Azure Meetup

FRANKFURT

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Sessions start at: 4.00PM and 7.00PM

Online Meeting Rules

- If not muted, mute yourself.
- Ask your questions in the chat window.
- Use mic if you are explicitly asked.
- If you want to show something, we will make you be a presenter
- If you like you can activate your camera. We love to see you all ☺
- Please do not spam the chat window.
- Do not post inappropriate content.
- Have fun. ☺

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Introduction to Semantic Kernel

Damir Dobric

Microsoft Regional Director

Microsoft Azure MVP

https://damirdobric.me

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Daenet Gesellschaft für Informationstechnologie mbH

Hanauer Landstraße 204, 60314 Frankfurt am Main

About Transformers, and related things

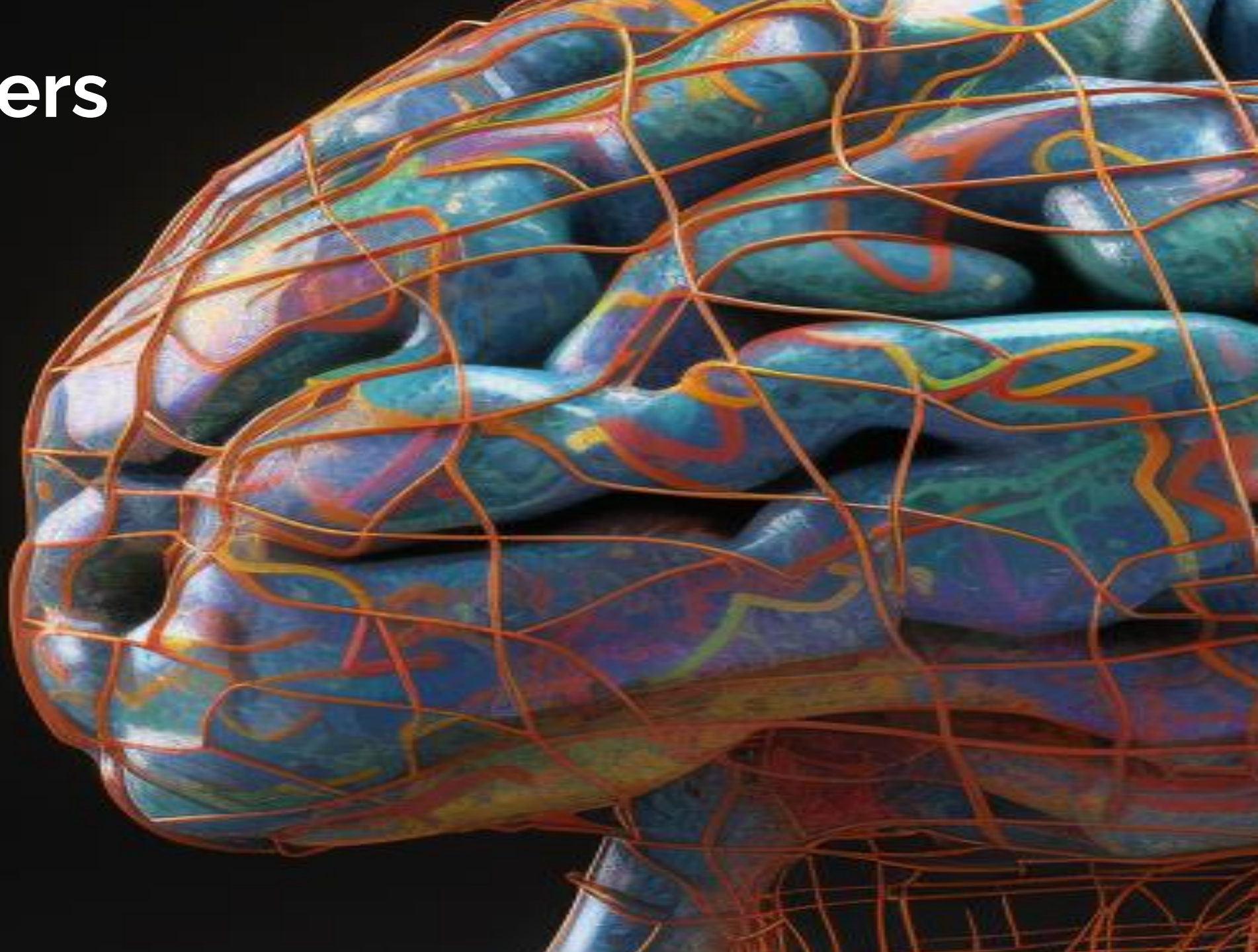
Kompetenzen und Lösungen

Akademie, Coaching und Webinare

Referenzen und Use Cases

Q & A

Transformers

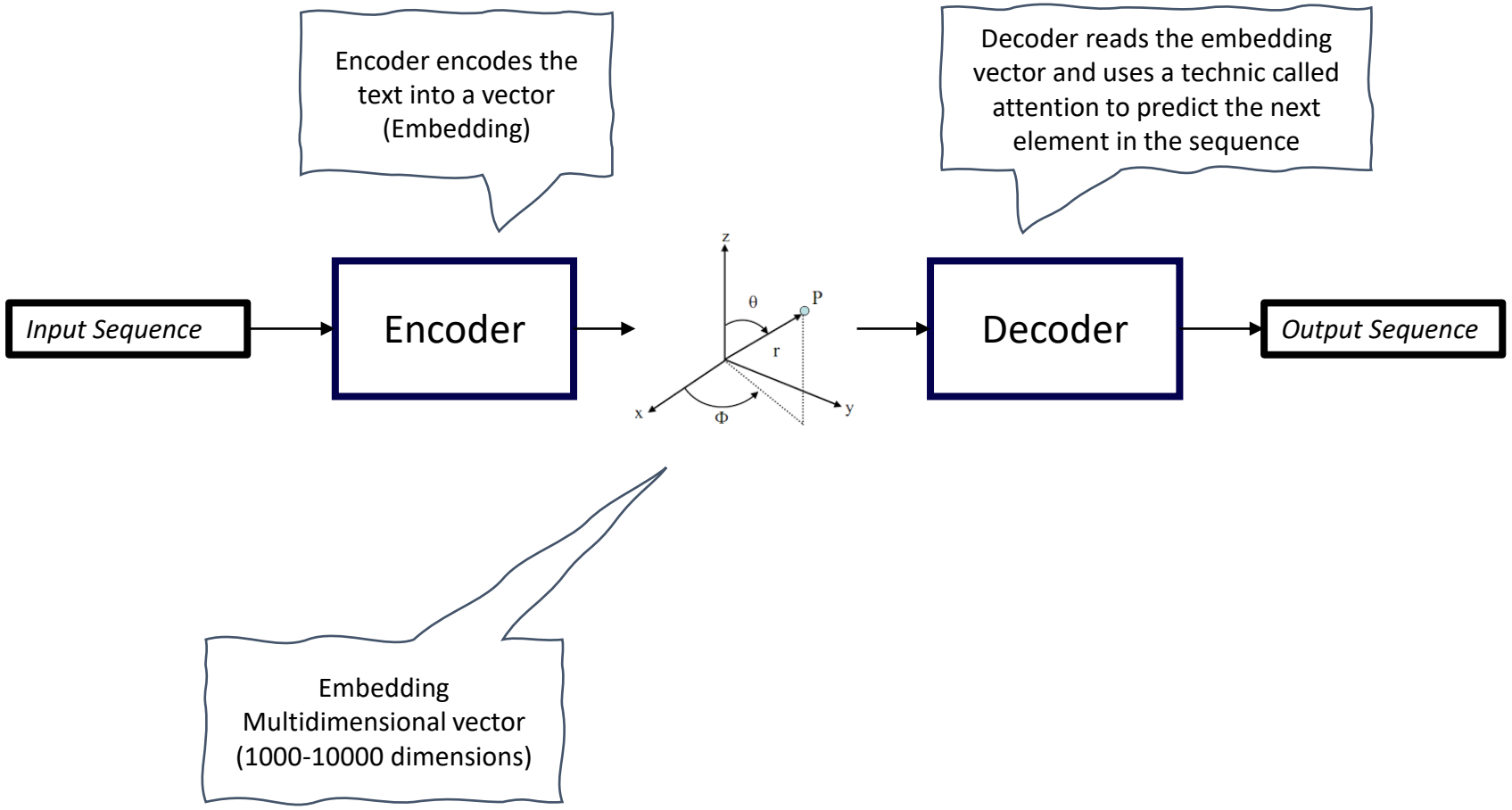


What are Transformers?

