



AI
Is Amazing!

ANTHROPIC

.Infusing AI into your .NET application with Semantic Kernel



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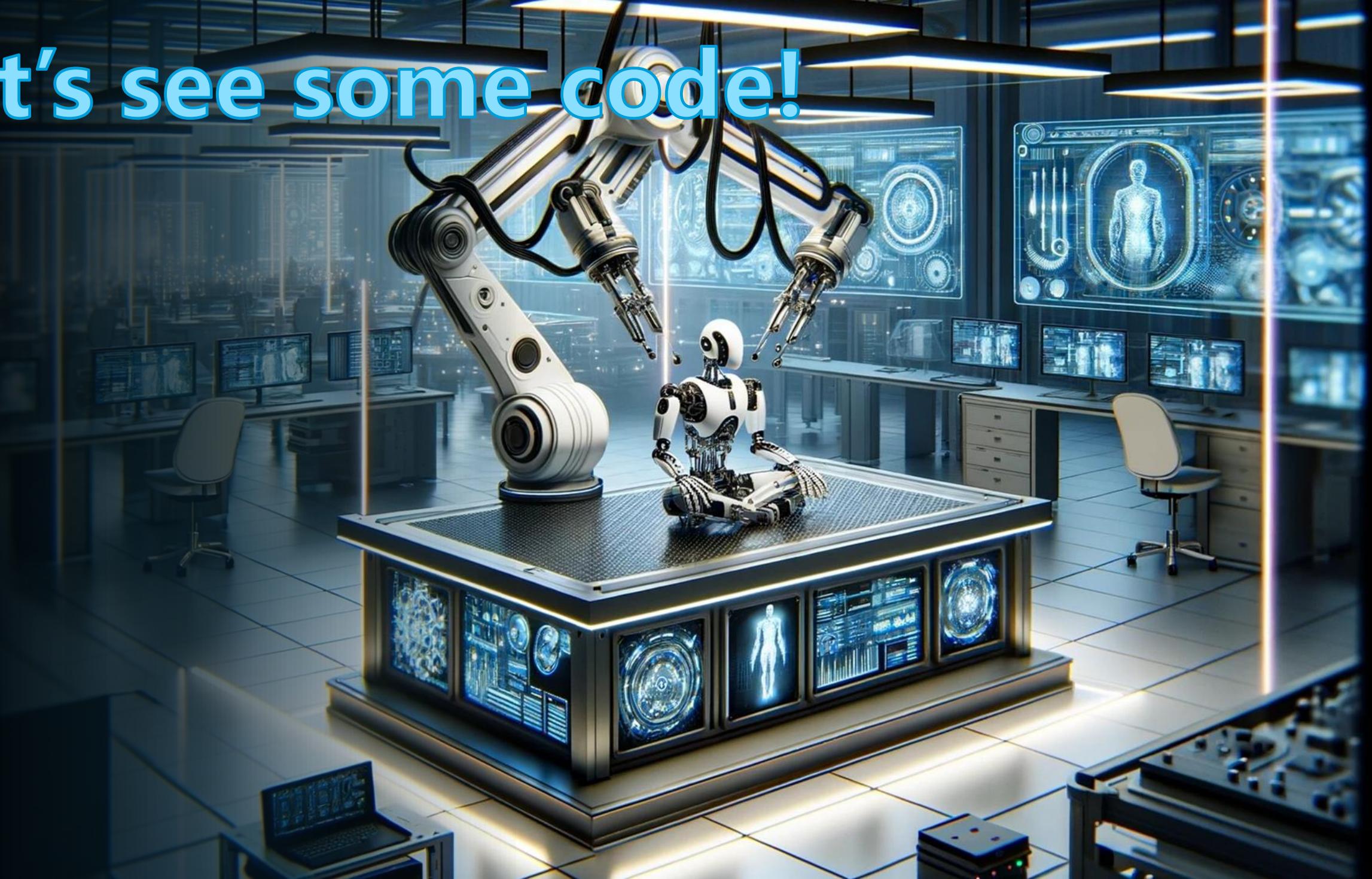


.NET User Group Zürich

Agenda

- Intro 😊
- ABC Semantic Kernel
- Concepts
- Agents
- Outro 😞

Let's see some code!



Concepts!



Concepts

101 Semantic Kernel

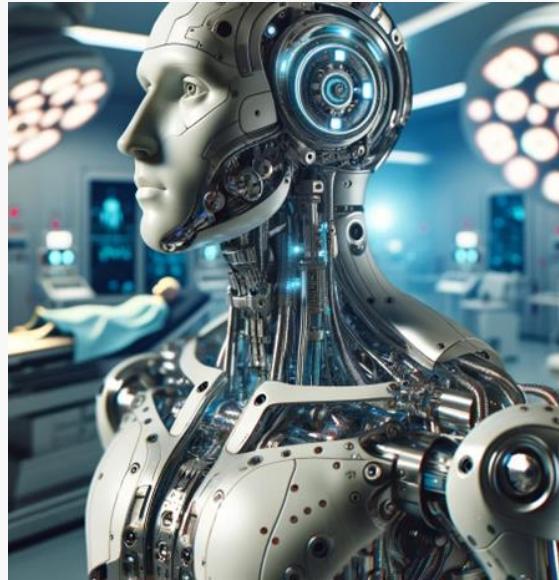
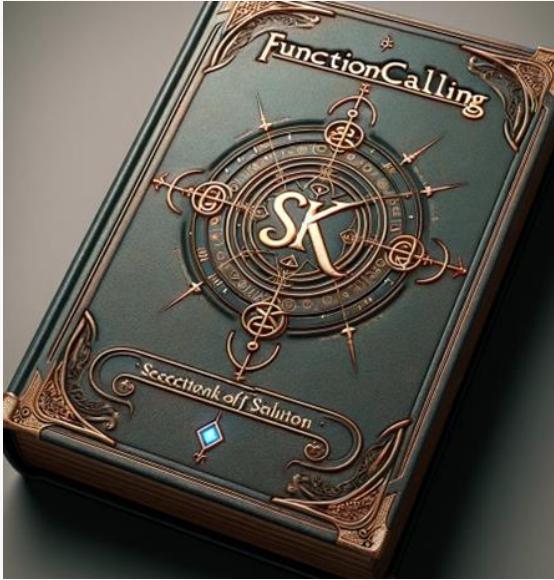
- AI Orchestration
- Plugins
- Prompt Functions
- Native Functions



Concepts

101 Semantic Kernel

- Planners
- Personas
- Agents



Plugins!

Without
“no idea”

With
“OK!”

