# MATLAB EXPO

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Oprogramowanie
Naukowo-Techniczne
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11.06.2026 r.

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# Agentic AI Workflow with MathWorks Tools

## MATLAB MCP Core Server & Simulink Agentic Toolkit

Filip Babiec, ONT

Oprogramowanie
Naukowo-Techniczne
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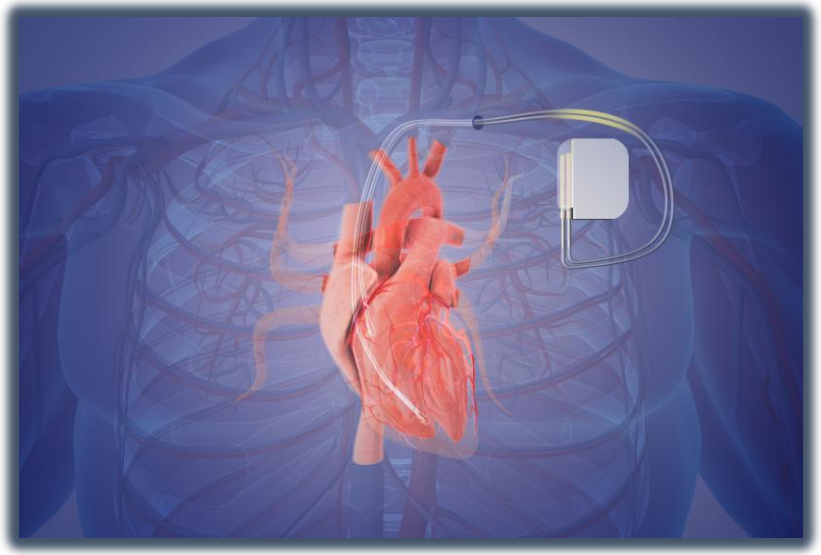
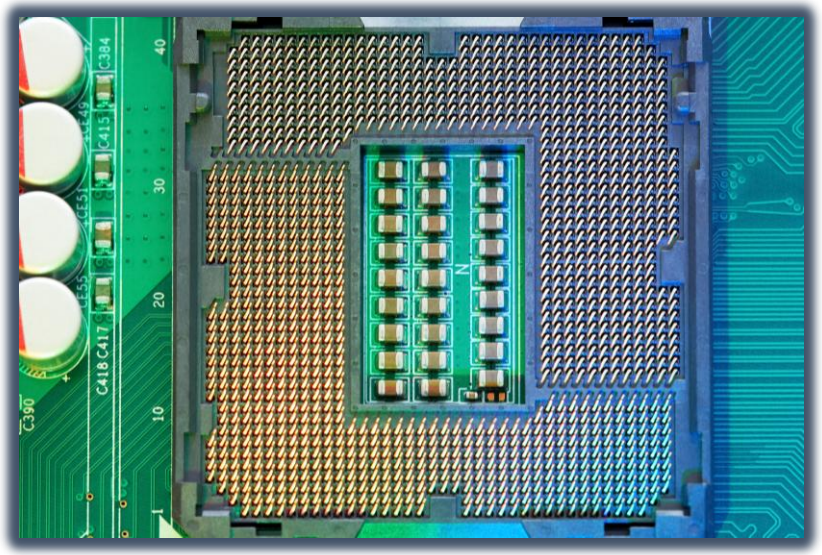
# AI Impact on Engineering



## Medtronic

Detecting heart disorders in implantable cardiac monitors



## Princeton University

Creating wireless chip designs

## Eaton

Advancing solar power systems performance

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# Generative AI

## GenAI is like a colleague who:

- Has the internet memorized
- Completes tasks almost instantly
- Excels at simple tasks and does not complain
- Can be overconfident in more complex tasks

## Elevates the role of engineer by automating simpler tasks

- The impact is not in final answers, it is where engineers spend their time

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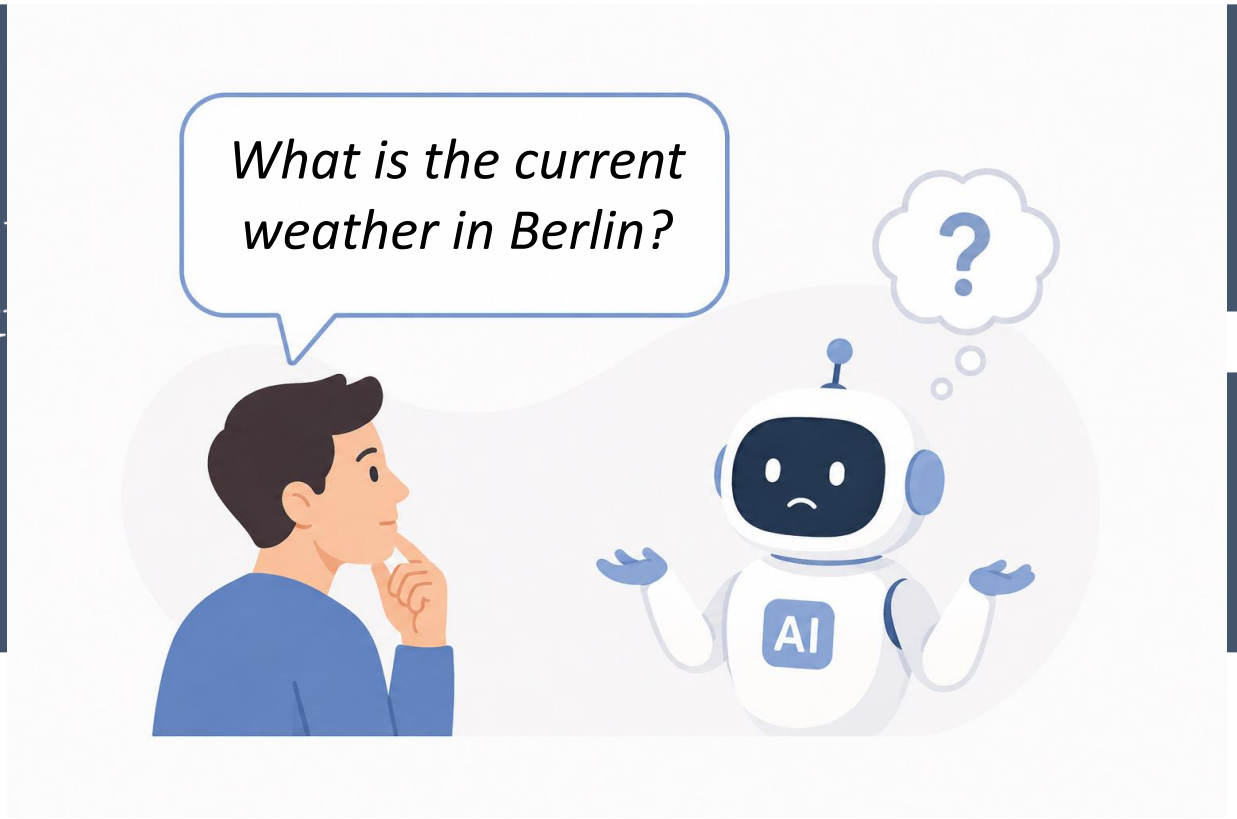
# Agentic AI – What it actually is?

# Agentic AI Workflow – What it actually is?

# Agentic AI Workflow

*„An agentic AI workflow is a proces uses where an LLM-based application executes multiple steps to complete a task" – Andrew Ng*

MATLA
&SIMU




rative AI

# Agenda

## 1. MATLAB and Simulink Copilots

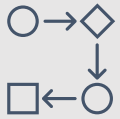
*optimized for MATLAB and Simulink*

## 2. External GenAI Agents

*use MATLAB or Simulink with external Agents via MCP or VS Code*

## 3. Develop GenAI-powered Applications

*call LLMs from MATLAB code*



## 4. Other GenAI capabilities

*ChatGPT, MathWorks documentation, etc.*

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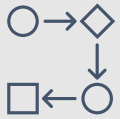