- Transformers
  - Machine Learning Model - Deep Neural Networks
  - Introduced by GoogleBrain 2017
  - Primarly focused on NLP (Nat. Language Processing)and CV (Computer Vision)
- How does a transformer work?
  - Transformers transform the input sequence into the output sequence
  - Sequence elements can be anything. (i.e.: words in a sentence)
  - In the case of language, sequence elements are words.
- GPT
  - General Pre-Trained Transformer

LLM AI Models | Microsoft Learn

How does the transformer work?



[Original Paper: [1706.03762] Attention Is All You Need (arxiv.org)]

What is a Large Language Model (LLM)

- LLM Models are Transformers
- L: Large means very, very Large (billions)
- L: Language, Words, Sentences, Paragraphs, ..
- M: Model is a high-dimensional mathematical representation of the semantic.
- Few examples:

LLM AI Model	Parameters	Year
BERT	340 million	2018
GPT-2	1.5 billion	2019
Meena	2.6 billion	2020
GPT-3	175 billion	2020
LaMDA	137 billion	2022
BLOOM	176 billion	2022

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OpenAI GPT Models?

- **Ada** – 350 million Params, 40GB Text
- **Babbage** – 3 Billion Params, 300GB Text
- **Curie** – 13 Billion Params, 800GB Text
- **Davinci** – 175 Billion Params, 45TB Text

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What is a ChatGPT?

- LLM AI model invented at OpenAI
- ChatGPT is an Application that uses LLM AI
- Specifically tuned to engage in interactive chats.

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Must know!

- Prompts
  - *Prompts* are the inputs or queries that a user or a program gives to an LLM AI, in order to elicit a specific response from the model.
- Tokens
  - Tokens are the basic units of text.
  - Tokens can be characters, words, subwords, or other segments of text or code.
  - Open AI uses Byte-Pair Encoding (BPE)
- Embedddings
  - High-dimensional vectors.
  - Define the semantic of input.
  - Two sequences are similar if the distance between their embedding s is small.

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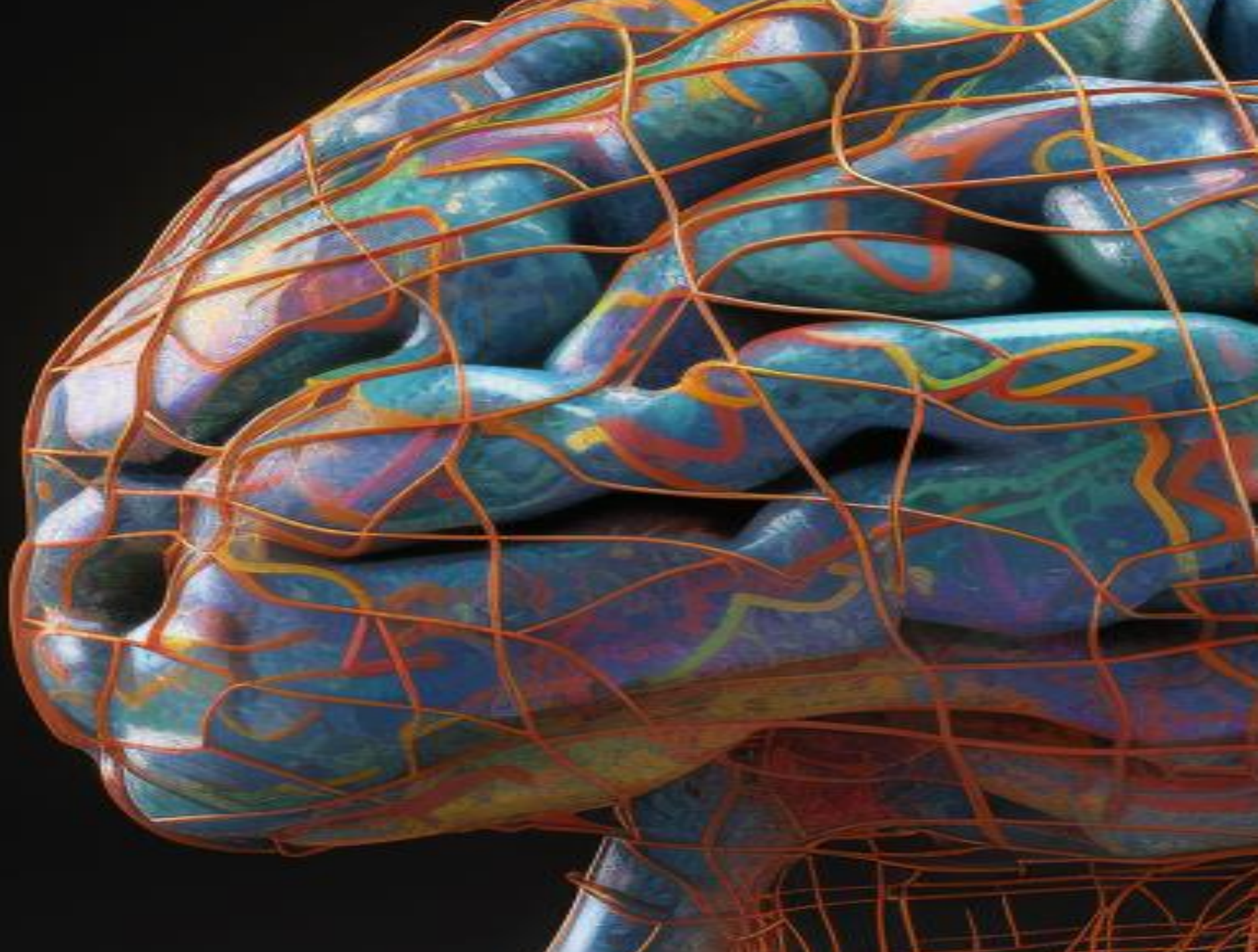
Semantic Kernel