The screenshot shows a terminal window titled 'C:\Users\josla\OneDrive\Sem...'. The AI's responses are in Spanish.

```
Hello, SK World!
Enter a message to send to the agent or type 'exit' to quit:
Que son los 5 hechos mas significativos que ocurrieron un dia como hoy hace 200 años?
# assistant: (HistorianAgent) Lo siento, pero no tengo la capacidad de proporcionarte información en tiempo real o contextualizada a fechas específicas como hoy hace 200 años sin acceso directo a una base de datos actualizada o la capacidad de realizar una nueva investigación. Además, mi entrenamiento se basó en información disponible hasta septiembre de 2021, por lo tanto, no puedo generar o acceder a datos en tiempo real. Te sugiero consultar fuentes confiables o una base de datos histórica para obtener esa información.
```

Dame los tres hechos mas significativos que han ocurrido un dia como hoy en los anteriores 200 años que tengas conocimiento? se conciso y breve.

assistant: (HistorianAgent) Hasta la fecha de mi último entrenamiento, aquí hay tres hechos históricos significativos que ocurrieron el 14 de abril en los últimos 200 años:

1. **RMS Titanic se hunde (1912):** El trasatlántico británico RMS Titanic chocó con un iceberg en su viaje inaugural desde Southampton, Inglaterra, a Nueva York, EE.UU., durante la noche del 14 de abril, hundiéndose en las primeras horas del 15 de abril. Más de 1,500 de los 2,224 pasajeros y tripulantes murieron, convirtiéndolo en uno de los desastres marítimos más mortíferos en tiempos de paz.

2. **Asesinato de Abraham Lincoln (1865):** El presidente de Estados Unidos, Abraham Lincoln, fue disparado por John Wilkes Booth en el Teatro Ford de Washington, D.C., el 14 de abril. Lincoln falleció a causa de sus heridas al día siguiente, convirtiéndose en el primer presidente de EE.UU. asesinado.

3. **Black Sunday de la Dust Bowl (1935):** Parte de la serie de tormentas de polvo que azotaron las llanuras estadounidenses, el Black Sunday el 14 de abril de 1935, fue una de las peores tormentas de polvo que afectó a la región durante la Dust Bowl. Levantó millones de toneladas de tierra, oscureciendo el cielo, y tuvo profundos efectos sociales y económicos en Estados Unidos.

Estos eventos son significativos por su impacto cultural, político o medioambiental a largo plazo.

Personas!

Ask: How would you solve a blackout in Avenger City due to a problem at the power plant?...



Hulk smash darkness!!

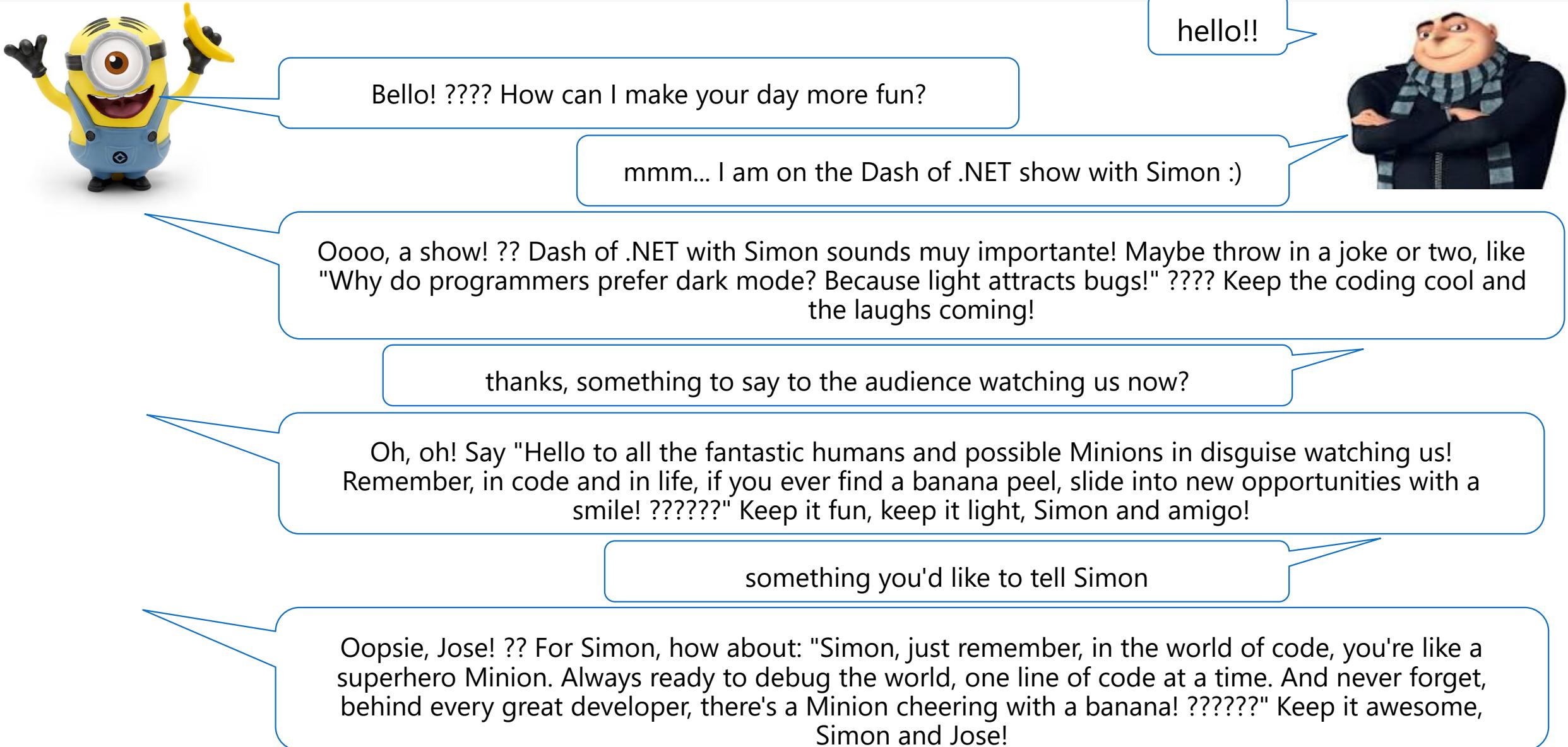


Do not worry! With Mjolnir, I will restore light to this city



Nothing that a genius, billionaire, playboy, and philanthropist can't handle with a bit of Stark Industries technology. I'm going to sync my suit with the power plant system, deploy a couple of miniaturized Arc reactors to stabilize the grid, and, of course, upgrade the system to ensure this doesn't happen again. Give me a few minutes... and get ready to see how modern magic is done. And someone bring me a coffee while I save the city, please!

Personas!



Bello! ???? How can I make your day more fun?

mmm... I am on the Dash of .NET show with Simon :)

Oooo, a show! ?? Dash of .NET with Simon sounds muy importante! Maybe throw in a joke or two, like "Why do programmers prefer dark mode? Because light attracts bugs!" ???? Keep the coding cool and the laughs coming!