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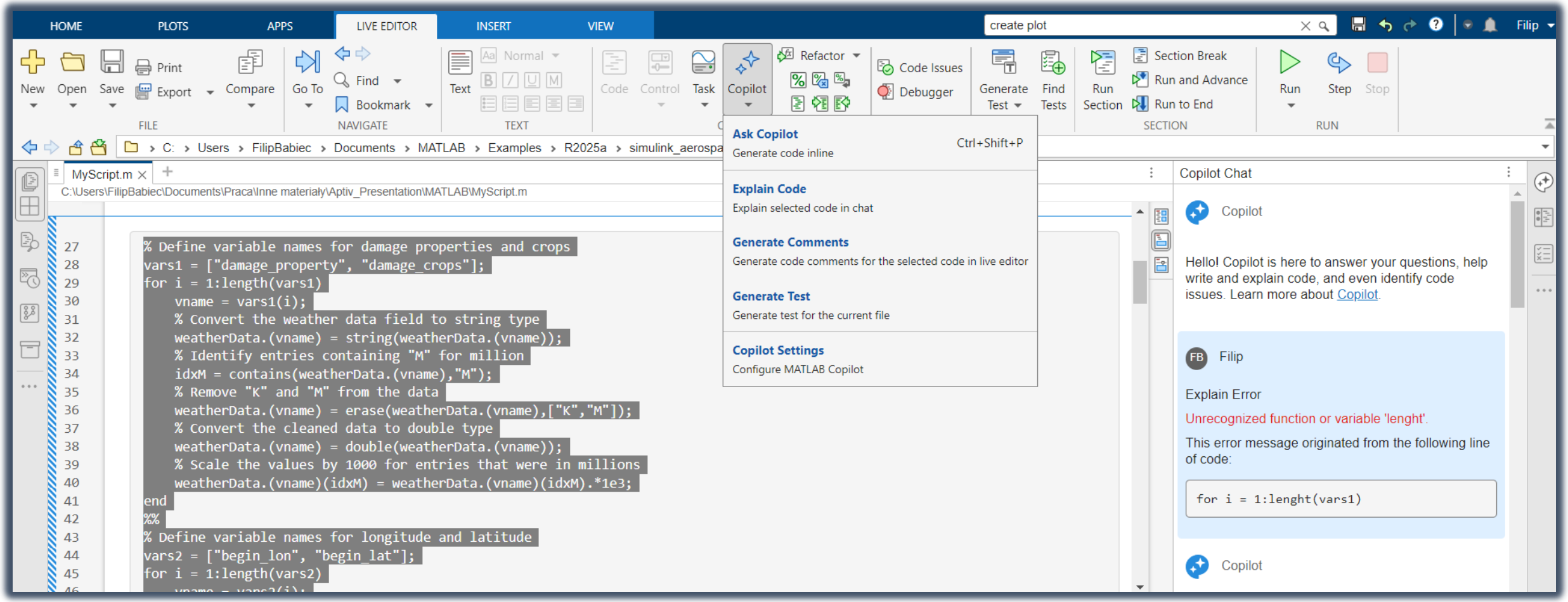
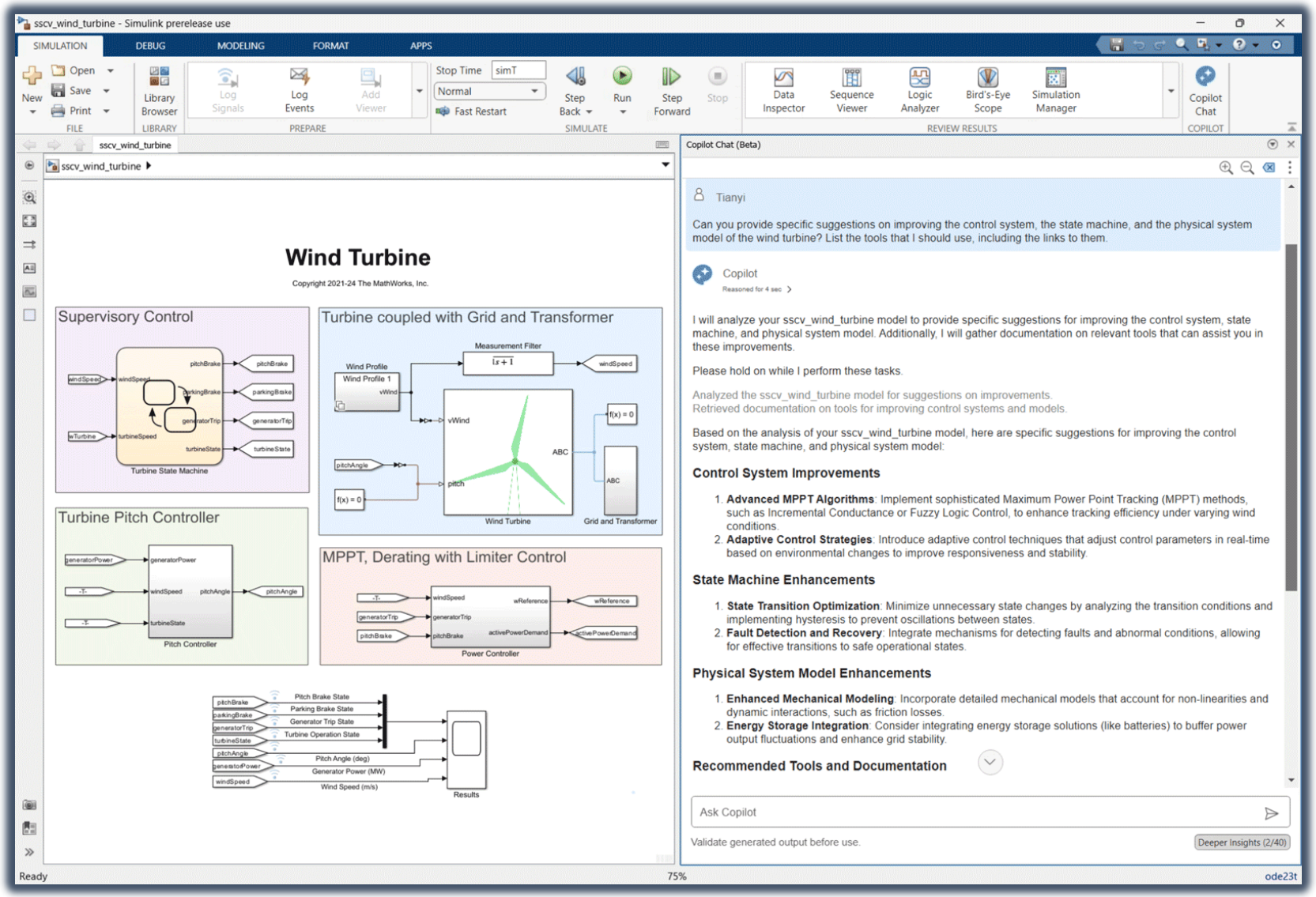
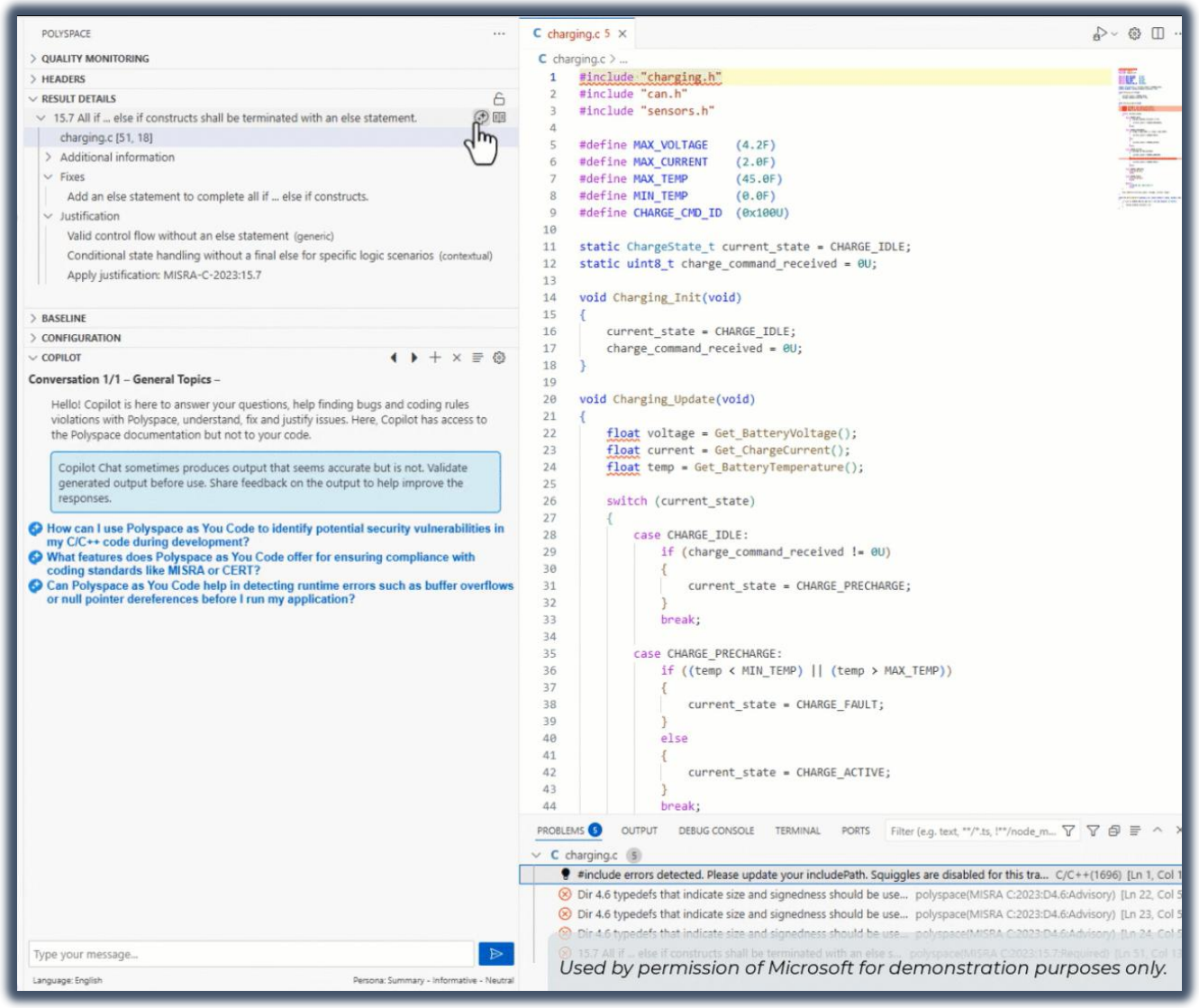
# MATLAB Copilot



