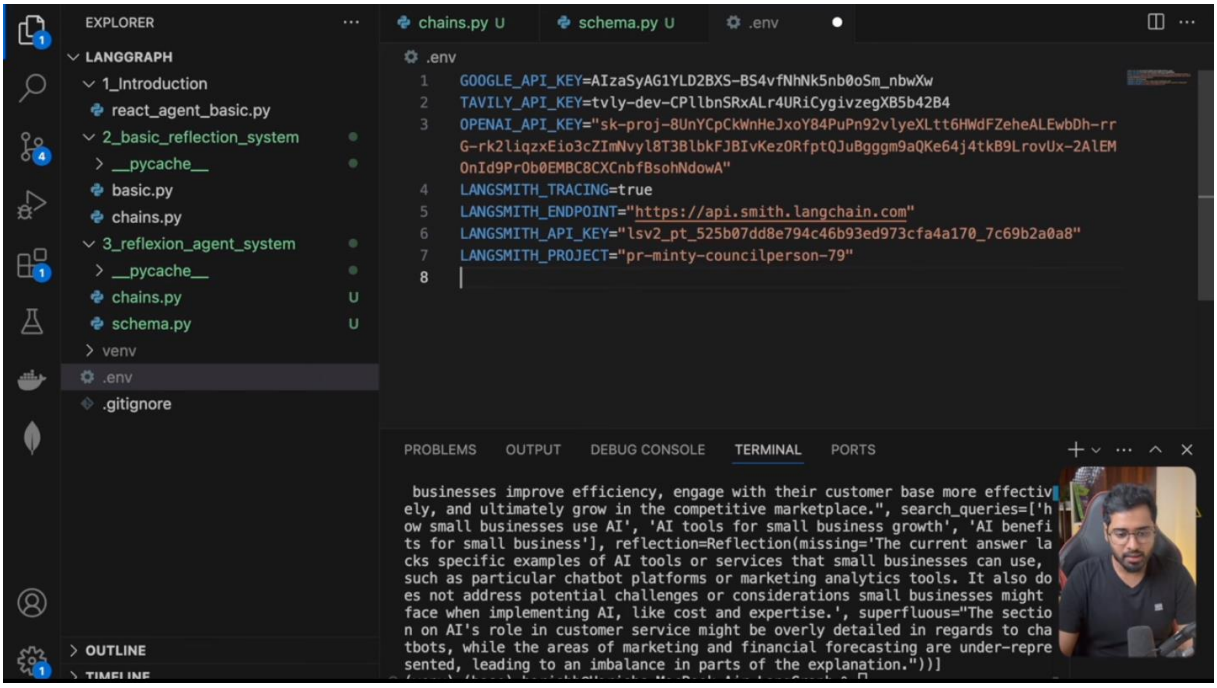


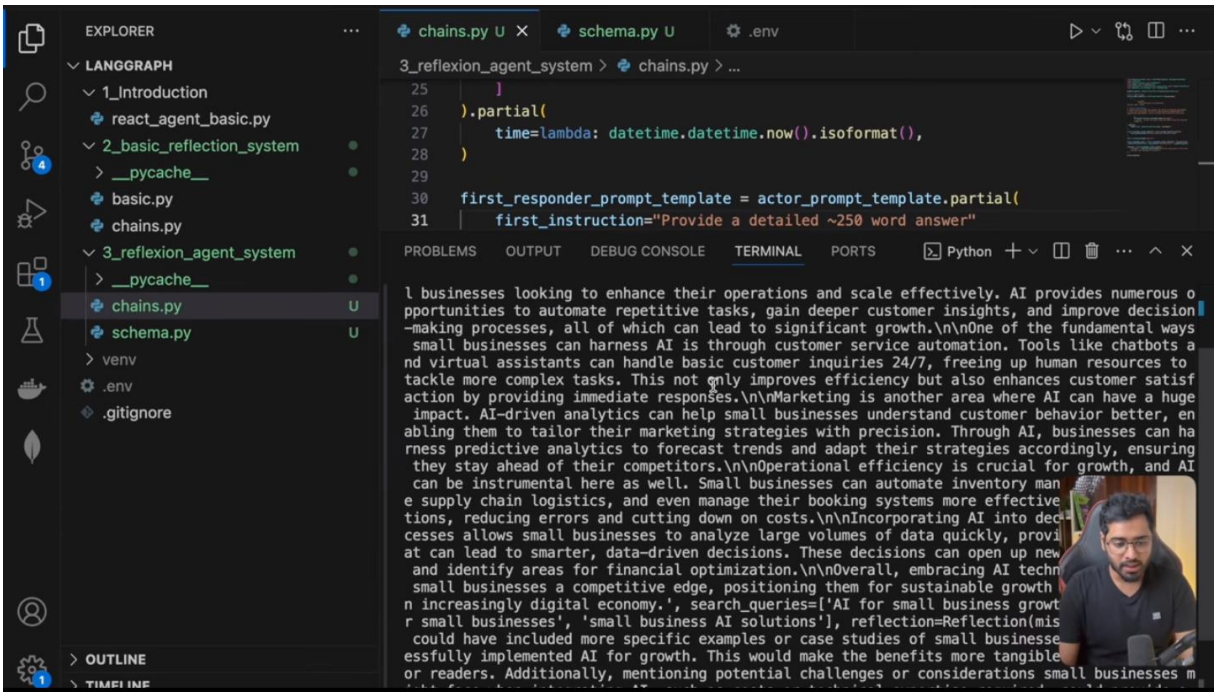


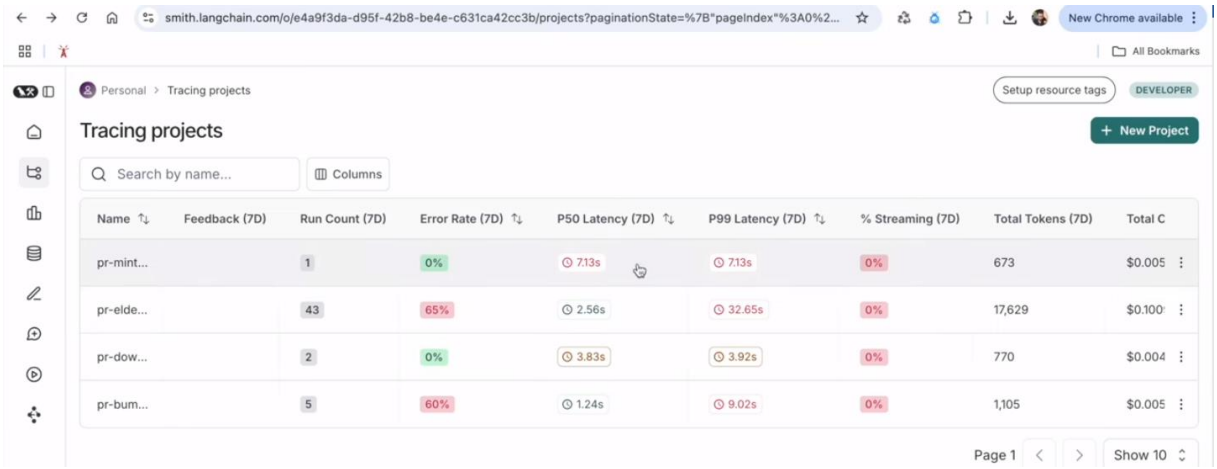


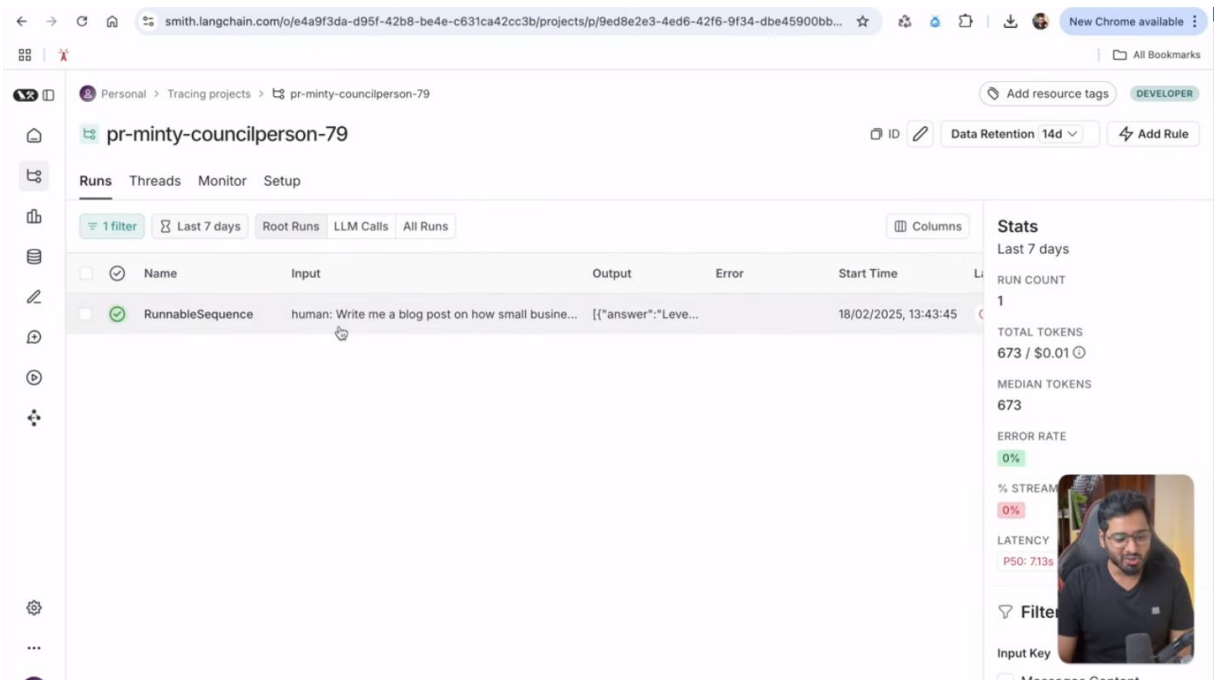
We can see that we now have the response in the Pydantic model format we wanted with the AnswerQuestion, search_queries, reflection and superfluous sections correctly stated.

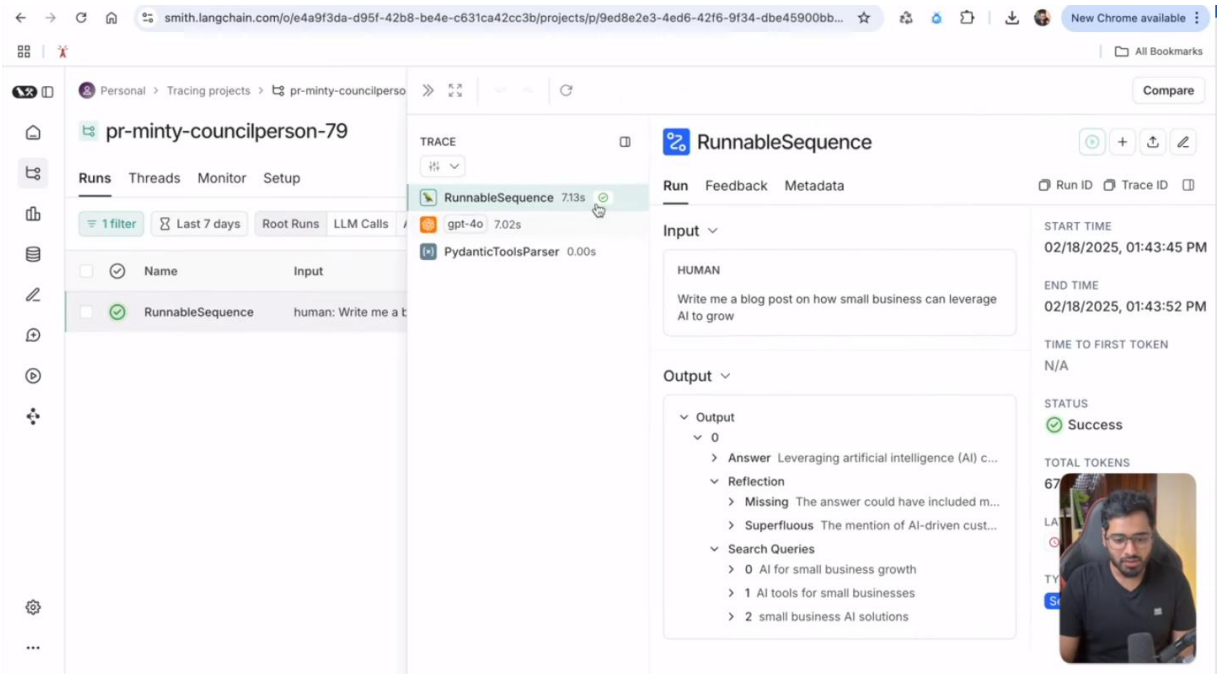

smith.langchain.com/o/e4a9f3da-d95f-42b8-be4e-c631ca42cc3b/projects?paginationState=%7B"pageIndex"%3A0%2...
New Chrome available
All Bookmarks
1. New key created:
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
2. Install dependencies
Python
TypeScript
1 pip install -U langchain langchain-openai
Copy
3. Configure environment to connect to LangSmith.
Project Name
pr-minty-councilperson-79
1 LANGSMITH_TRACING=true
2 LANGSMITH_ENDPOINT="https://api.smith.langchain.com"
3 LANGSMITH_API_KEY="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"
4 LANGSMITH_PROJECT="pr-minty-councilperson-79"
5 OPENAI_API_KEY="<your-openai-api-key>"
Copy
4. Run any LLM, Chat model, or Chain. Its trace will be sent to this project.
1 from langchain_openai import ChatOpenAI
2
3 llm = ChatOpenAI()
4 llm.invoke("Hello, world!")
Copy


EXPLORER
LANGGRAPH
1_Introduction
react_agent_basic.py
2_basic_reflection_system
__pycache__
basic.py
chains.py
3_reflexion_agent_system
__pycache__
chains.py U
schema.py U
venv
.env
.gitignore
OUTLINE
TIMELINE
chains.py U
schema.py U
.env
.env
1 GOOGLE_API_KEY=AIzaSyAG1YLD2BXS-BS4vfNhNk5nb0oSm_nbwXw
2 TAVILY_API_KEY=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
3 OPENAI_API_KEY="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"
4 LANGSMITH_TRACING=true
5 LANGSMITH_ENDPOINT="https://api.smith.langchain.com"
6 LANGSMITH_API_KEY="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"
7 LANGSMITH_PROJECT="pr-minty-councilperson-79"
8
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
businesses improve efficiency, engage with their customer base more effectively, and ultimately grow in the competitive marketplace.", search_queries=['how small businesses use AI', 'AI tools for small business growth', 'AI benefits for small business'], reflection=Reflection(missing='The current answer lacks specific examples of AI tools or services that small businesses can use, such as particular chatbot platforms or marketing analytics tools. It also does not address potential challenges or considerations small businesses might face when implementing AI, like cost and expertise.', superfluous="The section on AI's role in customer service might be overly detailed in regards to chatbots, while the areas of marketing and financial forecasting are under-represented, leading to an imbalance in parts of the explanation."))]

