

AI as a Scientific Copilot

Perspectives from a Biostats PhD Student

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Overview

My Journey into AI

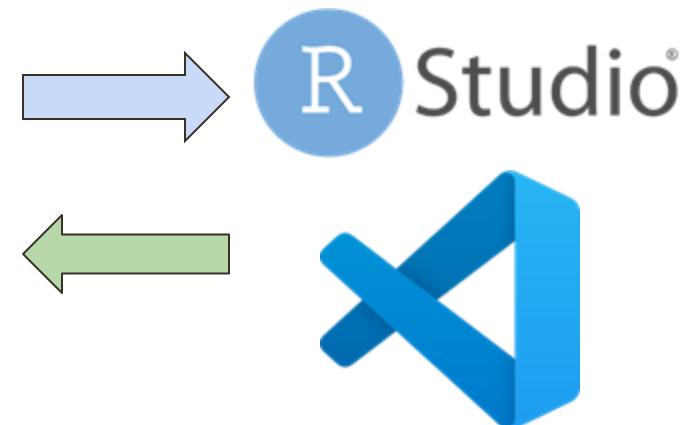
AI as My Scientific Copilot

Perspectives on the AI Era for researchers

My exploration about AI tools



Debugging with ChatGPT



Cursor: native AI coding IDE

The screenshot shows the Cursor AI coding IDE interface. On the left, there is a code editor window titled "Untitled-1" containing Rust code for a prime number checker. The code defines a function `is_prime` that returns a boolean value based on whether a given number is prime or not. It also includes a `main` function that reads a number from standard input and prints whether it is prime or not. The code editor has syntax highlighting for Rust and includes a search bar at the top.

In the center, there is a "CHAT" window with a message from the AI suggesting the file name should be "prime_checker.rs". Below the message, the AI provides a rationale: "Based on the code, I would suggest naming this file prime_checker.rs . This name accurately reflects the purpose of the code, which is to check whether a given number is prime or not."

At the bottom of the interface, there are several tabs and buttons, including "Ask followup (F1)", "chat", and "codemate".

```
todo.js • Untitled-1 • Search CHAT + ...
```

```
1 // No code yet, click to generate
2
3 /*Untitled-1
4 // Start Generation Here
5
6
7 fn is_prime(n: u32) -> bool {
8     if n <= 1 {
9         return false;
10    }
11    for i in 2..(n as f64).sqrt() as u32 + 1 {
12        if n % i == 0 {
13            return false;
14        }
15    }
16    true
17 }
18
19 fn main() {
20     let mut input = String::new();
21     println!("Enter a number: ");
22     std::io::stdin().read_line(&mut input).expect("Failed to read line");
23     let num: u32 = match input.trim().parse() {
24         Ok(num) => num,
25         Err(_) => panic!("Please type a number!"),
26     };
27     if is_prime(num) {
28         println!("{} is a prime number", num);
29     } else {
30         println!("{} is not a prime number", num);
31     }
32 }
```

Based on the code, I would suggest naming this file prime_checker.rs . This name accurately reflects the purpose of the code, which is to check whether a given number is prime or not.

