



Pieter Nijs

# Building a Copilot for Your Own Application with Semantic Kernel

A detailed steampunk workshop scene. In the foreground, a man with a beard, wearing a top hat and goggles, is seated at a workbench. He is focused on adjusting a large, intricate mechanical robot. The robot is composed of various gears, brass plates, and pipes, with a head that has two circular lenses. The workshop is filled with mechanical parts, gears, and hanging lamps, creating a warm, industrial atmosphere. The background shows a large window with a view of a cityscape, and the walls are covered in various mechanical components and clocks.

# Building a Copilot for Your Own Application with Semantic Kernel



# Pieter Nijs

Consultant, Mobile Dev. Expert & AI @ Xebia



The MVVM Pattern in .NET MAUI (Packt)



Active Community Member



[Blog.PieEatingNinjas.be](https://blog.pieeatingninjas.be)



Microsoft MVP



# Copilot:

['kɒʊ,paɪlət] *noun*

1. An AI buddy that engages in conversation with a user to collect information and confirm understanding.
2. A digital assistant that collaborates closely with a user, requiring consent before executing tasks or actions.



# Going Beyond RAG



RAG = enhancing responses with  
information retrieval

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RAG is part of a Copilot

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Our Copilot focusses on

- Conversational AI, engaging with user
  - Gather information
  - Clarify intents
  - Seek permission before taking action
- 







Demo

Introducing a working Copilot





# Under the hood



## Large Language Model

- › GPT 4
- › OpenAI API
- › Azure Open AI Services
- › Prompt Engineering



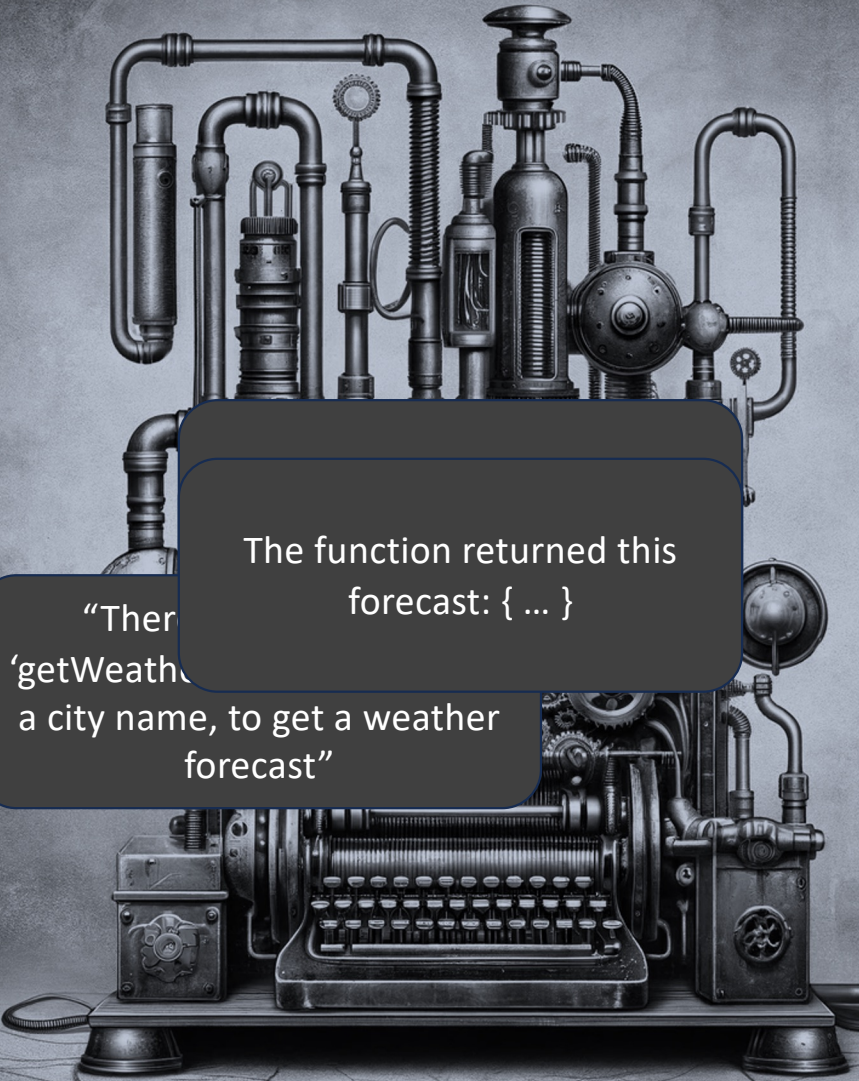
## Semantic Kernel

- › Open-Source SDK by Microsoft
- › C#, Python, Java
- › Orchestrate AI capabilities
- › Build intelligent Agents that understand and execute complex workflows