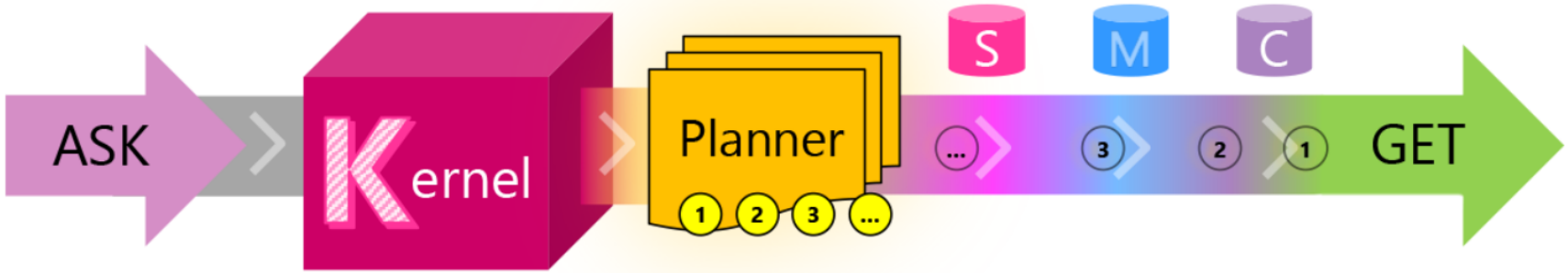


What is the Semantic Kernel (SK)?

Semantic Kernel (SK) is a lightweight SDK
that lets you easily
mix conventional programming languages with
the latest in Large Language Model (LLM) AI "prompts

