Getting Started with LangChain

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Agenda

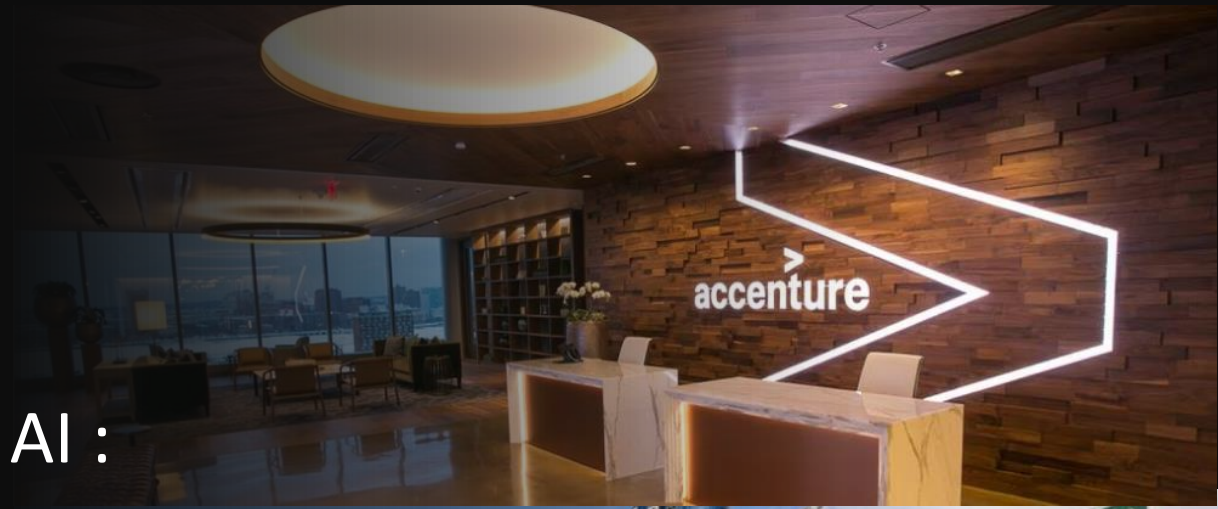
- What is LangChain?
- Components
- Start Coding
- Restaurant Business Bot
- Agents : US GDP in 2022 +5
- Conclusion & Take Aways

01

About the Speaker?

Change is the only constant. From System Engineer , Principal Data Scientist to a Startup

Unlocking the Path to AI : Empowering 1000+ Learners Through My Inspiring Journey



What is Semantic Kernel?

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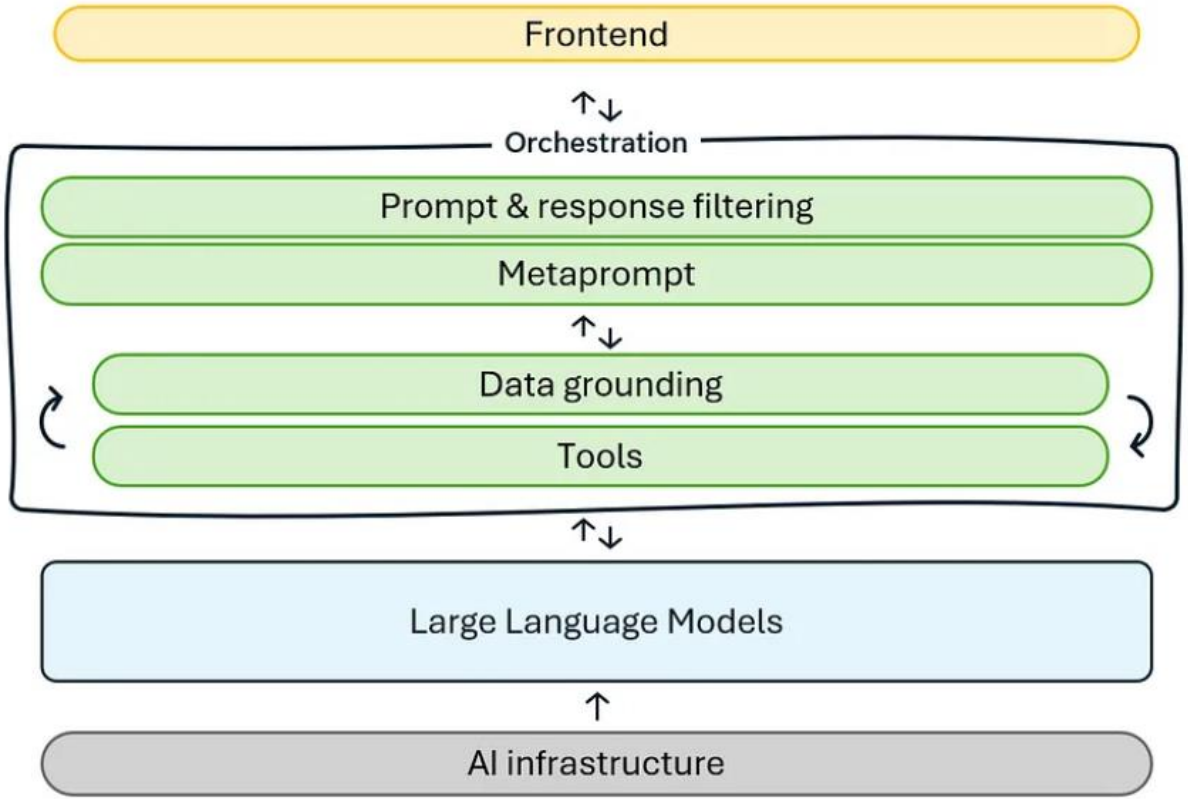
AI orchestrator