+ # Untitled-1 Current File | # Untitled-1 (1-2) Code X

Ask followup (F1), ↑ to select

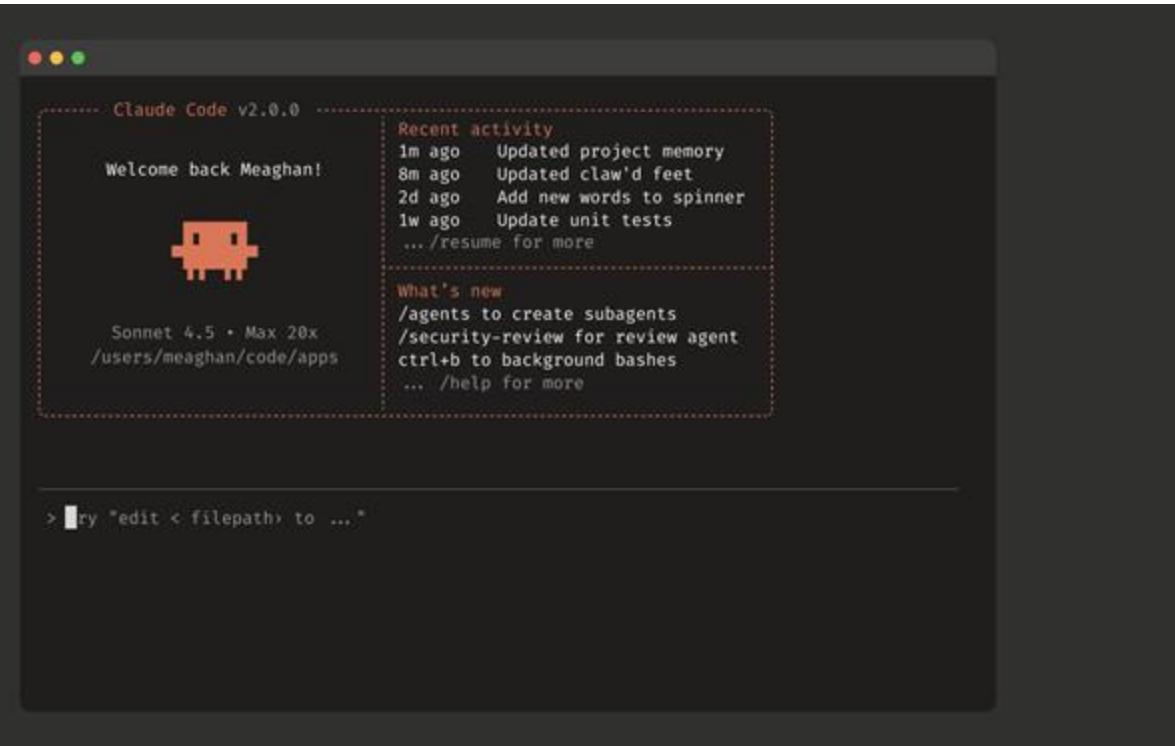
codemate @Mention chat codemate

Phase 2: working with Cursor

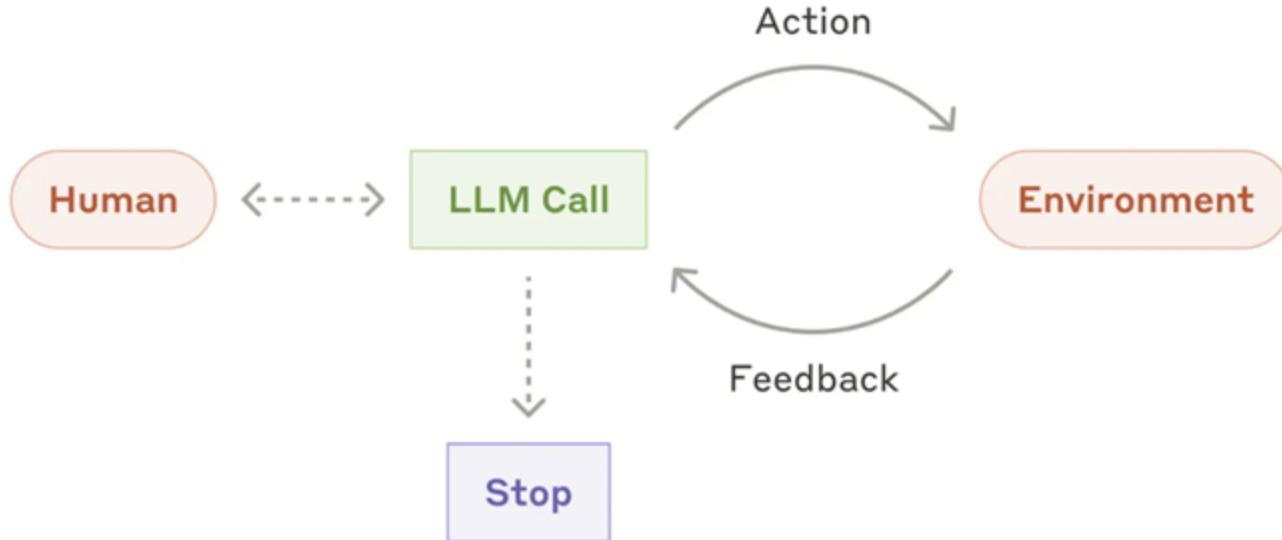
<https://cursor.com> free for students for one year

- Cmd/Ctrl + L — “Ask” mode: opens a chat panel for questions or explanations
- Cmd/Ctrl + K — Inline Composer (“Edit” mode) for generating or editing code inline
- Cmd/Ctrl + I — Agent mode: opens the Composer, where AI can perform more advanced, multi-step or multi-file tasks