# Simulink Copilot



# Polyspace Copilot



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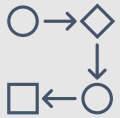


## 4. Other GenAI capabilities

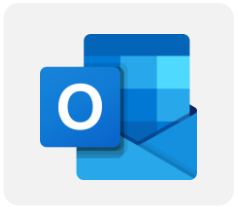
*ChatGPT, MathWorks documentation, etc.*

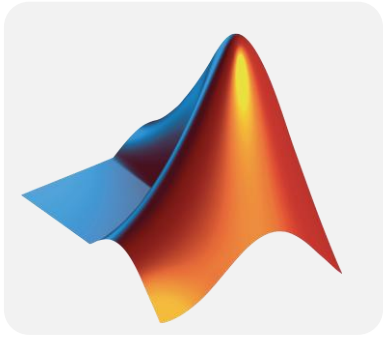
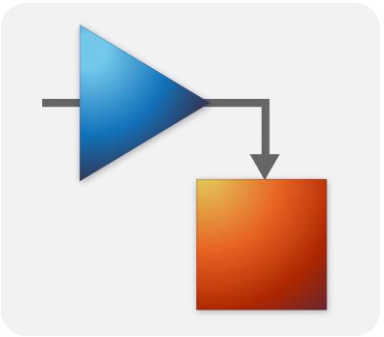
# Model Context Protocol (MCP)

MCP Client

MCP

MCP Server

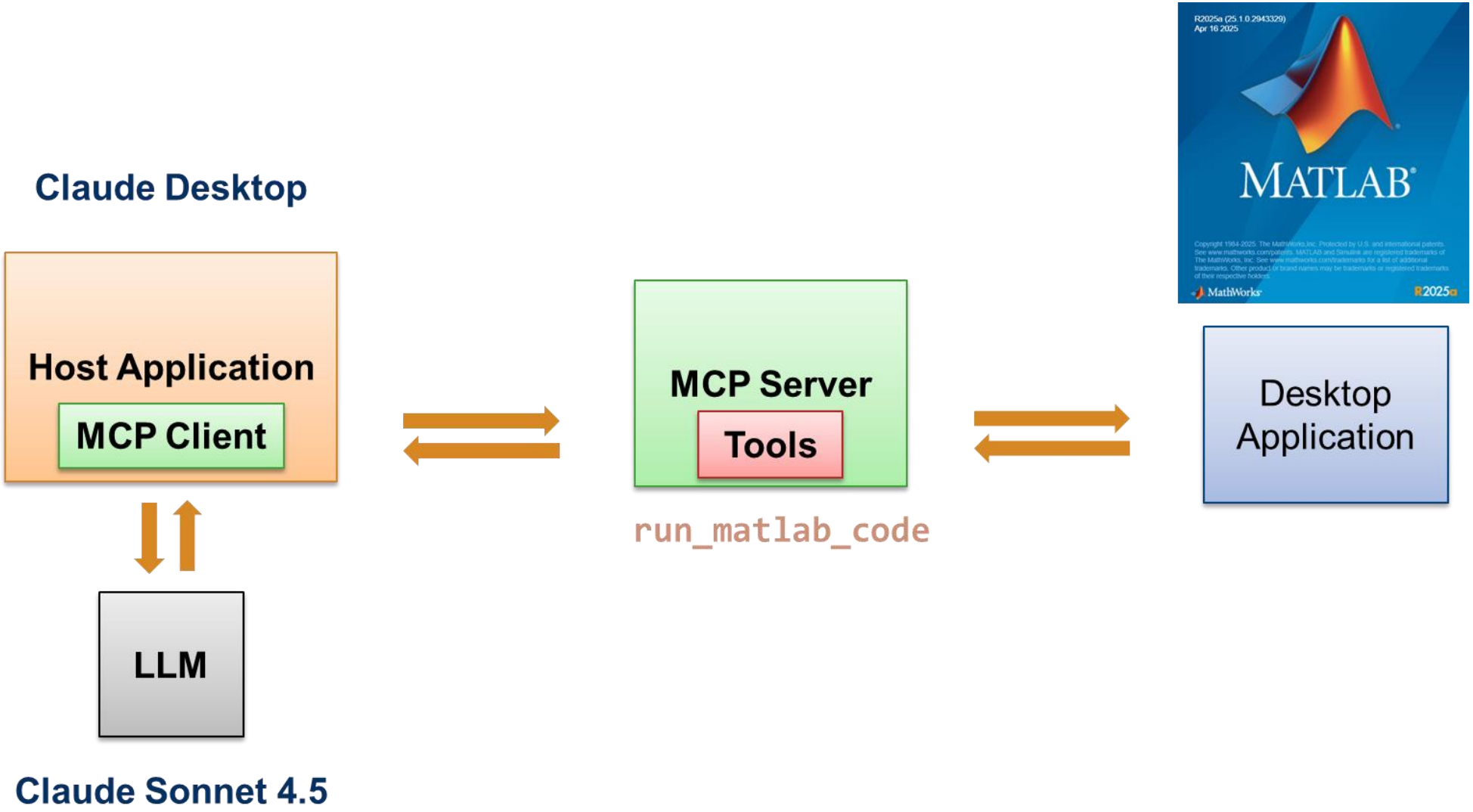


AI Chat and Agent Applications

Tools

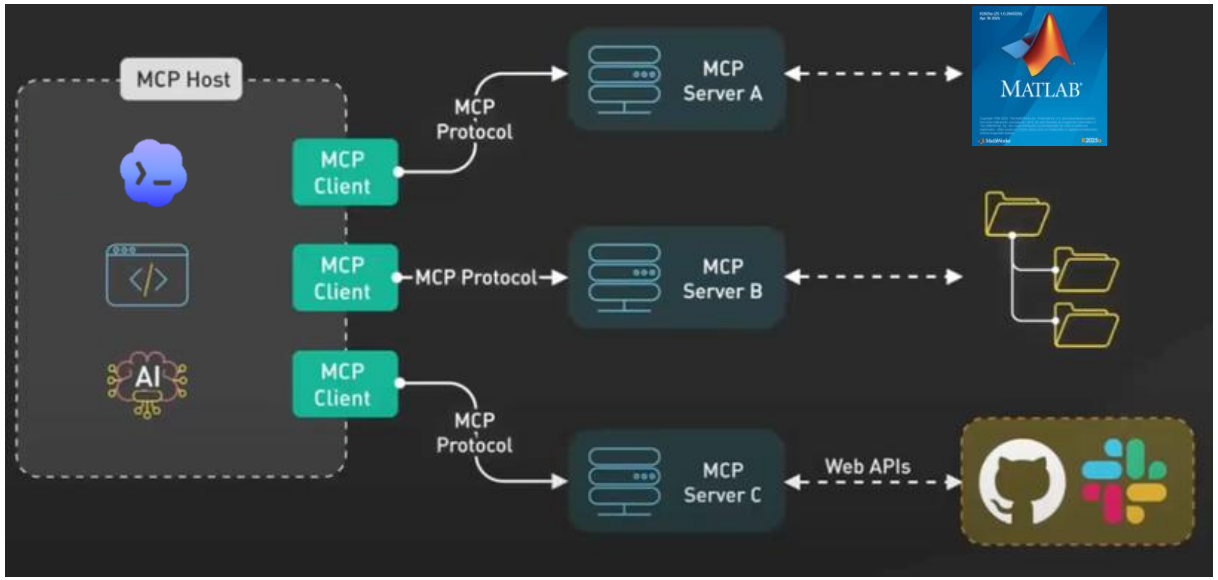
# MATLAB MCP Core Server workflow



# MATLAB MCP Core Server

A free, open-source local MCP server that connects GenAI assistants to a locally licensed MATLAB