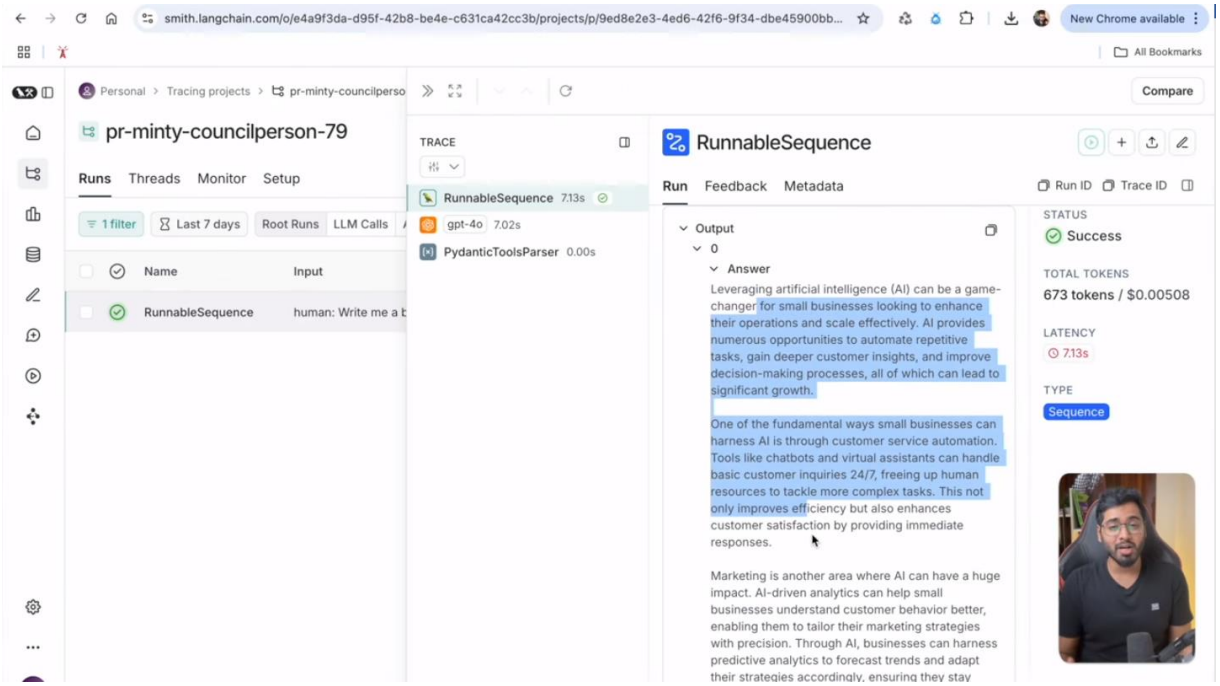

EXPLORER
LANGGRAPH
1_Introduction
react_agent_basic.py
2_basic_reflection_system
__pycache__
basic.py
chains.py
3_reflexion_agent_system
__pycache__
chains.py
schema.py
venv
.env
.gitignore
OUTLINE
chains.py U
schema.py U
.env
3_reflexion_agent_system > chains.py > ...
25]
26).partial(
27 time=lambda: datetime.datetime.now().isoformat(),
28)
29
30 first_responder_prompt_template = actor_prompt_template.partial(
31 first_instruction="Provide a detailed ~250 word answer"
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
Python
l businesses looking to enhance their operations and scale effectively. AI provides numerous o
pportunities to automate repetitive tasks, gain deeper customer insights, and improve decision
-making processes, all of which can lead to significant growth.\n\nOne of the fundamental ways
small businesses can harness AI is through customer service automation. Tools like chatbots a
nd virtual assistants can handle basic customer inquiries 24/7, freeing up human resources to
tackle more complex tasks. This not only improves efficiency but also enhances customer satisf
action by providing immediate responses.\n\nMarketing is another area where AI can have a huge
impact. AI-driven analytics can help small businesses understand customer behavior better, en
abling them to tailor their marketing strategies with precision. Through AI, businesses can ha
rness predictive analytics to forecast trends and adapt their strategies accordingly, ensuring
they stay ahead of their competitors.\n\nOperational efficiency is crucial for growth, and AI
can be instrumental here as well. Small businesses can automate inventory man
e supply chain logistics, and even manage their booking systems more effective
tions, reducing errors and cutting down on costs.\n\nIncorporating AI into dec
cesses allows small businesses to analyze large volumes of data quickly, provi
at can lead to smarter, data-driven decisions. These decisions can open up new
and identify areas for financial optimization.\n\nOverall, embracing AI techn
small businesses a competitive edge, positioning them for sustainable growth
n increasingly digital economy.', search_queries=['AI for small business growt
r small businesses', 'small business AI solutions'], reflection=Reflection(mis
could have included more specific examples or case studies of small businesse
essfully implemented AI for growth. This would make the benefits more tangible
or readers. Additionally, mentioning potential challenges or considerations small businesses m

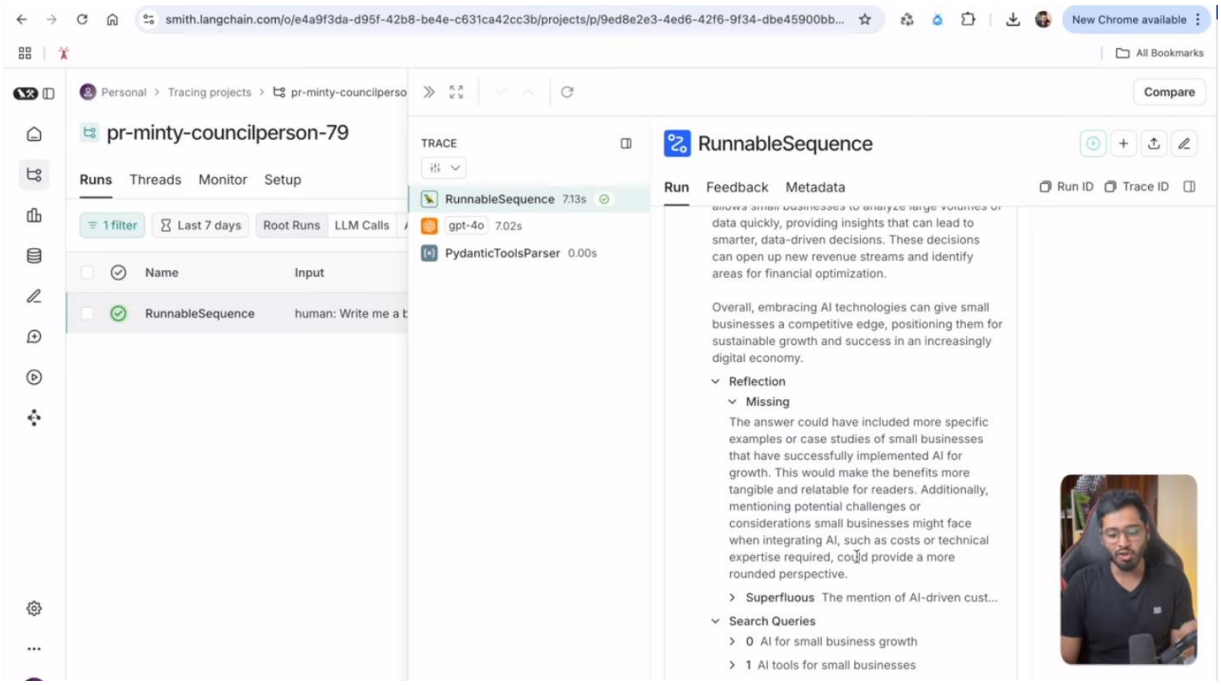

smith.langchain.com/o/e4a9f3da-d95f-42b8-be4e-c631ca42cc3b/projects?paginationState=%7B"pageIndex"%3A0%2...
New Chrome available
All Bookmarks
Personal > Tracing projects
Setup resource tags
DEVELOPER
Tracing projects
New Project
Search by name...
Columns
Name
Feedback (7D)
Run Count (7D)
Error Rate (7D)
P50 Latency (7D)
P99 Latency (7D)
% Streaming (7D)
Total Tokens (7D)
Total C
pr-mint... 1 0% 7.13s 7.13s 0% 673 $0.005
pr-elde... 43 65% 2.56s 32.65s 0% 17,629 $0.100
pr-dow... 2 0% 3.83s 3.92s 0% 770 $0.004
pr-bum... 5 60% 1.24s 9.02s 0% 1,105 $0.005
Page 1
Show 10

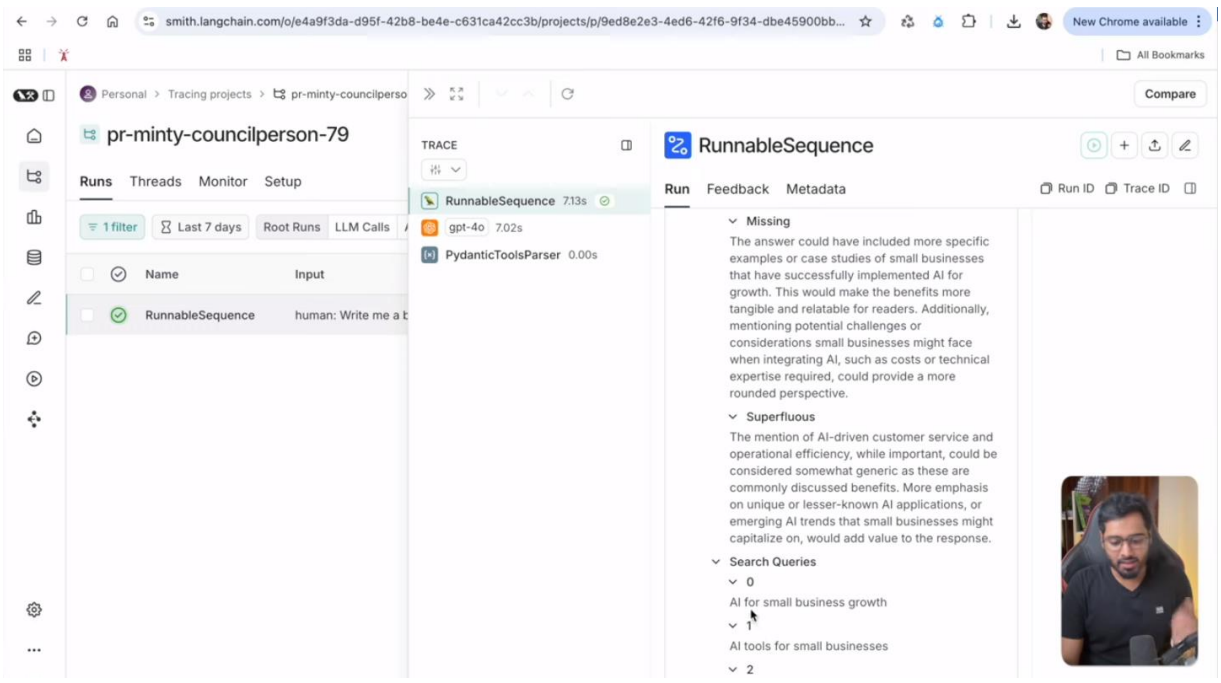

smith.langchain.com/o/e4a9f3da-d95f-42b8-be4e-c631ca42cc3b/projects/p/9ed8e2e3-4ed6-42f6-9f34-dbe45900bb...
New Chrome available
All Bookmarks
Personal > Tracing projects > pr-minty-councilperson-79
Add resource tags
DEVELOPER
pr-minty-councilperson-79
ID
Data Retention 14d
Add Rule
Runs Threads Monitor Setup
1 filter
Last 7 days
Root Runs
LLM Calls
All Runs
Columns
Name
Input
Output
Error
Start Time
RunnableSequence
human: Write me a blog post on how small busine...
[{"answer":"Leve...
18/02/2025, 13:43:45
Stats
Last 7 days
RUN COUNT
1
TOTAL TOKENS
673 / $0.01
MEDIAN TOKENS
673
ERROR RATE
0%
% STREAM
0%
LATENCY
P50: 7.13s
Input Key

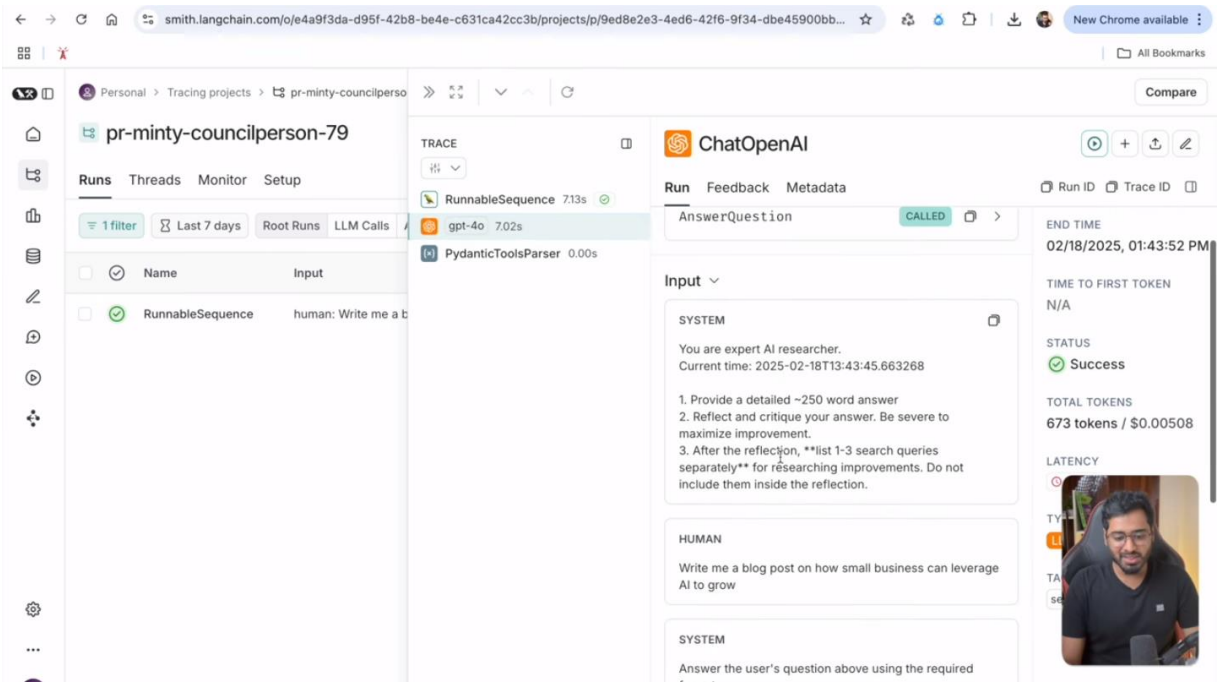


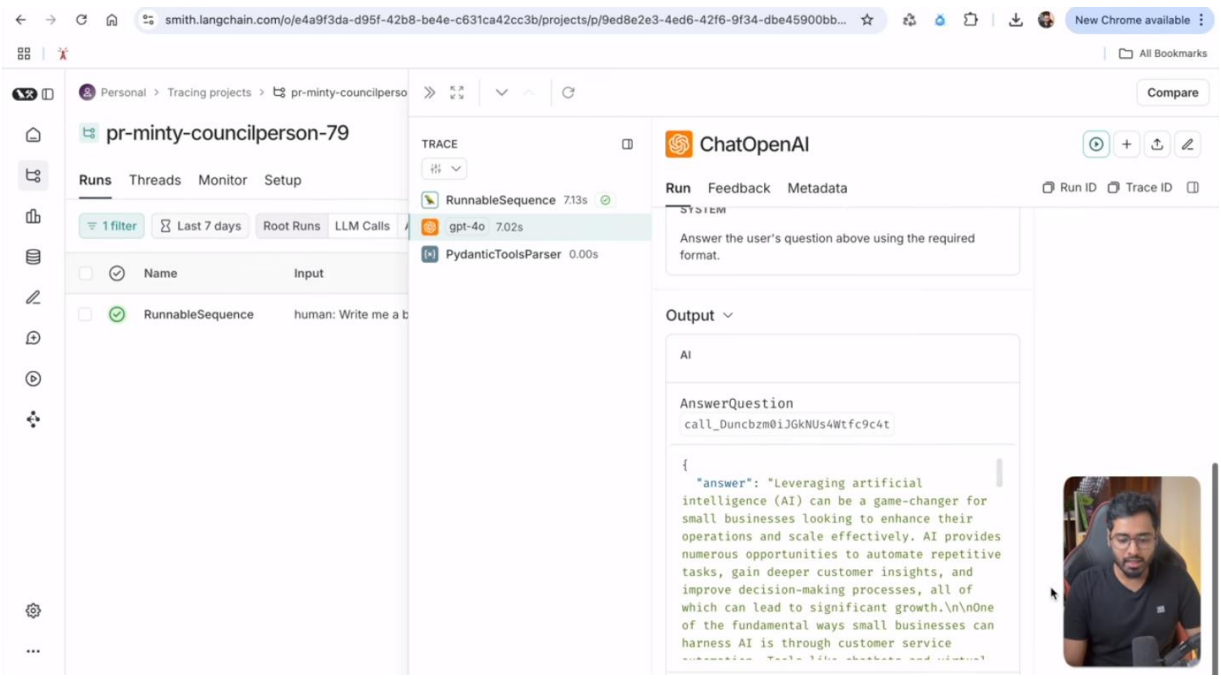
We can also see the traces stated as expected



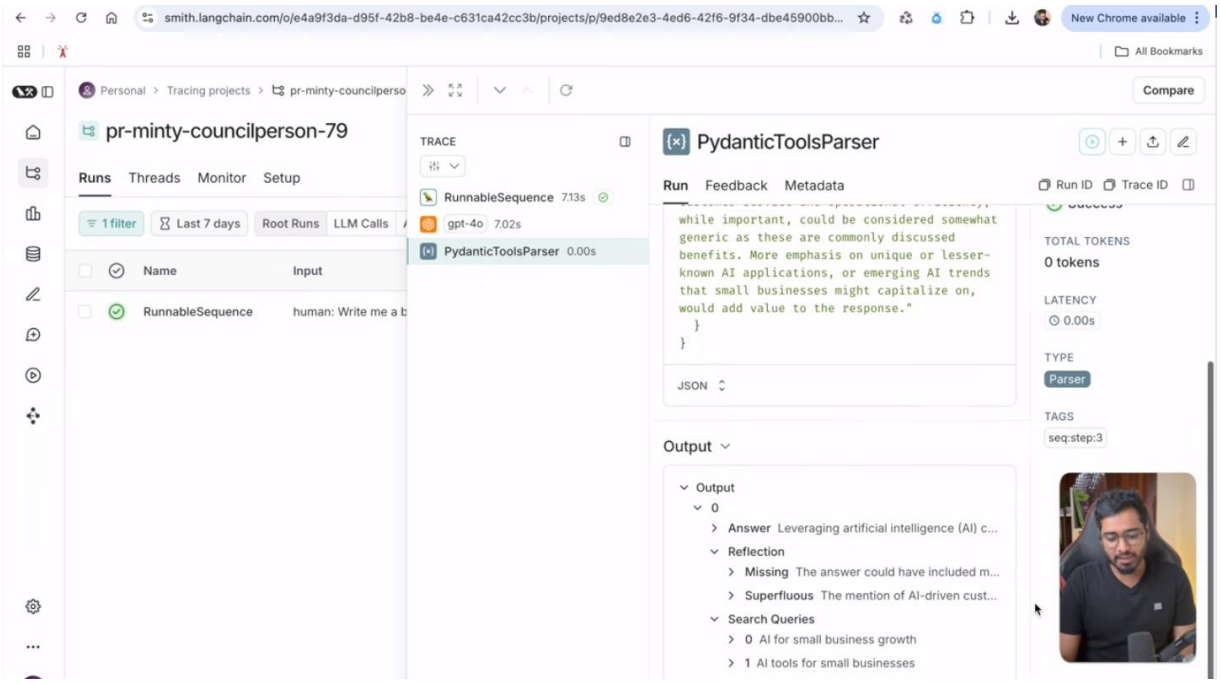

smith.langchain.com/o/e4a9f3da-d95f-42b8-be4e-c631ca42cc3b/projects/p/9ed8e2e3-4ed6-42f6-9f34-dbe45900bb...
New Chrome available
All Bookmarks
Personal > Tracing projects > pr-minty-councilperso
Compare
pr-minty-councilperson-79
Runs Threads Monitor Setup
1 filter Last 7 days Root Runs LLM Calls
Name Input
RunnableSequence human: Write me a t
TRACE
RunnableSequence 7.13s
gpt-4o 7.02s
PydanticToolsParser 0.00s
RunnableSequence
Run Feedback Metadata
Run ID Trace ID
data quickly, providing insights that can lead to smarter, data-driven decisions. These decisions can open up new revenue streams and identify areas for financial optimization.
Overall, embracing AI technologies can give small businesses a competitive edge, positioning them for sustainable growth and success in an increasingly digital economy.
Reflection
Missing
The answer could have included more specific examples or case studies of small businesses that have successfully implemented AI for growth. This would make the benefits more tangible and relatable for readers. Additionally, mentioning potential challenges or considerations small businesses might face when integrating AI, such as costs or technical expertise required, could provide a more rounded perspective.
Superfluous The mention of AI-driven cust...
Search Queries
0 AI for small business growth
1 AI tools for small businesses


smith.langchain.com/o/e4a9f3da-d95f-42b8-be4e-c631ca42cc3b/projects/p/9ed8e2e3-4ed6-42f6-9f34-dbe45900bb...
New Chrome available
All Bookmarks
Personal > Tracing projects > pr-minty-councilperso
Compare
pr-minty-councilperson-79
Runs Threads Monitor Setup
1 filter Last 7 days Root Runs LLM Calls
Name Input
RunnableSequence human: Write me a t
TRACE
RunnableSequence 7.13s
gpt-4o 7.02s
PydanticToolsParser 0.00s
RunnableSequence
Run Feedback Metadata
Run ID Trace ID
Missing
The answer could have included more specific examples or case studies of small businesses that have successfully implemented AI for growth. This would make the benefits more tangible and relatable for readers. Additionally, mentioning potential challenges or considerations small businesses might face when integrating AI, such as costs or technical expertise required, could provide a more rounded perspective.
Superfluous
The mention of AI-driven customer service and operational efficiency, while important, could be considered somewhat generic as these are commonly discussed benefits. More emphasis on unique or lesser-known AI applications, or emerging AI trends that small businesses might capitalize on, would add value to the response.
Search Queries
0
AI for small business growth
1
AI tools for small businesses
2

