ML08

Next-Gen Statistical Programming: AI as Your Coding Co-Pilot in R

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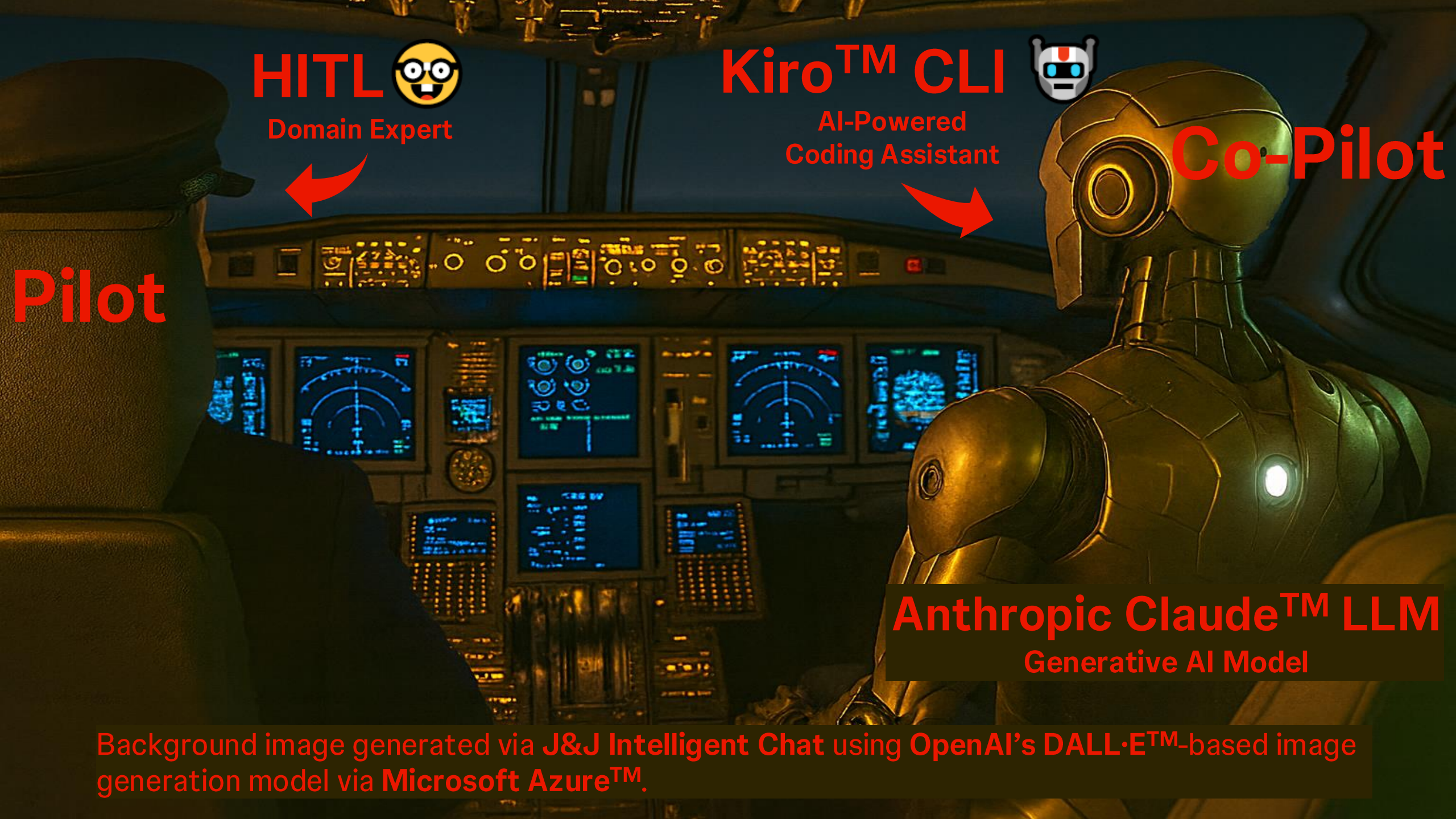

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The 3 AI Bellwethers:

(Circ… -2025)

1. Skepticism … man-

2

3. …text Protocol (MCP)

"Stay **skeptical**, but also, let yourself be **curious**."