- Tool Execution: Run, check, evaluate, and test MATLAB code via LLMs
- Toolbox Detection: Identify required MATLAB toolboxes dynamically
- Resources: MATLAB Coding Guidelines
- Secure & Local: Preserves privacy with local execution




*Agentic workflow architecture using MCP*

» https://github.com/matlab/matlab-mcp-core-server

# MATLAB Agentic Toolkit

Expands MATLAB MCP Core Server with curated knowledge in a form of skills

» matlab/matlab-agentic-toolkit

Description

Display images and annotations for image processing, computer vision, and visual inspection. Use when displaying images with imageshow, creating image viewers with viewer2d, adding Regions of Interest (ROI) or annotations, overlaying masks or segmentations, streaming video frames, or building apps with image display.

License MathWorks BSD-3-Clause

Author MathWorks

Version 1.0

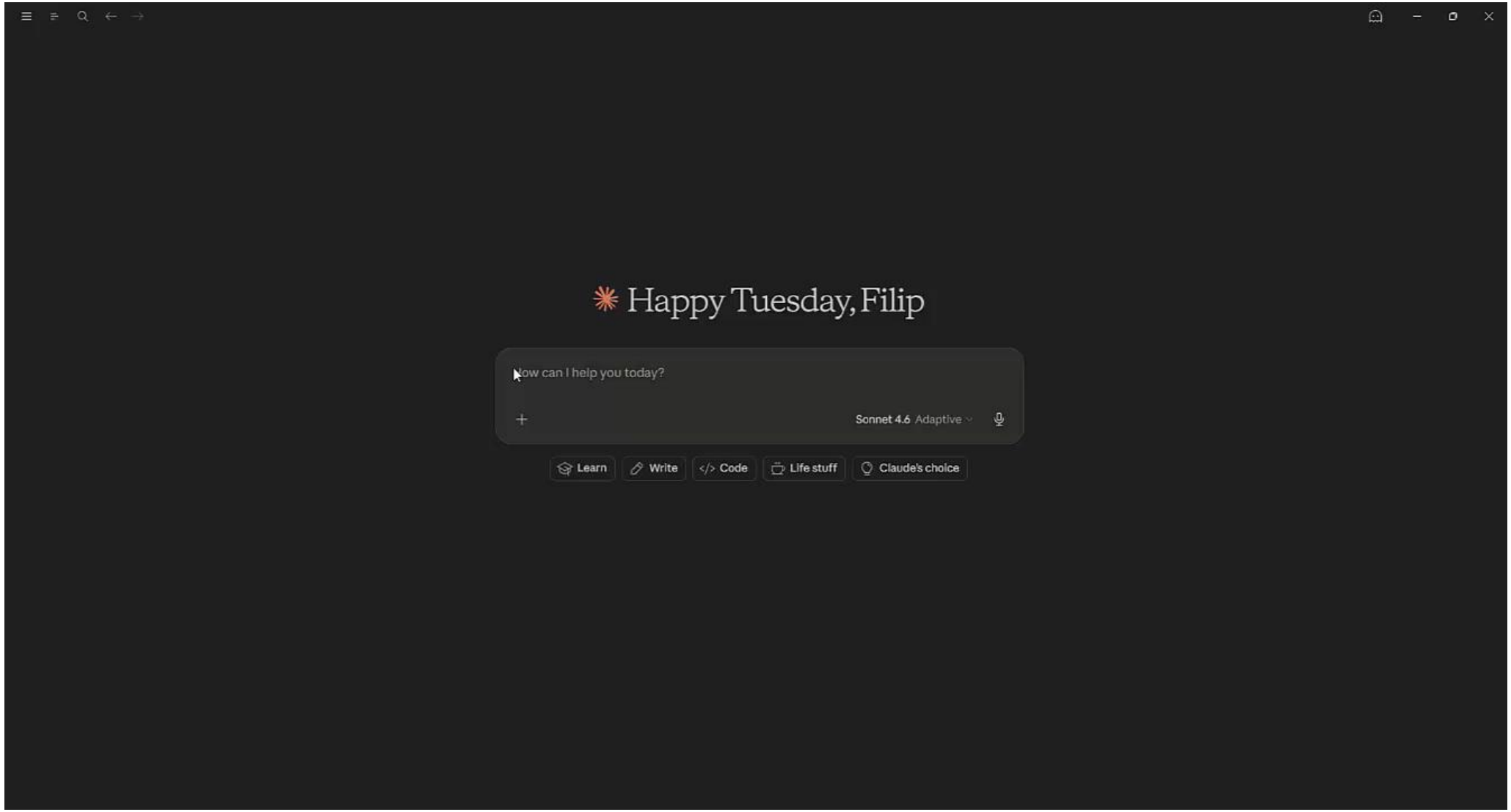
## Image Display

Display images with `imageshow` rather than `imshow` for more performant, higher quality image display with more responsive interactions for images of all sizes.

### When to Use

- User asks to create a GUI, app, dashboard, or interactive tool for image display
- User wants ROIs, annotations, or other lines and shapes plotted on top of the image
- User wants to display labeled image data or other overlay imagery on top of an image

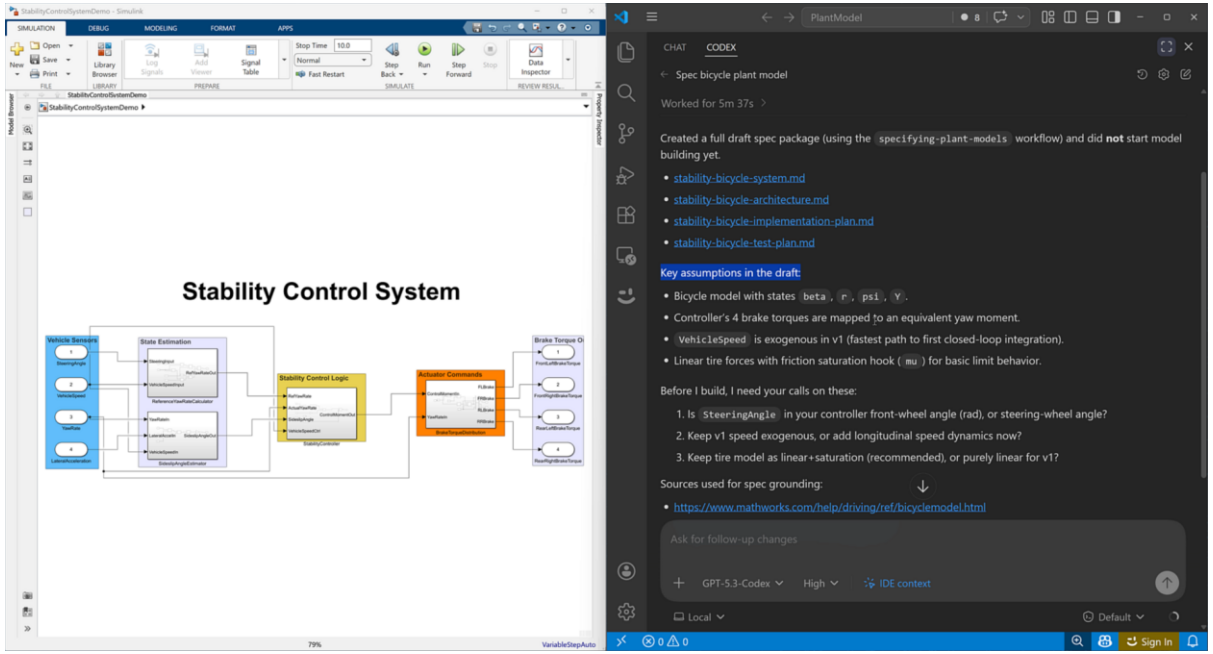
# MATLAB MCP Core Server – Signal Analysis in Seconds



