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Vibe Coding and Anything

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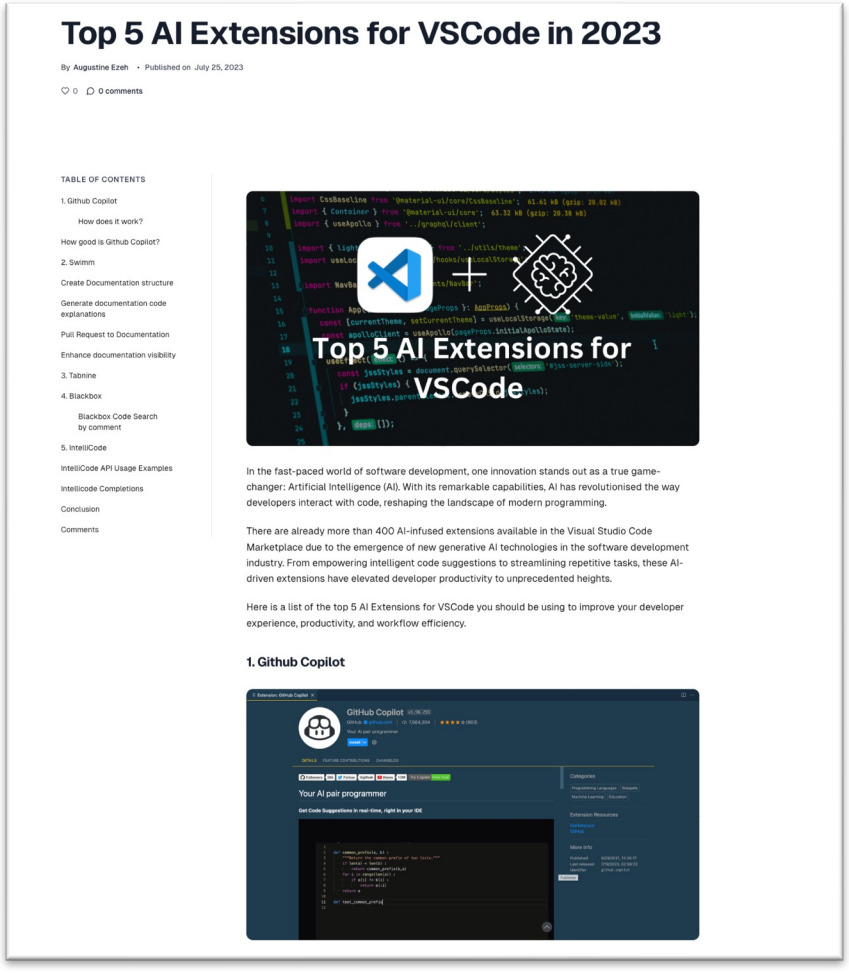
第一阶段：Autocomplete

GitHub Copilot



Top 5 AI Extensions for VSCode in 2023

By Augustine Ezeh • Published on July 25, 2023

0 0 comments

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In the fast-paced world of software development, one innovation stands out as a true game-changer: Artificial Intelligence (AI). With its remarkable capabilities, AI has revolutionised the way developers interact with code, reshaping the landscape of modern programming.

There are already more than 400 AI-infused extensions available in the Visual Studio Code Marketplace due to the emergence of new generative AI technologies in the software development industry. From empowering intelligent code suggestions to streamlining repetitive tasks, these AI-driven extensions have elevated developer productivity to unprecedented heights.

Here is a list of the top 5 AI Extensions for VSCode you should be using to improve your developer experience, productivity, and workflow efficiency.

1. Github Copilot

2021年开始测试，正式上线于2022年

- 自动补全工具
- 根据注释提示可以补全函数

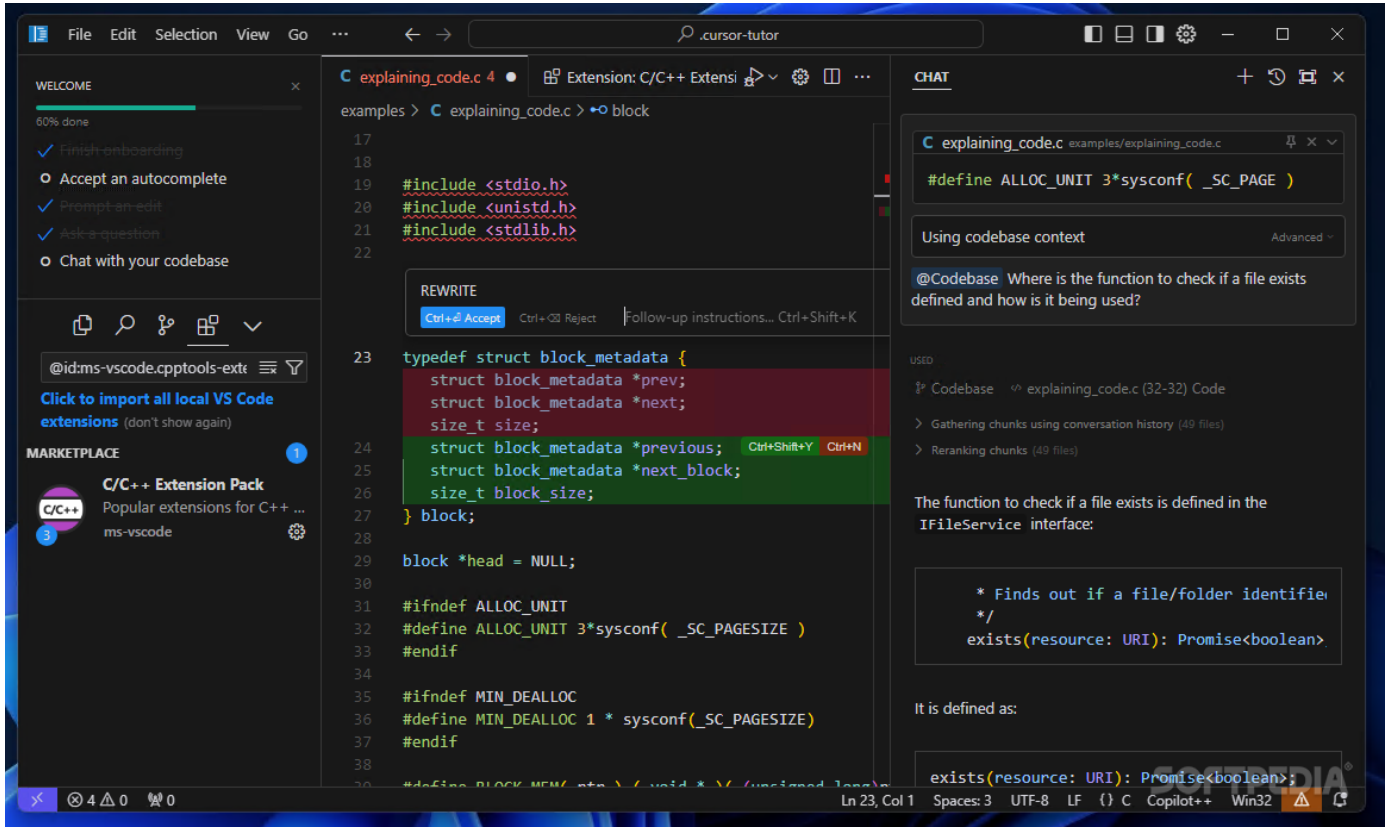
useRowActions.js

```
28      },
29      {
30        label: 'Modify rate/allocation',
31        selected: false,
32        onClick: (e, row) => {
33          const id = row[0]?.value;
34          const record = { ...getRecordById(id) };
35          setRowModal(<ModifyModal booking={record} onClose={e => setRowMod
36        },
37      },
38      {
39        label: 'Delete',
40        selected: false,
41        onClick: (e, row) => {
42          const id = row[0]?.value;
43          const booking = { ...getRecordById(id) };
44          setRowModal(<DeleteModal booking={booking} refreshParent={refresh
45        },
46      },
47    ];
48    return rowActions;
49  };
50
51  export default useRowActions;
52
```

第二阶段：IDE Agent

发布于2023年

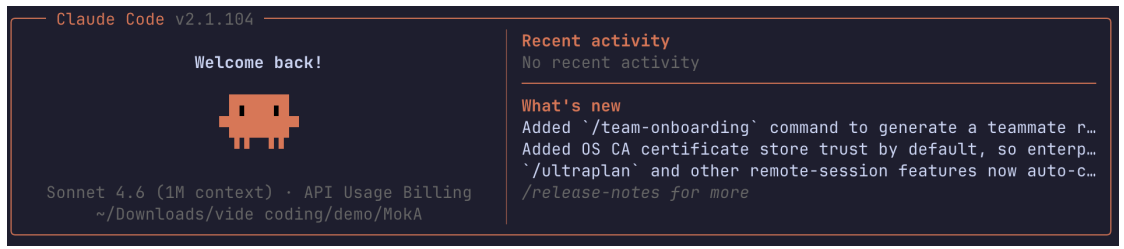
- 大模型Agent内置在IDE中
- Human-agent协作
- 自然语言编程，prompt-repsonse方式驱动，只需要校验修改
- 可以直接针对整个项目进行更改
- 配置多个主流大模型