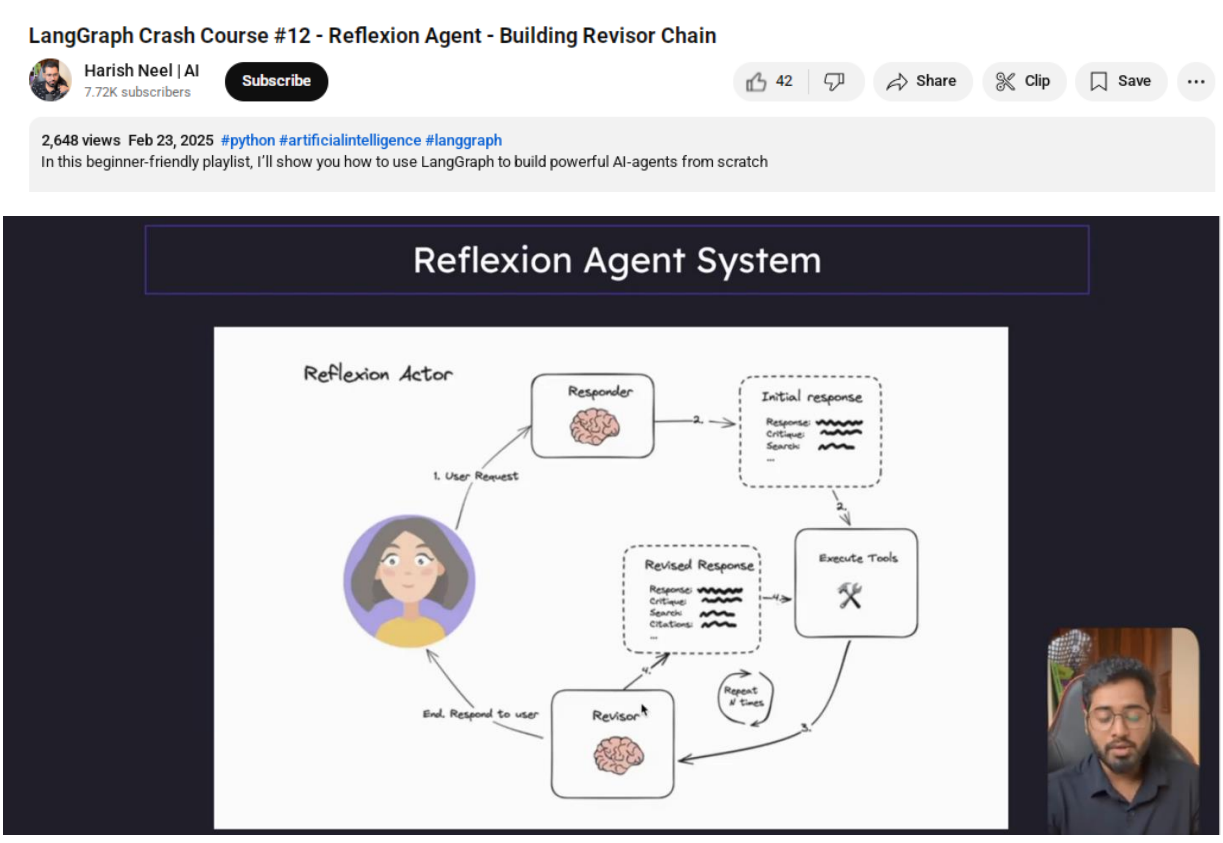


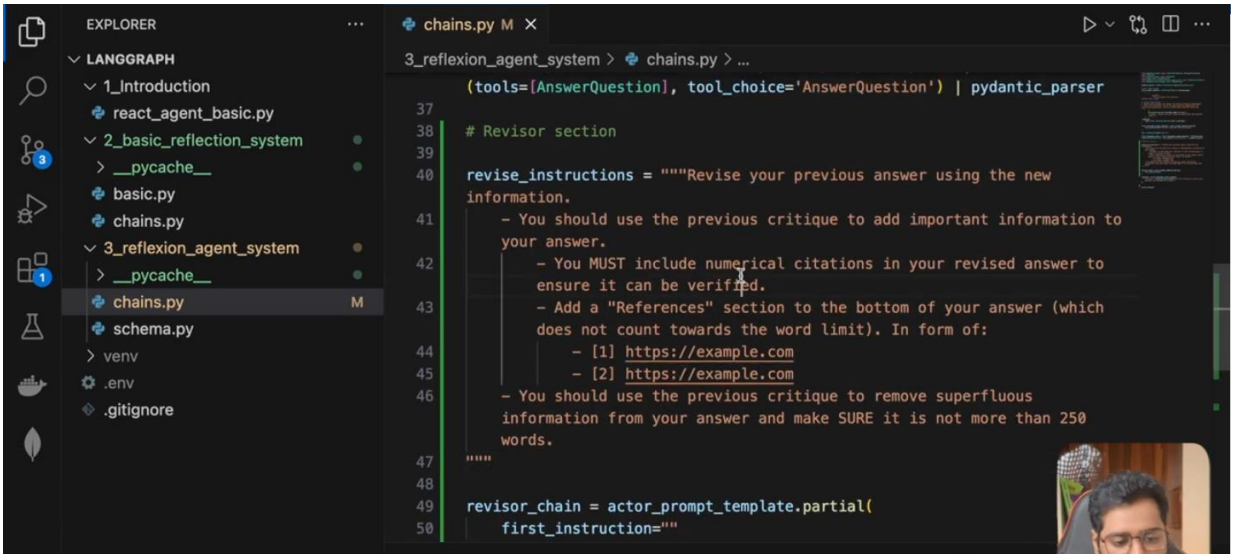


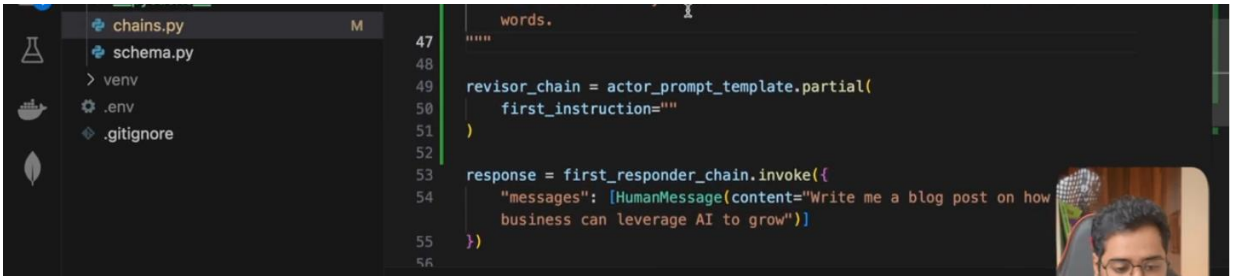
We are getting the JSON output that is also grounded



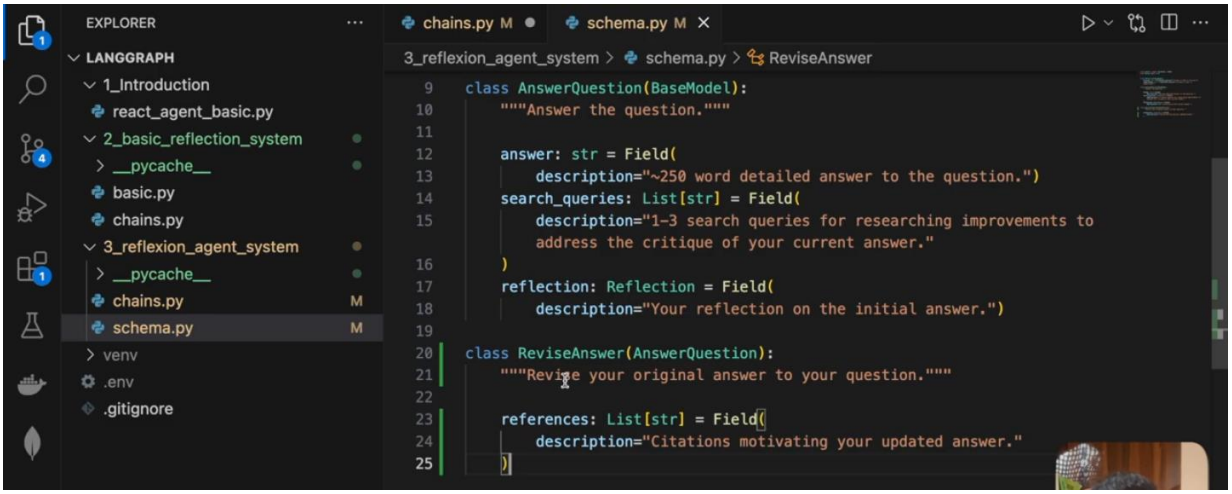
Next, let us build the Revisor agent chain in a structured way

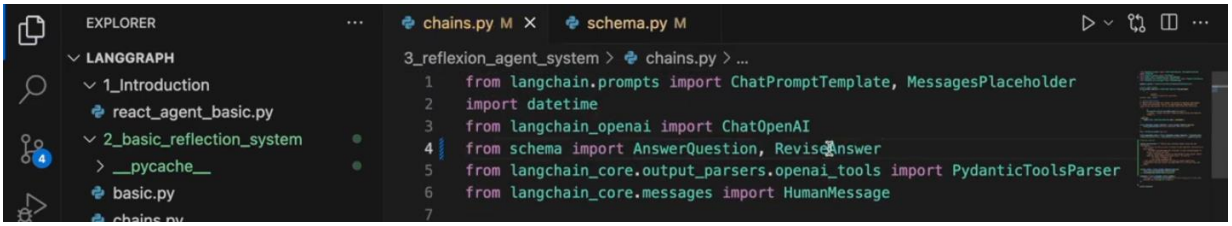


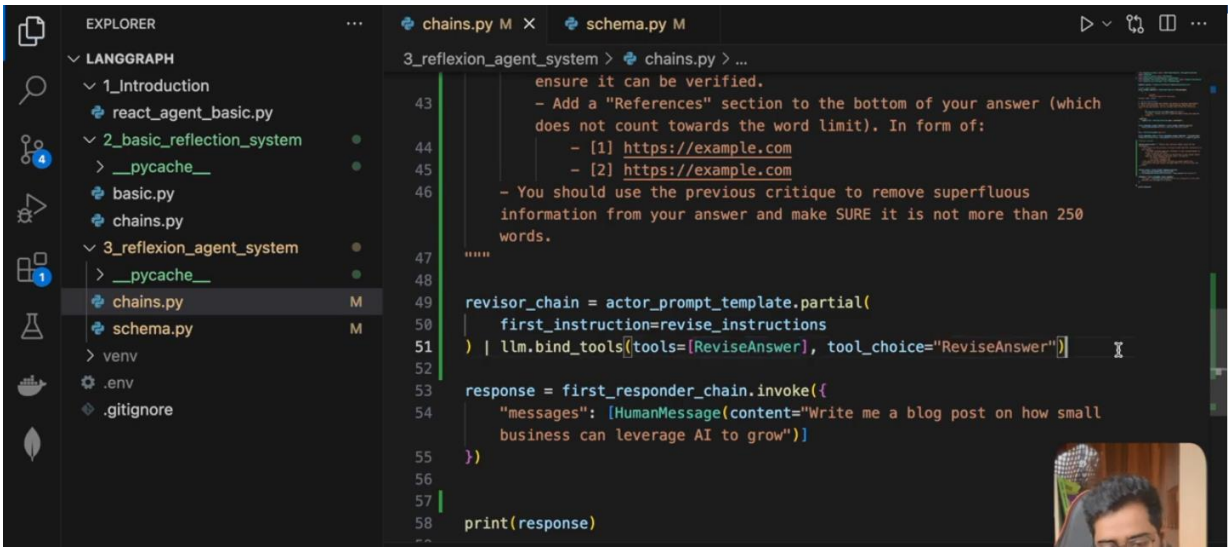


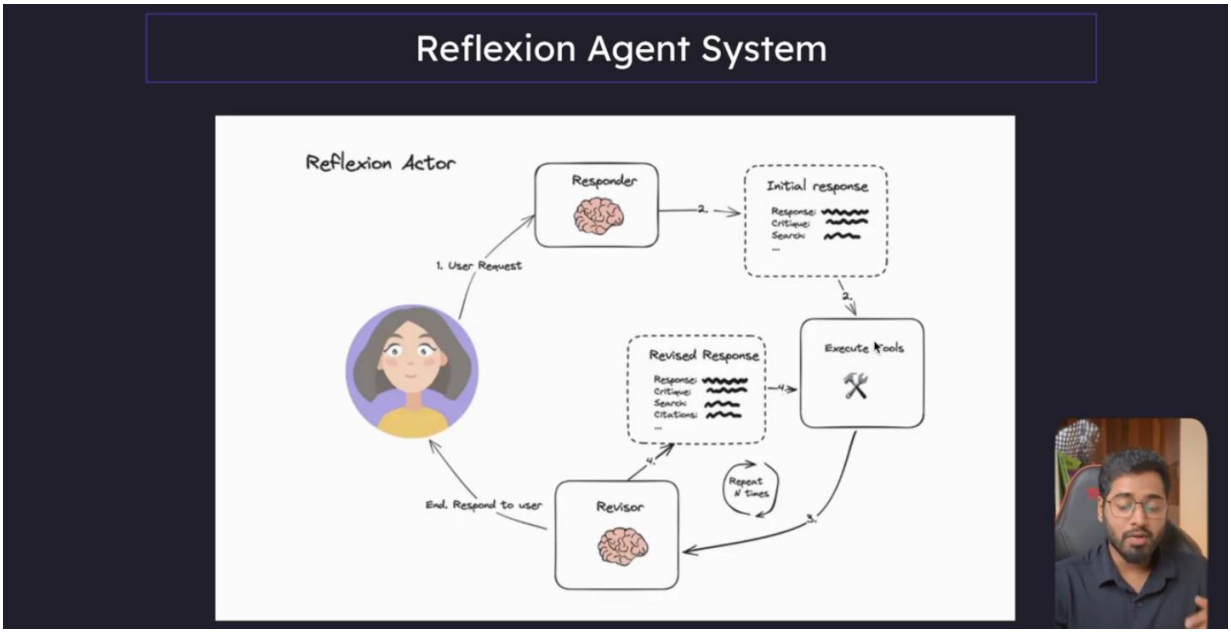


Next, we need to ground the response of the LLM in the revise structure to include same things plus the citations

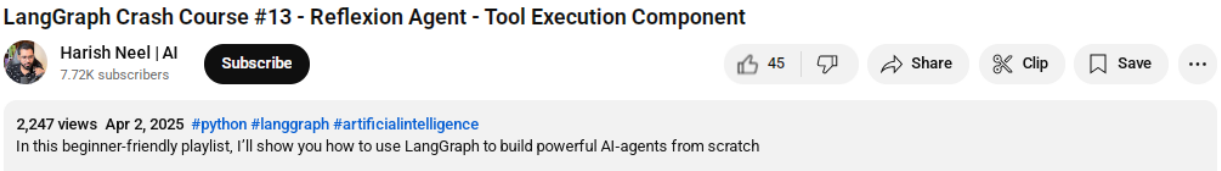








Next, we will start building out the 3rd component **Execute Tools** before connecting it all together using LangGraph



Execute Tools method needs to inspect the last message which is the AIMessage and look at the search terms inside it, loop through each search term and formulate one unified tool message with all the information.

execute_tools.py

4_reflexion_agent_system > execute_tools.py > ...