# Simulink Agentic Toolkit

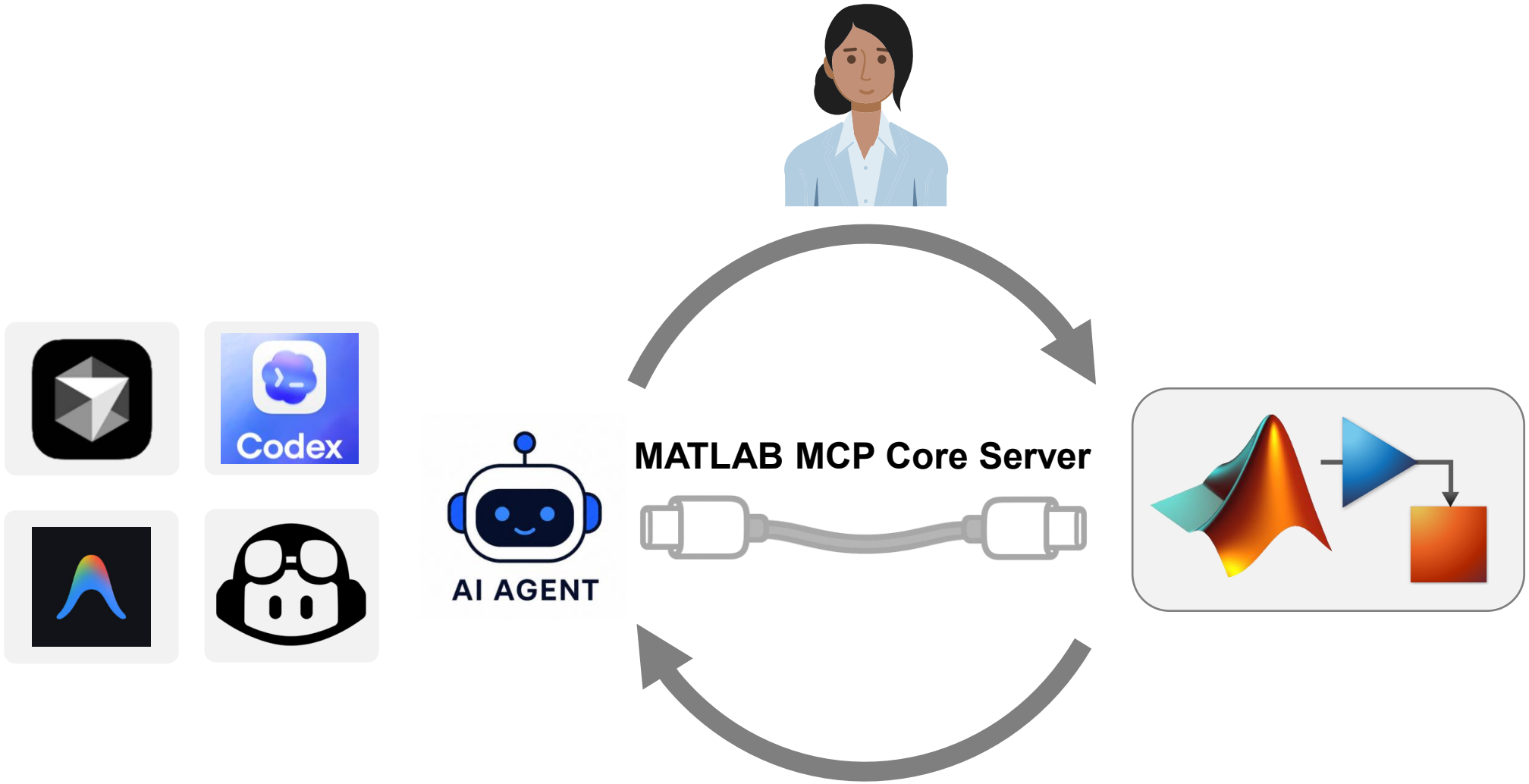
Provides AI agents with both the tools and the knowledge to work effectively with Simulink models:

- MCP tools optimized for Simulink + expert skill catalog
- Equips the AI agent to understand, change, and verify Simulink models
- Multi-platform support

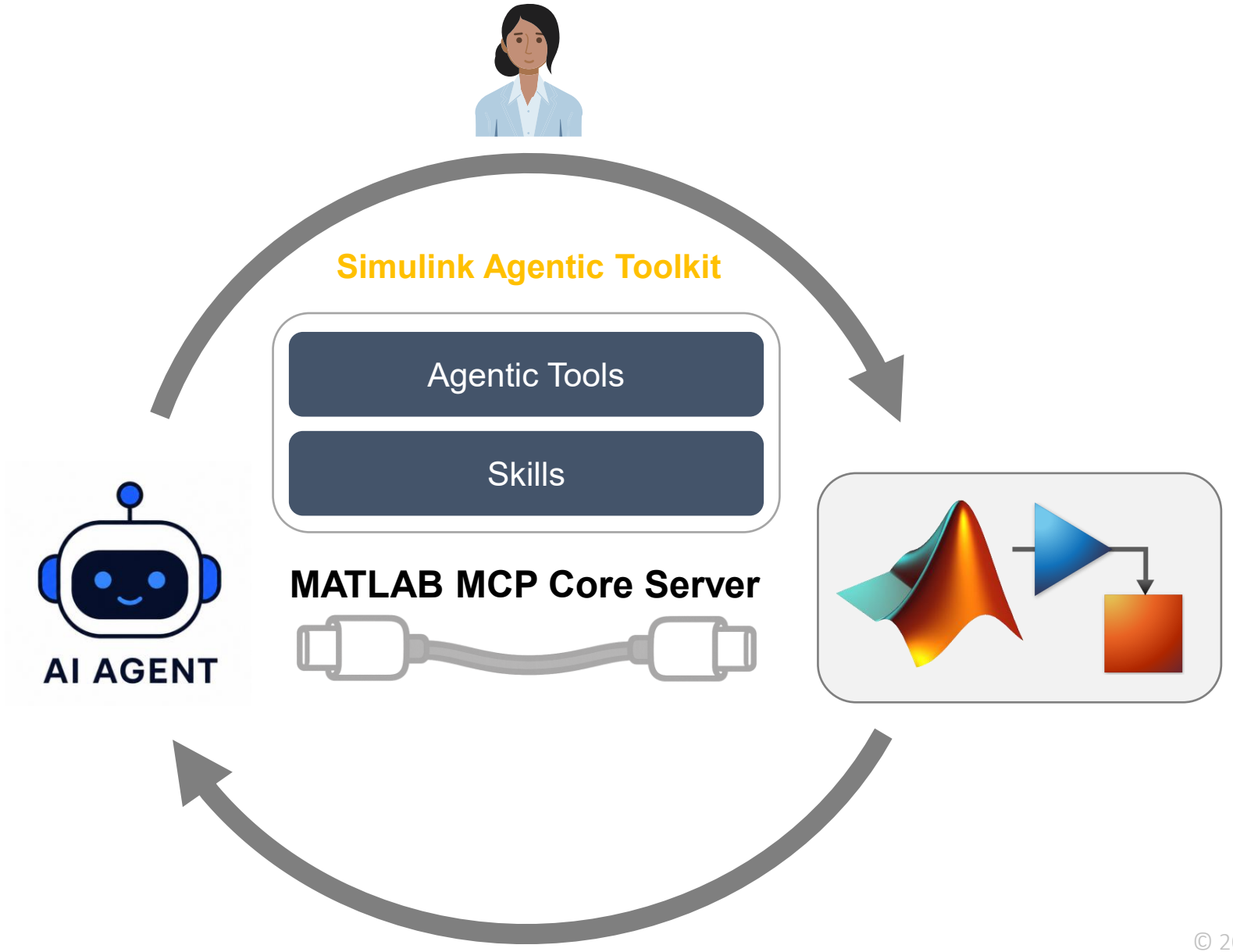



» matlab/simulink-agentic-toolkit

# Simulink Agentic Toolkit



# Simulink Agentic Toolkit



# Simulink Agentic Toolkit – Tools

## MCP Tools

| Agent Capability | Tool Name | Purpose |
|---|---|---|
| Understand | `model_overview` | Explore model architecture |
| | `model_read` | Understand model behavior |
| | `model_query_params` | Inspect any model parameter |
| | `model_resolve_params` | Resolve workspace variables |
| Change | `model_edit` | Build and modify models |
| Verify | `model_test*` | Verify models by creating & running tests |
| | `model_check` | Validate model health before simulation |

