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data science for everyone

LLM Application 🦜🔗 with *LangChain*

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Why Use an LLM Orchestration Tool?

Here are the reasons why the LLM orchestration framework is useful:

- Combine multiple LLMs and services
- Automate complex workflows
- Integrate with data and systems
- Optimize cost and performance
- Ensure reliability and error handling
- Simplify deployment and monitoring

What is LangChain?

- LangChain is a framework for developing applications powered by large language models
- It makes the complicated parts of working and building with AI models easier
- As of August 2023, this game-changing library has already garnered almost 60,000 stars on GitHub

Why LangChain?

- Components: LangChain makes it easy to swap out abstractions and components necessary to work with language models
- Customized chains: LangChain provides out-of-the-box support for using and customizing 'chains' - a series of actions strung together

LangChain Components

- Model I/O: Building blocks to interface with any language model
- Retrieval: Bridging external data with LLMs
- Chaining: Crafting complex LLM workflows with LangChain
- Memory: Retain context and refer to past interactions
- LangChain agents: Dynamic decision-making with LLMs
- Callbacks that run on events during execution

Model I/O

Building blocks to interface with any language model

The model is the core part of any large language model application. LangChain offers the necessary components to interface directly with any language model. Different components of model I/O:

- Prompts: Use a prompt template, select a prompt dynamically, and control model inputs
- Language models: Interface and make calls to LLMs through common interfaces
- Output parsers: Refine and extract valuable data from model outputs

Retrieval

Bridging external data with LLMs

Retrieval integrates real-time data with language models, reducing costly fine-tuning. It helps businesses ensure data relevance, cut costs, and produce timely responses. Different components of retrieval:

- Document loaders: Load documents from many different sources
- Document transformers: Split documents, convert documents into Q&A format, drop redundant documents, and more
- Text embedding models: Take unstructured text and turn it into a list of floating-point numbers
- Vector stores: Store and search over embedded data.
- Retrievers: Query your data

Memory

Retain context and refer to past interactions

Memory is the concept of storing and retrieving data in a conversation. There are different types of memory. Memory is the concept of storing and retrieving data in a conversation. There are different types of memory:

- Buffer for storing all messages
- Buffer window for storing the last few interactions
- Entity memory for saving details about entities and learning more about them using an LLM.
- Using a knowledge graph to recreate the memory
- Summary for continuously condensed dialogue.
- Using vectorstore to store history and return relevant chat parts

Chaining

Crafting complex LLM workflows with LangChain

LangChain provides the 'Chain' interface, allowing users to link multiple LLMs or other components in sequence:

- Simplify complex applications: Convert intricate workflows into manageable steps
- Modularity: Easier debugging, maintenance, and scalability
- Create cohesive applications: Combine multiple operations for a unified user experience

LangChain Agents

Crafting complex LLM workflows with LangChain

- *Agents* autonomously accomplish goals by choosing actions
- More flexible than hardcoded action sequences
- Can handle complex tasks like assistants, game playing, automation
- The reasoning engine chooses the best actions dynamically
- A natural metaphor for goal-driven AI systems
- Can optimize sequences of actions toward a goal

Callbacks

Use callbacks for logging, monitoring, streaming, integrations, debugging, etc.

Benefits of using callbacks:

- Subscribe to events like start, new token, end, error
- Pass callbacks during initialization or requests
- Use for logging, monitoring, streaming, etc
- Built-in handlers available
- Integrations with 3rd party tools

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Want to Master LangChain For LLM Application Development?

Check out this in-depth workshop hosted by Southern Data Science Conference.

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