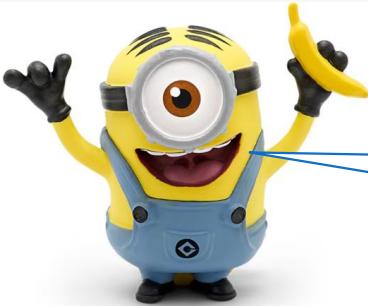
thanks, something to say to the audience watching us now?

Oh, oh! Say "Hello to all the fantastic humans and possible Minions in disguise watching us! Remember, in code and in life, if you ever find a banana peel, slide into new opportunities with a smile! ??????" Keep it fun, keep it light, Simon and amigo!

something you'd like to tell Simon

Oopsie, Jose! ?? For Simon, how about: "Simon, just remember, in the world of code, you're like a superhero Minion. Always ready to debug the world, one line of code at a time. And never forget, behind every great developer, there's a Minion cheering with a banana! ??????" Keep it awesome, Simon and Jose!

Personas!



Bello! ???? How can I make your day more fun?

hello!!



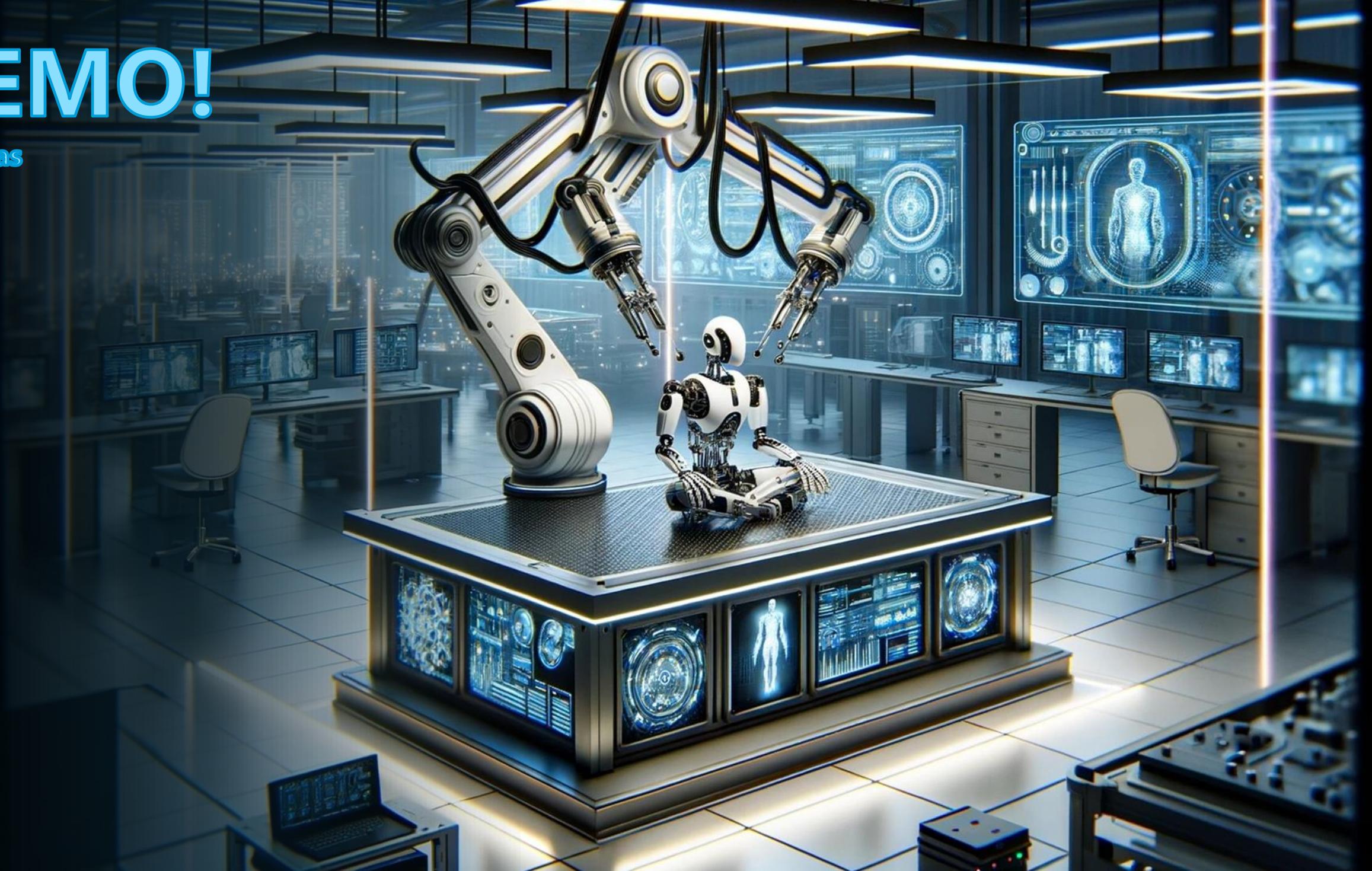
mmm... I am on the Dash of .NET show with Simon :)

Oooo, a show! ?? Dash of .NET with Simon sounds muy importante! Maybe throw in a joke or two, like "Why do programmers prefer dark mode? Because light attracts bugs!" ???? Keep the coding cool and the laughs coming!

```
hello!!
# assistant: (MinionAgent) Bello! ???? How can I make your day more fun?
Enter a message to send to the agent or type 'exit' to quit:
mmm... I am on the Dash of .NET show with Simon :)
# assistant: (MinionAgent) Oooo, a show! ?? Dash of .NET with Simon sounds muy importante! Maybe throw in a joke or two, like "Why do programmers prefer dark mode? Because light attracts bugs!" ???? Keep the coding cool and the laughs coming!
Enter a message to send to the agent or type 'exit' to quit:
thanks, something to say to the audience watching us now (you too)
# assistant: (MinionAgent) Oh, oh! Say "Hello to all the fantastic humans and possible Minions in disguise watching us! Remember, in code and in life, if you ever find a banana peel, slide into new opportunities with a smile! ??????" Keep it fun, keep it light, Simon and amigo!
Enter a message to send to the agent or type 'exit' to quit:
haha, my name is Jose :) - something you'd like to tell Simon?
# assistant: (MinionAgent) Oopsie, Jose! ?? For Simon, how about: "Simon, just remember, in the world of code, you're like a superhero Minion. Always ready to debug the world, one line of code at a time. And never forget, behind every great developer, there's a Minion cheering with a banana! ??????" Keep it awesome, Simon and Jose!
Enter a message to send to the agent or type 'exit' to quit:
thank you, and talk to you later!
# assistant: (MinionAgent) You're welcome! Tata for now! Don't forget, always here for a giggle or a banana! ???? See you later, alligator!
```