https://learn.microsoft.com/en-us/semantic-kernel/whatissk

ASK→	Kernel	Planner	Skills	Memories	Connectors	>>>	→GET

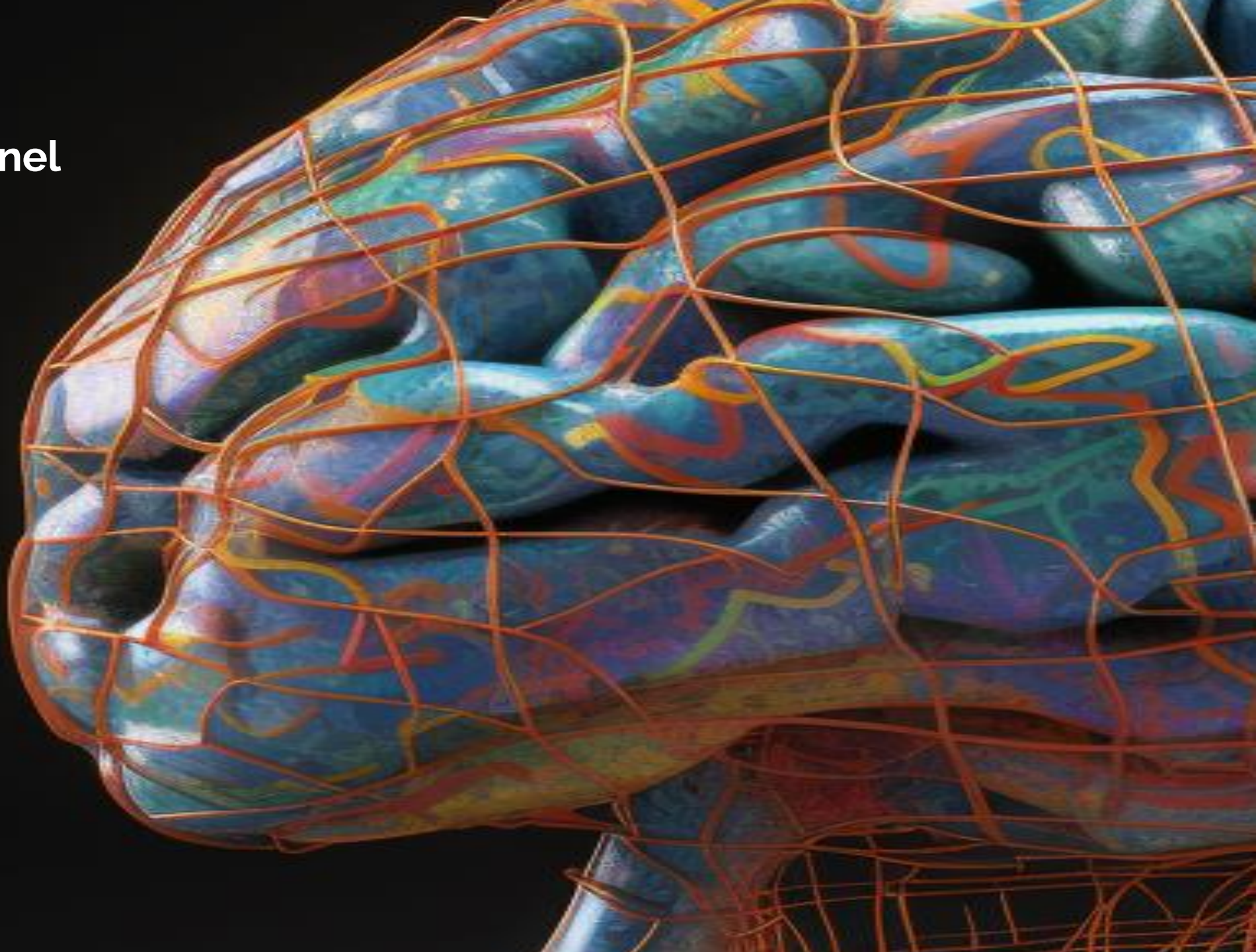


Semantic Kernel (SK) builds upon these concepts:

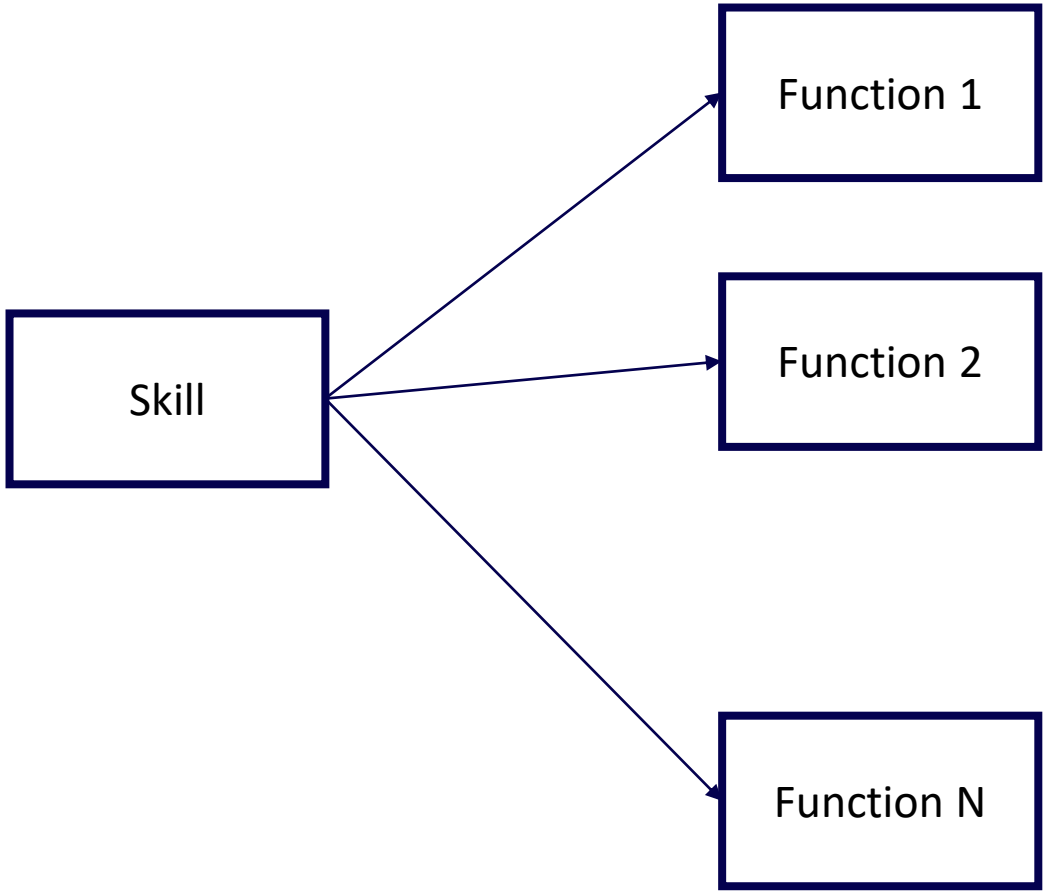
Concept	Short Description
Kernel	The kernel orchestrates a user's ASK expressed as a goal
Planner	The planner breaks it down into steps based upon resources that are available
Skills	Skills are customizable resources built from LLM AI prompts and native code
Memories	Memories are customizable resources that manage contextual information
Connectors	Connectors are customizable resources that enable external data access

