Entity Memory

Contents

This notebook shows how to work with a memory module that remembers things about specific entities. It extracts information on entities (using LLMs) and builds up its knowledge about that entity over time (also using LLMs).

Let's first walk through using this functionality.

```
from langchain.llms import OpenAI
from langchain.memory import ConversationEntityMemory
llm = OpenAI(temperature=0)
```

```
memory = ConversationEntityMemory(llm=llm)
_input = {"input": "Deven & Sam are working on a hackathon project"}
memory.load_memory_variables(_input)
memory.save_context(
    _input,
    {"ouput": " That sounds like a great project! What kind of project are they
working on?"}
)
```

```
memory.load_memory_variables({"input": 'who is Sam'})
```

```
{'history': 'Human: Deven & Sam are working on a hackathon project\nAI:  That
sounds like a great project! What kind of project are they working on?',
 'entities': {'Sam': 'Sam is working on a hackathon project with Deven.'}}
```

```
memory = ConversationEntityMemory(llm=llm, return_messages=True)
 input = {"input": "Deven & Sam are working on a hackathon project"}
```

Skip to main content

```
    _input,
    {"ouput": " That sounds like a great project! What kind of project are they
working on?"}
)
```

```
memory.load_memory_variables({"input": 'who is Sam'})
```

```
{'history': [HumanMessage(content='Deven & Sam are working on a hackathon
project', additional_kwargs={}),
  AIMessage(content=' That sounds like a great project! What kind of project are
they working on?', additional_kwargs={})],
 'entities': {'Sam': 'Sam is working on a hackathon project with Deven.'}}
```

Using in a chain

Let's now use it in a chain!

```
from langchain.chains import ConversationChain
from langchain.memory import ConversationEntityMemory
from langchain.memory.prompt import ENTITY_MEMORY_CONVERSATION_TEMPLATE
from pydantic import BaseModel
from typing import List, Dict, Any
```

```
conversation = ConversationChain(
    llm=llm,
    verbose=True,
    prompt=ENTITY_MEMORY_CONVERSATION_TEMPLATE,
    memory=ConversationEntityMemory(llm=llm)
)
```

```
conversation.predict(input="Deven & Sam are working on a hackathon project")
```

```
> Entering new ConversationChain chain...
Prompt after formatting:
You are an assistant to a human, powered by a large language model trained by
OpenAI.

You are designed to be able to assist with a wide range of tasks, from answering
simple questions to providing in-depth explanations and discussions on a wide
```