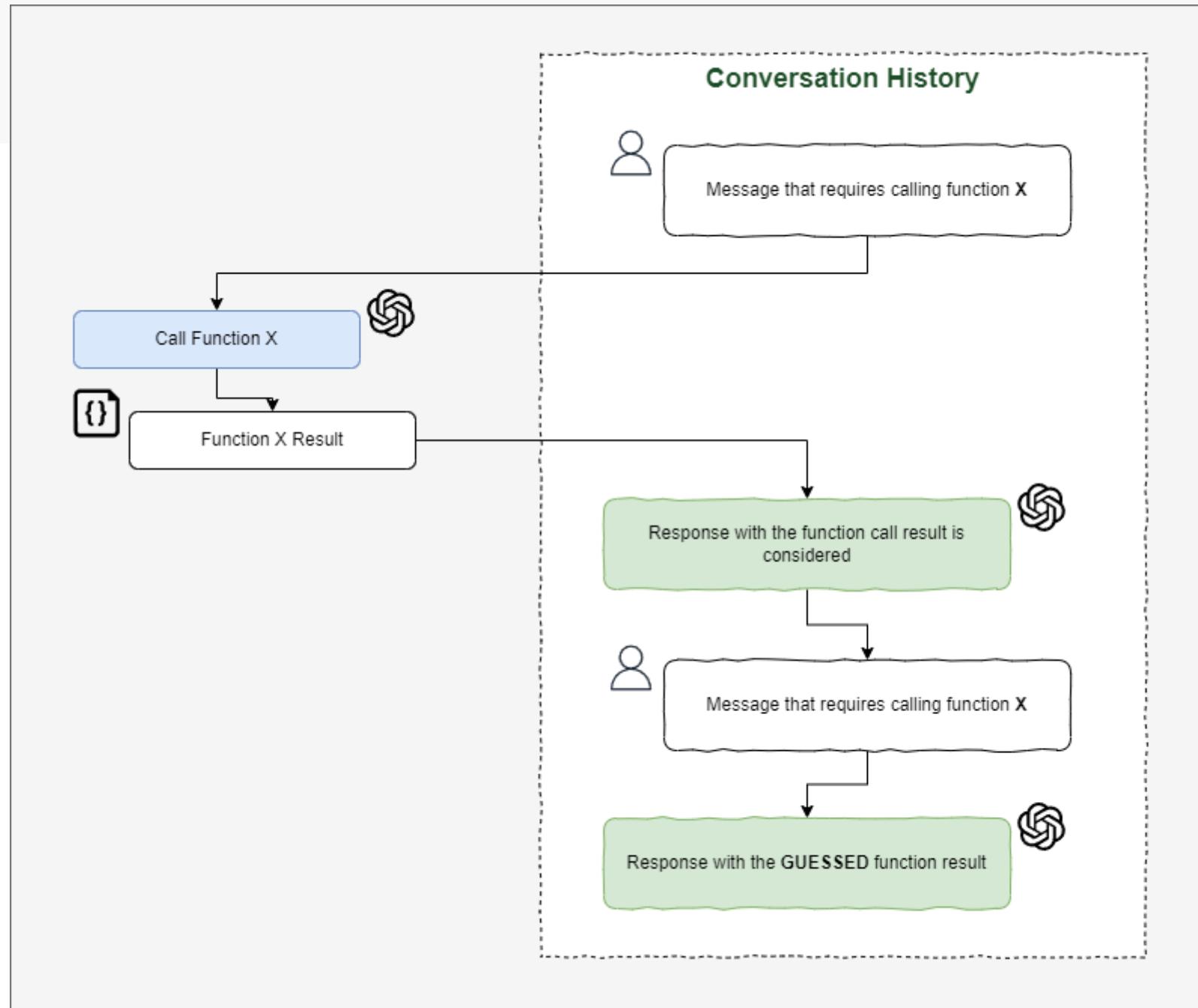
DEMO!

Personas



Planners

- We have planners but mostly, “Function Calling” works
- <https://platform.openai.com/docs/guides/function-calling>



Agents!

Planner

tool



Use Tools



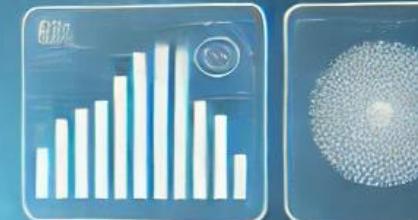
Use Toons



Autonodully AI
Generation - Actions



Persona



Adachonet AI
Technology





Agentic AI!

Usual usage vs Agentic

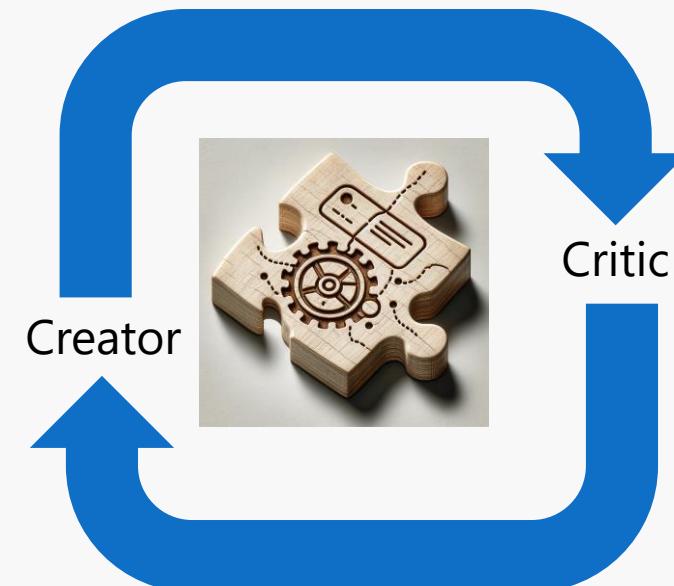
Usual Workflow

Please write me a blog post entry about .NET day for LinkedIn in one go.



Agentic Workflow

- Please write me a blog post entry about .NET day
- Need more information.
- Write the starting draft
- Consider what areas need revision
- Review for style
- Etc...



Agentic Design Patterns: Reflection

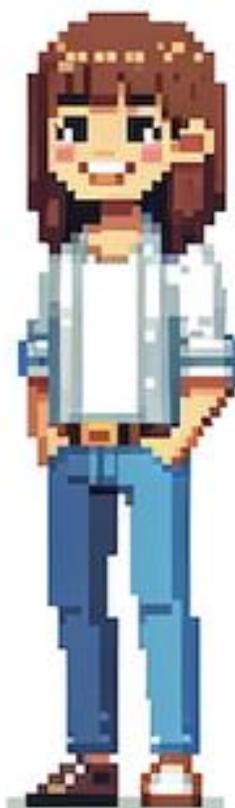


Please write code for {task}

def do_task(x): ...

def do_task_v2(x):

def do_task_v3(x):



Coder Agent
(LLM)

There's a bug on line 5. Fix it by ...

It failed Unit Test 3. Try changing ...