— **Joe Cheng**, CTO of Posit

(posit::conf(2024): Shiny Talks, August 2024)

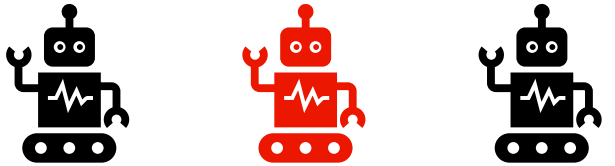
Upskilling **~90** Programmers & Statisticians

1. **Overview of the VS Code™ IDE**
2. **Intro to Code Development via prompting**
3. ***Effective* Prompting**
4. **Using Context**
5. **Using *MCP Tools***

Take-Home **Messages from Upskilling**

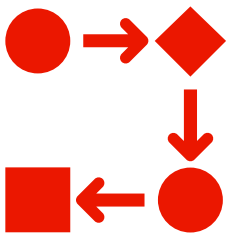
- **You** are the **domain expert**—AI is your ***co****-pilot*.
- **LLM = "child prodigy"** willing to ***hallucinate***.
- Use ***iterative*** **prompting** for complex analyses.
- **Request** ***explanations*** for AI's reasoning.
- **You** are responsible for **code quality & accuracy**.

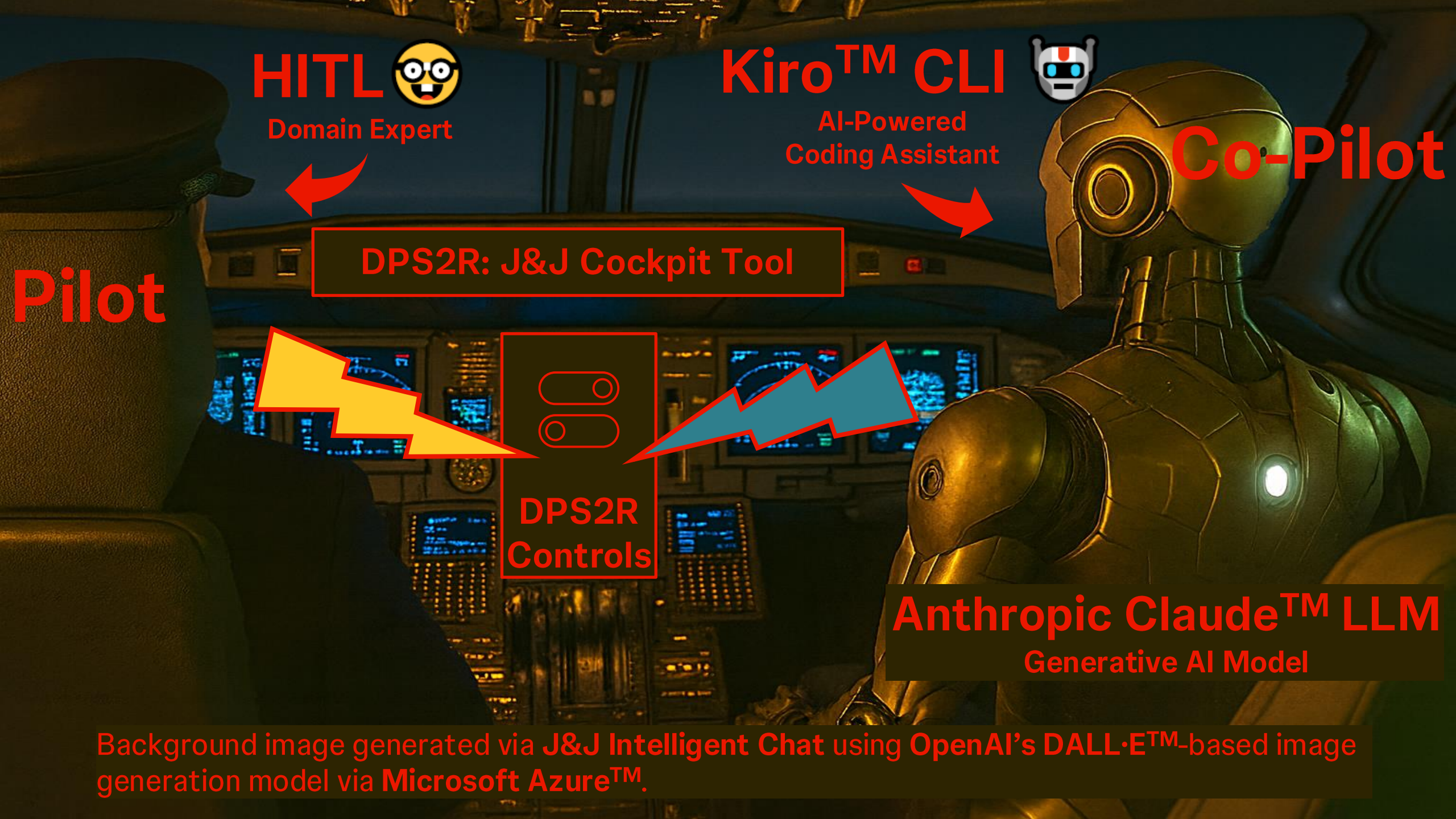
The 3 AI Bellwethers:



(Circa 2024-2025)

1. Skepticism, Curiosity, and Human-In-The-Loop (HITL) Validation
2. Context
3. Model Context Protocol (MCP)
4. Agentic AI





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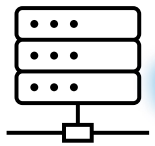
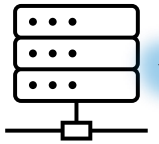
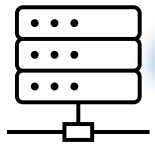
DPS2R



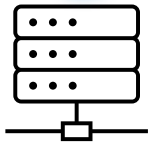
DPS Helper



ADaM Planning Tool

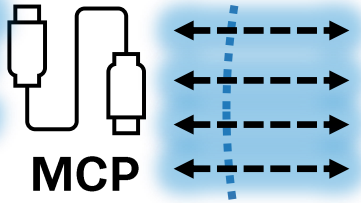


rtables, junco, tern, & tidytlg R Package Documentation



SP & JJCS Guidance Documentation & Templates

Kiro CLI
(*Anthropic Claude LLM*)

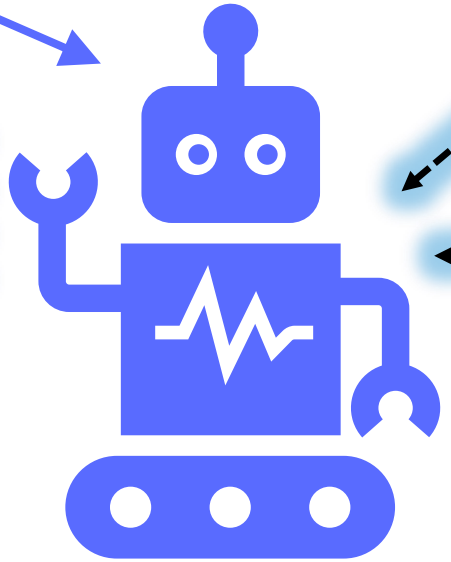


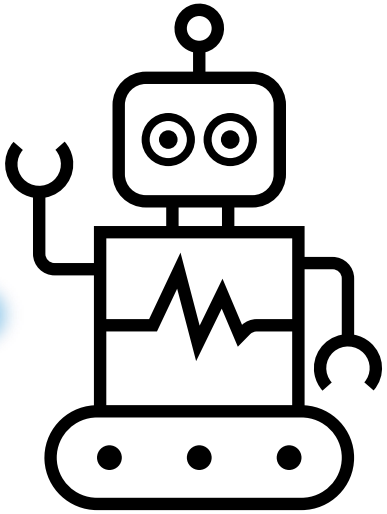
MCP Connection Tools

Positron™ IDE (SPACE)

gpt-o4-mini™

HITL (*Study Lead*)