Skip to main content

```
conversations and provide responses that are coherent and relevant to the topic at
hand.

You are constantly learning and improving, and your capabilities are constantly
evolving. You are able to process and understand large amounts of text, and can
use this knowledge to provide accurate and informative responses to a wide range
of questions. You have access to some personalized information provided by the
human in the Context section below. Additionally, you are able to generate your
own text based on the input you receive, allowing you to engage in discussions and
provide explanations and descriptions on a wide range of topics.

Overall, you are a powerful tool that can help with a wide range of tasks and
provide valuable insights and information on a wide range of topics. Whether the
human needs help with a specific question or just wants to have a conversation
about a particular topic, you are here to assist.

Context:
{'Deven': '', 'Sam': ''}

Current conversation:

Last line:
Human: Deven & Sam are working on a hackathon project
You:

> Finished chain.
```

```
' That sounds like a great project! What kind of project are they working on?'
```

```
conversation.memory.store
```

```
{'Deven': 'Deven is working on a hackathon project with Sam.',
 'Sam': 'Sam is working on a hackathon project with Deven.'}
```

```
conversation.predict(input="They are trying to add more complex memory structures
to Langchain")
```

```
> Entering new ConversationChain chain...
Prompt after formatting:
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human needs help with a specific question or just wants to have a conversation
about a particular topic, you are here to assist.

Context:
{'Deven': 'Deven is working on a hackathon project with Sam.', 'Sam': 'Sam is
working on a hackathon project with Deven.', 'Langchain': ''}

Current conversation:
Human: Deven & Sam are working on a hackathon project
AI:  That sounds like a great project! What kind of project are they working on?
Last line:
Human: They are trying to add more complex memory structures to Langchain
You:

> Finished chain.
```

```
' That sounds like an interesting project! What kind of memory structures are they
trying to add?'
```

```
conversation.predict(input="They are adding in a key-value store for entities
mentioned so far in the conversation.")
```

```
> Entering new ConversationChain chain...
Prompt after formatting:
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You are designed to be able to assist with a wide range of tasks, from answering
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based on the input you receive, allowing you to engage in natural-sounding
conversations and provide responses that are coherent and relevant to the topic at
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provide valuable insights and information on a wide range of topics. Whether the
human needs help with a specific question or just wants to have a conversation
about a particular topic, you are here to assist.

Context:
{'Deven': 'Deven is working on a hackathon project with Sam, attempting to add
more complex memory structures to Langchain.', 'Sam': 'Sam is working on a
hackathon project with Deven, trying to add more complex memory structures to
Langchain.', 'Langchain': 'Langchain is a project that is trying to add more
complex memory structures.', 'Key-Value Store': ''}

Current conversation:
Human: Deven & Sam are working on a hackathon project
AI:  That sounds like a great project! What kind of project are they working on?
Human: They are trying to add more complex memory structures to Langchain
AI:  That sounds like an interesting project! What kind of memory structures are
they trying to add?
Last line:
Human: They are adding in a key-value store for entities mentioned so far in the
conversation.
You:

> Finished chain.
```

```
' That sounds like a great idea! How will the key-value store work?'
```

```
conversation.predict(input="What do you know about Deven & Sam?")
```

```
> Entering new ConversationChain chain...
Prompt after formatting:
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simple questions to providing in-depth explanations and discussions on a wide
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```

Skip to main content

```
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provide explanations and descriptions on a wide range of topics.

Overall, you are a powerful tool that can help with a wide range of tasks and
provide valuable insights and information on a wide range of topics. Whether the
human needs help with a specific question or just wants to have a conversation
about a particular topic, you are here to assist.

Context:
{'Deven': 'Deven is working on a hackathon project with Sam, attempting to add
more complex memory structures to Langchain, including a key-value store for
entities mentioned so far in the conversation.', 'Sam': 'Sam is working on a
hackathon project with Deven, trying to add more complex memory structures to
Langchain, including a key-value store for entities mentioned so far in the
conversation.'}

Current conversation:
Human: Deven & Sam are working on a hackathon project
AI:  That sounds like a great project! What kind of project are they working on?
Human: They are trying to add more complex memory structures to Langchain
AI:  That sounds like an interesting project! What kind of memory structures are
they trying to add?
Human: They are adding in a key-value store for entities mentioned so far in the
conversation.
AI:  That sounds like a great idea! How will the key-value store work?
Last line:
Human: What do you know about Deven & Sam?
You:

> Finished chain.
```

```
' Deven and Sam are working on a hackathon project together, attempting to add
more complex memory structures to Langchain, including a key-value store for
entities mentioned so far in the conversation.'
```

Inspecting the memory store

We can also inspect the memory store directly. In the following examaples, we look at it directly, and then go through some examples of adding information and watch how it changes.

```
from pprint import pprint
pprint(conversation.memory.store)
```

Skip to main content

```
        'store for entities mentioned so far in the conversation.',
 'Key-Value Store': 'A key-value store that stores entities mentioned in the '
                    'conversation.',
 'Langchain': 'Langchain is a project that is trying to add more complex '
              'memory structures, including a key-value store for entities '
              'mentioned so far in the conversation.',
 'Sam': 'Sam is working on a hackathon project with Deven, attempting to add '
        'more complex memory structures to Langchain, including a key-value '
        'store for entities mentioned so far in the conversation.'}
```

```
conversation.predict(input="Sam is the founder of a company called Daimon.")
```

```
> Entering new ConversationChain chain...
Prompt after formatting:
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simple questions to providing in-depth explanations and discussions on a wide
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provide valuable insights and information on a wide range of topics. Whether the
human needs help with a specific question or just wants to have a conversation
about a particular topic, you are here to assist.

