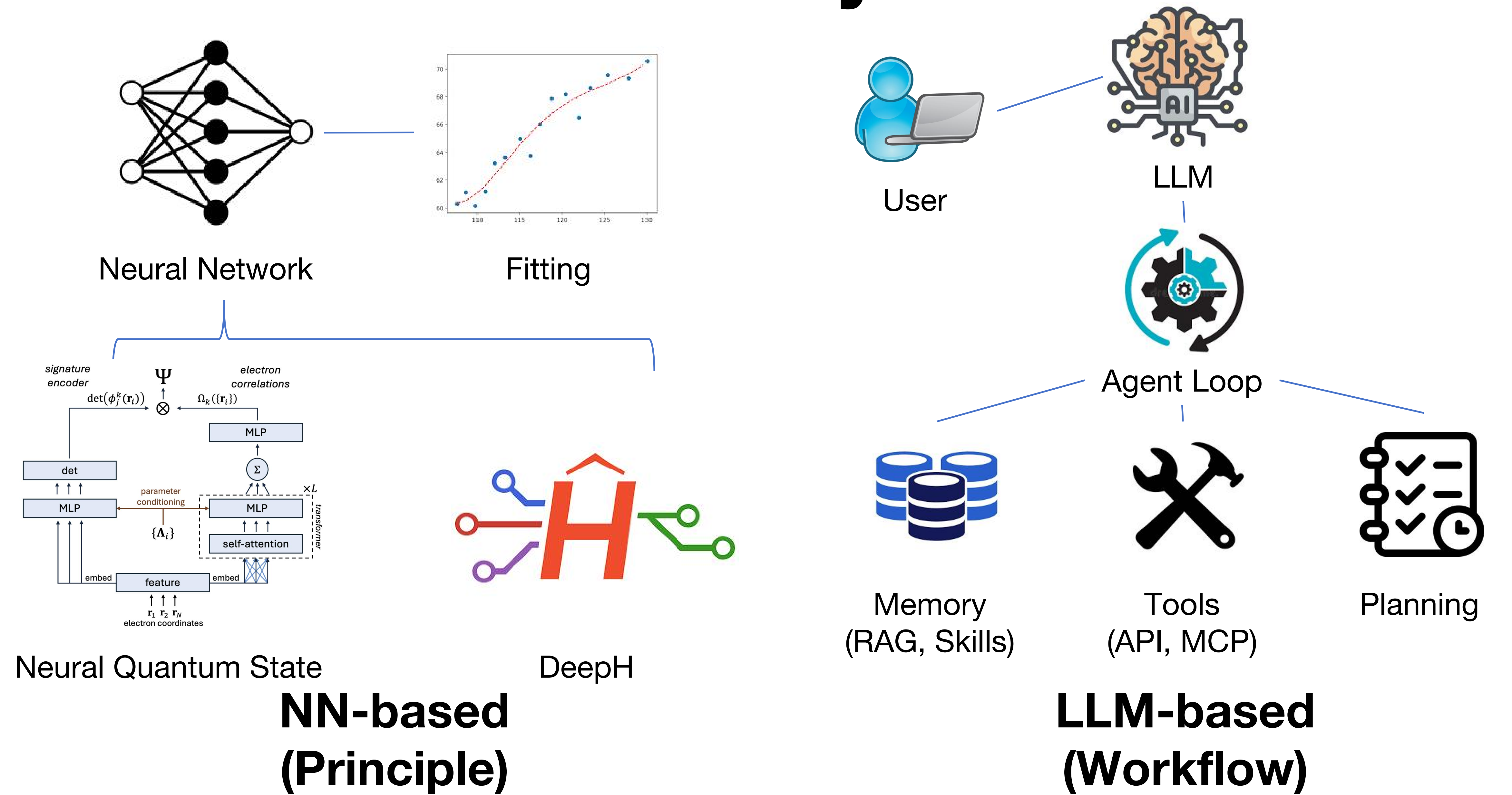
AI Workflow & Vibe Researching

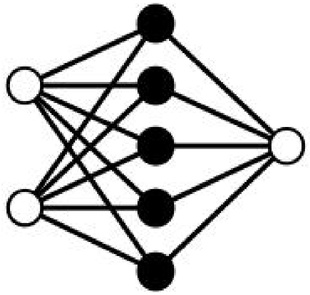
To use or not to use, that’s not a question.