第三阶段：CLI Agent

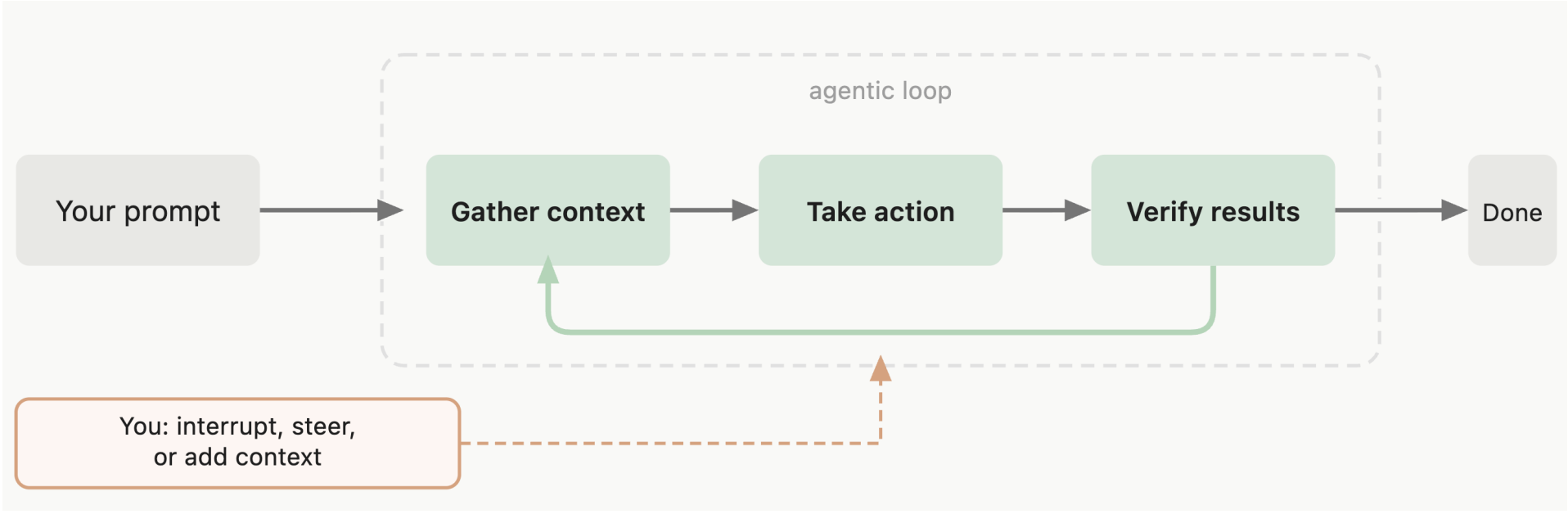
Claude Code发布于2025年

- Command Line Agent
- AI从“副驾驶”到“主驾驶”
- 只关心输出，不关心difference
- Human只关注如何定义任务，放手让AI全部执行，主动性更强
- 部署更自由，有terminal的地方就有agent



Beyond coding

基本使用


agentic loop
Your prompt
Gather context
Take action
Verify results
Done
You: interrupt, steer,
or add context

QuickStart

以我们的NeurIPS论文MokA的项目代码为例，如何快速上手并进行修改和拓展

如何快速了解一个新项目？

/init

总结当前codebase的基本结构.

然后继续提问从high-level到specific：

- *give me an overview of this codebase*
- *explain the main architecture patterns used here*
- *what are the model backbone?*

QuickStart

以我们的NeurIPS论文MokA的项目代码为例，如何快速上手并进行修改和拓展

```
→ MokA claude
  Claude Code v2.1.91
  Sonnet 4.6 · API Usage Billing
  ~/Downloads/demo/MokA

❯ 修改modified_peft，修改原本设计中的cross-attention模块，改为使用文本question作为query
进行跨模态attention

● Explore(Explore modified_peft directory)
  └ Bash(ls -la /Users/ykw/Downloads/demo/MokA/models/ | head -30)
    Bash(grep -r "projector\|QFormer" /Users/ykw/Downloads/demo/MokA/models/*.py
        2>/dev/null | grep -i "class\|def" | head -20)
    Search(pattern: "class.*Projector|class.*QFormer", path: "models")
    +11 more tool uses (ctrl+o to expand)
  └ Interrupted · What should Claude do instead?

❯ 查看当前LoRA的实现

  Searched for 1 pattern, read 1 file (ctrl+o to expand)

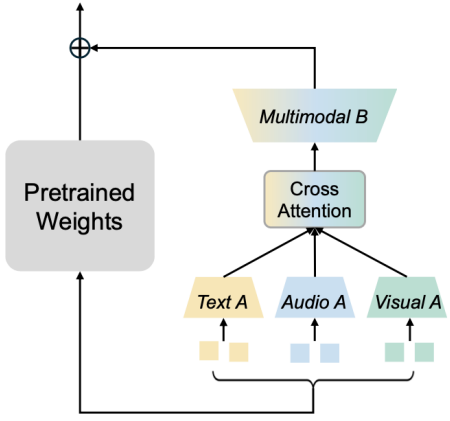
● 现在我理解了当前设计：image token 作为 query，question token 作为 key/value。

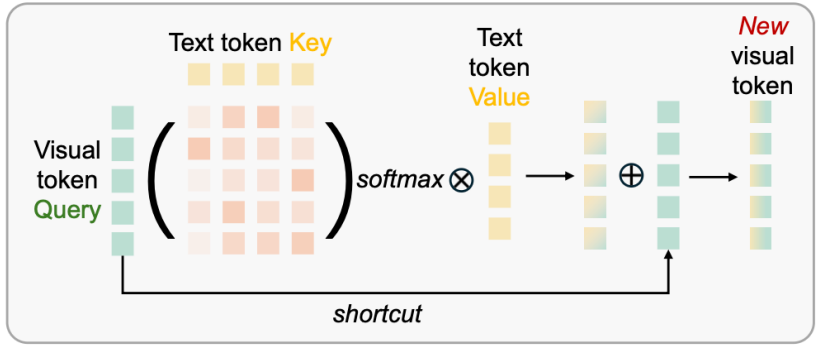
  要改为 question token 作为 query，image token 作为 key/value，只需修改 Linear.forward
  中的 cross-attention 块（第 627-653 行）：

● Update(modified_peft/tuners/lora/layer.py)

Edit file
modified_peft/tuners/lora/layer.py
623                     # Step 2: reshape 回 batch 维度，进行 cross attention
624                     lora_A_output = lora_A_output_flat.reshape(batch, seq_len, 1)
625
626 -                   # 如果有 question_mask，对 image token 和 question token 做 cross
    -attention
626 +                   # 如果有 question_mask，对 question token 和 image token 做 cross
    +attention
627                     if (image_mask_flat == 1).any():
628                         for i in range(batch):
629 -                           # 获取当前样本的 image token 索引
630 -                           image_indices = torch.where(my_image_mask[i] == 1)[0]
631 -                           if len(image_indices) == 0:
632 -                               continue
633 -
```

如何基于该项目进行拓展？此时以MokA中的交互模块设计为示例。





Vibe Coding and Anything

Context
让agent理解项目

- Rules
  永久上下文
- Memory
  项目内部上下文

Orchestration
让agent做复杂项目

- Skills
  预置SOP
- Hooks
  状态触发事件
- Automations
  后台任务
- SubAgent
  各自执行
- AgentTeam
  多Agent合作