DEMO

Hello Semantic Kernel



Skill



Native Skills

```
string prompt = @"
        You have a knowledge of international days.
        Is date {{datetime.Today}} known for something?
        ";
```

Semantic Skills

```
var func = kernel.Skills.GetSemanticFunction(
"SummarizeSkill", "Summarize");

string res = await
kernel.RunAsync(prompt,func)
```

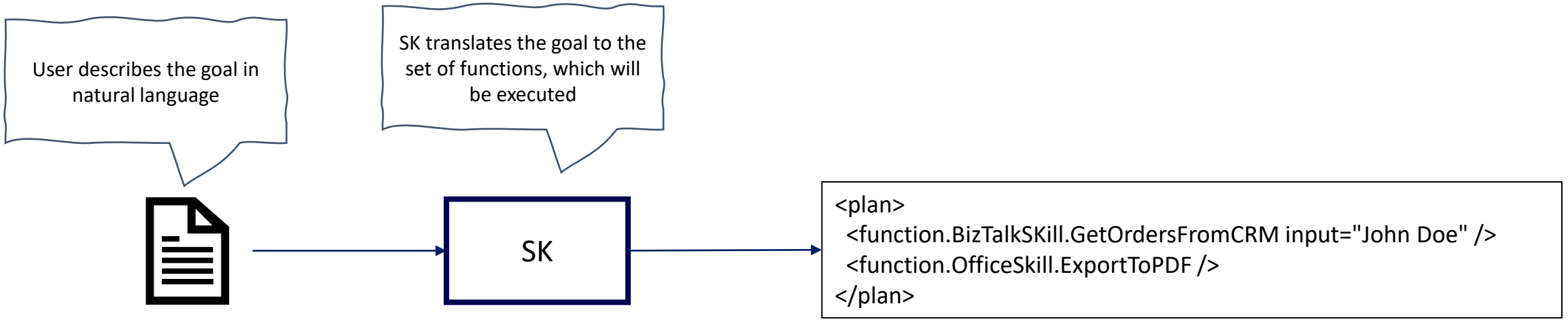
```
[SUMMARIZATION RULES]
DONT WASTE WORDS
USE SHORT, CLEAR, COMPLETE SENTENCES.
DO NOT USE BULLET POINTS OR DASHES.
USE ACTIVE VOICE.
MAXIMIZE DETAIL, MEANING
FOCUS ON THE CONTENT

[BANNED PHRASES]
This article
This document
This page
This material
[END LIST]

Summarize:
Hello how are you?
+++++
Hello

Summarize this
{{$input}}
+++++
```

Goals and Plans



Where to start?

- Semantic Kernel documentation | Microsoft Learn
- https://github.com/microsoft/semantic-kernel
- Nuget: Microsoft.SemanticKernel
- Blog: https://devblogs.microsoft.com/semantic-kernel/

Thank YOU ☺

Damir Dobric

Microsoft Regional Director

Microsoft Azure MVP

https://damirdobric.me

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Daenet Gesellschaft für Informationstechnologie mbH

Hanauer Landstraße 204, 60314 Frankfurt am Main

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