1st *Draft* R Code for TLG *in minutes*

DPS2R: 7 Phases, 6 HITL Checkpoints

1. **Initialization** (*Retrieve study metadata and mockshells*) →

2. **Mockshell Understanding** → 🤓✅❌

3. **Comparison** → 🤓✅❌

4. **Metadata Review**→ 🤓✅❌

5. **Variable Analysis** → 🤓✅❌

6. **Plan** → 🤓✅❌

7. **Code Generatation** → 🤓✅❌

Done 🥳

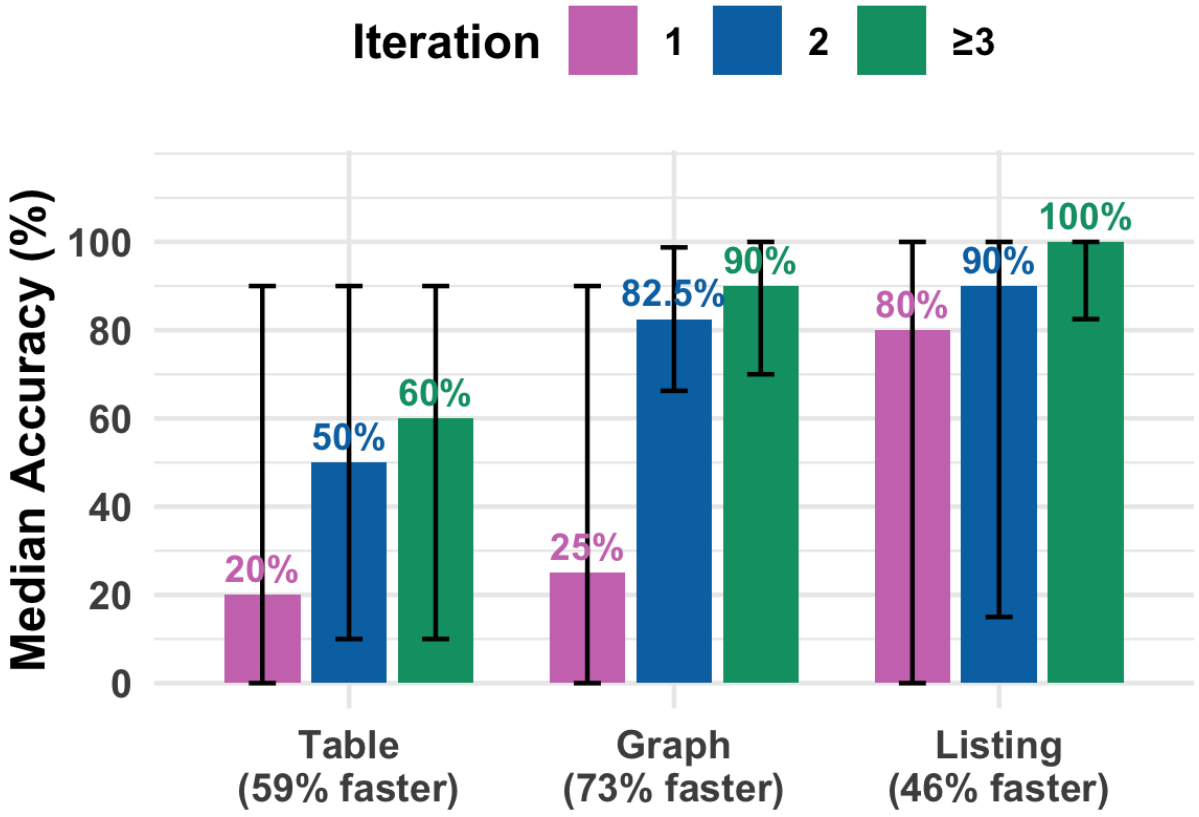
→ **Human confirms at each checkpoint** *via* `@pass`, `@fail`, `@clarify`

Results (2 HITL Checkpoints)

- 9 statistical programmers were assigned multiple TLGs.
- Across 3 therapeutic areas and 9 completed studies, using both **JJCS** and ***non*-JJCS** standards to reflect **real-world** workflows.
- Resulted in **329** total output attempts across all programmers and iterations.