Guardrails
让agent可控

- Permissions
  命令执行权限
- Sandbox
  隔离的运行环境

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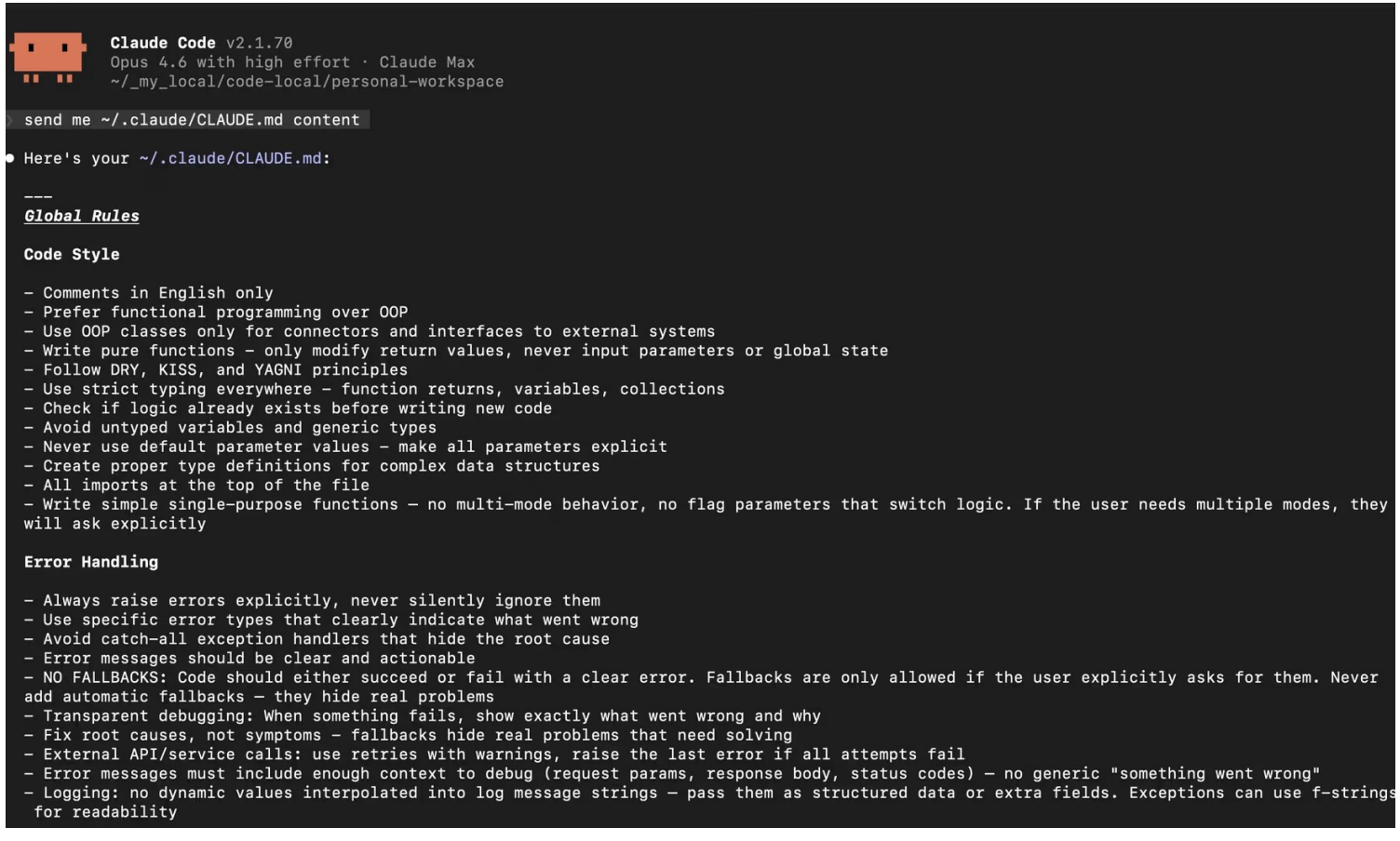
Rules-全局上下文

Rules：~/.claude/CLAUDE.md

永久上下文，每次新session都会载入，显式制定规则，例如coding style，错误处理等等。
不建议太长， 如有需求可以拆解为多个markdown，按需载入




```
.claude/rules/
├── code-style.md
├── testing.md
├── api-conventions.md
└── security.md
```

Memory-项目内上下文

Memory：~/.claude/projects/<project>/memory/

Claude code会为每个项目维护memory目录，MEMORY.md为入口文件，在整个会话期间，Claude 会读取和写入此目录中的文件。

记录当前项目的debug信息，以及当前项目需要遵循的要求等等。

```
~/.claude/projects/<project>/memory/
├── MEMORY.md          # Concise index, loaded into every session
├── debugging.md       # Detailed notes on debugging patterns
├── api-conventions.md # API design decisions
└── ...                # Any other topic files Claude creates
```

Vibe Coding and Anything

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- Sandbox
  隔离的运行环境

Skills-标准化

Why Skills?

- 大模型的SOP，抽象和复用能力，把流程标准化，避免反复说明，模型反复进行思考消耗。
- 可以是需要注入的domain knowledge，可以是对某类型文件的多种操作，可以是任一固定流程
- 包含背景信息、工具使用说明、参考范式/格式规范等等
  - 处理pdf，xlsx等各种格式文件
  - 抓取并总结当日hugging face daily paper，保存到Notion页面
  - 在指定的标准benchmark评测模型
  - 等等

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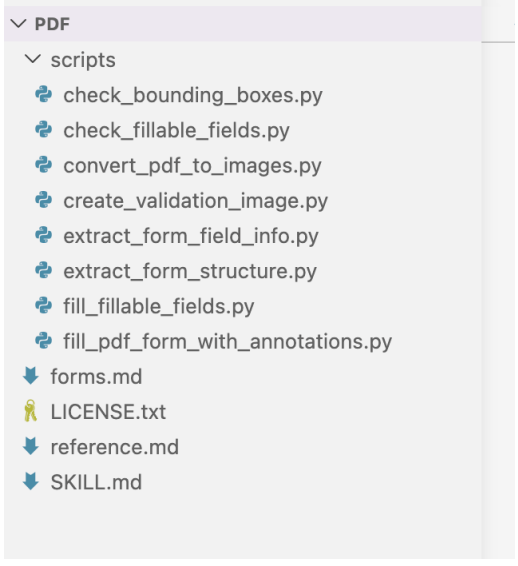
- 包含背景信息、工具使用说明、参考范式/格式规范等等
- 渐进式披露

SKILL.md中的其他内容：触发时加载（<5k token）

两种触发方式：

1. 模型生成过程中若判定需求与该skill匹配，则读取
2. 用户主动在prompt中斜杠调用



文件夹中的其他内容：按需加载（长度不限）

执行该skill过程中若需要则加载，SKILL.md中可能链接到文件夹中的其他资源

Skill姓名及描述：始终加载（~100 token）

```
---
name: pdf
description: Use this skill whenever the user wants to do anything with PDF files. This includes reading or extracting text/tables from PDFs, combining or merging multiple PDFs into one, splitting PDFs apart, rotating pages, adding watermarks, creating new PDFs, filling PDF forms, encrypting/decrypting PDFs, extracting images, and OCR on scanned PDFs to make them searchable. If the user mentions a .pdf file or asks to produce one, use this skill.
license: Proprietary. LICENSE.txt has complete terms
---

# PDF Processing Guide

## Overview

This guide covers essential PDF processing operations using Python libraries and command-line tools. For advanced features, JavaScript libraries, and detailed examples, see REFERENCE.md. If you need to fill out a PDF form, read FORMS.md and follow its instructions.

## Quick Start

```python
from pypdf import PdfReader, PdfWriter

# Read a PDF
reader = PdfReader("document.pdf")
print(f"Pages: {len(reader.pages)}")

# Extract text
text = ""
for page in reader.pages:
    text += page.extract_text()
```
```

具体的事件描述及处理方式

SKILL.md

```
## Python Libraries

### pypdf - Basic Operations

#### Merge PDFs
```python
from pypdf import PdfWriter, PdfReader

writer = PdfWriter()
for pdf_file in ["doc1.pdf", "doc2.pdf", "doc3.pdf"]:
    reader = PdfReader(pdf_file)
    for page in reader.pages:
        writer.add_page(page)