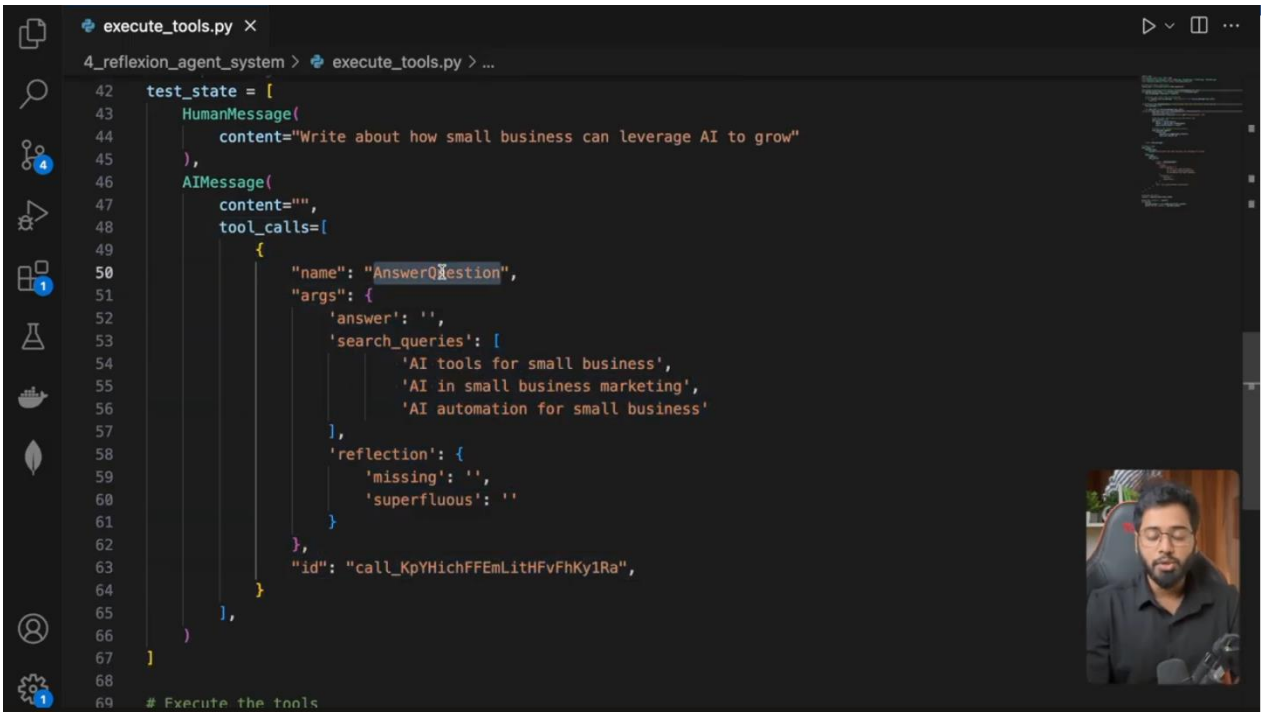
```python
import json
from typing import List, Dict, Any
from langchain_core.messages import AIMessage, BaseMessage, ToolMessage, HumanMessage
from langchain_community.tools import TavilySearchResults

# Create the Tavily search tool
tavily_tool = TavilySearchResults(max_results=5)

# Function to execute search queries from AnswerQuestion tool calls
def execute_tools(state: List[BaseMessage]) -> List[BaseMessage]:
    last_ai_message: AIMessage = state[-1]

    # Extract tool calls from the AI message
    if not hasattr(last_ai_message, "tool_calls") or not last_ai_message.tool_calls:
        return []

    # Process the AnswerQuestion or ReviseAnswer tool calls to extract search queries
    tool_messages = []

    for tool_call in last_ai_message.tool_calls:
        if tool_call["name"] in ["AnswerQuestion", "ReviseAnswer"]:
            call_id = tool_call["id"]
            search_queries = tool_call["args"].get("search_queries", [])

            # Execute each search query using the tavily tool
            query_results = {}
            for query in search_queries:
                result = tavily_tool.invoke(query)
```

execute_tools.py

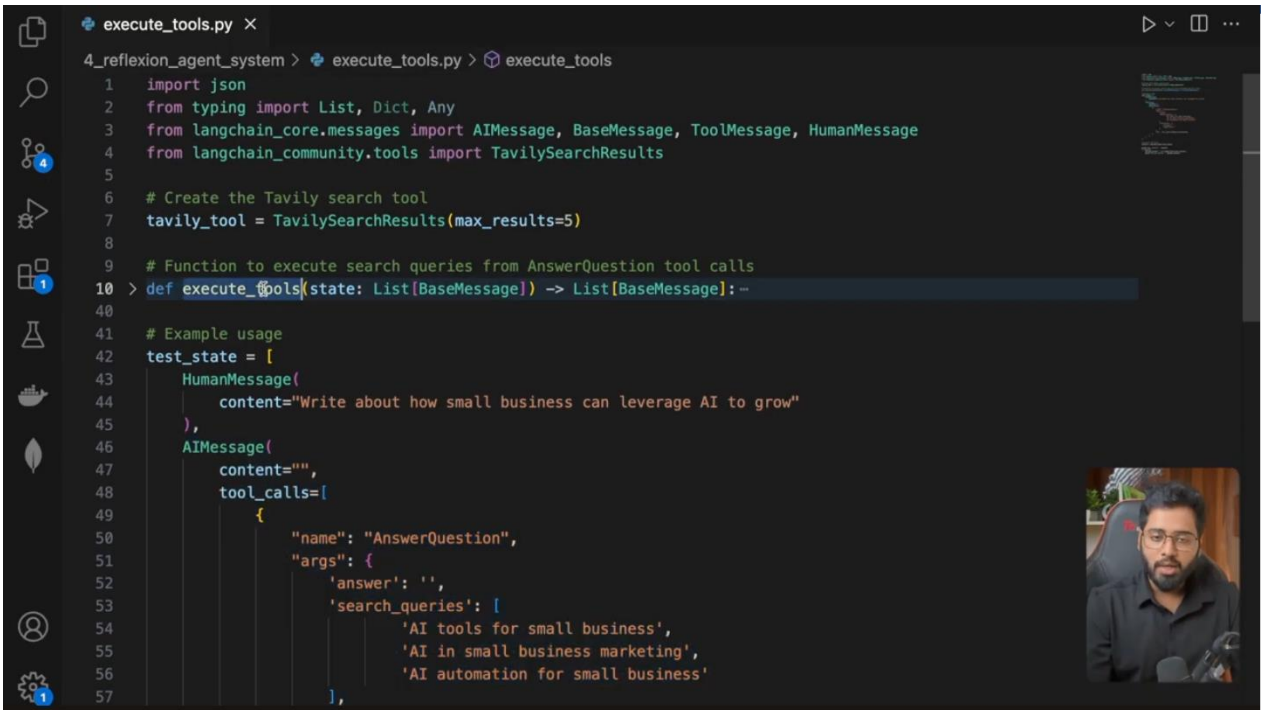
4_reflexion_agent_system > execute_tools.py > execute_tools

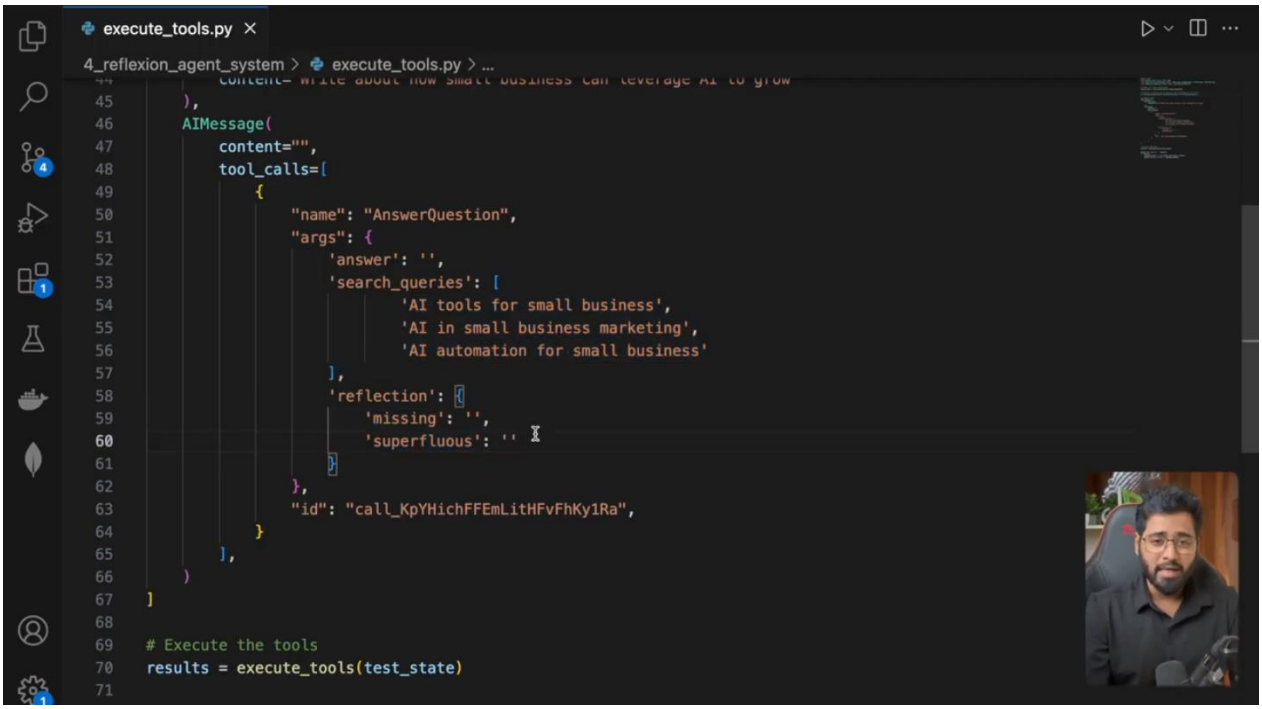
```python
def execute_tools(state: List[BaseMessage]) -> List[BaseMessage]:
    # Extract tool calls from the AI message
    if not hasattr(last_ai_message, "tool_calls") or not last_ai_message.tool_calls:
        return []

    # Process the AnswerQuestion or ReviseAnswer tool calls to extract search queries
    tool_messages = []

    for tool_call in last_ai_message.tool_calls:
        if tool_call["name"] in ["AnswerQuestion", "ReviseAnswer"]:
            call_id = tool_call["id"]
            search_queries = tool_call["args"].get("search_queries", [])

            # Execute each search query using the tavily tool
            query_results = {}
            for query in search_queries:
                result = tavily_tool.invoke(query)
                query_results[query] = result

            # Create a tool message with the results
            tool_messages.append(
                ToolMessage(
                    content=json.dumps(query_results),
                    tool_call_id=call_id
                )
            )

    return tool_messages
```

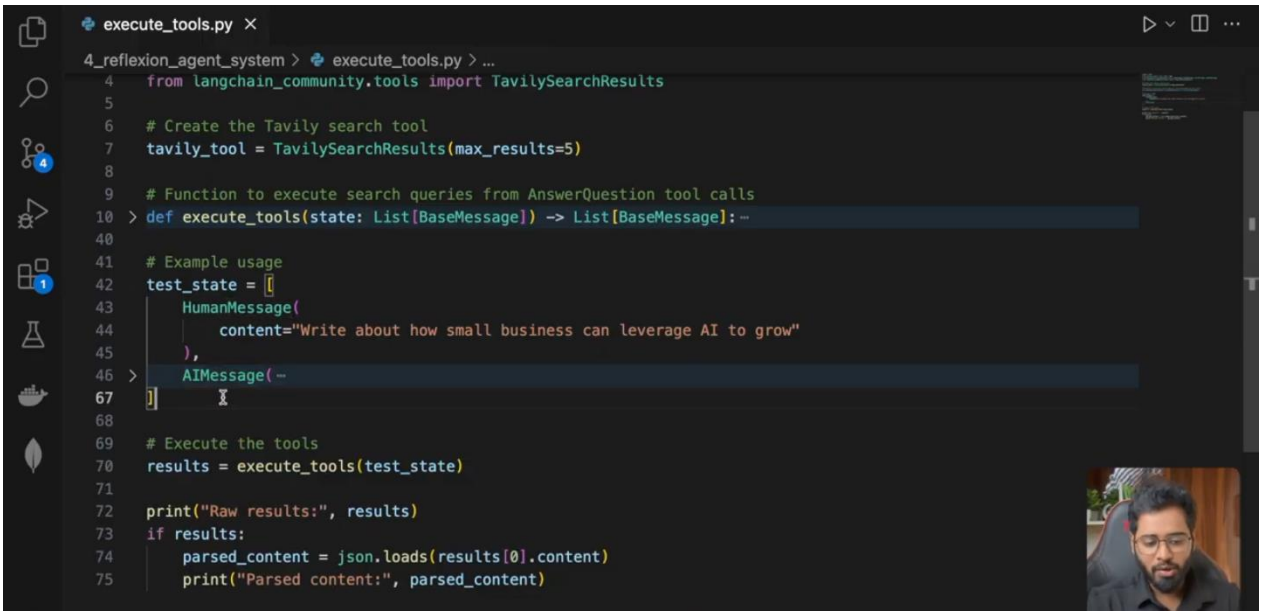
```python
                ToolMessage(
                    content=json.dumps(query_results),
                    tool_call_id=call_id
                )
            )

    return tool_messages

# Example usage
test_state = [
    HumanMessage(
        content="Write about how small business can leverage AI to grow"
    ),
    AIMessage(
        content="",
        tool_calls=[
            {
                "name": "AnswerQuestion",
                "args": {
```



Let us test as below







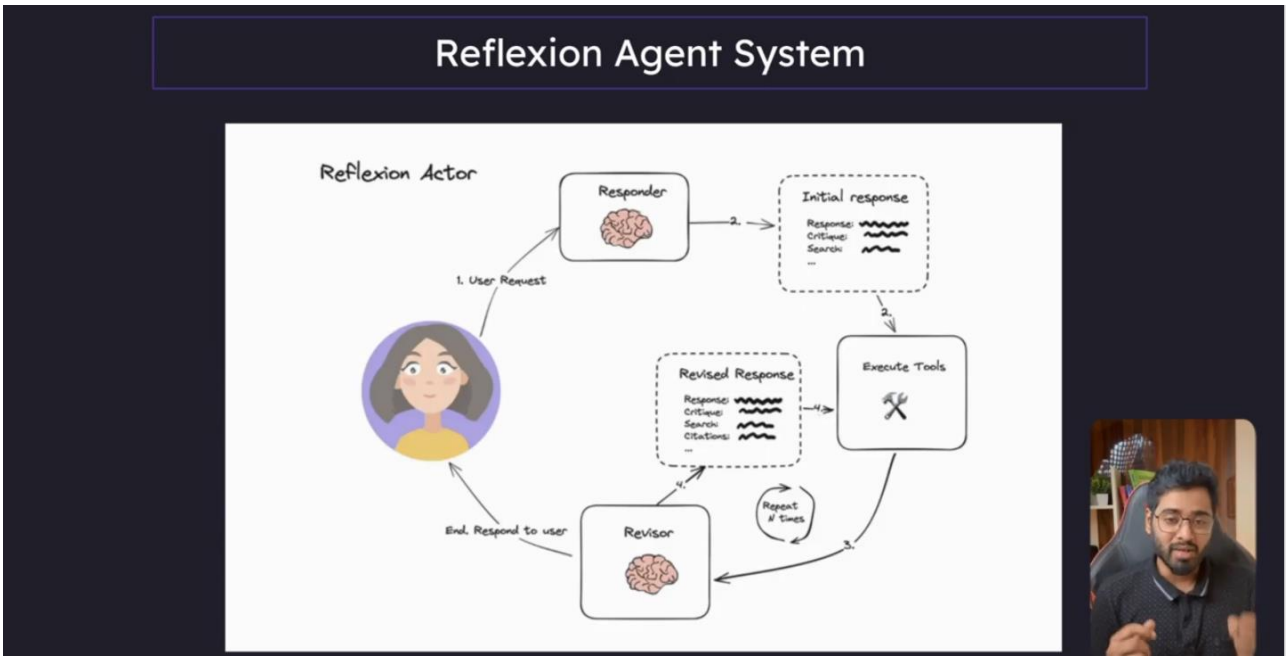
We have now built all the components of the Reflexion system, we now need to pull them together and run the graph

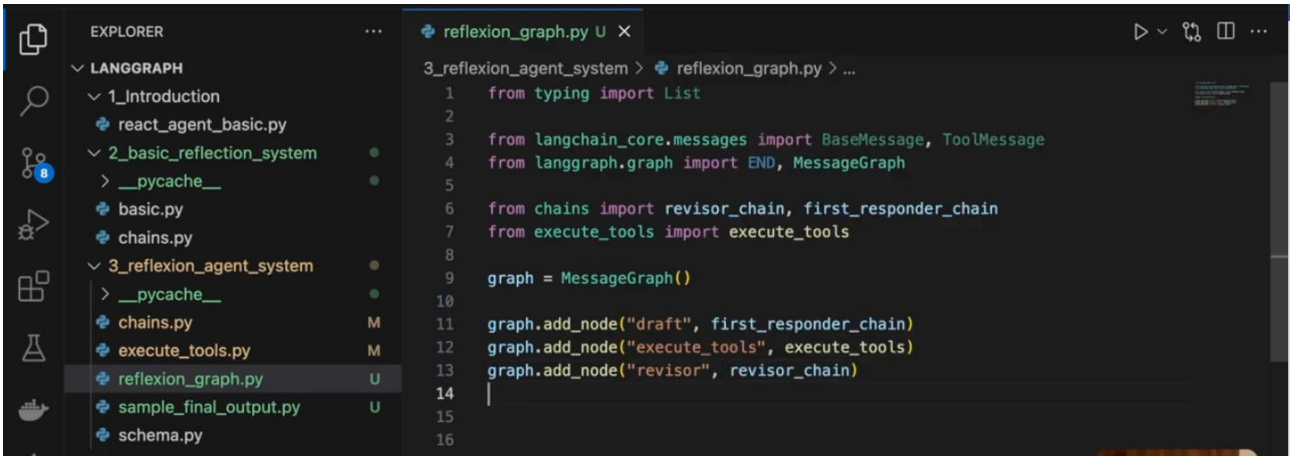
LangGraph Crash Course #14 - Reflexion Agent - Building Graph