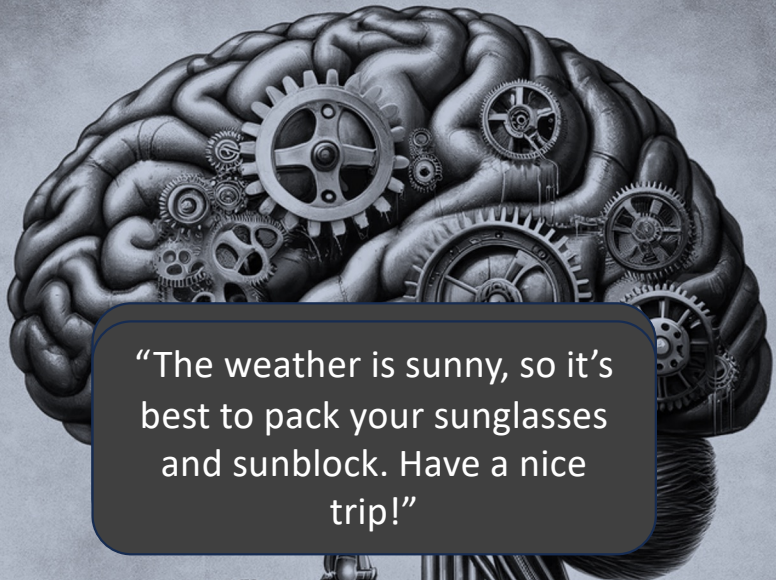
## OpenAI Function Calling

- › LLM suggests specific function to call in response to user query
- › Response is sent back to LLM
- ›  $\geq$  GPT 3.5 Turbo
- › Seamless with Semantic Kernel

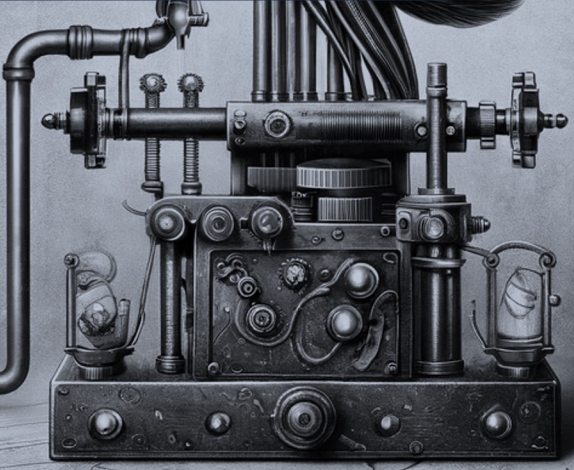


“There is a function called ‘getWeather’ that takes a city name, to get a weather forecast”

The function returned this forecast: { ... }



“The weather is sunny, so it’s best to pack your sunglasses and sunblock. Have a nice trip!”





# Let's build this



Our API endpoints are ready to use  
No update needed



Define a goal (Prompt Engineering)



Define functions (Plugins, Function Calling)



Orchestration through Semantic Kernel







It's coding time!

Building a Copilot





# Key Takeaways



## Getting started is straightforward

- › Proof of Concept
- › Decision Maker Buy-In
- › Familiar tools
- › Abstraction through Semantic Kernel



## The Principle of Diminishing Returns

- › Quick Wins
- › Refinement Takes (a lot of) Time
- › Increasing complexity with advanced features
- › Maintainability



## Mindful Resource Management

- › Cost of Tokens
- › Optimize Interactions
- › Monitor Usage



Questions?



# Thank you!



## More information

- › Me | Pieter Nijs
- › Work | <https://xebia.com/digital-transformation/microsoft-services/>
- › LinkedIn | <https://www.linkedin.com/in/pieter-nijs>
- › Sources | <https://github.com/PieEatingNinjas/copilot-semantickernel/tree/demo>
- › Blog | <https://blog.pieeatingninjas.be>



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