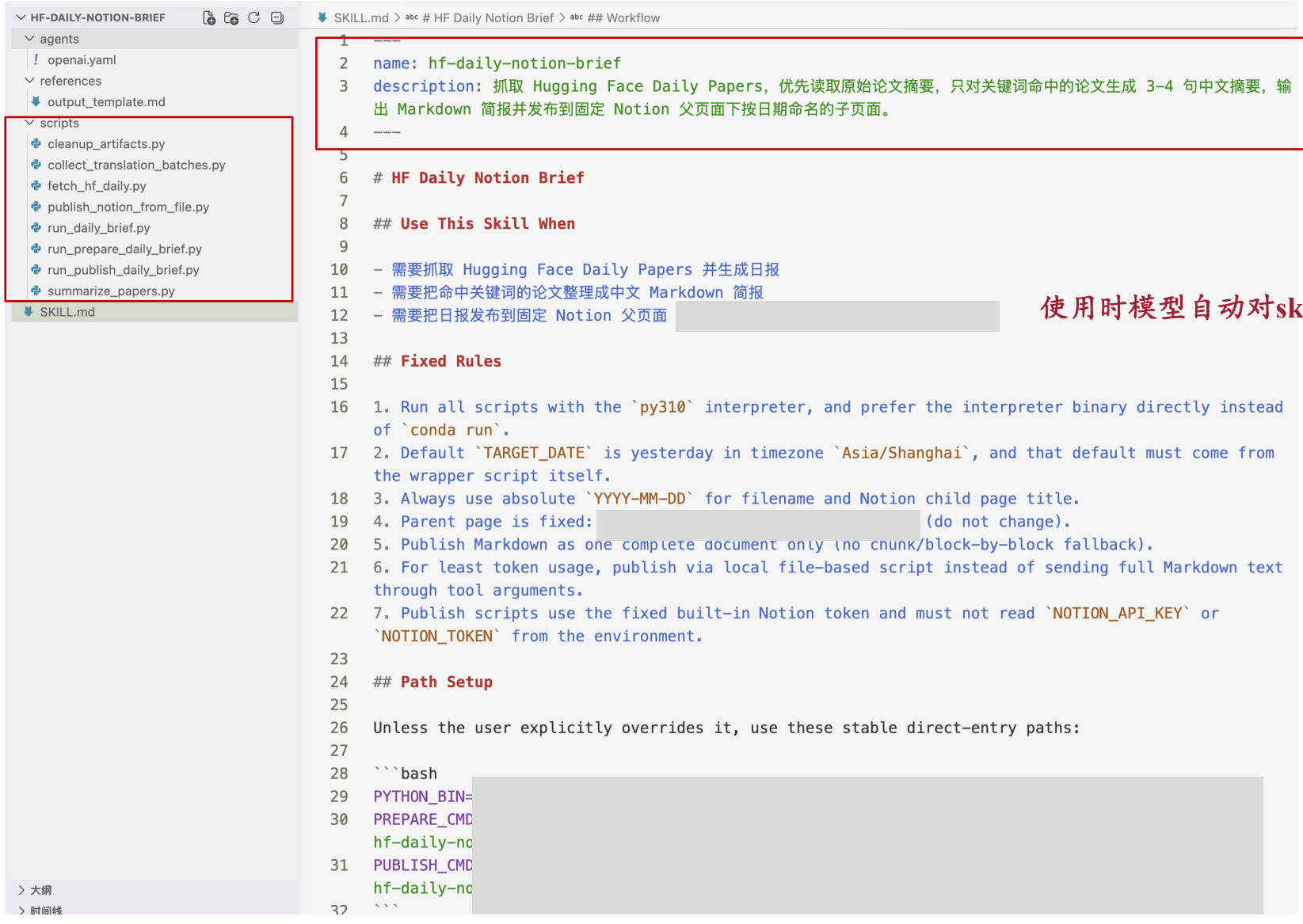
with open("merged.pdf", "wb") as output:
    writer.write(output)
```

Split PDF
```python
reader = PdfReader("input.pdf")
for i, page in enumerate(reader.pages):
    writer = PdfWriter()
    writer.add_page(page)
    with open(f"page_{i+1}.pdf", "wb") as output:
        writer.write(output)
```
```

可能设计对python脚本，shell命令的执行

Skills-标准化

一个抓取每日论文的skill例子



使用时模型自动对skill具体内容进行改进

Skills-标准化

Why Skills?

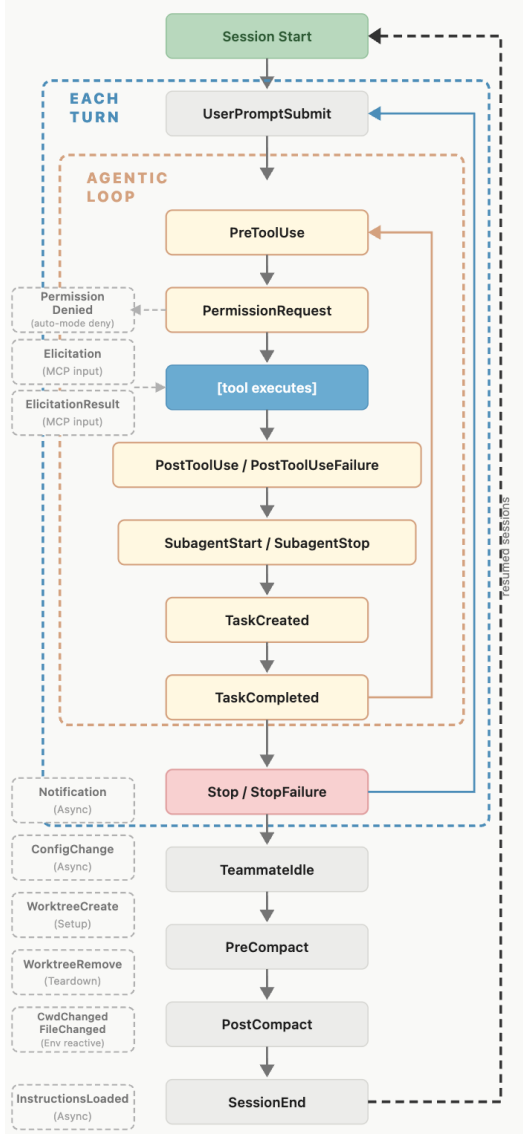
- 大模型的SOP，抽象和复用能力，把流程标准化，避免反复说明，模型反复进行思考消耗。
- 可以是需要注入的domain knowledge，可以是对某类型文件的多种操作，可以是任一固定流程
- 包含背景信息、工具使用说明、参考范式/格式规范等等
  - 处理pdf，xlsx等各种格式文件
  - 抓取并总结当日hugging face daily paper，保存到Notion页面
  - 在指定的标准benchmark评测模型
  - 等等

- 不建议载入过多skills。占用过多context长度，且尤其在session窗口context已经比较长的情况下，模型无法回溯到注入的skills信息。
- 在输入的指令圈定可能使用的skills范围，减少模型的大范围搜索

Hooks-自动化

Why Hooks?

- 自定义的shell命令，执行确定性脚本，在session的生命周期的特定环节触发。
- Event-driven automations.
- 需要指定：什么时候触发、针对什么操作、运行什么脚本



一个session的生命周期

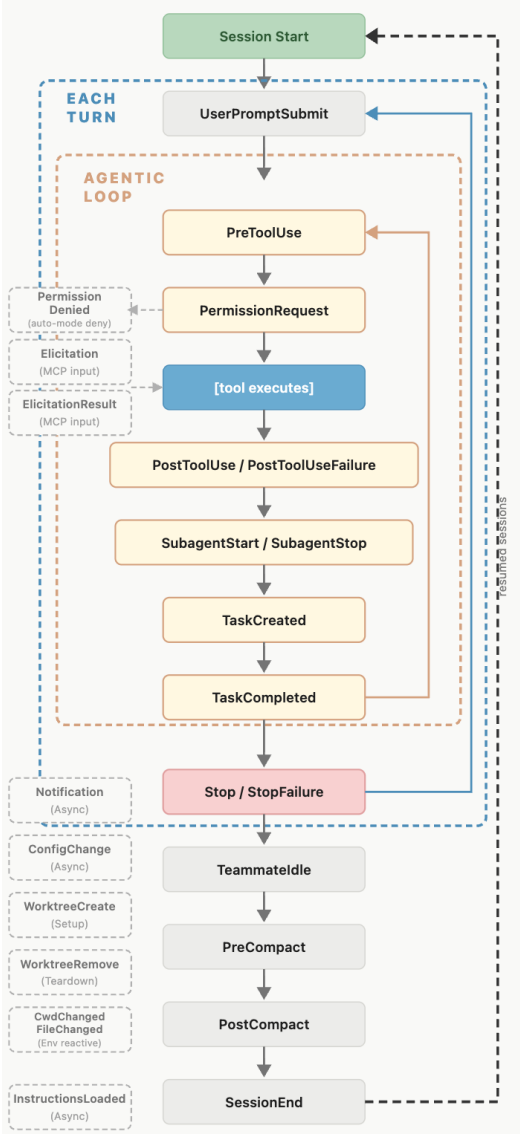
Hooks-自动化

```
{
  "hooks": {
    "CwdChanged": [
      {
        "hooks": [
          {
            "type": "command",
            "command": "direnv export bash >> \"$CLAUDE_ENV_FILE\""
          }
        ]
      }
    ]
  }
}
```

在文件切换时切换不同的环境变量

```
{
  "hooks": {
    "PostToolUse": [
      {
        "matcher": "Edit|Write",
        "hooks": [
          {
            "type": "command",
            "command": "jq -r '.tool_input.file_path' | xargs npx prettier --write"
          }
        ]
      }
    ]
  }
}
```