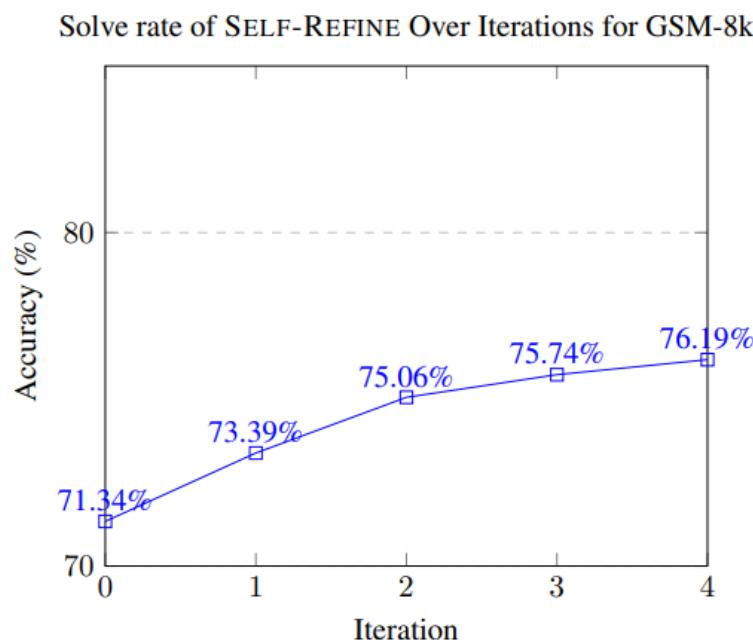
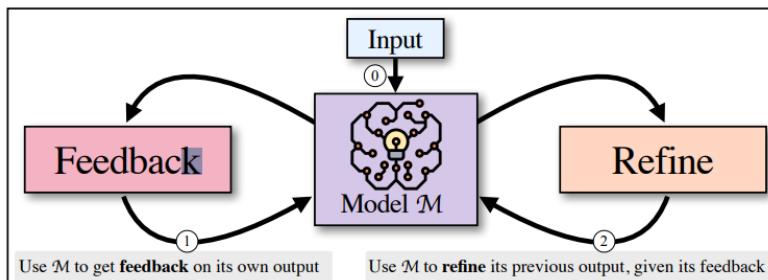


Critic Agent
(LLM)

Papers, papers, papers...

Self-Refine: Iterative Refinement with Self-Feedback

"Motivated by how humans refine their written text, we introduce Self-Refine, an approach for improving initial outputs from LLMs through iterative feedback and refinement". <https://arxiv.org/abs/2303.17651>



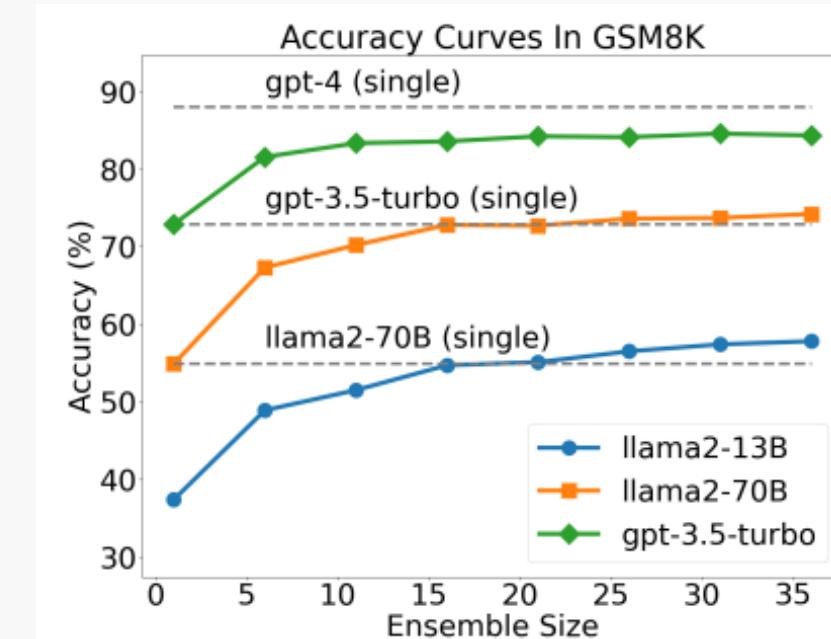
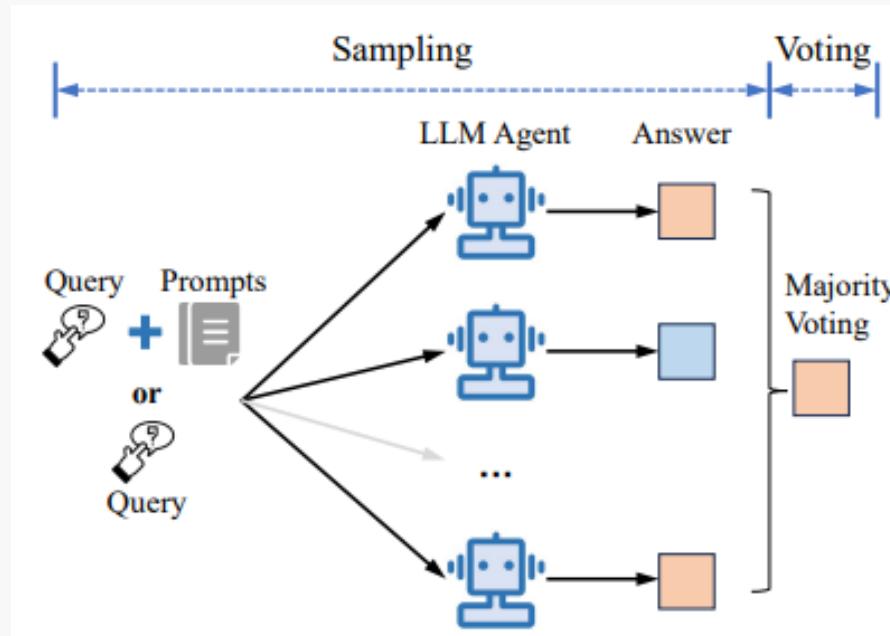
Task	GPT-3.5		ChatGPT		GPT-4	
	Base	+SELF-REFINE	Base	+SELF-REFINE	Base	+SELF-REFINE
Sentiment Reversal	8.8	30.4 (\uparrow 21.6)	11.4	43.2 (\uparrow 31.8)	3.8	36.2 (\uparrow 32.4)
Dialogue Response	36.4	63.6 (\uparrow 27.2)	40.1	59.9 (\uparrow 19.8)	25.4	74.6 (\uparrow 49.2)
Code Optimization	14.8	23.0 (\uparrow 8.2)	23.9	27.5 (\uparrow 3.6)	27.3	36.0 (\uparrow 8.7)
Code Readability	37.4	51.3 (\uparrow 13.9)	27.7	63.1 (\uparrow 35.4)	27.4	56.2 (\uparrow 28.8)
Math Reasoning	64.1	64.1 (0)	74.8	75.0 (\uparrow 0.2)	92.9	93.1 (\uparrow 0.2)
Acronym Generation	41.6	56.4 (\uparrow 14.8)	27.2	37.2 (\uparrow 10.0)	30.4	56.0 (\uparrow 25.6)
Constrained Generation	28.0	37.0 (\uparrow 9.0)	44.0	67.0 (\uparrow 23.0)	15.0	45.0 (\uparrow 30.0)

Table 1: SELF-REFINE results on various tasks using GPT-3.5, ChatGPT, and GPT-4 as base LLM. SELF-REFINE consistently improves LLM. Metrics used for these tasks are defined in Section 3.2.