Simulink

**SKILLS**

**MATLAB MCP Core Server**

*requires Simulink Test

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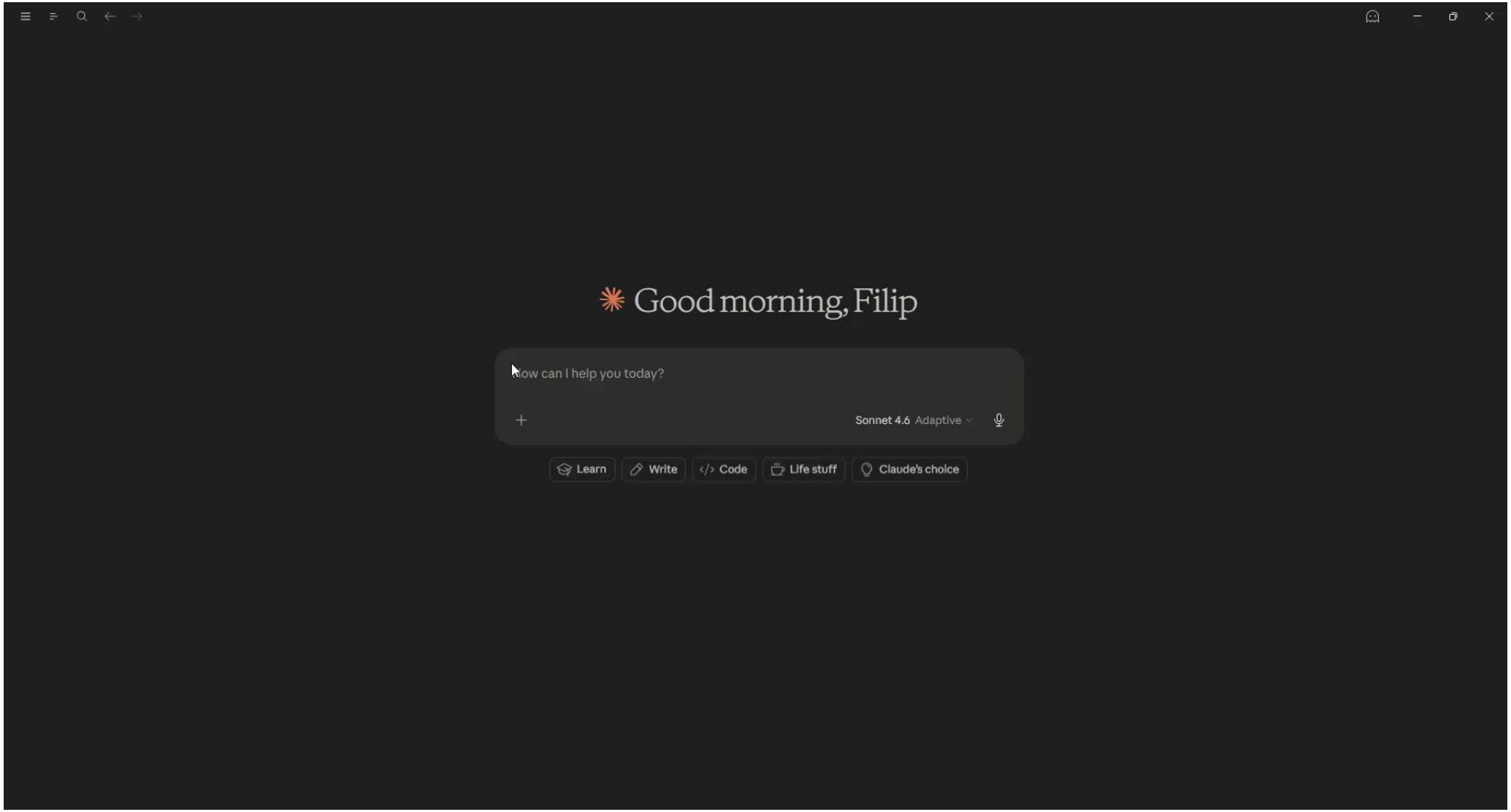
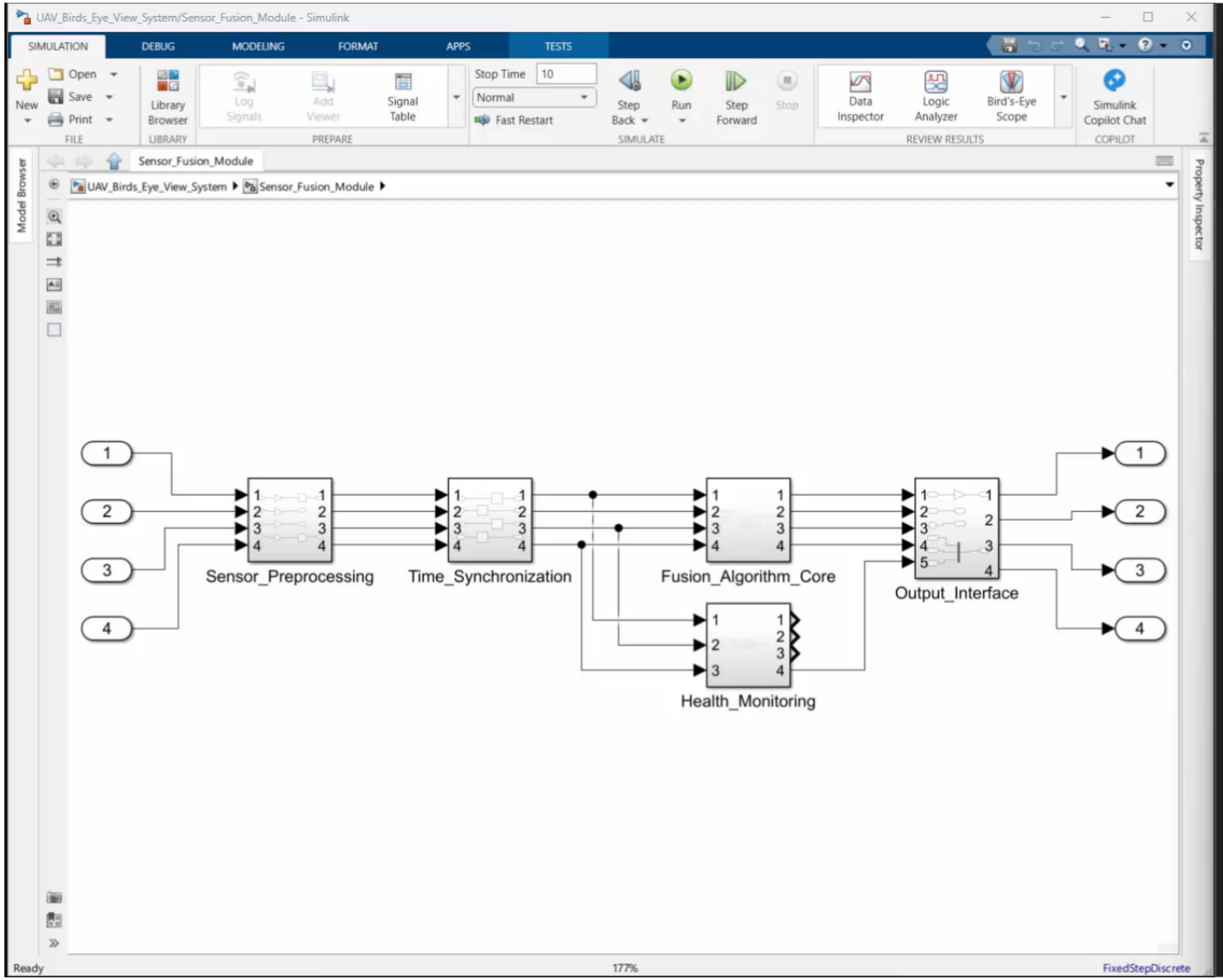
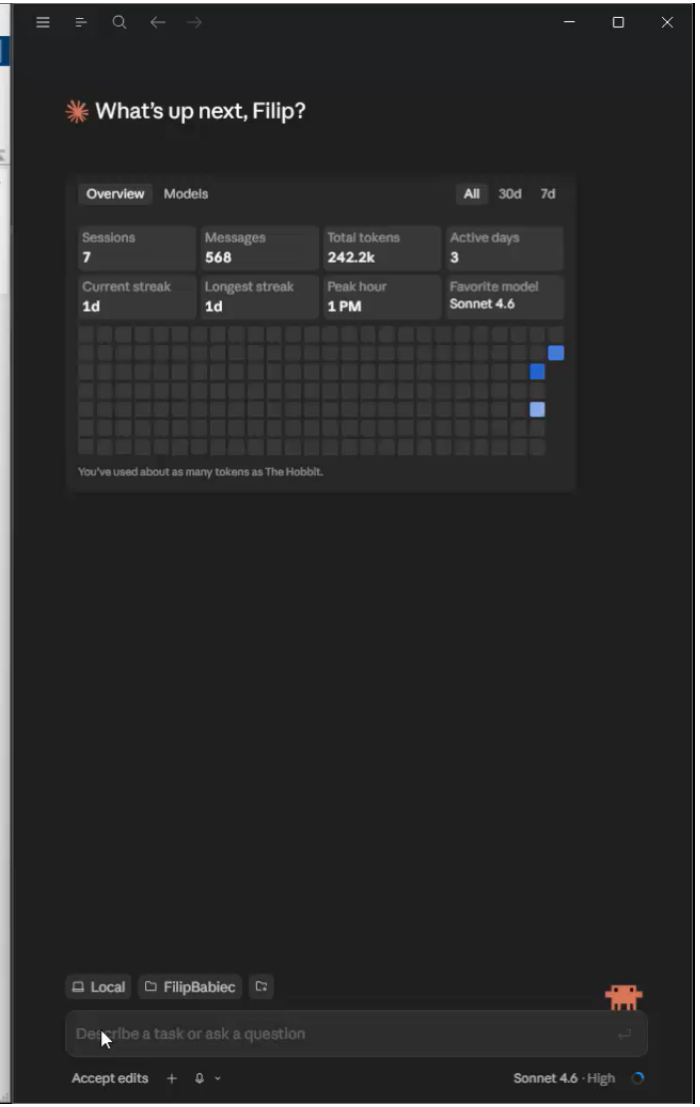
# Simulink Agentic Toolkit – Model Draft from Requirements