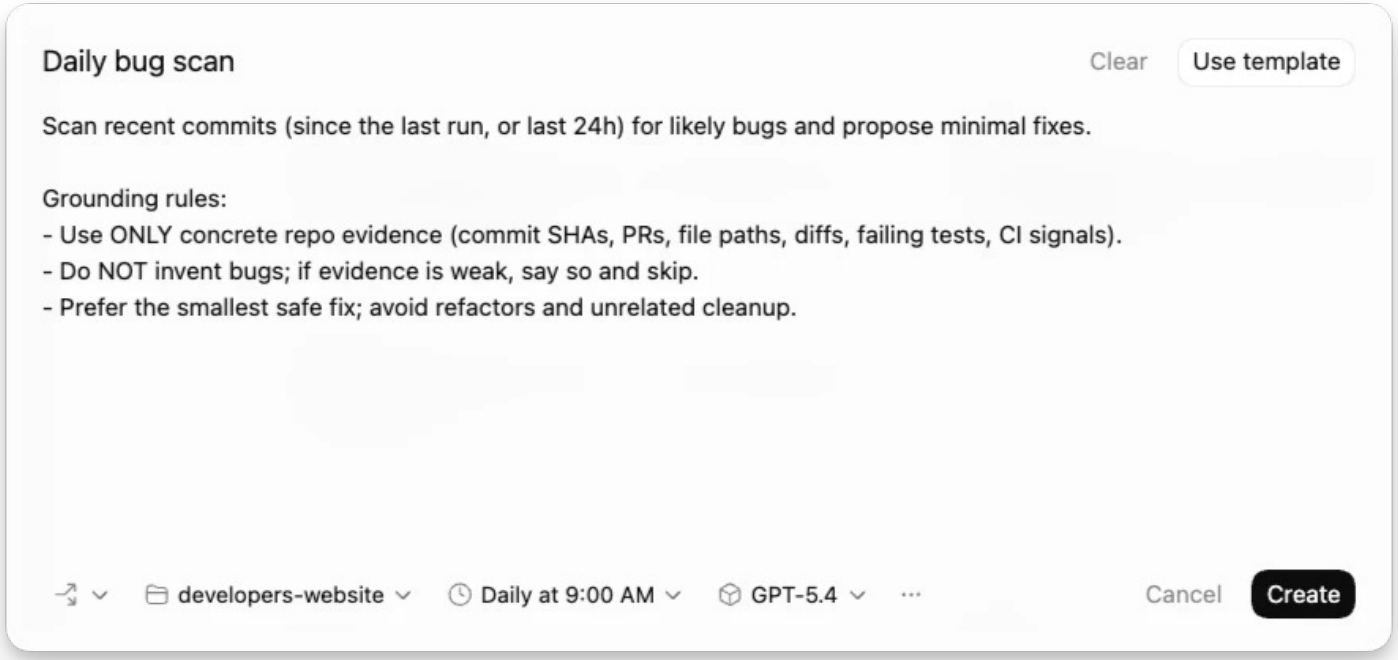
编辑后自动格式化代码



一个session的生命周期

Automations-后台任务

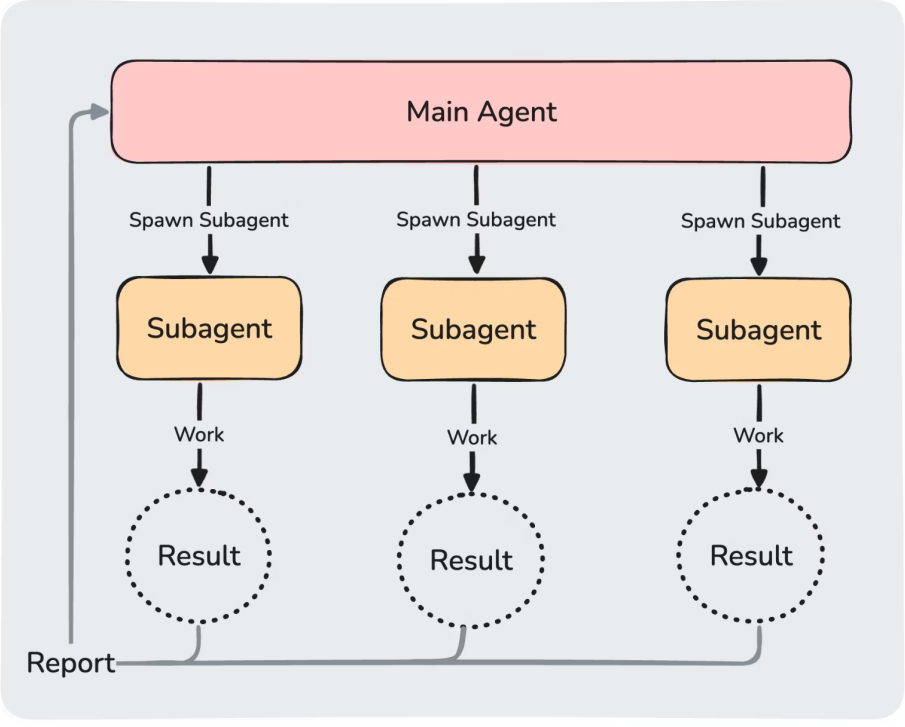
- 在后台自动执行重复性任务：每天抓取daily papers/每周生成research digest/定时检查 long-running experiments
- Hooks：当前 session 中某个事件触发
- Automations：未来某个时间/周期自动运行



应对复杂任务：Subagents与Agent Team

Why Subagent?

- 执行特定任务，在隔离的session中完成任务，节省/避免污染主session的context
- 对于特定任务，可以在隔离的session中给出更精准的instruction，避免主session的context影响特定任务
- 将明确、固定的特定任务交给成本更低的模型，节省成本。例如，主session用opus，subagent用haiku
- 跨项目复用subagent
- Main agent调用或用户触发



应对复杂任务：Subagents与Agent Team

还是抓取每日论文的skill例子，对于中文摘要总结采用单独的子程序处理，隔离context，并行加速

```
## Translation Prompt Template

When running subagents on the exported translation jobs, use a prompt with these
constraints:

- Read one JSON item at a time or a small batch of items from the local jobs
file.
- For each item, write `summary_zh` as 3-4 Chinese sentences.
- Stay faithful to the full English abstract.
- Preserve model names, dataset names, benchmark names, metrics, percentages,
and technical terms.
- Do not add commentary like `这篇文章主要讲了`.
- Output strict JSON only.
```

```
Recommended per-item prompt shape:

```text
你在处理机器学习论文摘要。请基于给定的完整英文摘要，写 3-4 句忠实、紧凑的中文摘要。
要求：
1. 保留方法、任务、数据集、指标、结果等关键信息。
2. 不要编造原文没有的信息。
3. 不要输出解释、前言或 Markdown。
4. 只输出一个 JSON 对象，格式为 {"index":<int>,"summary_zh":"..."}。
```

Expected translation job item shape:

```json
{
  "index": 0,
  "title": "Paper title",
  "topics": ["LLM", "Multimodal"],
  "summary": "Full English abstract..."
}
```
```

SKILL.md

共有 22 个待翻译条目，所以这轮按规则起 6 个子代理，批次会是 `4/4/4/4/3/3` 。我先把每批 jobs 写到独立的临时文件，再并行分发。

后台终端已完成以及 /Users/yichenfan/opt/anaconda3/envs/py310/bin/python - <<'PY' import json from pathlib impor...

已生成6 个智能体

已根据以下指令创建 Mendel (worker)：Translate the ML paper abstracts in /tmp/hf_batch_jobs_0.json into Chinese su...
已根据以下指令创建 Huygens (worker)：Translate the ML paper abstracts in /tmp/hf_batch_jobs_1.json into Chinese su...
已根据以下指令创建 Popper (worker)：Translate the ML paper abstracts in /tmp/hf_batch_jobs_2.json into Chinese su...
已根据以下指令创建 Kierkegaard (worker)：Translate the ML paper abstracts in /tmp/hf_batch_jobs_3.json into Chines...
已根据以下指令创建 Kepler (worker)：Translate the ML paper abstracts in /tmp/hf_batch_jobs_4.json into Chinese sum...
已根据以下指令创建 Meitner (worker)：Translate the ML paper abstracts in /tmp/hf_batch_jobs_5.json into Chinese su...

6 个翻译子代理已经分发出去了，每个只负责自己的 batch 文件，不会互相覆盖。我现在等第一轮全部落盘，然后按技能要求一次性 merge，再走 publish wrapper。

应对复杂任务：Subagents与Agent Team

Why Agent team?