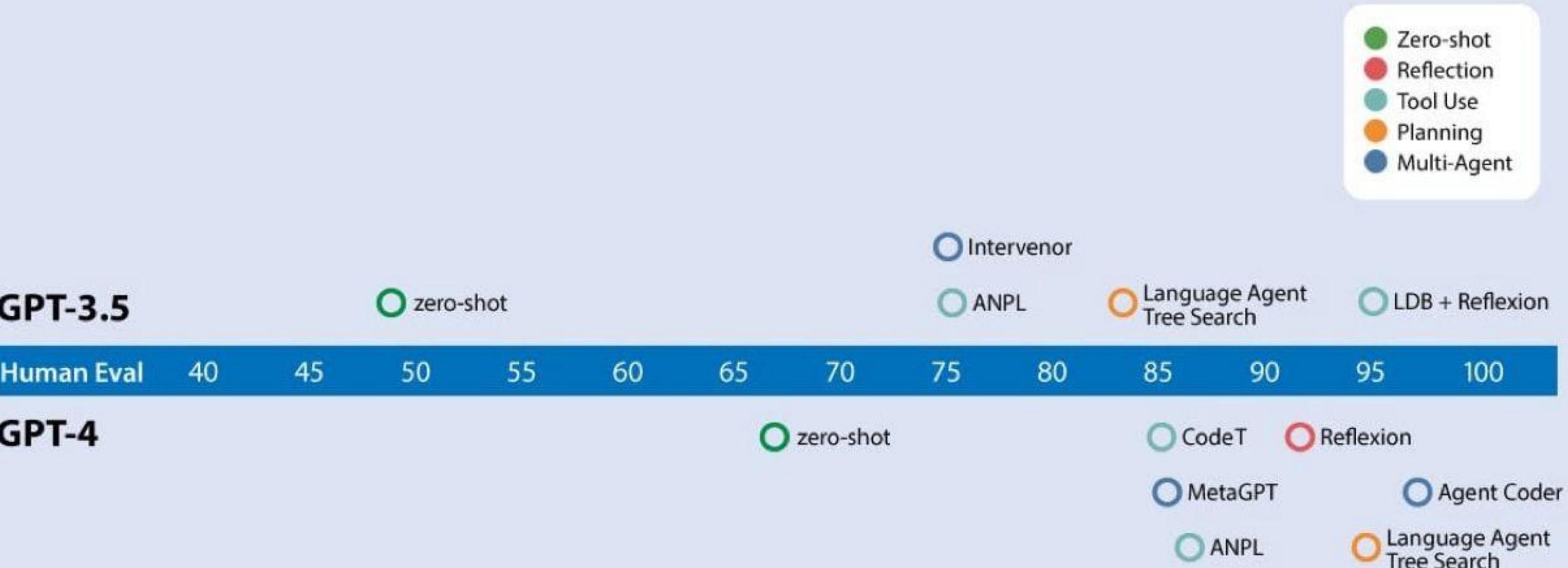
Papers, papers, papers...

More Agents is all you need

"sampling-and-voting method, the performance of large language models (LLMs) scales with the number of agents instantiated". <https://arxiv.org/abs/2402.05120>



GPT-3.5 and GPT-4 performance using zero-shot and agent workflows



Source: Andy Ng

Performance of GPT-3.5 and GPT-4 (zero-shot) on HumanEval, along with algorithms that use agent workflows on top of GPT-3.5 or GPT-4. Thanks to Joaquin Dominguez and John Santerre for help with this analysis.

"In the future, AIs are going to be like employees in our companies"

Jensen Huang, CEO, NVIDIA

"Agents are not only going to change how everyone interacts with computers. They're also going to upend the software industry, bringing about the biggest revolution in computing since we went from typing commands to tapping on icons." - Bill Gates, Co-founder, Microsoft

"I think AI agentic workflows will drive massive AI progress this year — perhaps even more than the next generation of foundation models." - Andrew Ng, CEO, DeepLearning

"In terms of AI technology trends, I think for any builder, anyone building AI, if I had to pick one thing to keep an eye on, I would say it's AI agents." - Andrew Ng, CEO, DeepLearning

"AI agents are poised to become the next step of evolution of AI for businesses in our increasingly digital society," - Lionel Sujay Vailshery, Statista

"...the technology is moving from thought to action," - McKinsey, Why agents are the next frontier of generative AI