Harish Neel | AI
7.72K subscribers
Subscribe

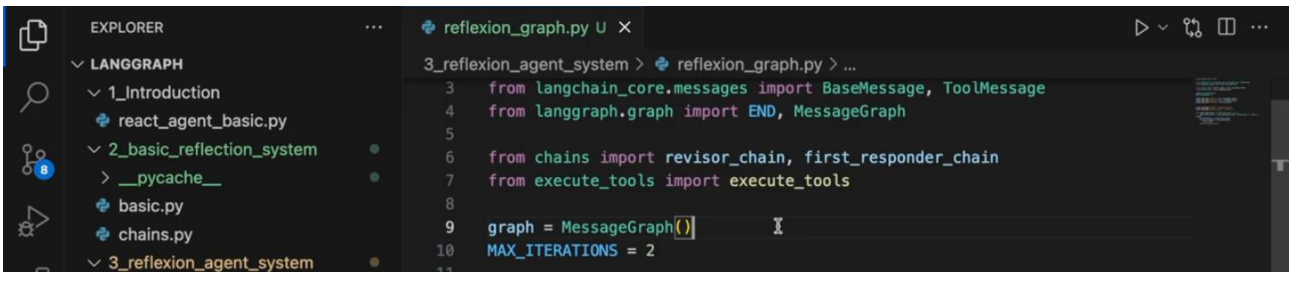
56 Share Clip Save

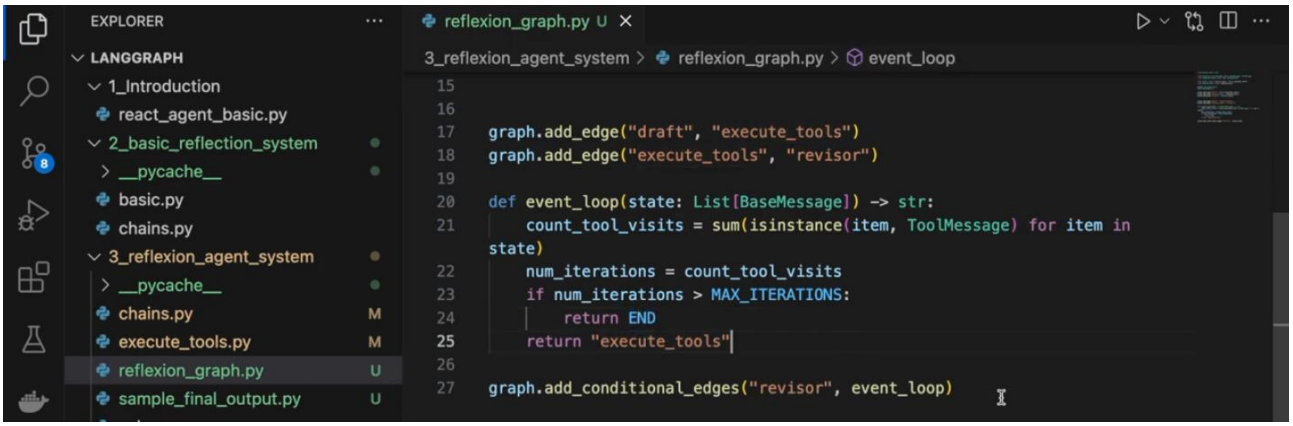
2,673 views Feb 24, 2025 #python #artificialintelligence #langgraph
In this beginner-friendly playlist, I'll show you how to use LangGraph to build powerful AI-agents from scratch

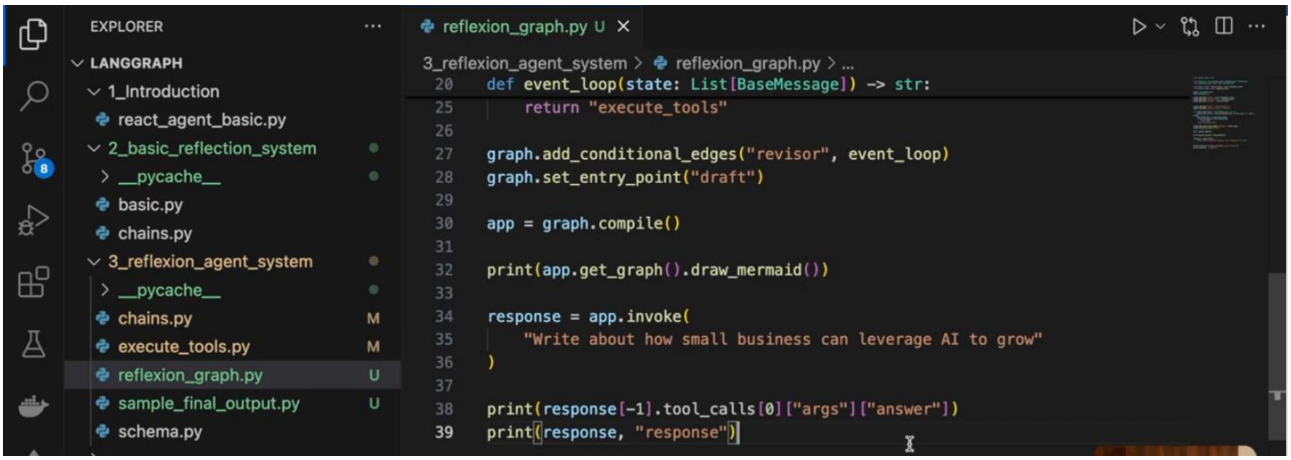


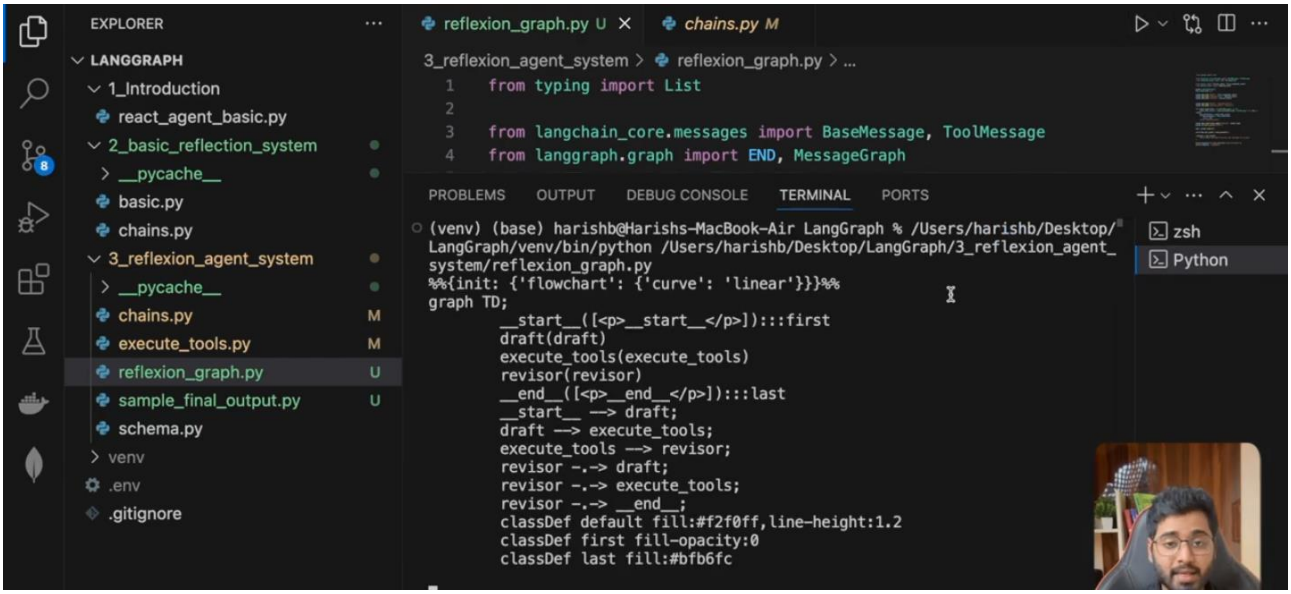


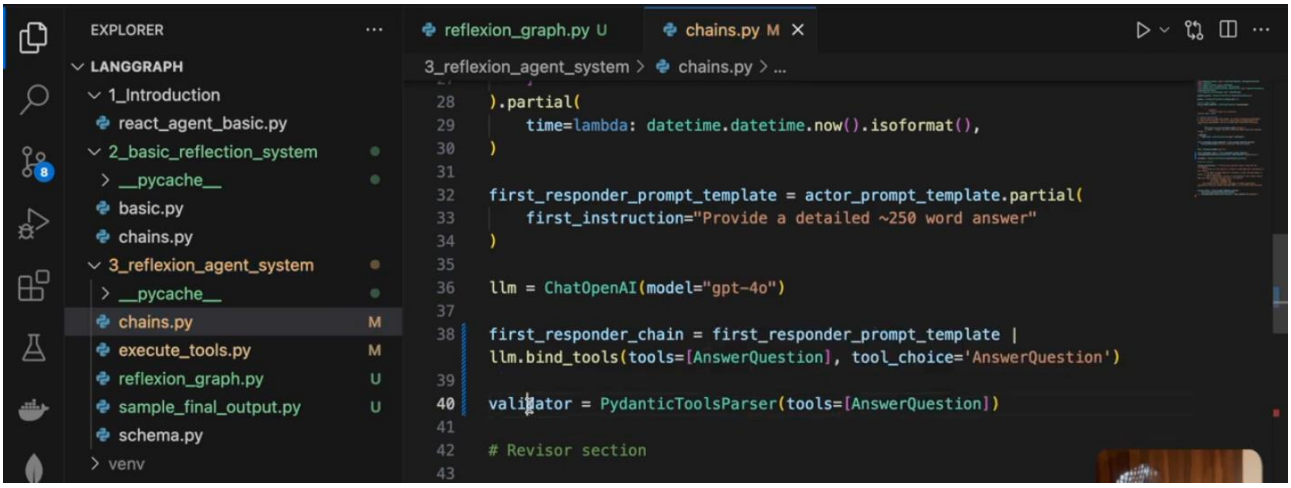
We can now connect the nodes together using edges as below