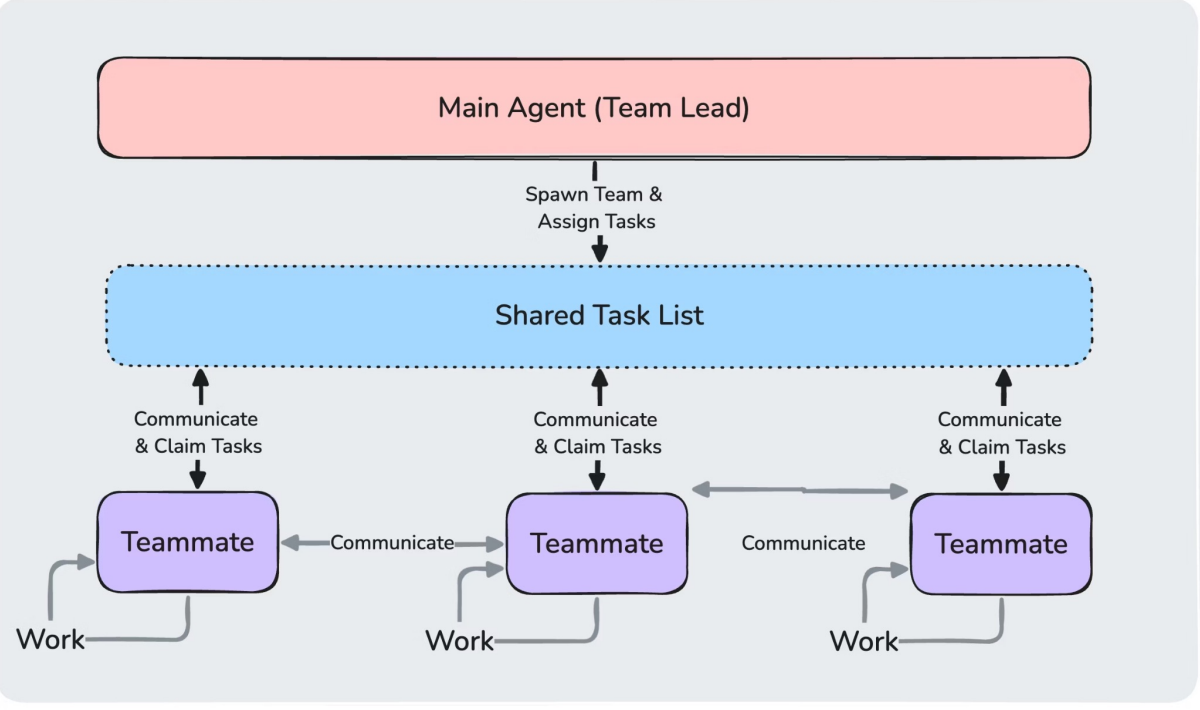
- Agent之间需要交流
- 需要多方面review正确性
- 并行处理讨论，更快收敛到正确答案

分别针对不同方面进行code review

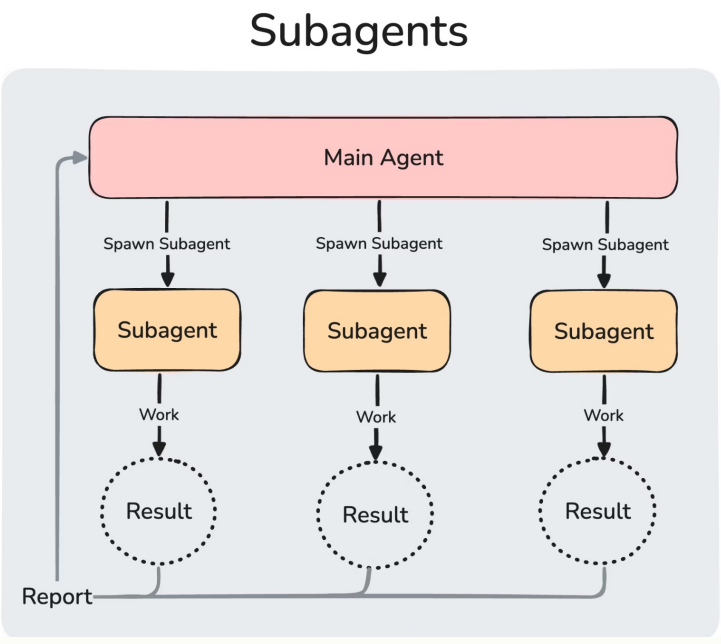
```
Create an agent team to review PR #142. Spawn three reviewers:
- One focused on security implications
- One checking performance impact
- One validating test coverage
Have them each review and report findings.
```

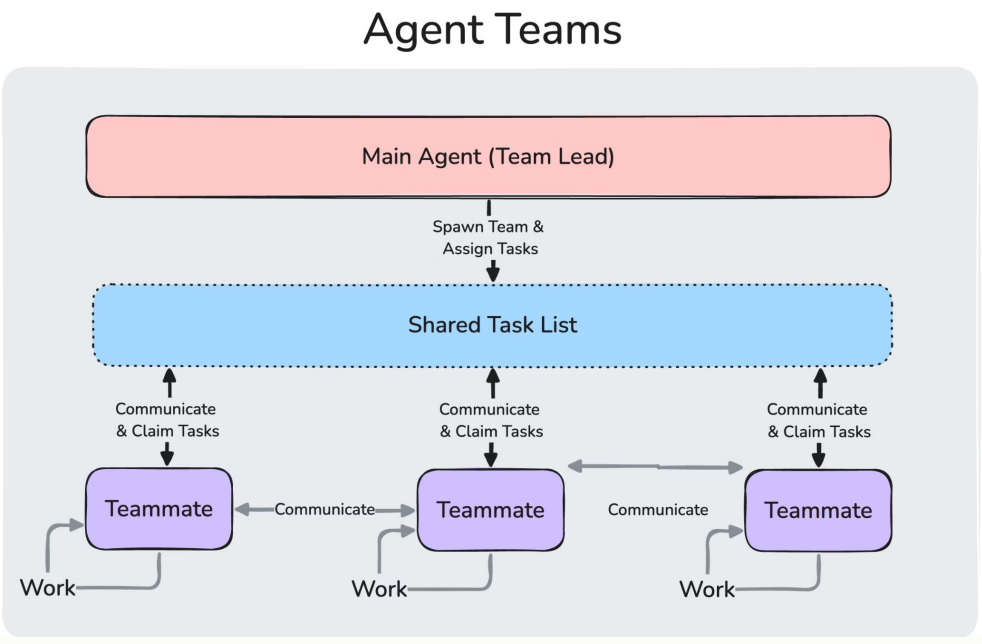
对于code issue，并行开展检查，并且进行debate

```
Users report the app exits after one message instead of staying connected.
Spawn 5 agent teammates to investigate different hypotheses. Have them talk to
each other to try to disprove each other's theories, like a scientific
debate. Update the findings doc with whatever consensus emerges.
```



应对复杂任务：Subagents与Agent Team





	Subagents	Agent teams
Context	Own context window; results return to the caller	Own context window; fully independent
Communication	Report results back to the main agent only	Teammates message each other directly
Coordination	Main agent manages all work	Shared task list with self-coordination
Best for	Focused tasks where only the result matters	Complex work requiring discussion and collaboration
Token cost	Lower: results summarized back to main context	Higher: each teammate is a separate Claude instance

是否需要agent之间交流　　仅执行　　需要讨论合作

Vibe Coding and Anything

Context
让agent理解项目

- Rules
  永久上下文
- Memory
  项目内部上下文

Orchestration
让agent做复杂项目

- Skills
  预置SOP
- Hooks
  状态触发事件
- Automations
  后台任务
- SubAgent
  各自执行
- AgentTeam
  多Agent合作

Guardrails
让agent可控

- Permissions
  命令执行权限
- Sandbox
  隔离的运行环境

Permissions-可执行边界

Permissions：/permissions

如何防止cli agent删库？

Allow，Ask，Deny

Tool type	Example	Approval required	”Yes, don’t ask again” behavior
Read-only	File reads, Grep	No	N/A
Bash commands	Shell execution	Yes	Permanently per project directory and command
File modification	Edit/write files	Yes	Until session end

```
/permissions

Permissions:  Recently denied   Allow   Ask   Deny   Workspace

Claude Code can read files in the workspace, and make edits when auto-accept edits
is on.

  -  /Users/ykw/Downloads/demo/MokA (Original working directory)
  1. Add directory…
```

Sandbox-受限环境安全运行

Why Sandbox?