Yiyang Jiang

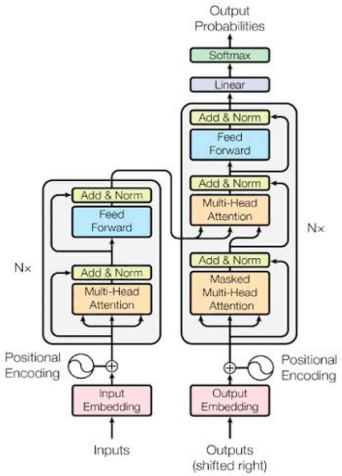
AI in Physics



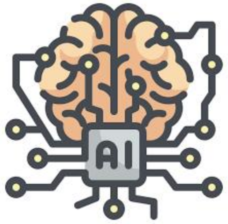
Key Concepts in AI Community



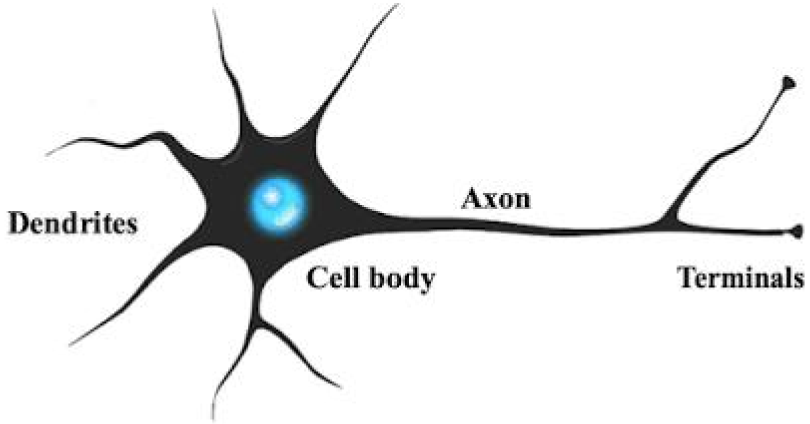
Neural Network

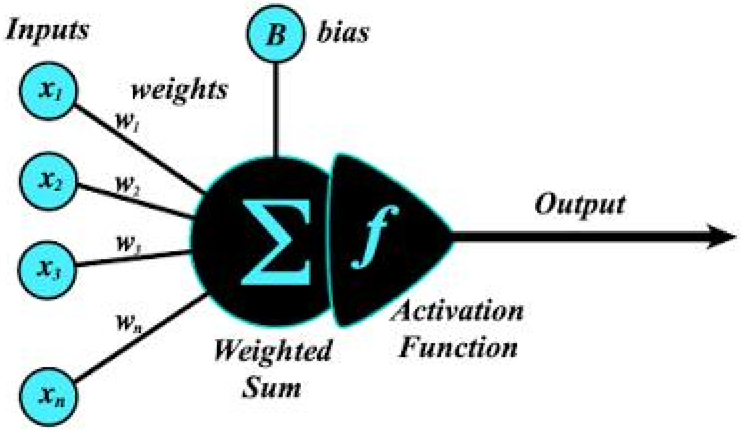


Transformer



LLM





Token

1 Token
~ 0.75 words
~ 1.5 Chinese character（汉字）

Key Concepts in AI Community

Context (Temporary Memory)

Context Window

Save Context

RAG (Retrieval Augmented Generation)

Prompt

User Prompt

Precise and Concise Prompt
(Prompt Engineering)

System Prompt

Tool

MCP (Model Context Protocol)