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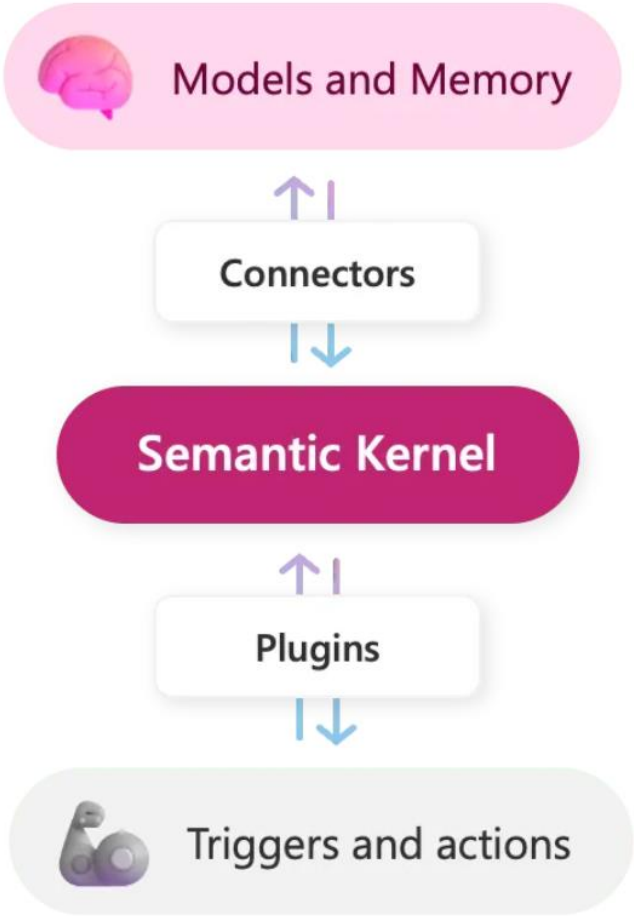
SK components



Source: Orchestrate your AI with Semantic Kernel | Microsoft Learn

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Semantic Kernel

Aspect	Kernel in Operating Systems	Kernel in Semantic Kernel Context (AI Orchestration)
Primary Function	Core of the operating system	AI orchestration layer
Main Role	Interface between software and hardware	Connects LLMs, components, external sources, and systems
Responsibilities	Resource allocation, File management, Security	Resource management for AI applications, Configuration and plugin management
Process Management	Manages and allows communication between user processes	Not primarily focused on process management
Integration	Integrates software with computer hardware	Integrates AI models and services with native code and systems
Complexity and Specialization	Generally less specialized in AI	Highly specialized in AI and related technologies

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MEMORIES

Provide broader context for contextual-based prompts.

Essential for storing and retrieving information necessary for AI application functionality.

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Types of Memory Access

1. **Conventional Key-Value Pairs**:

   - ✓ One-to-one match between a key and a query

2. **Conventional Local-Storage**:

   - ✓ Suitable for storing large amounts of information.
   - ✓ Information is stored in key-value pairs on disk.

3. **Semantic Memory Search**:

   - ✓ Represents text information as long vectors of numbers (embeddings).
   - ✓ Allows for "semantic" search by comparing meaning-to-meaning with a query.

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Application in Semantic Kernel:

- Uses memories to enhance context understanding.
- Facilitates information retrieval and storage for AI applications.

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Introduction to Plugins (Formerly Known as Skills)

- **Function of Plugins**:
  - Extend the capabilities of Large Language Model (LLM)-powered applications.
  - Example: MathSkill plugin adds mathematical reasoning and operation capabilities.