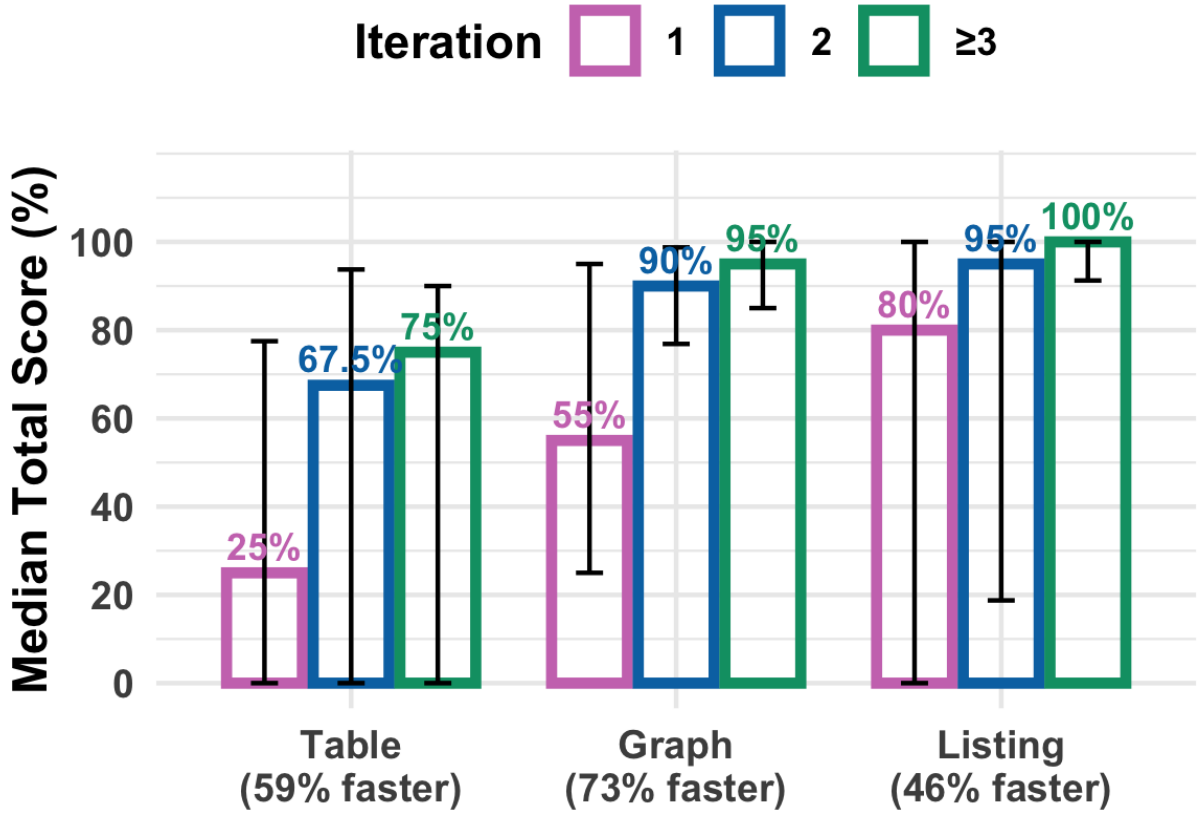
Accuracy

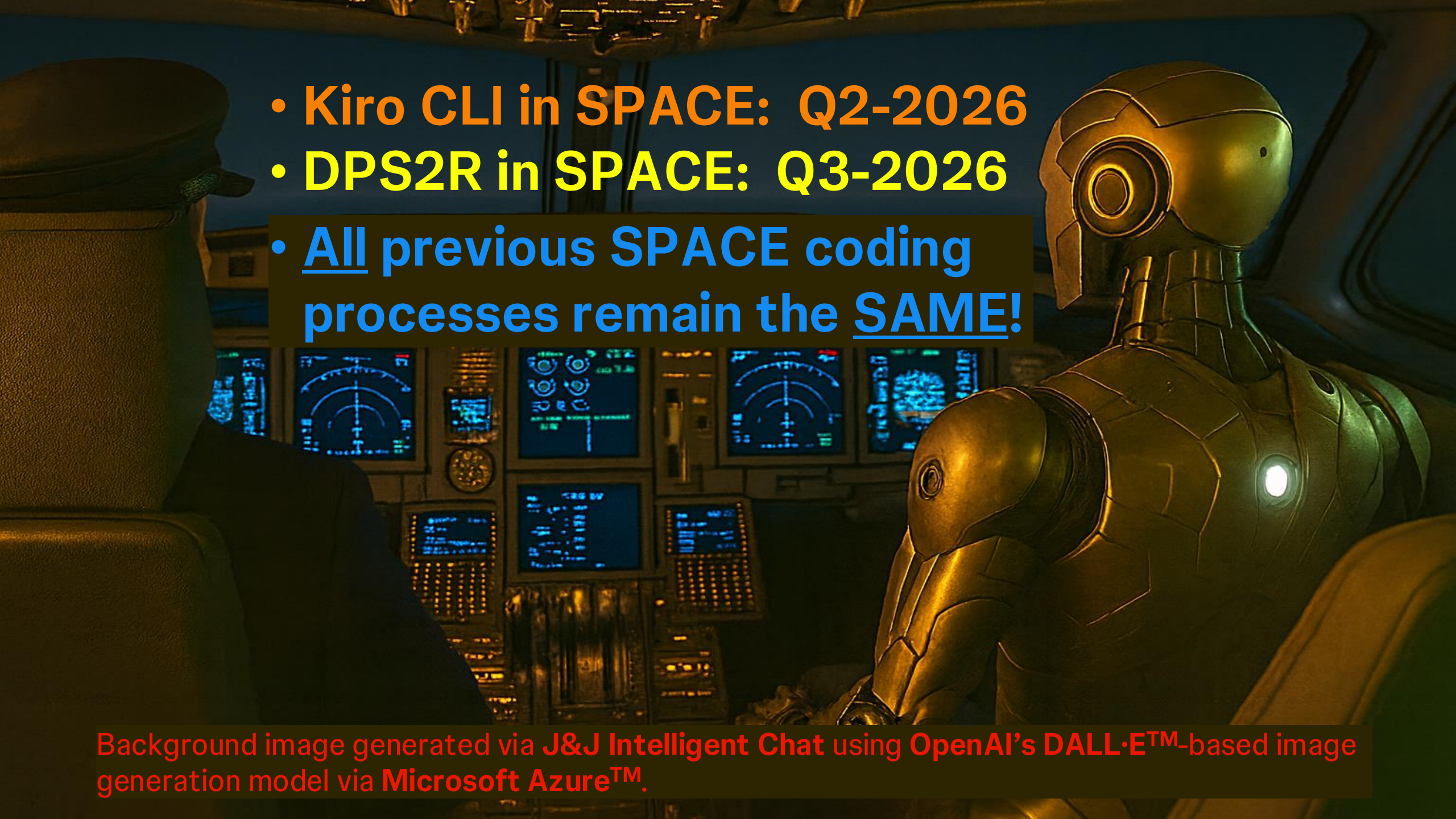
N: Table=150, Graph=51, Listing=73



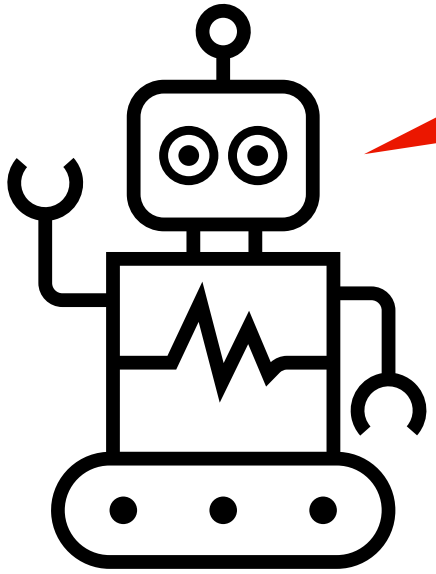
Total Score

N: Table=189, Graph=56, Listing=84




• Kiro CLI in SPACE: Q2-2026
• DPS2R in SPACE: Q3-2026
• All previous SPACE coding processes remain the SAME!
Background image generated via J&J Intelligent Chat using OpenAI's DALL·E™-based image generation model via Microsoft Azure™.

Questions???



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Thank You! 😊