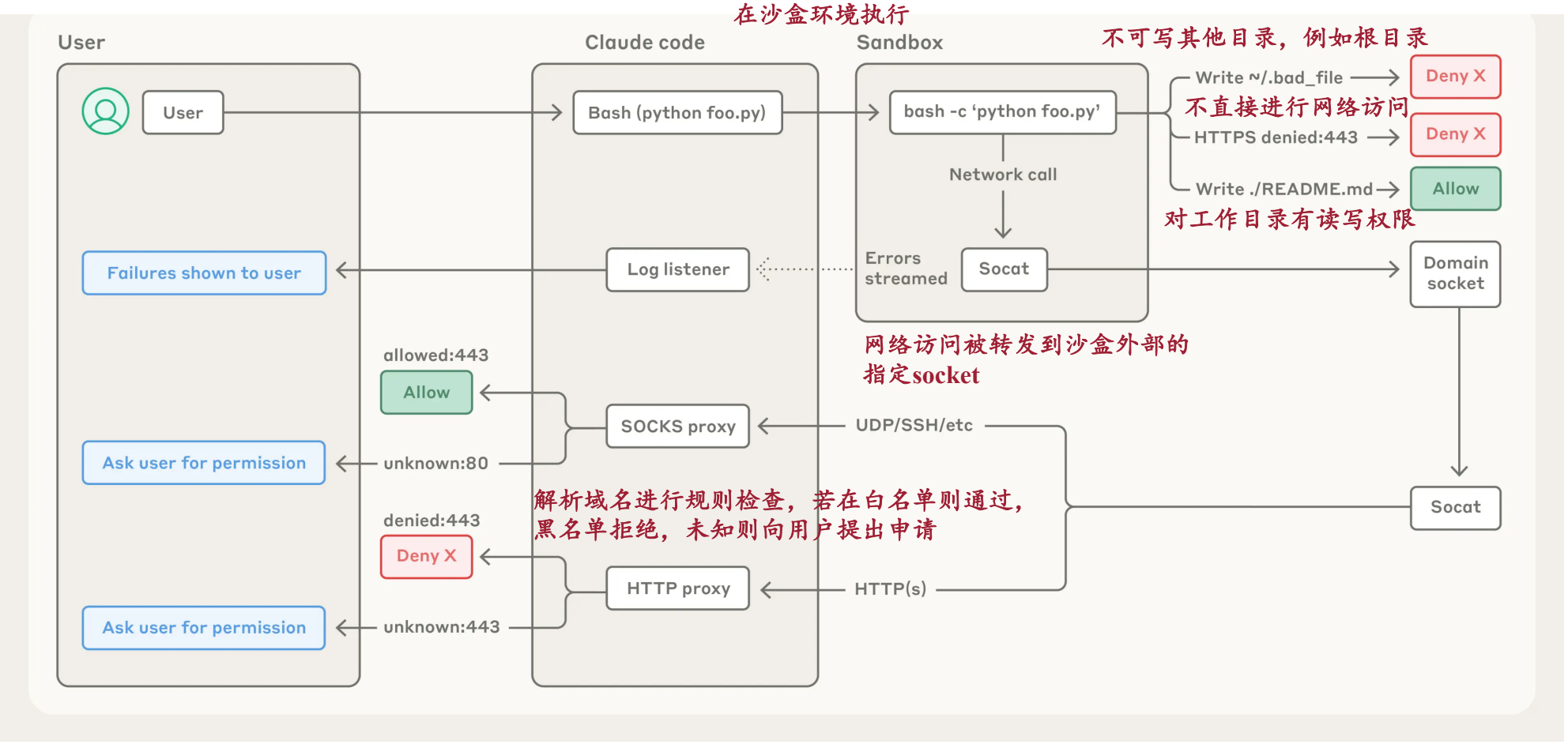
- 多次审批造成疲劳感
- 影响生产力，减慢开发流程
- 干扰模型自主性

How?

- 明确权限范围
- 减少审批提示
- 增强自主性

Sandbox-受限环境安全运行

Claude Code沙盒设计：文件系统隔离&网络隔离



Vibe Coding and Anything

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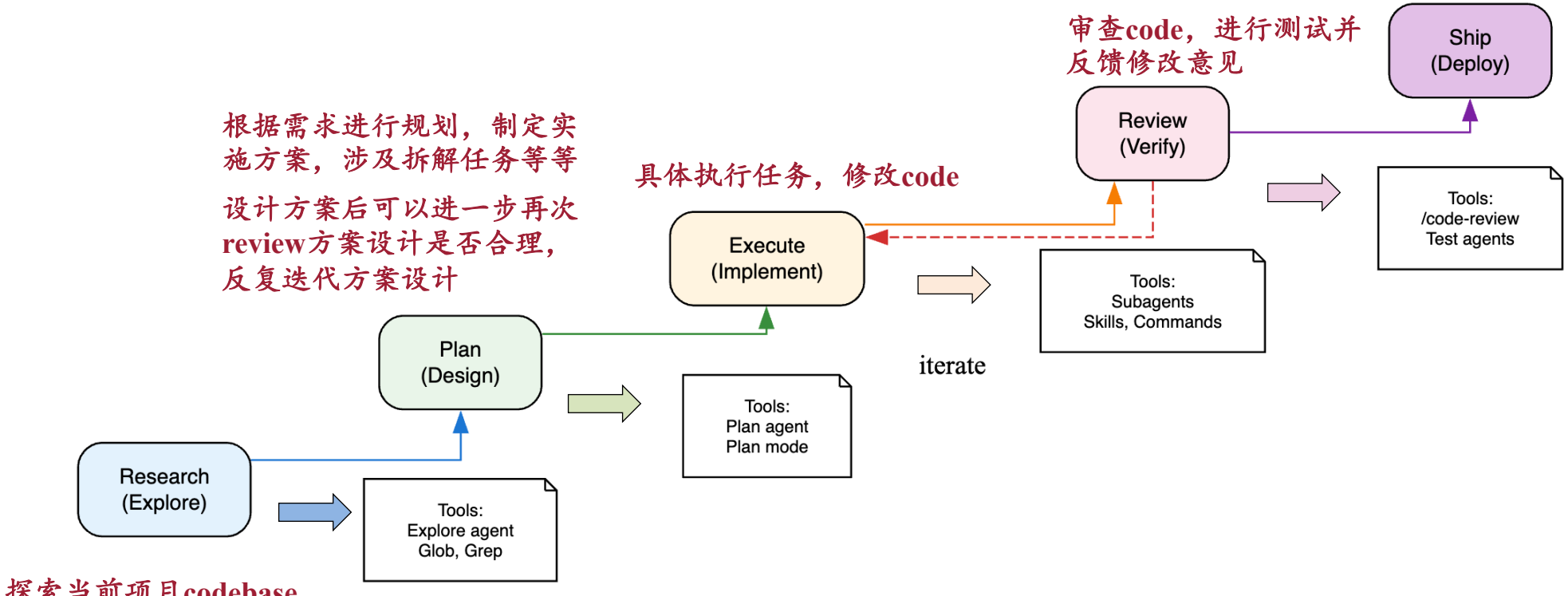
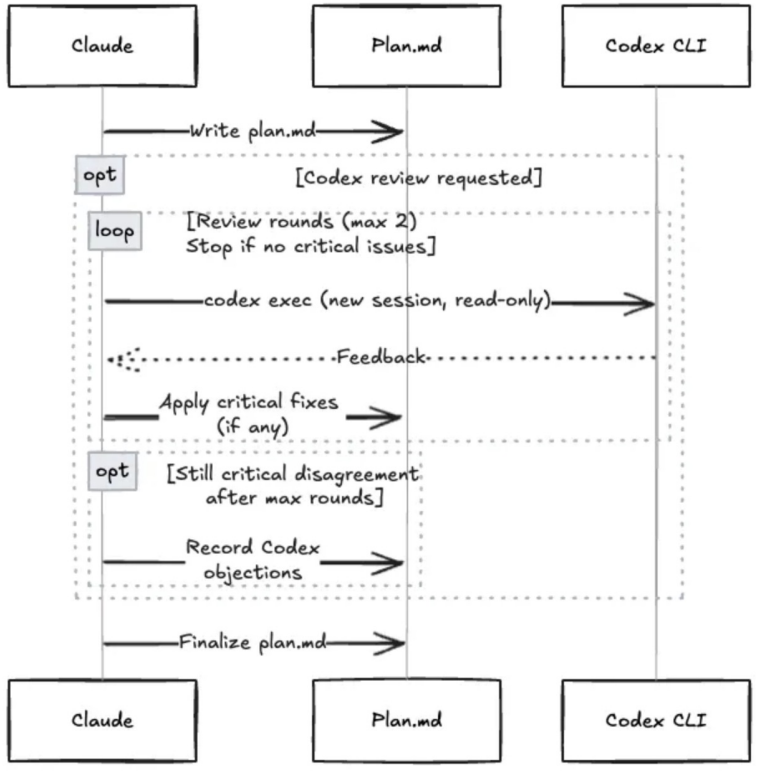
工作实践：Explore、Plan、Execute、Review

- 先探索规划，再执行，同时review迭代
- 其中任意步骤之后都可以插入review，不仅是code review，也可以插入plan review
- 打磨 plan比修改bad code效率更高
- 使用markdown作为媒介，作为human-agent/agent-agent interface