Key Concepts in AI Community

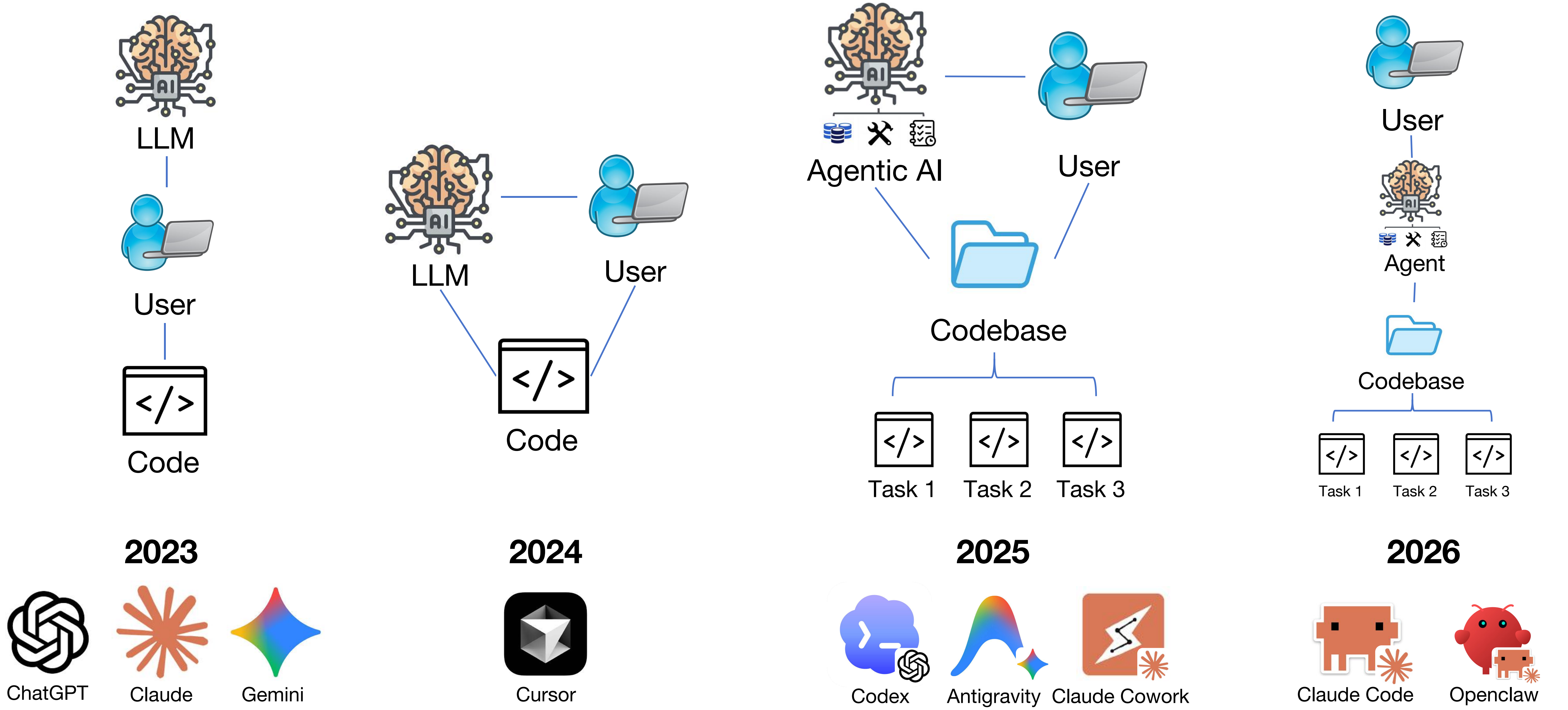
Agent

API (Application Programming Interface)

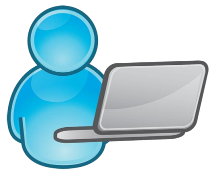
Skills

Headless mode

Evolution of Human-AI Collaboration

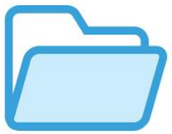


Strengths of Human / PC / AI



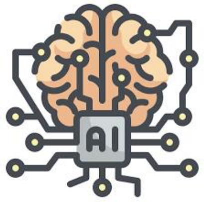
Human

- **Image Process**
- **Speaking**
- **Decision Making**
- **Longer Thinking** **(?)**