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Types of Plugin Functions:

1. **Semantic Functions**:
    1. Core functions are specialized prompts for specific tasks.
    2. Example: In WriterPlugin, the Translate function uses a .txt file prompt for language translation.

2. **Native Functions**:
    1. Hard-coded snippets executed by the planner.
    2. Do not rely on semantic interpretation.

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Plugin Orchestration by Semantic Kernel's Planner:

- Functions are orchestrated by the Semantic Kernel's (SK's) planner.
- Initialization requires semantic descriptions for the planner to understand when to use a given function.
- This orchestration allows the planner, powered by LLM, to effectively utilize the functions.

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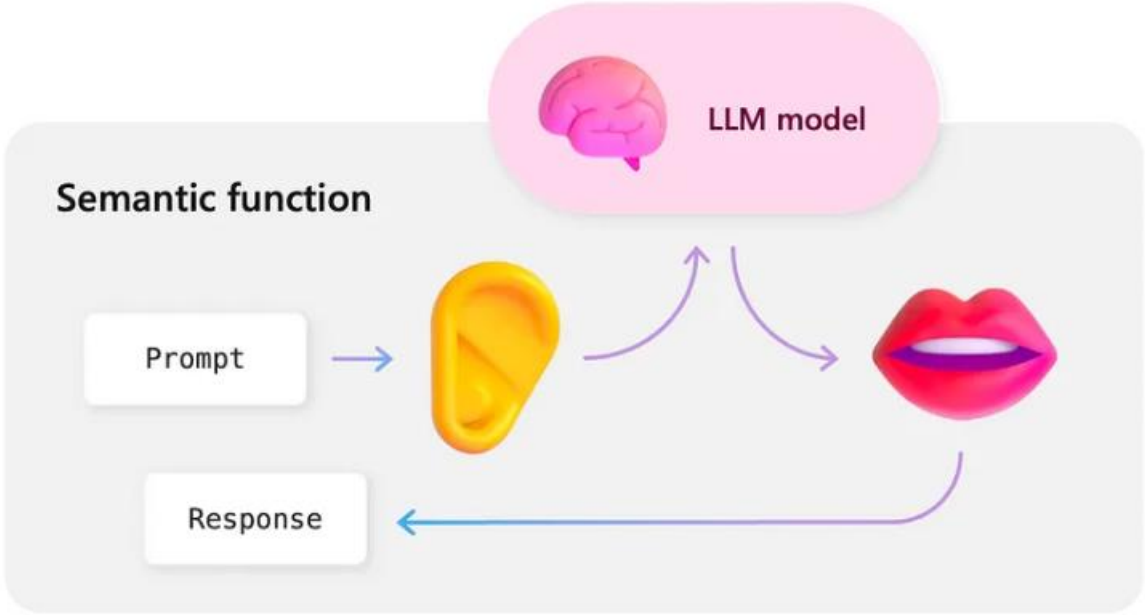

Source: Understanding AI plugins in Semantic Kernel and beyond | Microsoft Learn

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Connectors

- **Role of Connectors in AI Applications**:
  - Connect the conversational aspects (hearing and speaking) of an AI app to the Large Language Model (LLM), referred to as the "brain."
- **Functionality of Connectors**:
  - Enable AI apps to listen to user requests.
  - Facilitate the AI app in providing natural language responses.

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- **Distinctive Characteristics of Connectors**:
  - Compared to plugins, connectors specifically link the conversational interfaces to the LLM.
  - While plugins encapsulate individual capabilities, connectors integrate these capabilities with the AI app's "ears" and "mouth.“
- **Integration with the AI Application’s Core**:
  - Essential in linking the user interface components with the central processing capabilities of the LLM.
- **Source**: *Understanding AI plugins in Semantic Kernel and beyond | Microsoft Learn*.

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Demo

- https://github.com/microsoft/semantic-kernel/tree/main

- https://learn.microsoft.com/en-us/semantic-kernel/ai-orchestration/plugins/?tabs=Csharp

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Summarize this text

1) A robot may not injure a human being or, through inaction,
allow a human being to come to harm.

2) A robot must obey orders given it by human beings except where
such orders would conflict with the First Law.

3) A robot must protect its own existence as long as such protection
does not conflict with the First or Second Law.

As a function

```
# Summarize the laws of motion
print(summarize("""
1. An object at rest remains at rest, and an object in motion remains in motion at constant speed and in a straight line unless acted on by an unbalanced force.
2. The acceleration of an object depends on the mass of the object and the amount of force applied.
3. Whenever one object exerts a force on another object, the second object exerts an equal and opposite on the first."""))
```

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