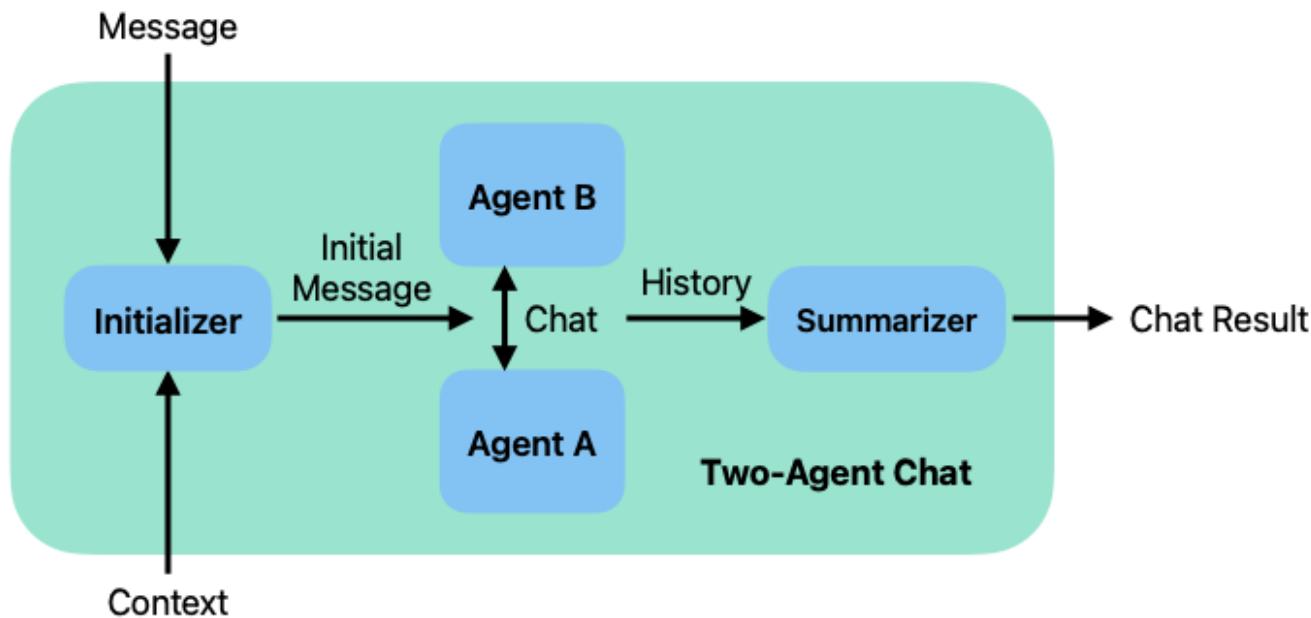
Agentic Workflows



AutoGen 101 – Two-Agent Chat

- Simplest chat, a round-robin sequential dialogue between two agents that iterate a “discussion” and at one point it ends due to a finalization condition or a number of iterations has been met.

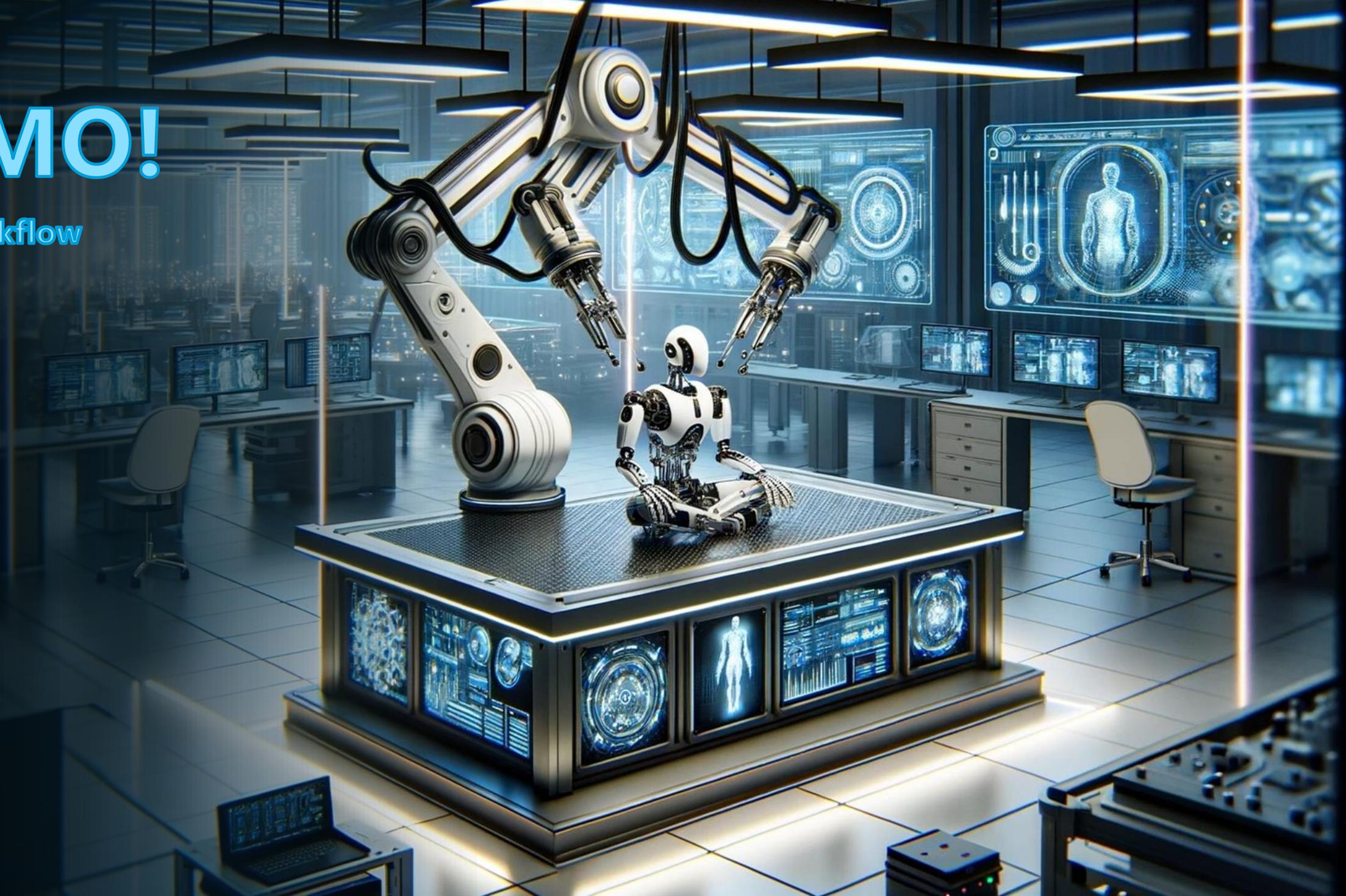
E.g., "What is triangle inequality?"