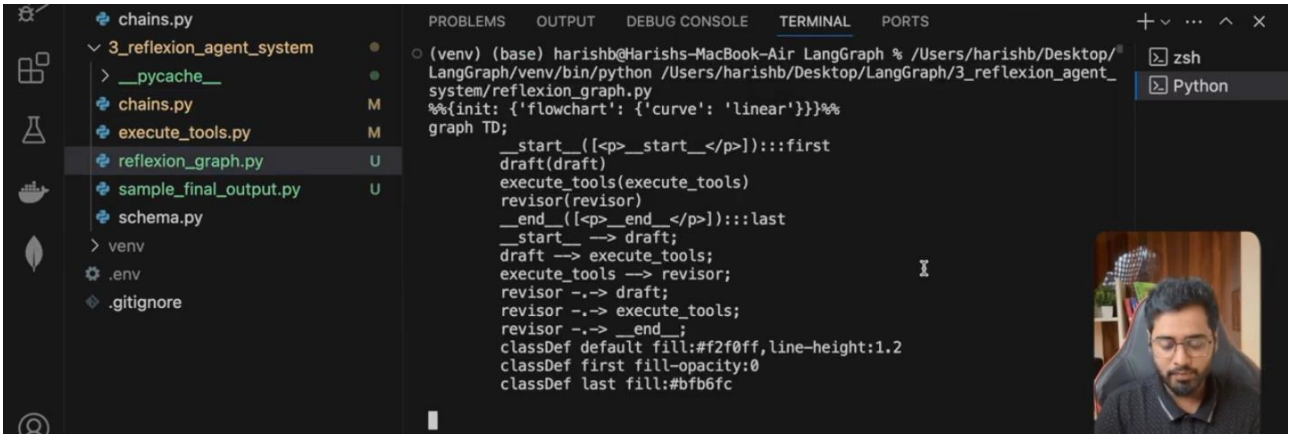


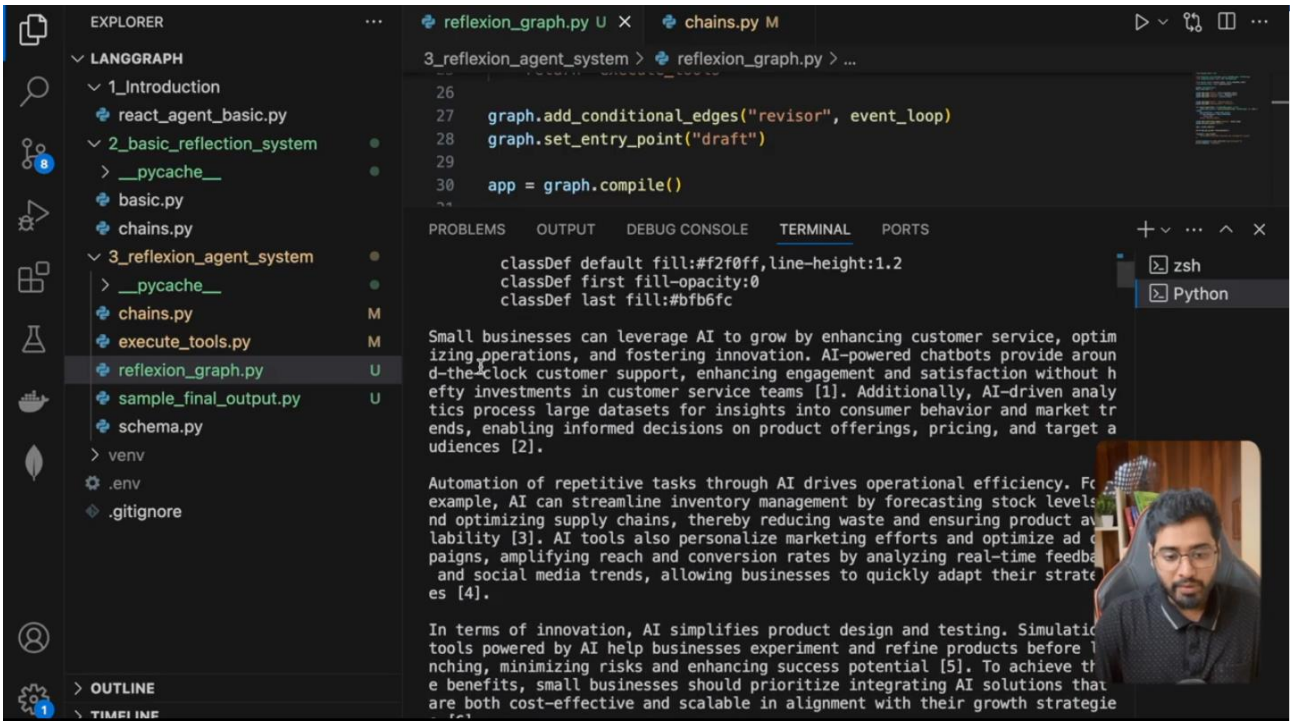


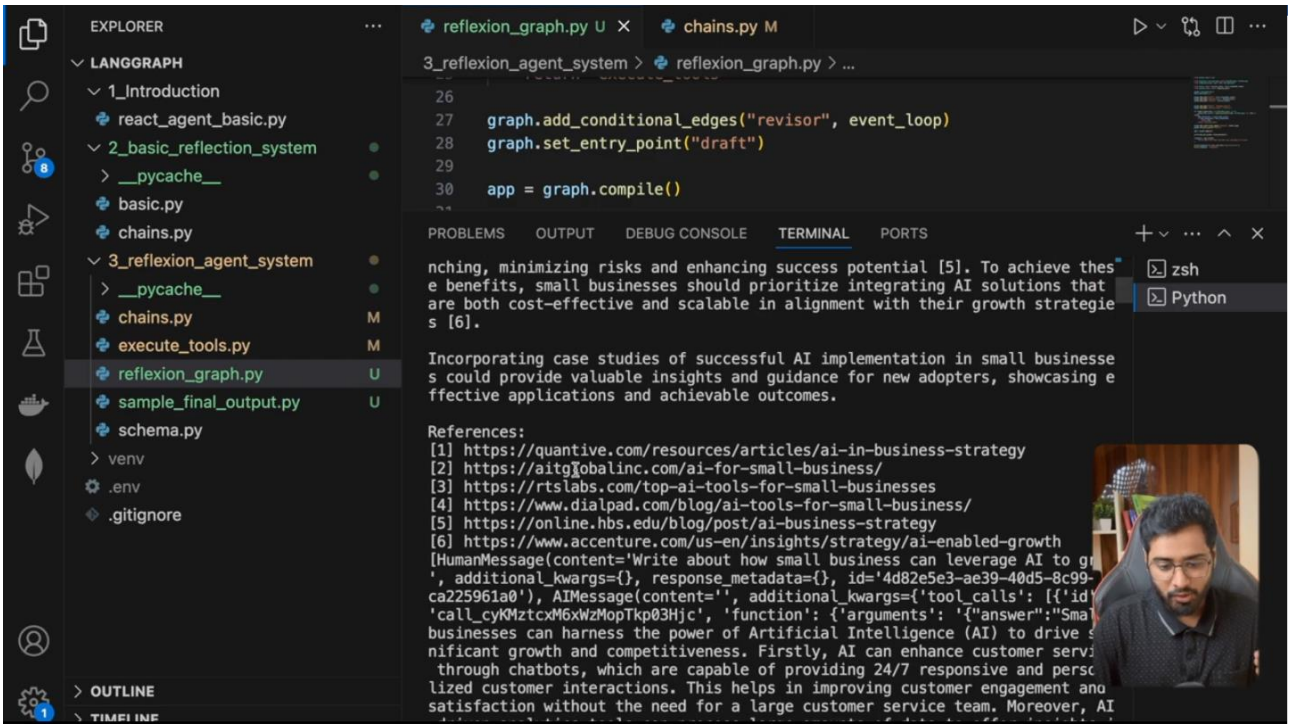


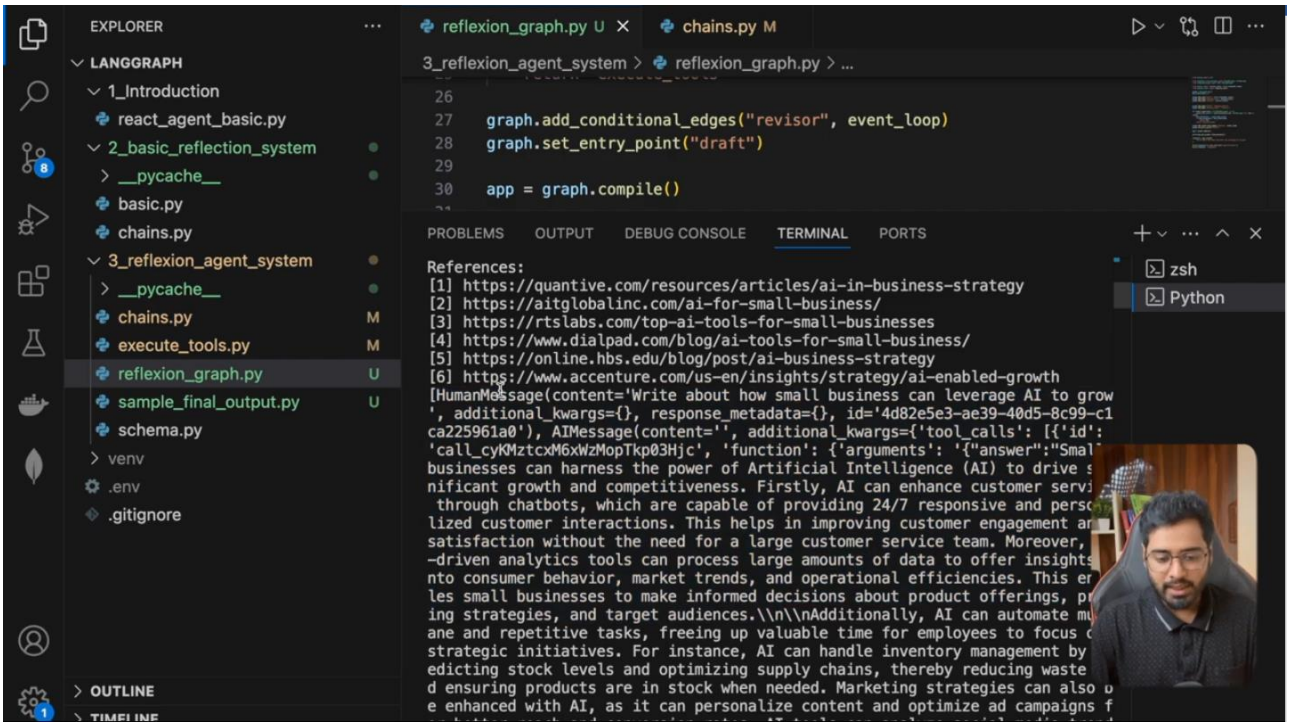


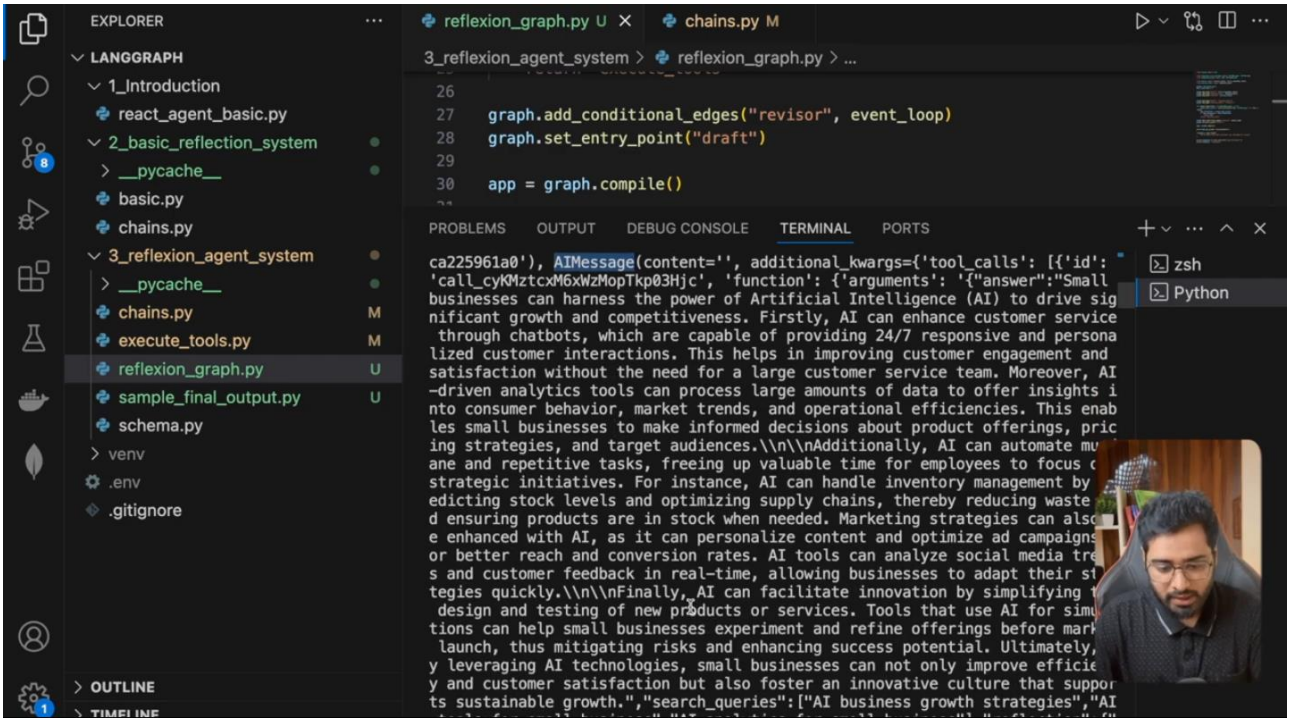
Take away the parser from line 38 and run again

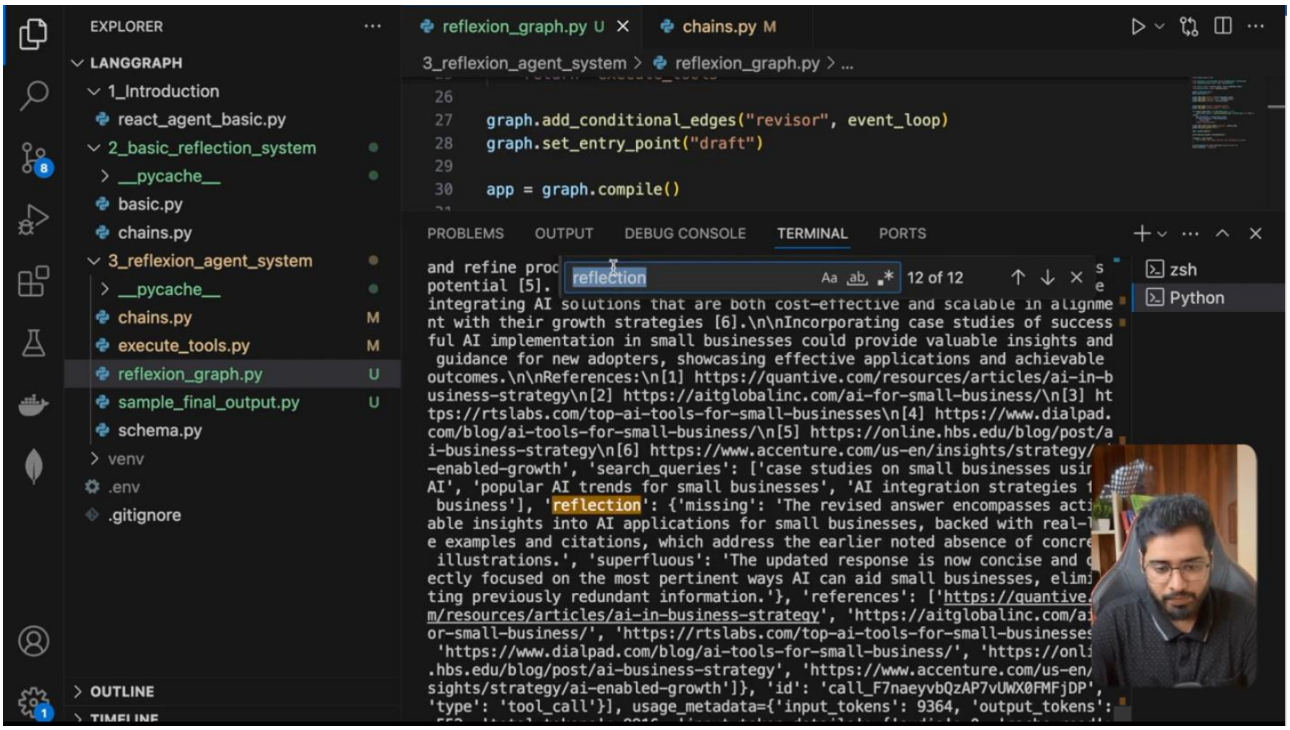

chains.py
3_reflexion_agent_system
__pycache__
chains.py M
execute_tools.py M
reflexion_graph.py U
sample_final_output.py U
schema.py
venv
.env
.gitignore
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
zsh
Python
(venv) (base) harishb@Harishs-MacBook-Air LangGraph % /Users/harishb/Desktop/LangGraph/venv/bin/python /Users/harishb/Desktop/LangGraph/3_reflexion_agent_system/reflexion_graph.py
%%{init: {'flowchart': {'curve': 'linear'}}}%%
graph TD;
__start__([__start__]):::first
draft(draft)
execute_tools(execute_tools)
revisor(revisor)
__end__([__end__]):::last
__start__ --> draft;
draft --> execute_tools;
execute_tools --> revisor;
revisor -.-> draft;
revisor -.-> execute_tools;
revisor -.-> __end__;
classDef default fill:#f2f0ff,line-height:1.2
classDef first fill-opacity:0
classDef last fill:#bfb6fc

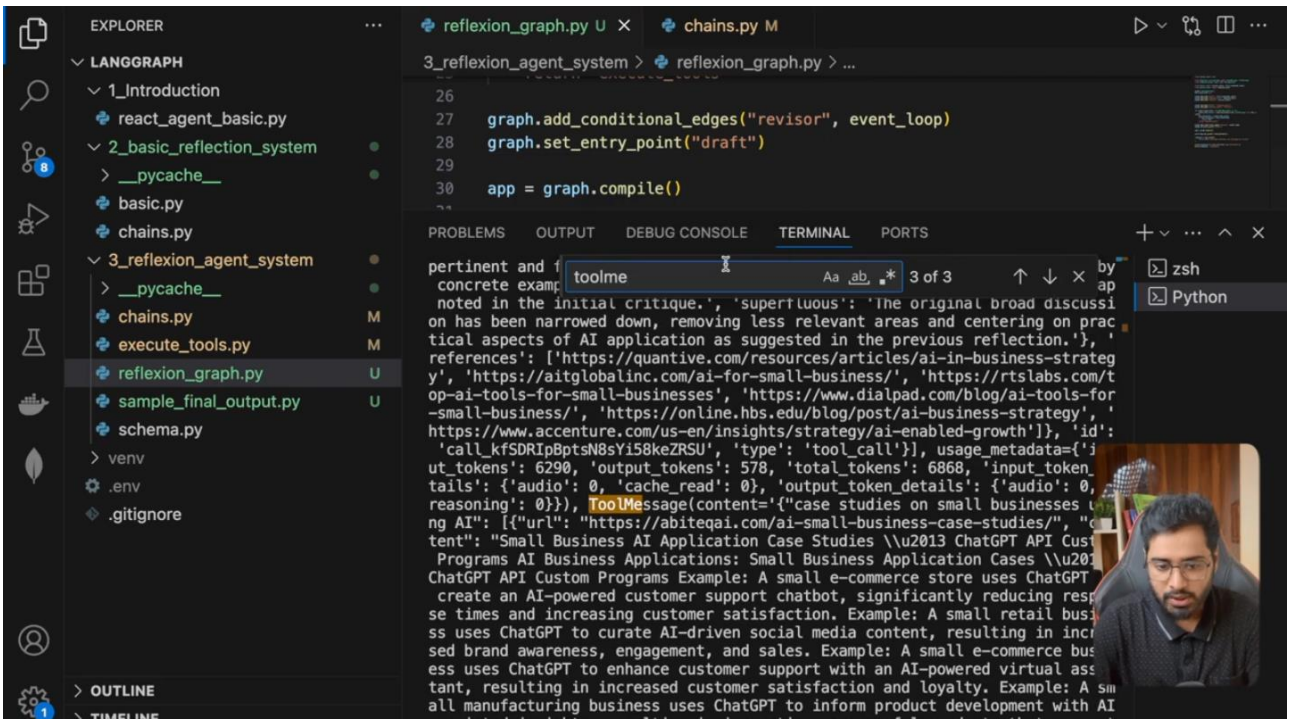

EXPLORER
LANGGRAPH
1_Introduction
react_agent_basic.py
2_basic_reflection_system
__pycache__
basic.py
chains.py
3_reflexion_agent_system
__pycache__
chains.py M
execute_tools.py M
reflexion_graph.py U
sample_final_output.py U
schema.py
venv
.env
.gitignore
OUTLINE
TIMELINE
reflexion_graph.py U
chains.py M
3_reflexion_agent_system > reflexion_graph.py > ...
graph.add_conditional_edges("revisor", event_loop)
graph.set_entry_point("draft")
app = graph.compile()
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
zsh
Python
classDef default fill:#f2f0ff,line-height:1.2
classDef first fill-opacity:0
classDef last fill:#bfb6fc
Small businesses can leverage AI to grow by enhancing customer service, optimizing operations, and fostering innovation. AI-powered chatbots provide around-the-clock customer support, enhancing engagement and satisfaction without hefty investments in customer service teams [1]. Additionally, AI-driven analytics process large datasets for insights into consumer behavior and market trends, enabling informed decisions on product offerings, pricing, and target audiences [2].
Automation of repetitive tasks through AI drives operational efficiency. For example, AI can streamline inventory management by forecasting stock levels and optimizing supply chains, thereby reducing waste and ensuring product availability [3]. AI tools also personalize marketing efforts and optimize ad campaigns, amplifying reach and conversion rates by analyzing real-time feedback and social media trends, allowing businesses to quickly adapt their strategies [4].
In terms of innovation, AI simplifies product design and testing. Simulation tools powered by AI help businesses experiment and refine products before launching, minimizing risks and enhancing success potential [5]. To achieve these benefits, small businesses should prioritize integrating AI solutions that are both cost-effective and scalable in alignment with their growth strategies [6].