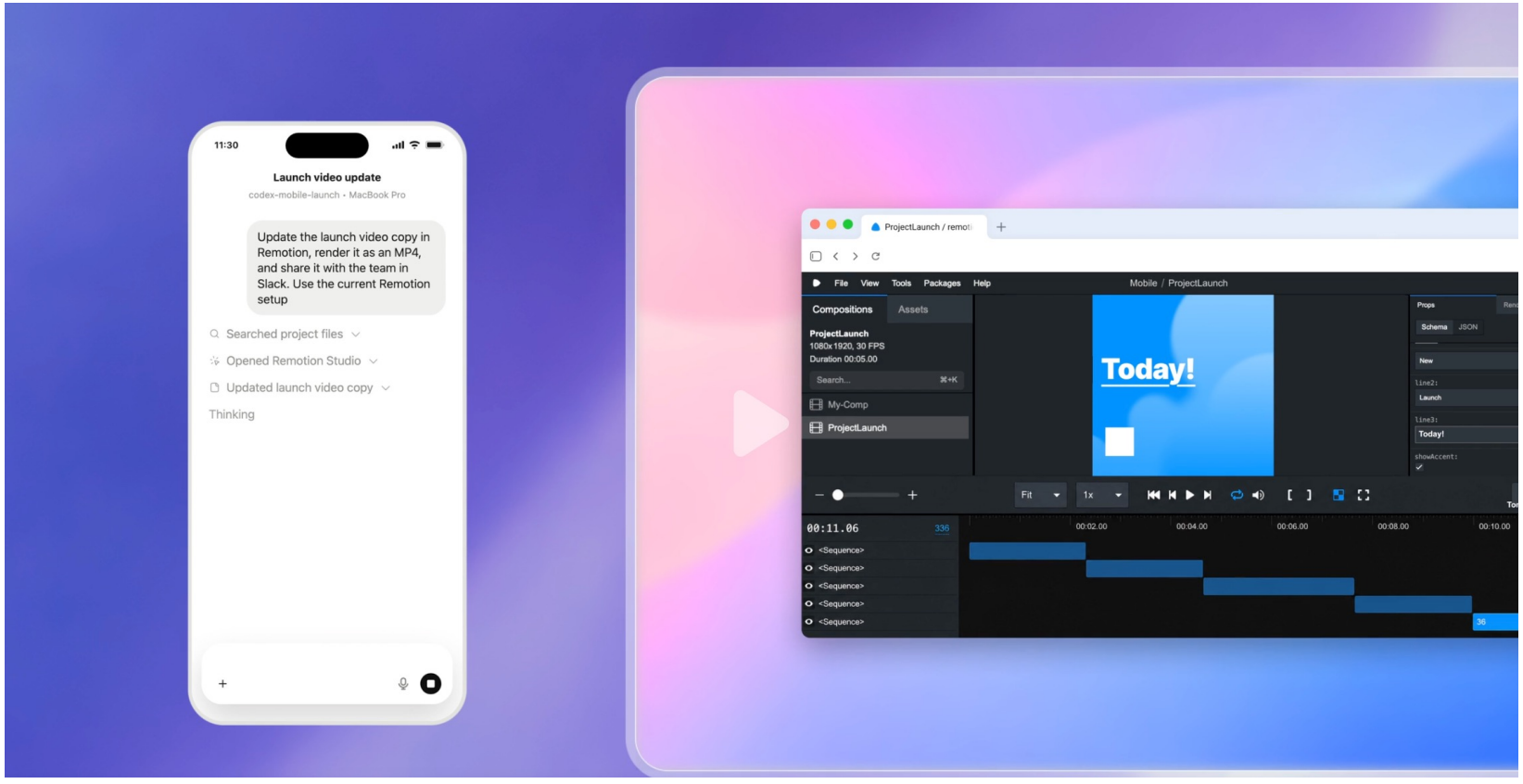
工作实践：多家模型协同

- Single-Model Blindness：使用一家模型，plan、execute、review是同一个， 既当运动员又当裁判，难以发现自身问题
- Claude Code已支持 /codex-review，在Claude Code中调用Codex中的gpt-5.5等模型进行review
- 或者可以直接基于markdown作为媒介，查阅批注plan，或者review代码



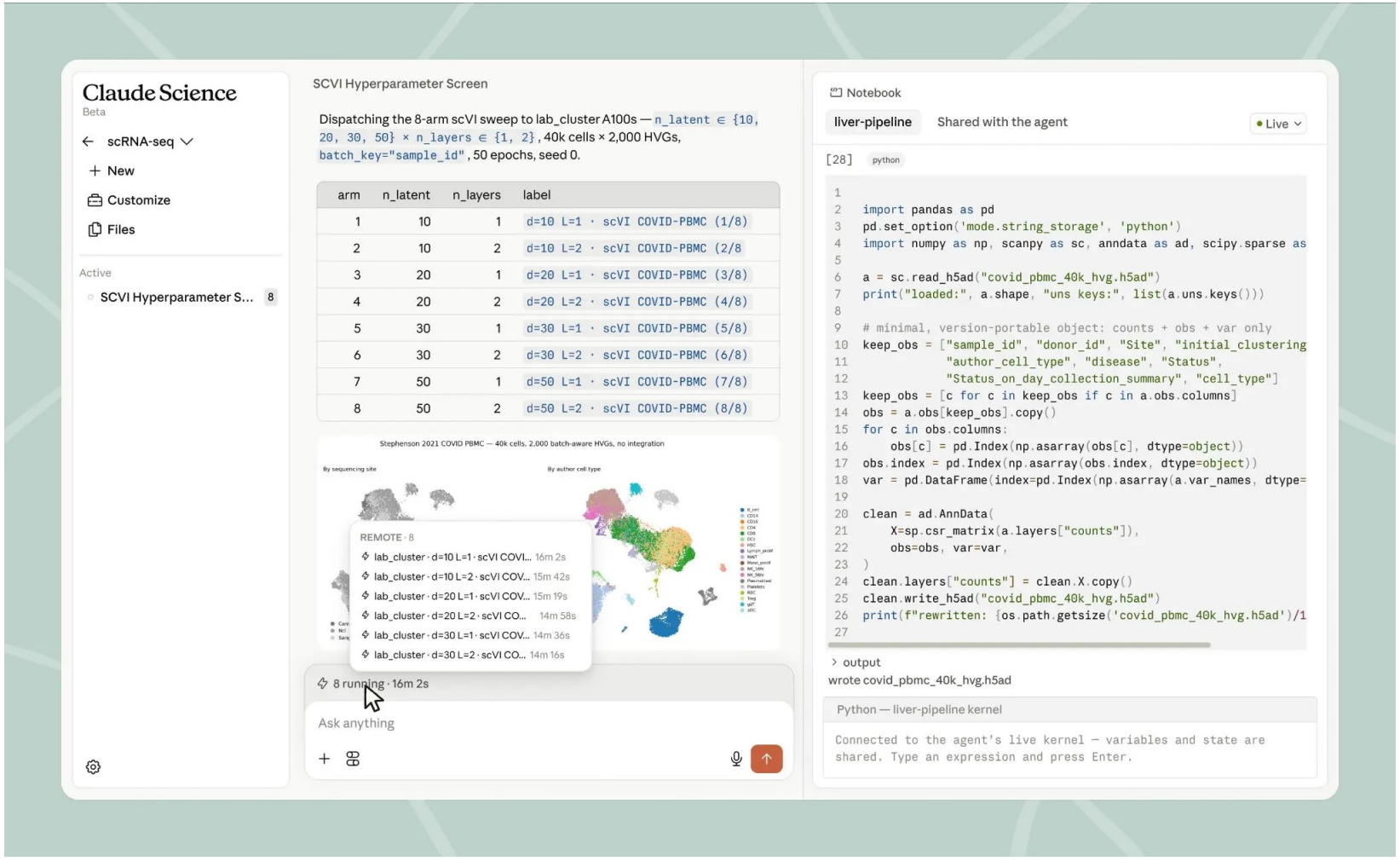
多端协作

- Codex已支持多端协同（iOS 移动端 + MacOS 桌面端 + Linux端）



From Coding to Anything

- 6月30日发布：Claude Science：文献分析/分步研究任务/数据分析与可视化/图表/形成修改manuscript



Thanks for Listening!

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参考来源：

- https://code.claude.com/docs
- https://pyshine.com/Claude-Code-Best-Practices
- https://martinfowler.com/articles/harness-engineering.html
- https://www.philschmid.de/agent-harness-2026
- https://yuanchaofa.com/post/harness-engineering-for-ai-agents
- https://x.com/Vtrivedy10/status/2023805578561060992?s=20&ref=blog.langchain.com
- https://www.anthropic.com/news/claude-science-ai-workbench