# Simulink Agentic Toolkit – Reverse Requirements Engineering

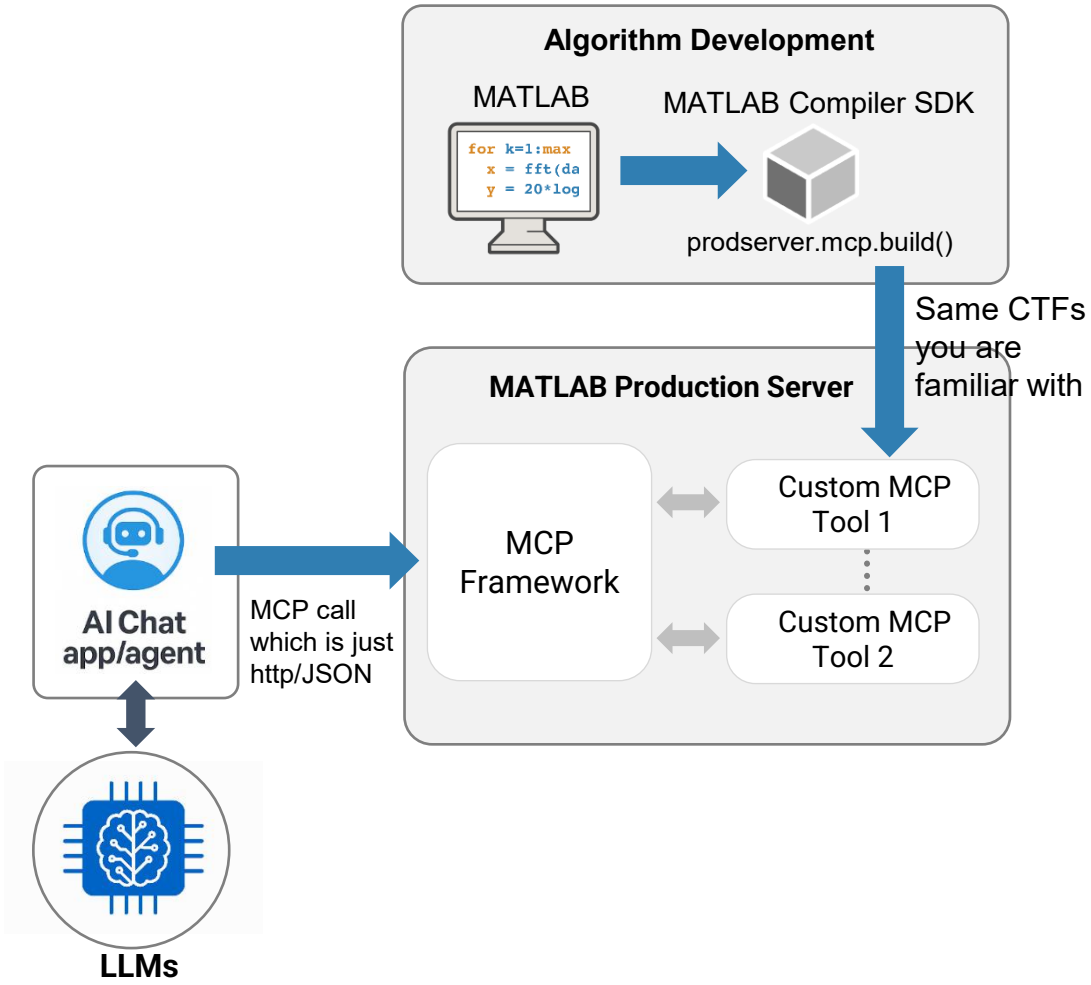


# MCP Framework for MATLAB Production Server

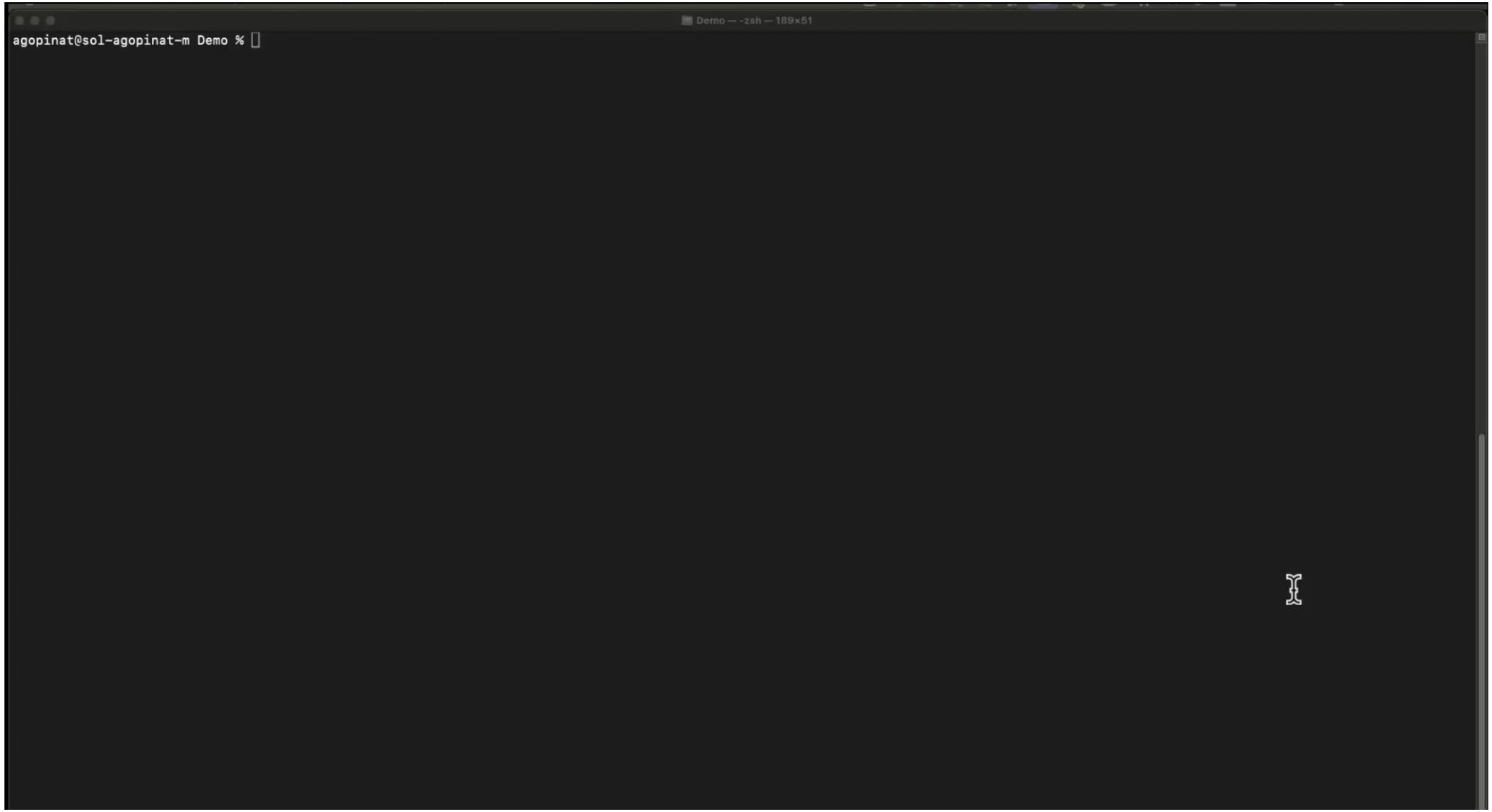
Allows AI agents to call your deployed functions, enhancing their capabilities with doman-specific expertise:

- Hosts must support remote MCP servers. For example, Visual Studio Code with GitHub Copilot, Claude desktop.
- The MCP Framework deploys your MATLAB function to MATLAB Production Server as an MCP Tool.
- Requires MATLAB Compiler SDK and MATLAB Production 25b and higher




» https://github.com/matlab/mcp-framework-matlab-production-server

# MCP Framework for MATLAB Production Server – PFR



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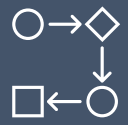


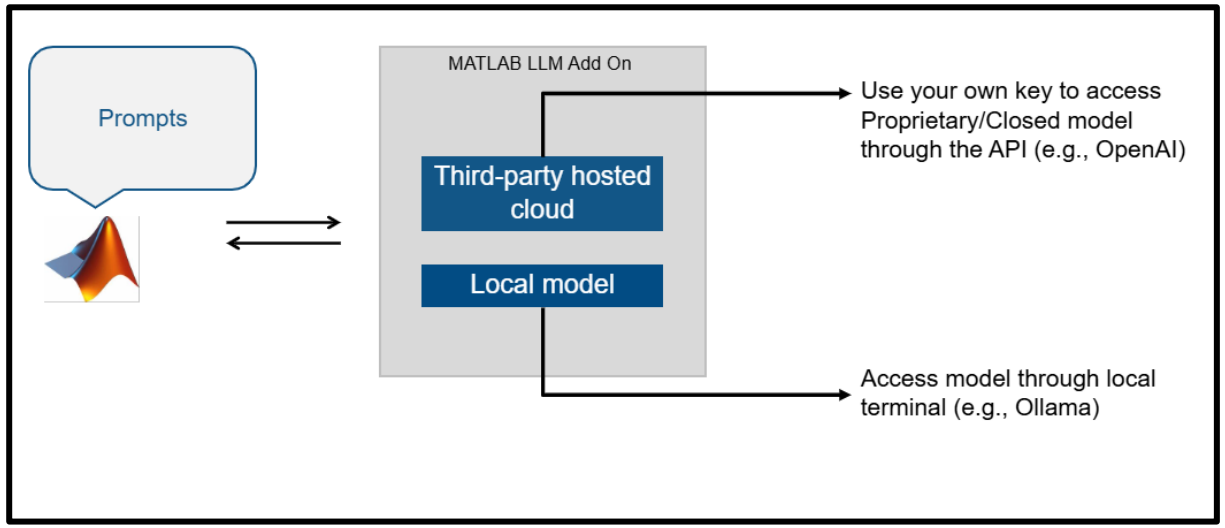
## 4. Other GenAI capabilities

*ChatGPT, MathWorks documentation, etc.*

# MATLAB LLM Add-on

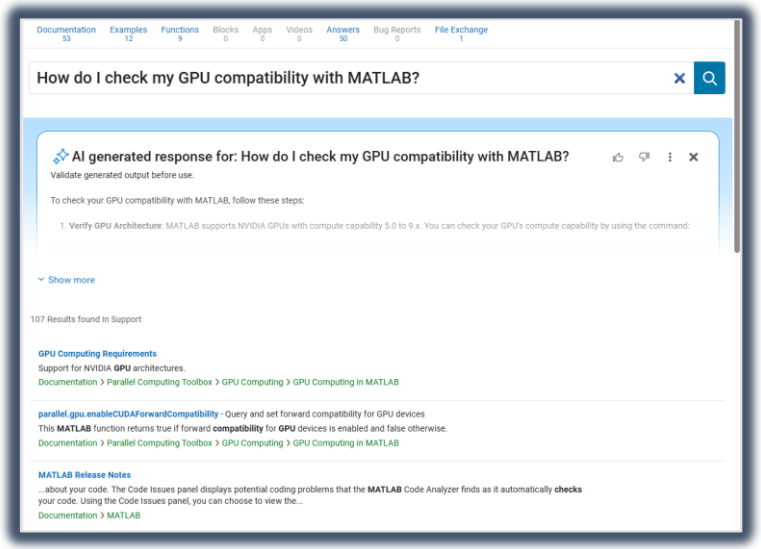
Connect MATLAB with popular Gen AI Providers.:

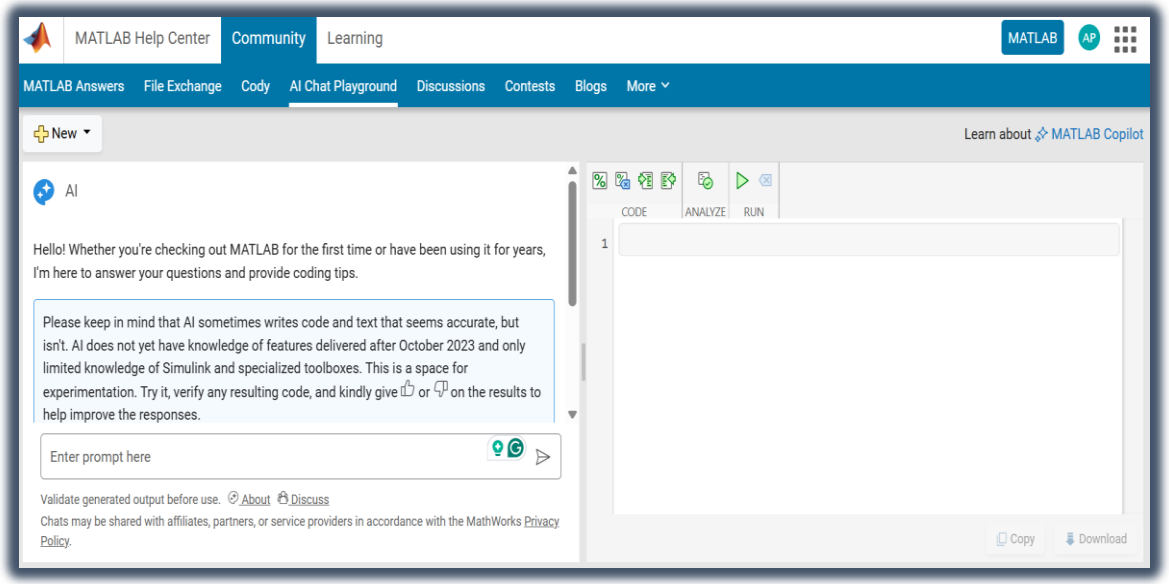
- OpenAI Chat Completions API (e.g.,ChatGPT)
- OpenAI Images API (e.g., DALL·E)
- Azure OpenAI Service
- Local models via Ollama (e.g.,LLaMA, Mistral, Phi3)

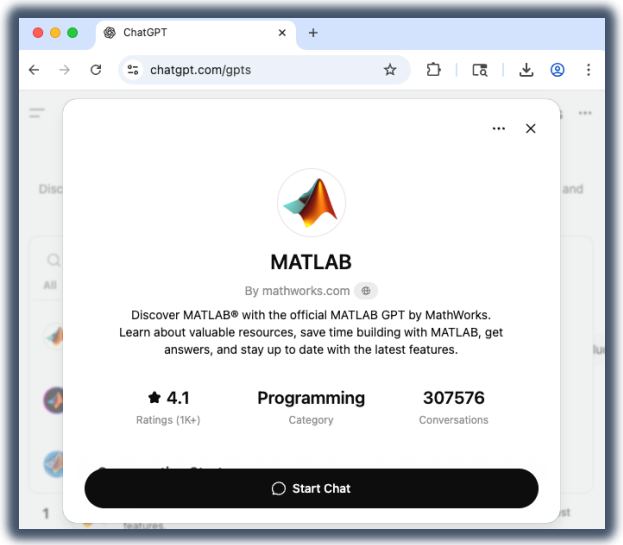



» matlab-deep-learning/llms-with-matlab

# Other GenAI capabilities



# Benefits and Risks of Using AI Agents

## Benefits

- Use MATLAB with agentic AI tools like Codex, GitHub Copilot and Claude
- Automate MATLAB workflows with agentic loopss
- Write code, evaluate code, proces results, repeat…

## Risks

- AI agents can generate and execute code with access to local files
- AI agents send data to the cloud and often gather our information for learning purposes

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