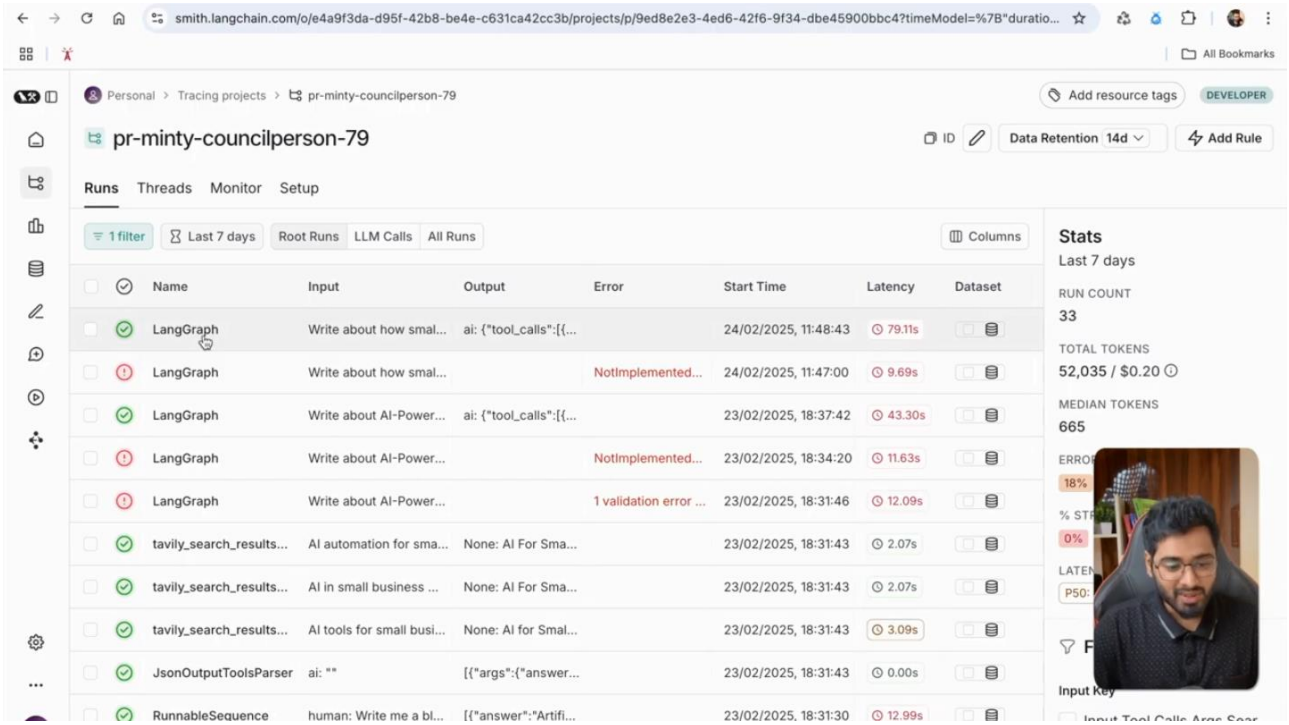

EXPLORER
LANGGRAPH
1_Introduction
react_agent_basic.py
2_basic_reflection_system
__pycache__
basic.py
chains.py
3_reflexion_agent_system
__pycache__
chains.py M
execute_tools.py M
reflexion_graph.py U
sample_final_output.py U
schema.py
venv
.env
.gitignore
OUTLINE
TIMELINE
reflexion_graph.py U
chains.py M
3_reflexion_agent_system > reflexion_graph.py > ...
graph.add_conditional_edges("revisor", event_loop)
graph.set_entry_point("draft")
app = graph.compile()
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
zsh
Python
nching, minimizing risks and enhancing success potential [5]. To achieve these benefits, small businesses should prioritize integrating AI solutions that are both cost-effective and scalable in alignment with their growth strategies [6].
Incorporating case studies of successful AI implementation in small businesses could provide valuable insights and guidance for new adopters, showcasing effective applications and achievable outcomes.
References:
[1] https://quantive.com/resources/articles/ai-in-business-strategy
[2] https://aitoglobalinc.com/ai-for-small-business/
[3] https://rtslabs.com/top-ai-tools-for-small-businesses
[4] https://www.dialpad.com/blog/ai-tools-for-small-business/
[5] https://online.hbs.edu/blog/post/ai-business-strategy
[6] https://www.accenture.com/us-en/insights/strategy/ai-enabled-growth
[HumanMessage(content='Write about how small business can leverage AI to gr
', additional_kwargs={}, response_metadata={}, id='4d82e5e3-ae39-40d5-8c99-
ca225961a0'), AIMessage(content='', additional_kwargs={'tool_calls': [{'id
'call_cyKMztcxM6xWzMopTkp03Hjc', 'function': {'arguments': '{"answer":"Sma
businesses can harness the power of Artificial Intelligence (AI) to drive s
nificant growth and competitiveness. Firstly, AI can enhance customer servi
through chatbots, which are capable of providing 24/7 responsive and perso
lized customer interactions. This helps in improving customer engagement and
satisfaction without the need for a large customer service team. Moreover, AI

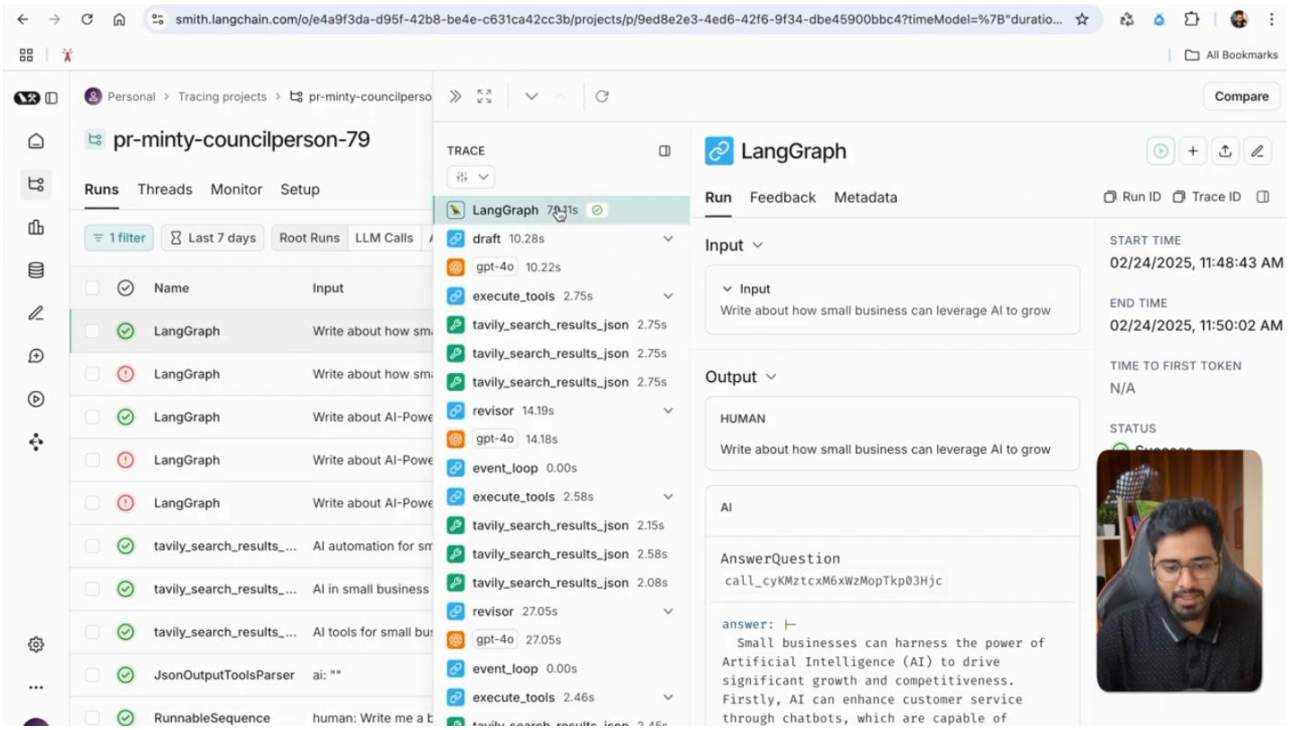

EXPLORER
LANGGRAPH
1_Introduction
react_agent_basic.py
2_basic_reflection_system
__pycache__
basic.py
chains.py
3_reflexion_agent_system
__pycache__
chains.py M
execute_tools.py M
reflexion_graph.py U
sample_final_output.py U
schema.py
venv
.env
.gitignore
OUTLINE
reflexion_graph.py U
chains.py M
3_reflexion_agent_system > reflexion_graph.py > ...
graph.add_conditional_edges("revisor", event_loop)
graph.set_entry_point("draft")
app = graph.compile()
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
zsh
Python
References:
[1] https://quantive.com/resources/articles/ai-in-business-strategy
[2] https://aitglobalinc.com/ai-for-small-business/
[3] https://rtslabs.com/top-ai-tools-for-small-businesses
[4] https://www.dialpad.com/blog/ai-tools-for-small-business/
[5] https://online.hbs.edu/blog/post/ai-business-strategy
[6] https://www.accenture.com/us-en/insights/strategy/ai-enabled-growth
[HumanMessage(content='Write about how small business can leverage AI to grow
', additional_kwargs={}, response_metadata={}, id='4d82e5e3-ae39-40d5-8c99-c1
ca225961a0'), AIMessage(content='', additional_kwargs={'tool_calls': [{'id':
'call_cyKMztcxM6xWzMopTkp03Hjc', 'function': {'arguments': '{"answer":"Smal
businesses can harness the power of Artificial Intelligence (AI) to drive s
nificant growth and competitiveness. Firstly, AI can enhance customer servi
through chatbots, which are capable of providing 24/7 responsive and perso
lized customer interactions. This helps in improving customer engagement an
satisfaction without the need for a large customer service team. Moreover,
-driven analytics tools can process large amounts of data to offer insights
nto consumer behavior, market trends, and operational efficiencies. This en
les small businesses to make informed decisions about product offerings, pr
ing strategies, and target audiences.\\n\\nAdditionally, AI can automate mu
ane and repetitive tasks, freeing up valuable time for employees to focus
strategic initiatives. For instance, AI can handle inventory management by
edicting stock levels and optimizing supply chains, thereby reducing waste
d ensuring products are in stock when needed. Marketing strategies can also
e enhanced with AI, as it can personalize content and optimize ad campaigns f


EXPLORER
LANGGRAPH
1_Introduction
react_agent_basic.py
2_basic_reflection_system
__pycache__
basic.py
chains.py
3_reflexion_agent_system
__pycache__
chains.py M
execute_tools.py M
reflexion_graph.py U
sample_final_output.py U
schema.py
venv
.env
.gitignore
OUTLINE
reflexion_graph.py U
chains.py M
3_reflexion_agent_system > reflexion_graph.py > ...
graph.add_conditional_edges("revisor", event_loop)
graph.set_entry_point("draft")
app = graph.compile()
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
zsh
Python
ca225961a0'), AIMessage(content='', additional_kwargs={'tool_calls': [{'id':
'call_cyKMztcxM6xWzMopTkp03Hjc', 'function': {'arguments': '{"answer":"Small
businesses can harness the power of Artificial Intelligence (AI) to drive sig
nificant growth and competitiveness. Firstly, AI can enhance customer service
through chatbots, which are capable of providing 24/7 responsive and persona
lized customer interactions. This helps in improving customer engagement and
satisfaction without the need for a large customer service team. Moreover, AI
-driven analytics tools can process large amounts of data to offer insights i
nto consumer behavior, market trends, and operational efficiencies. This enab
les small businesses to make informed decisions about product offerings, pric
ing strategies, and target audiences.\\n\\nAdditionally, AI can automate mu
ane and repetitive tasks, freeing up valuable time for employees to focus
strategic initiatives. For instance, AI can handle inventory management by
edicting stock levels and optimizing supply chains, thereby reducing waste
d ensuring products are in stock when needed. Marketing strategies can also
e enhanced with AI, as it can personalize content and optimize ad campaigns
or better reach and conversion rates. AI tools can analyze social media tre
s and customer feedback in real-time, allowing businesses to adapt their st
tegies quickly.\\n\\nFinally, AI can facilitate innovation by simplifying t
design and testing of new products or services. Tools that use AI for simu
tions can help small businesses experiment and refine offerings before mark
launch, thus mitigating risks and enhancing success potential. Ultimately,
y leveraging AI technologies, small businesses can not only improve efficie
y and customer satisfaction but also foster an innovative culture that suppor
ts sustainable growth.","search_queries":["AI business growth strategies","AI


EXPLORER
LANGGRAPH
1_Introduction
react_agent_basic.py
2_basic_reflection_system
__pycache__
basic.py
chains.py
3_reflexion_agent_system
__pycache__
chains.py
execute_tools.py
reflexion_graph.py
sample_final_output.py
schema.py
venv
.env
.gitignore
OUTLINE
reflexion_graph.py U
chains.py M
3_reflexion_agent_system > reflexion_graph.py > ...
graph.add_conditional_edges("revisor", event_loop)
graph.set_entry_point("draft")
app = graph.compile()
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
reflection
12 of 12
zsh
Python


EXPLORER
LANGGRAPH
1_Introduction
react_agent_basic.py
2_basic_reflection_system
__pycache__
basic.py
chains.py
3_reflexion_agent_system
__pycache__
chains.py
execute_tools.py
reflexion_graph.py
sample_final_output.py
schema.py
venv
.env
.gitignore
OUTLINE
reflexion_graph.py U
chains.py M
3_reflexion_agent_system > reflexion_graph.py > ...
graph.add_conditional_edges("revisor", event_loop)
graph.set_entry_point("draft")
app = graph.compile()
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
toolme
3 of 3
zsh
Python


smith.langchain.com/o/e4a9f3da-d95f-42b8-be4e-c631ca42cc3b/projects/p/9ed8e2e3-4ed6-42f6-9f34-dbe45900bbc4?timeModel=%7B"duratio...
All Bookmarks
Personal > Tracing projects > pr-minty-councilperson-79
Add resource tags
DEVELOPER
pr-minty-councilperson-79
ID
Data Retention 14d
Add Rule
Runs
Threads
Monitor
Setup
1 filter
Last 7 days
Root Runs
LLM Calls
All Runs
Columns
Name
Input
Output
Error
Start Time
Latency
Dataset
LangGraph
Write about how smal...
ai: {"tool_calls":[{...
24/02/2025, 11:48:43
79.11s
LangGraph
Write about how smal...
NotImplemented...
24/02/2025, 11:47:00
9.69s
LangGraph
Write about AI-Power...
ai: {"tool_calls":[{...
23/02/2025, 18:37:42
43.30s
LangGraph
Write about AI-Power...
NotImplemented...
23/02/2025, 18:34:20
11.63s
LangGraph
Write about AI-Power...
1 validation error ...
23/02/2025, 18:31:46
12.09s
tavily_search_results...
AI automation for sma...
None: AI For Sma...
23/02/2025, 18:31:43
2.07s
tavily_search_results...
AI in small business ...
None: AI For Sma...
23/02/2025, 18:31:43
2.07s
tavily_search_results...
AI tools for small busi...
None: AI for Smal...
23/02/2025, 18:31:43
3.09s
JsonOutputToolsParser
ai: ""
[{"args":{"answer...
23/02/2025, 18:31:43
0.00s
RunnableSequence
human: Write me a bl...
[{"answer":"Artifi...
23/02/2025, 18:31:30
12.99s
Stats
Last 7 days
RUN COUNT
33
TOTAL TOKENS
52,035 / $0.20
MEDIAN TOKENS
665
18%
0%
Input Key


smith.langchain.com/o/e4a9f3da-d95f-42b8-be4e-c631ca42cc3b/projects/p/9ed8e2e3-4ed6-42f6-9f34-dbe45900bbc4?timeModel=%7B"duratio...
All Bookmarks
Personal > Tracing projects > pr-minty-councilperso
Compare
pr-minty-councilperson-79
Runs
Threads
Monitor
Setup
1 filter
Last 7 days
Root Runs
LLM Calls
Name
Input
LangGraph
Write about how sma
LangGraph
Write about how sma
LangGraph
Write about AI-Powe
LangGraph
Write about AI-Powe
LangGraph
Write about AI-Powe
tavily_search_results_...
AI automation for sm
tavily_search_results_...
AI in small business
tavily_search_results_...
AI tools for small bus
JsonOutputToolsParser
ai: ""
RunnableSequence
human: Write me a b
TRACE
LangGraph 79.11s
draft 10.28s
gpt-4o 10.22s
execute_tools 2.75s
tavily_search_results_json 2.75s
tavily_search_results_json 2.75s
tavily_search_results_json 2.75s
revisor 14.19s
gpt-4o 14.18s
event_loop 0.00s
execute_tools 2.58s
tavily_search_results_json 2.15s
tavily_search_results_json 2.58s
tavily_search_results_json 2.08s
revisor 27.05s
gpt-4o 27.05s
event_loop 0.00s
execute_tools 2.46s
LangGraph
Run
Feedback
Metadata
Run ID
Trace ID
Input
Input
Write about how small business can leverage AI to grow
Output
HUMAN
Write about how small business can leverage AI to grow
AI
AnswerQuestion
call_cyKMztcxM6xWzMopTkp03Hjc
answer:
Small businesses can harness the power of Artificial Intelligence (AI) to drive significant growth and competitiveness. Firstly, AI can enhance customer service through chatbots, which are capable of
START TIME
02/24/2025, 11:48:43 AM
END TIME
02/24/2025, 11:50:02 AM
TIME TO FIRST TOKEN
N/A
STATUS

smith.langchain.com/o/e4a9f3da-d95f-42b8-be4e-c631ca42cc3b/projects/p/9ed8e2e3-4ed6-42f6-9f34-dbe45900bbc4?timeModel=%7B"duratio...

All Bookmarks

Personal > Tracing projects > pr-minty-councilperso

Compare

pr-minty-councilperson-79

Runs Threads Monitor Setup

1 filter | Last 7 days | Root Runs | LLM Calls

Name	Input
LangGraph	Write about how sma
LangGraph	Write about how sma
LangGraph	Write about AI-Powe
LangGraph	Write about AI-Powe
LangGraph	Write about AI-Powe
tavily_search_results_...	AI automation for sm
tavily_search_results_...	AI in small business
tavily_search_results_...	AI tools for small bus
JsonOutputToolsParser	ai: ""
RunnableSequence	human: Write me a b

TRACE

- LangGraph 79.11s
- draft 10.28s
- gpt-4o 10.22s
- execute_tools 2.75s
- tavily_search_results_json 2.75s
- tavily_search_results_json 2.75s
- tavily_search_results_json 2.75s
- revisor 14.19s
- gpt-4o 14.18s
- event_loop 0.00s
- execute_tools 2.58s
- tavily_search_results_json 2.15s
- tavily_search_results_json 2.58s
- tavily_search_results_json 2.08s
- revisor 27.05s
- gpt-4o 27.05s
- event_loop 0.00s
- execute_tools 2.46s

LangGraph

Run Feedback Metadata

Run ID Trace ID

Write about how small business can leverage AI to grow

Success

AI

AnswerQuestion

call_cyKMztcxM6xWzMopTkp03Hjc

to the theoretical suggestions and increase the credibility and relatability of the information.

superfluous: The discussion on AI applications was too broad and attempted to cover many aspects without in-depth focus. Some information about AI capabilities, like the mention of social media insights and real-time feedback, could be consolidated to make space for more detailed exploration of specific AI tools or technologies that are currently popular or emerging in 2025.