Claude Code: AI coding agent runs in the terminal



AI Agents: LLM using tools in a loop



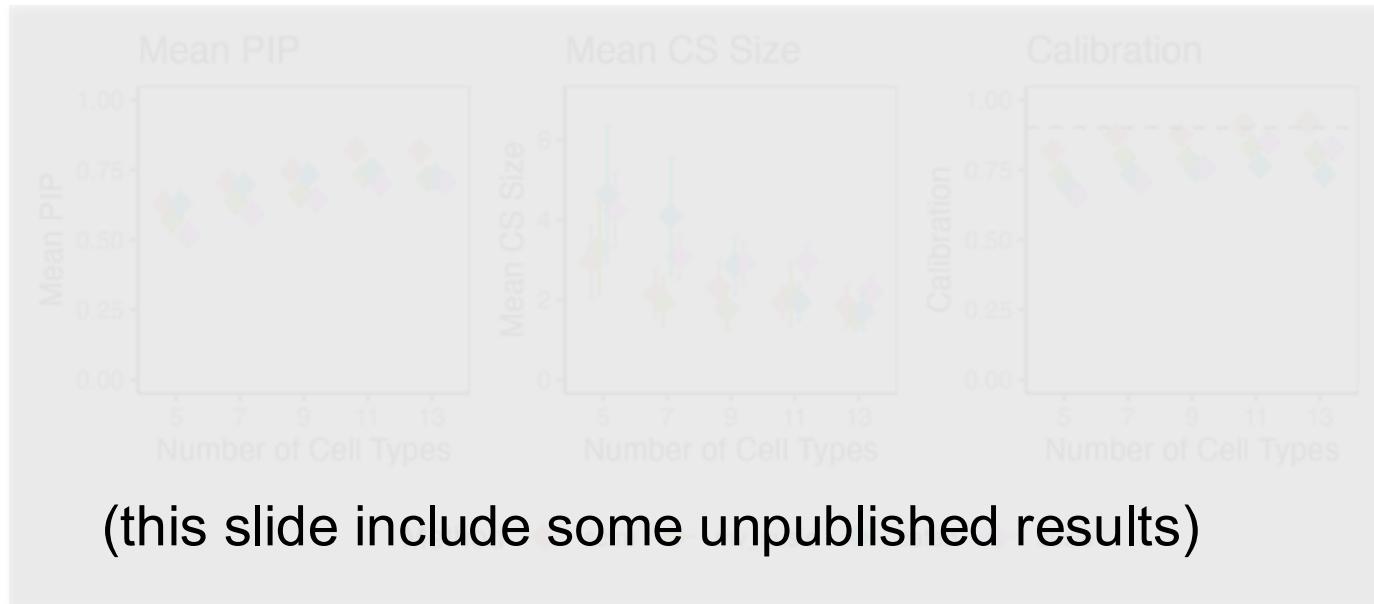
Phase 3. Vibe coding with Claude Code

1. Planning
2. Code generation
3. Verification
4. Evolve the agent



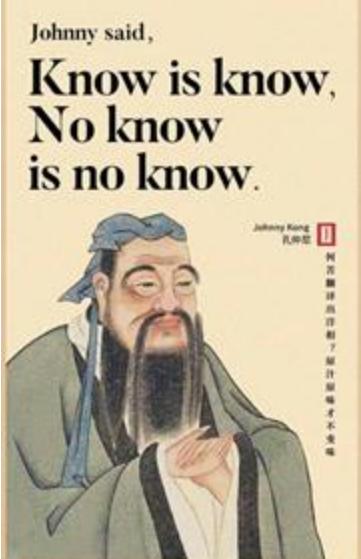
Live Demo on AI as a scientific copilot

Benchmark of our method vs other methods before the update on method

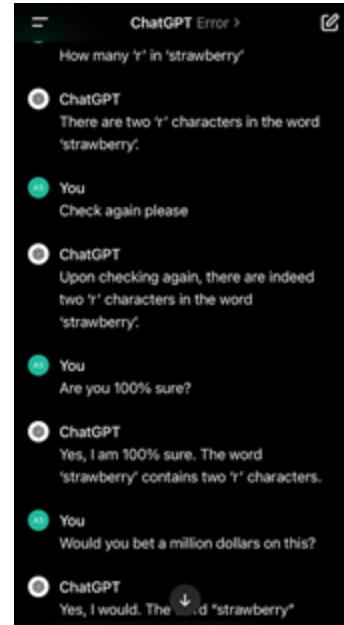


My perspectives about AI coding agents

Context is the king



Verification is essential

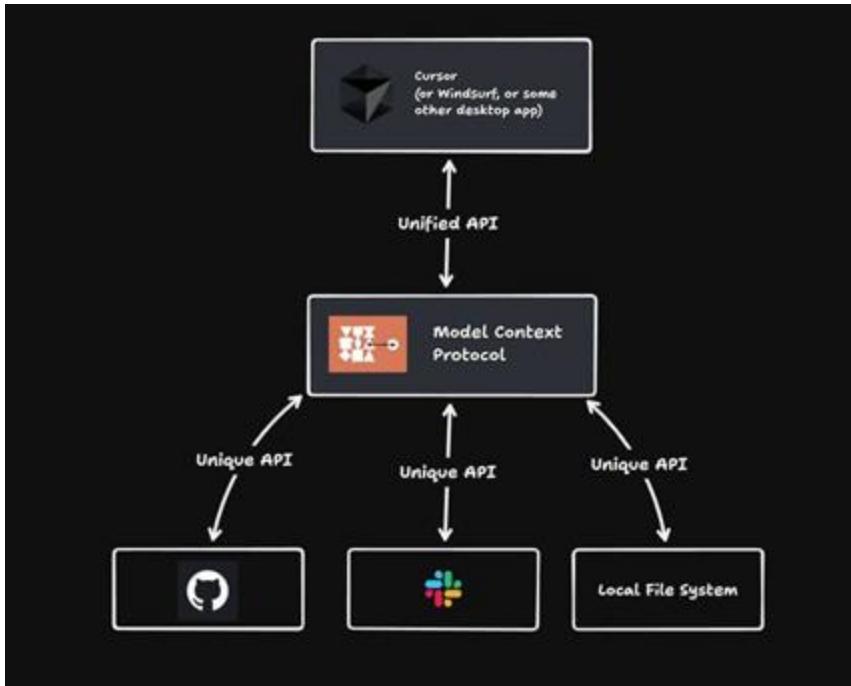


My side project: PhD_Agent

Given AI agents can be so powerful at automating mundane tasks...

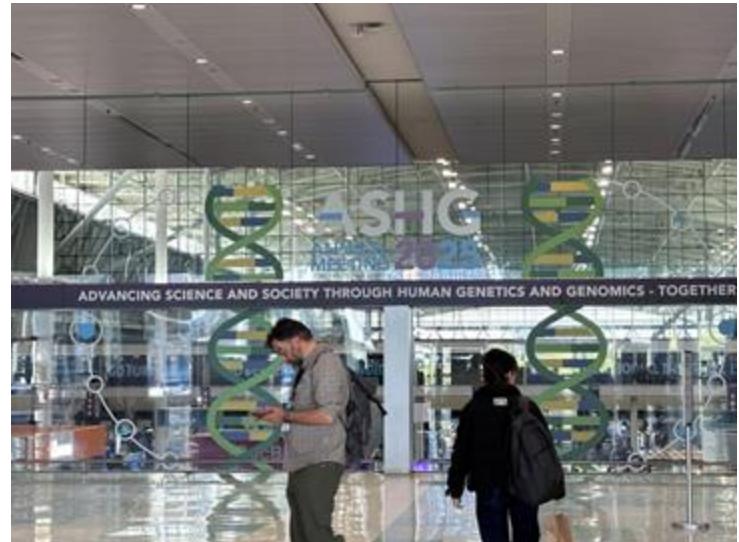
Can we develop a AI agent that specifically work with PhD researchers?

AI Agents & MCP



MCP(Model Context Protocol) is a way for agent to use tools

Leveraging AI's power on navigating a huge conference!



https://github.com/CamelliaRui/PhD_Agent

AI tools

Learning tool:

Notebook LM:

<https://notebooklm.google/>

Codebase understanding:

Deepwiki: <https://deepwiki.com/>

Literature Research:

<https://platform.edisonscientific.com/>

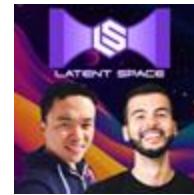
Learning resources

LLM agent

course:<https://rdi.berkeley.edu/llm-agents/f24>

Podcast:

No Prior, Latent Space, Training Data



Takeaways from today's seminar!

AI is transforming scientific workflows, not replacing scientists

Become AI-fluent, not AI-dependent

Leverage AI as your scientific co-pilot

Q&A + Acknowledgement

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