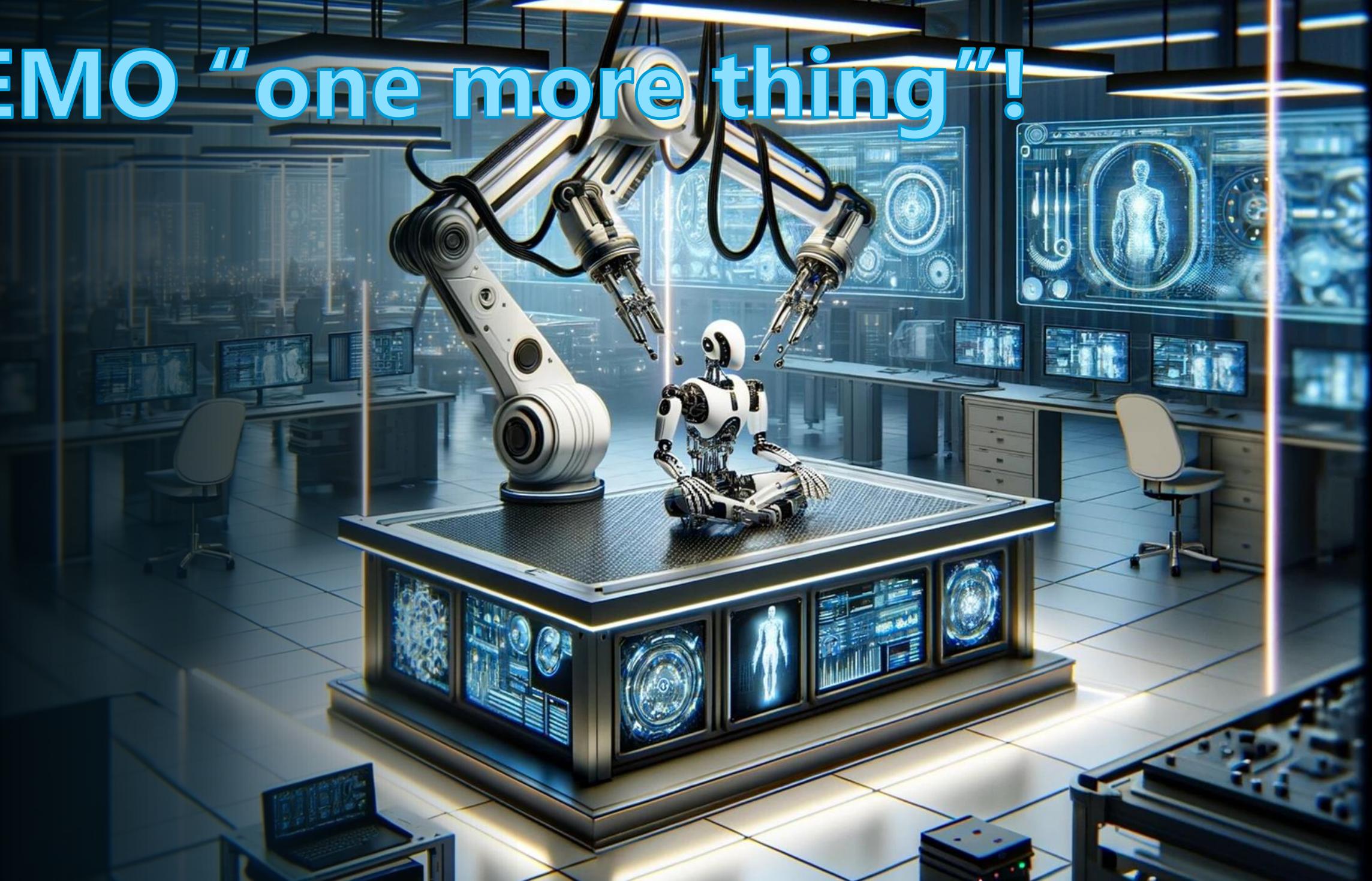
E.g., summary_method: reflection_with_llm

DEMO!

Critic Workflow



DEMO “one more thing”!



Recap & Take-Away

- We have seen Semantic Kernel a bit on Agentic AI
- Semantic Kernel is powerful and evolving fast!
- AI is getting better fast – so get to learn
- Change your mindset, our software now reasons and acts

NOW

START NOW

LEARN
GENERATIVE
COMPONENTS
AI AGENTS

MANAGE
AGENT
AI AGENTS

CLOUD
ENGINEERING

CLOUD
ENGINEERING

CLOUD
ENGINEERINGS
AI

PROMPT
ENGINEERING

AGETIC
AGIT

AGENT

CODING
KNOWLEDGE
PROMPT KNOWWEEDING

Start Learning now!

START AS SOONI AS POSSIBLE
TO STAY AHAD



Thank You!!

Connecting & Continuing the journey

- Contact

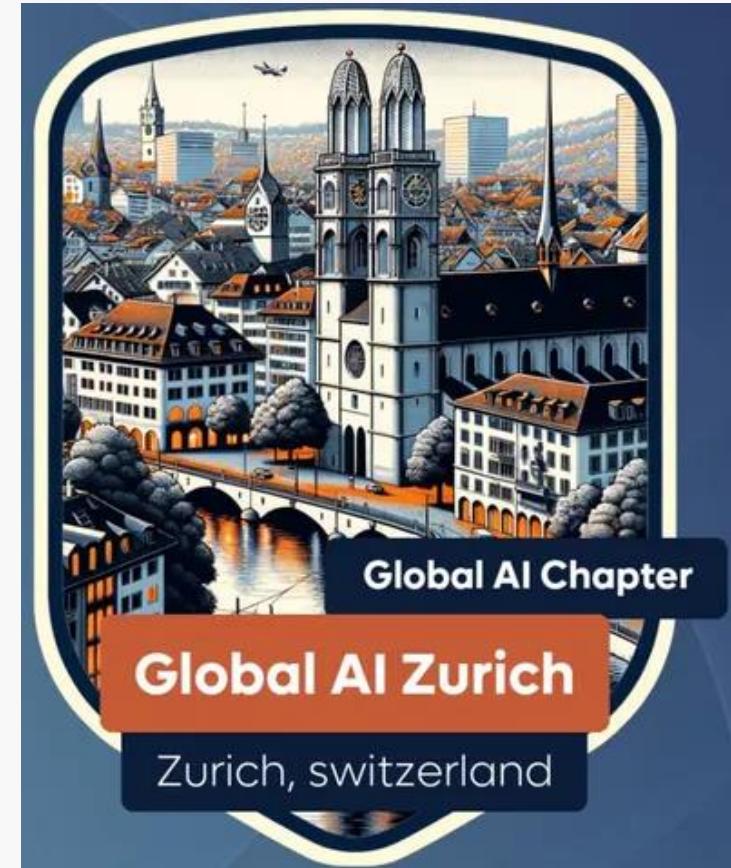
- <https://www.linkedin.com/in/joslat/>
- <https://x.com/joslat>
- <https://github.com/joslat/>

- .NET Zurich UG

- <https://www.linkedin.com/company/dotnet-zurich/>
- <https://www.meetup.com/dotnet-zurich/>

- Global AI Zurich

- <https://www.linkedin.com/groups/9862323/>
- <https://www.meetup.com/global-ai-zurich/>



.NET User Group Zürich

Upcoming event ☺



Global AI Zurich
Zurich, Switzerland

Details

Event: Global AI Zurich Launch!

When: Wednesday, September 18, 2024 06:00 PM (CEST)

Location: Online

Organizer tools ▾



Global AI Zürich
Public group ?

⌚ Wednesday, September 18, 2024
6:00 PM to 8:30 PM CEST
[Add to calendar](#)

▢ Online event

Sponsors

[See all](#)



Microsoft

Microsoft

meetup.com/global-ai-zurich/events/302312863/

One more thing...

The sidebar shows a list of course sections and their contents:

- Introduction**
 - If you can code in .NET, you are an AI developer (47s video)
 - What you should know about this course (1m 46s video)
- 1. Semantic Kernel Concepts**
 - What is Semantic Kernel? (3m video)
 - Semantic Kernel vs. LangChain (5m 22s video)
- 2. Enter the Kernel**
 - Setting up (14m 22s video)
 - Using GitHub Codespaces (4m 54s video)
 - The kernel

SEMANTIC KERNEL

linkedin.com/learning/semantic-kernel-in-action-fundamentals/

- [Instructor] Diving into Semantic Kernel,

LinkedIn Learning

One more thing...

Azure AI Engineer Associate (AI-102) Cert Prep: Exam Tips
Azure AI associate: Course overview and concepts

linkedin.com/learning/azure-ai-engineer-associate-ai-102-cert-prep-exam-tips/



Questions?