YAML

TOOL

TOTAL TOKENS
21,367 tokens / $0.069385

LATENCY
79.11s

TYPE
Chain

smith.langchain.com/o/e4a9f3da-d95f-42b8-be4e-c631ca42cc3b/projects/p/9ed8e2e3-4ed6-42f6-9f34-dbe45900bbc4?timeModel=%7B"duratio...

All Bookmarks

Personal > Tracing projects > pr-minty-councilperso

Compare

pr-minty-councilperson-79

Runs Threads Monitor Setup

1 filter | Last 7 days | Root Runs | LLM Calls

Name	Input
LangGraph	Write about how sma
LangGraph	Write about how sma
LangGraph	Write about AI-Powe
LangGraph	Write about AI-Powe
LangGraph	Write about AI-Powe
tavily_search_results_...	AI automation for sm
tavily_search_results_...	AI in small business
tavily_search_results_...	AI tools for small bus
JsonOutputToolsParser	ai: ""
RunnableSequence	human: Write me a b

TRACE

- LangGraph 79.11s
- draft 10.28s
- gpt-4o 10.22s
- execute_tools 2.75s
- tavily_search_results_json 2.75s
- tavily_search_results_json 2.75s
- tavily_search_results_json 2.75s
- revisor 14.19s
- gpt-4o 14.18s
- event_loop 0.00s
- execute_tools 2.58s
- tavily_search_results_json 2.15s
- tavily_search_results_json 2.58s
- tavily_search_results_json 2.08s
- revisor 27.05s
- gpt-4o 27.05s
- event_loop 0.00s
- execute_tools 2.46s

LangGraph

Run Feedback Metadata

Run ID Trace ID

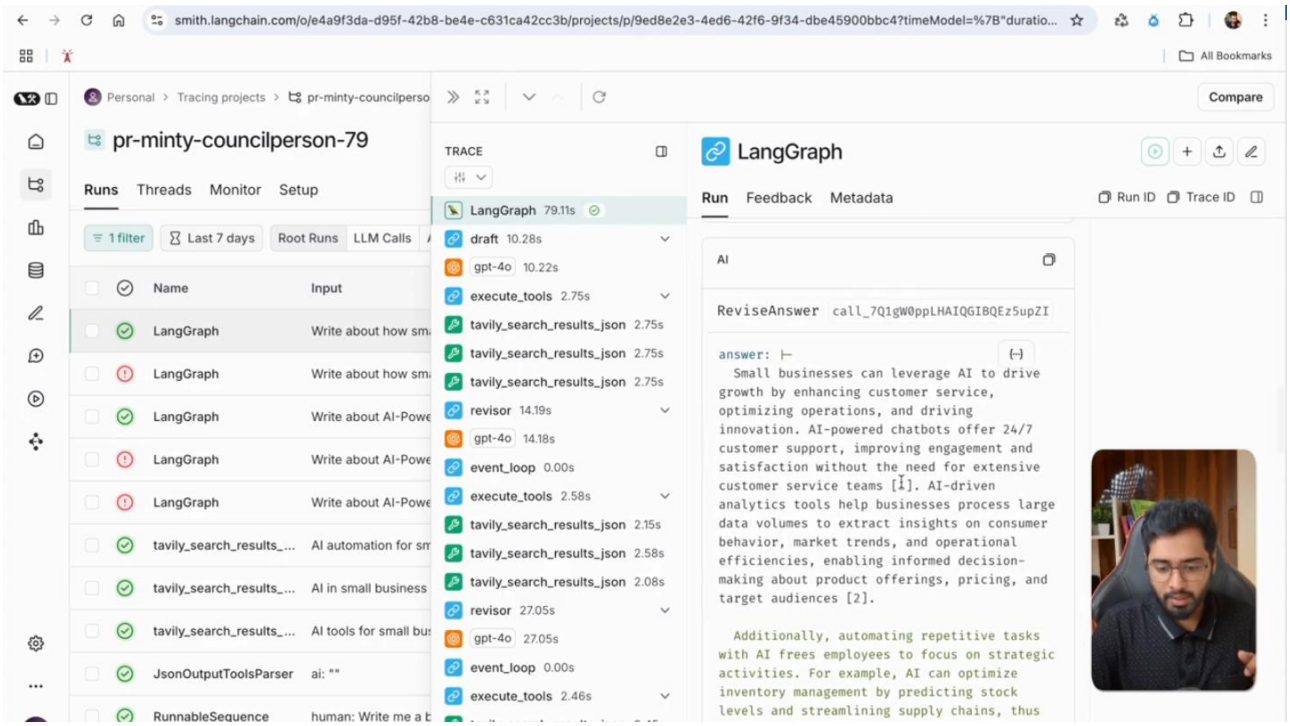
currently popular or emerging in 2025.

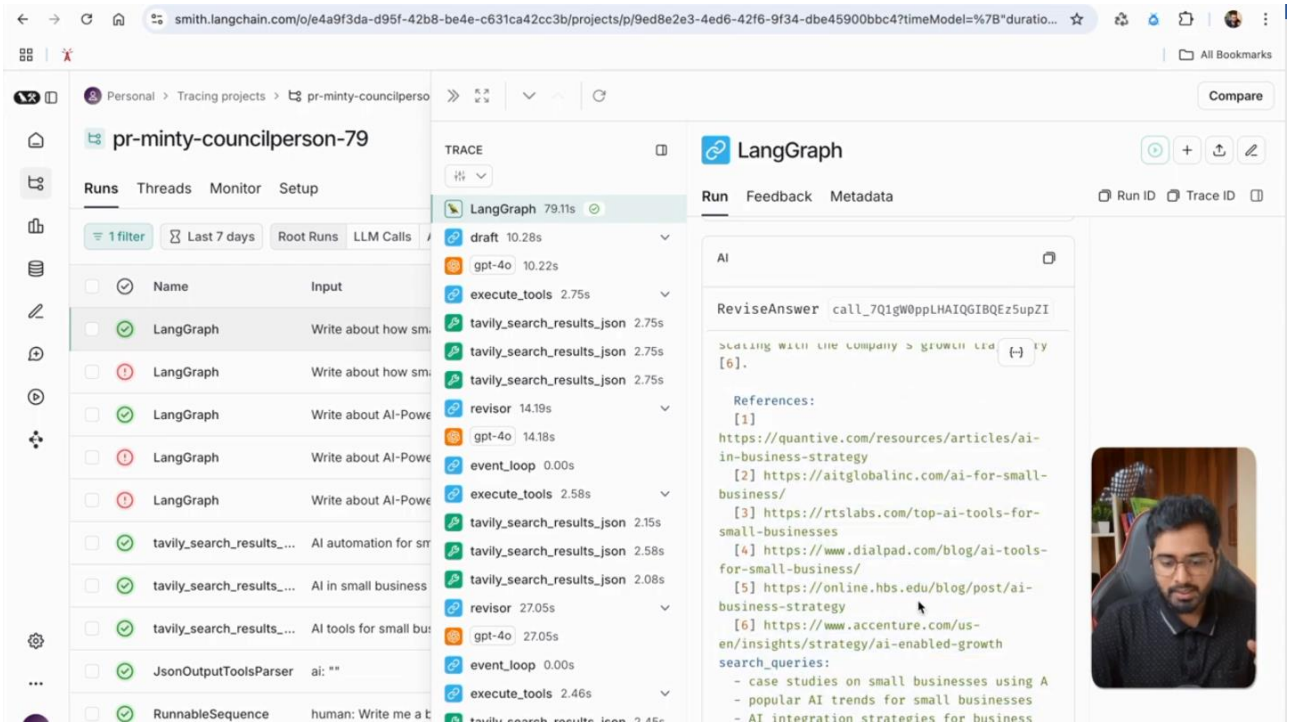
YAML

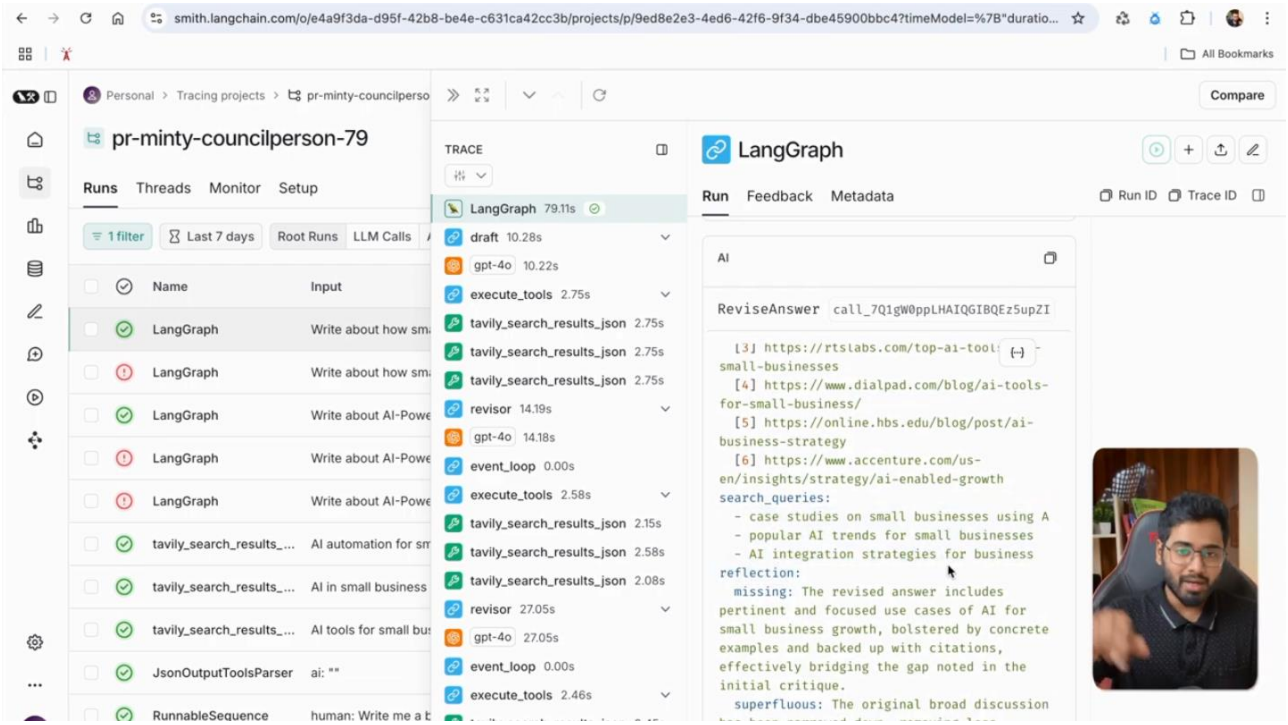
TOOL

call_cyKMztcxM6xWzMopTkp03Hjc

```
AI business growth strategies:
  - url: https://www.accenture.com/us-
en/insights/strategy/ai-enabled-growth
    content: AI-Enabled Business Growth
Strategies | Accenture And while cost
optimization and efficiency have been AI's
early business headliners, AI is proving its
potential to elevate competitiveness, expand
markets, and deliver exponential growth for
companies. With AI at their disposal, savvy
business leaders can embrace agile, end-to-
end and highly connected strategies and
approaches that address persistent market
volatility while unlocking sustainable
growth. This growth horizon uses AI to expand
into new markets or pursue industry-adjacent
value. Horizon three encompasses the greatest
```


smith.langchain.com/o/e4a9f3da-d95f-42b8-be4e-c631ca42cc3b/projects/p/9ed8e2e3-4ed6-42f6-9f34-dbe45900bbc4?timeModel=%7B"duratio...
All Bookmarks
Personal > Tracing projects > pr-minty-councilperso
Compare
pr-minty-councilperson-79
Runs Threads Monitor Setup
1 filter Last 7 days Root Runs LLM Calls
Name Input
LangGraph Write about how sma
LangGraph Write about how sma
LangGraph Write about AI-Powe
LangGraph Write about AI-Powe
LangGraph Write about AI-Powe
tavily_search_results_... AI automation for sm
tavily_search_results_... AI in small business
tavily_search_results_... AI tools for small bus
JsonOutputToolsParser ai: ""
RunnableSequence human: Write me a b
TRACE
LangGraph 79.11s
draft 10.28s
gpt-4o 10.22s
execute_tools 2.75s
tavily_search_results_json 2.75s
tavily_search_results_json 2.75s
tavily_search_results_json 2.75s
revisor 14.19s
gpt-4o 14.18s
event_loop 0.00s
execute_tools 2.58s
tavily_search_results_json 2.15s
tavily_search_results_json 2.58s
tavily_search_results_json 2.08s
revisor 27.05s
gpt-4o 27.05s
event_loop 0.00s
execute_tools 2.46s
LangGraph
Run Feedback Metadata
Run ID Trace ID
AI
ReviseAnswer call_7Q1gW0ppLHAIQGIBQEz5upZI
answer:
Small businesses can leverage AI to drive growth by enhancing customer service, optimizing operations, and driving innovation. AI-powered chatbots offer 24/7 customer support, improving engagement and satisfaction without the need for extensive customer service teams [1]. AI-driven analytics tools help businesses process large data volumes to extract insights on consumer behavior, market trends, and operational efficiencies, enabling informed decision-making about product offerings, pricing, and target audiences [2].
Additionally, automating repetitive tasks with AI frees employees to focus on strategic activities. For example, AI can optimize inventory management by predicting stock levels and streamlining supply chains, thus


smith.langchain.com/o/e4a9f3da-d95f-42b8-be4e-c631ca42cc3b/projects/p/9ed8e2e3-4ed6-42f6-9f34-dbe45900bbc4?timeModel=%7B"duratio...
All Bookmarks
Personal > Tracing projects > pr-minty-councilperso
Compare
pr-minty-councilperson-79
Runs Threads Monitor Setup
1 filter Last 7 days Root Runs LLM Calls
Name Input
LangGraph Write about how sma
LangGraph Write about how sma
LangGraph Write about AI-Powe
LangGraph Write about AI-Powe
LangGraph Write about AI-Powe
tavily_search_results_... AI automation for sm
tavily_search_results_... AI in small business
tavily_search_results_... AI tools for small bus
JsonOutputToolsParser ai: ""
RunnableSequence human: Write me a b
TRACE
LangGraph 79.11s
draft 10.28s
gpt-4o 10.22s
execute_tools 2.75s
tavily_search_results_json 2.75s
tavily_search_results_json 2.75s
tavily_search_results_json 2.75s
revisor 14.19s
gpt-4o 14.18s
event_loop 0.00s
execute_tools 2.58s
tavily_search_results_json 2.15s
tavily_search_results_json 2.58s
tavily_search_results_json 2.08s
revisor 27.05s
gpt-4o 27.05s
event_loop 0.00s
execute_tools 2.46s
LangGraph
Run Feedback Metadata
Run ID Trace ID
AI
ReviseAnswer call_7Q1gW0ppLHAIQGIBQEz5upZI
[6].
References:
[1] https://quantive.com/resources/articles/ai-in-business-strategy
[2] https://aitglobalinc.com/ai-for-small-business/
[3] https://rtslabs.com/top-ai-tools-for-small-businesses
[4] https://www.dialpad.com/blog/ai-tools-for-small-business/
[5] https://online.hbs.edu/blog/post/ai-business-strategy
[6] https://www.accenture.com/us-en/insights/strategy/ai-enabled-growth
search_queries:
- case studies on small businesses using A
- popular AI trends for small businesses
- AI integration strategies for business


smith.langchain.com/o/e4a9f3da-d95f-42b8-be4e-c631ca42cc3b/projects/p/9ed8e2e3-4ed6-42f6-9f34-dbe45900bbc4?timeModel=%7B"duratio...
All Bookmarks
Personal > Tracing projects > pr-minty-councilperso
Compare
pr-minty-councilperson-79
Runs
Threads
Monitor
Setup
1 filter
Last 7 days
Root Runs
LLM Calls
Name
Input
LangGraph
Write about how sma
LangGraph
Write about how sma
LangGraph
Write about AI-Powe
LangGraph
Write about AI-Powe
LangGraph
Write about AI-Powe
tavily_search_results_...
AI automation for sm
tavily_search_results_...
AI in small business
tavily_search_results_...
AI tools for small bus
JsonOutputToolsParser
ai: ""
RunnableSequence
human: Write me a b
TRACE
LangGraph 79.11s
draft 10.28s
gpt-4o 10.22s
execute_tools 2.75s
tavily_search_results_json 2.75s
tavily_search_results_json 2.75s
tavily_search_results_json 2.75s
revisor 14.19s
gpt-4o 14.18s
event_loop 0.00s
execute_tools 2.58s
tavily_search_results_json 2.15s
tavily_search_results_json 2.58s
tavily_search_results_json 2.08s
revisor 27.05s
gpt-4o 27.05s
event_loop 0.00s
execute_tools 2.46s
LangGraph
Run
Feedback
Metadata
Run ID
Trace ID
AI
ReviseAnswer
call_7Q1gW0ppLHAIQGIBQEz5upZI
[3] https://rtslabs.com/top-ai-tool
small-businesses
[4] https://www.dialpad.com/blog/ai-tools-for-small-business/
[5] https://online.hbs.edu/blog/post/ai-business-strategy
[6] https://www.accenture.com/us-en/insights/strategy/ai-enabled-growth
search_queries:
- case studies on small businesses using A
- popular AI trends for small businesses
- AI integration strategies for business
reflection:
missing: The revised answer includes pertinent and focused use cases of AI for small business growth, bolstered by concrete examples and backed up with citations, effectively bridging the gap noted in the initial critique.
superfluous: The original broad discussion