Context:
{'Daimon': '', 'Sam': 'Sam is working on a hackathon project with Deven to add
more complex memory structures to Langchain, including a key-value store for
entities mentioned so far in the conversation.'}

Current conversation:
Human: They are trying to add more complex memory structures to Langchain
AI:  That sounds like an interesting project! What kind of memory structures are
they trying to add?
Human: They are adding in a key-value store for entities mentioned so far in the
conversation.
AI:  That sounds like a great idea! How will the key-value store work?
Human: What do you know about Deven & Sam?
```

Skip to main content

```
in the conversation. They seem to be very motivated and passionate about their
project, and are working hard to make it a success.
Last line:
Human: Sam is the founder of a company called Daimon.
You:

> Finished chain.
```

```
"\nThat's impressive! It sounds like Sam is a very successful entrepreneur. What
kind of company is Daimon?"
```

```
from pprint import pprint
pprint(conversation.memory.store)
```

```
{'Daimon': 'Daimon is a company founded by Sam.',
 'Deven': 'Deven is working on a hackathon project with Sam to add more '
          'complex memory structures to Langchain, including a key-value store '
          'for entities mentioned so far in the conversation.',
 'Key-Value Store': 'Key-Value Store: A data structure that stores values '
                    'associated with a unique key, allowing for efficient '
                    'retrieval of values. Deven and Sam are adding a key-value '
                    'store for entities mentioned so far in the conversation.',
 'Langchain': 'Langchain is a project that seeks to add more complex memory '
              'structures, including a key-value store for entities mentioned '
              'so far in the conversation.',
 'Sam': 'Sam is working on a hackathon project with Deven to add more complex '
        'memory structures to Langchain, including a key-value store for '
        'entities mentioned so far in the conversation. He is also the founder '
        'of a company called Daimon.'}
```

```
conversation.predict(input="What do you know about Sam?")
```

```
> Entering new ConversationChain chain...
Prompt after formatting:
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OpenAI.

You are designed to be able to assist with a wide range of tasks, from answering
simple questions to providing in-depth explanations and discussions on a wide
range of topics. As a language model, you are able to generate human-like text
based on the input you receive, allowing you to engage in natural-sounding
conversations and provide responses that are coherent and relevant to the topic at
hand.
```

Skip to main content

```
use this knowledge to provide accurate and informative responses to a wide range
of questions. You have access to some personalized information provided by the
human in the Context section below. Additionally, you are able to generate your
own text based on the input you receive, allowing you to engage in discussions and
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provide valuable insights and information on a wide range of topics. Whether the
human needs help with a specific question or just wants to have a conversation
about a particular topic, you are here to assist.

Context:
{'Sam': 'Sam is working on a hackathon project with Deven to add more complex
memory structures to Langchain, including a key-value store for entities mentioned
so far in the conversation. He is also the founder of a company called Daimon.',
'Daimon': 'Daimon is a company founded by Sam.'}

Current conversation:
Human: They are adding in a key-value store for entities mentioned so far in the
conversation.
AI:  That sounds like a great idea! How will the key-value store work?
Human: What do you know about Deven & Sam?
AI:  Deven and Sam are working on a hackathon project to add more complex memory
structures to Langchain, including a key-value store for entities mentioned so far
in the conversation. They seem to be very motivated and passionate about their
project, and are working hard to make it a success.
Human: Sam is the founder of a company called Daimon.
AI:
That's impressive! It sounds like Sam is a very successful entrepreneur. What kind
of company is Daimon?
Last line:
Human: What do you know about Sam?
You:

> Finished chain.
```

```
' Sam is the founder of a company called Daimon. He is also working on a hackathon
project with Deven to add more complex memory structures to Langchain, including a
key-value store for entities mentioned so far in the conversation. He seems to be
very motivated and passionate about his project, and is working hard to make it a
success.'
```