PC

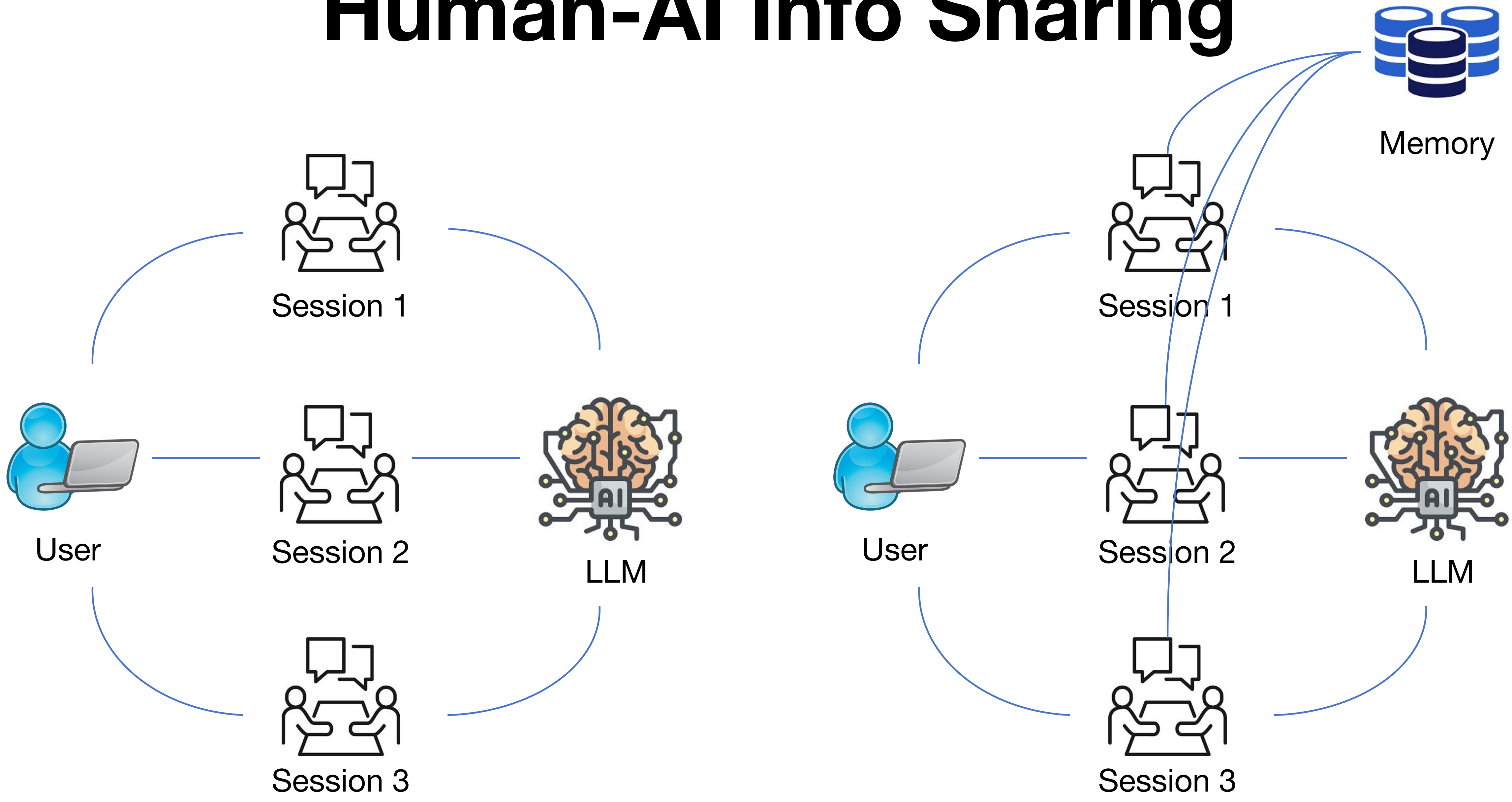
- **Structured Memory**



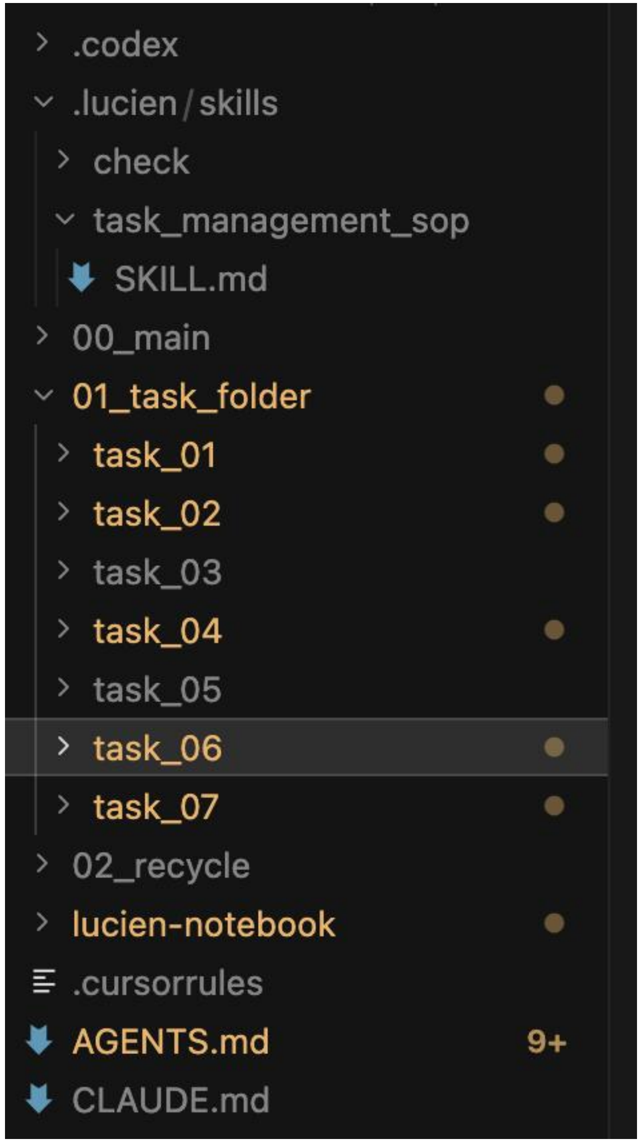
AI (LLM)

- **Summary**
- **Typing**
- **Coding**
- **Literature Research**

Human-AI Info Sharing



Project Folder Structure



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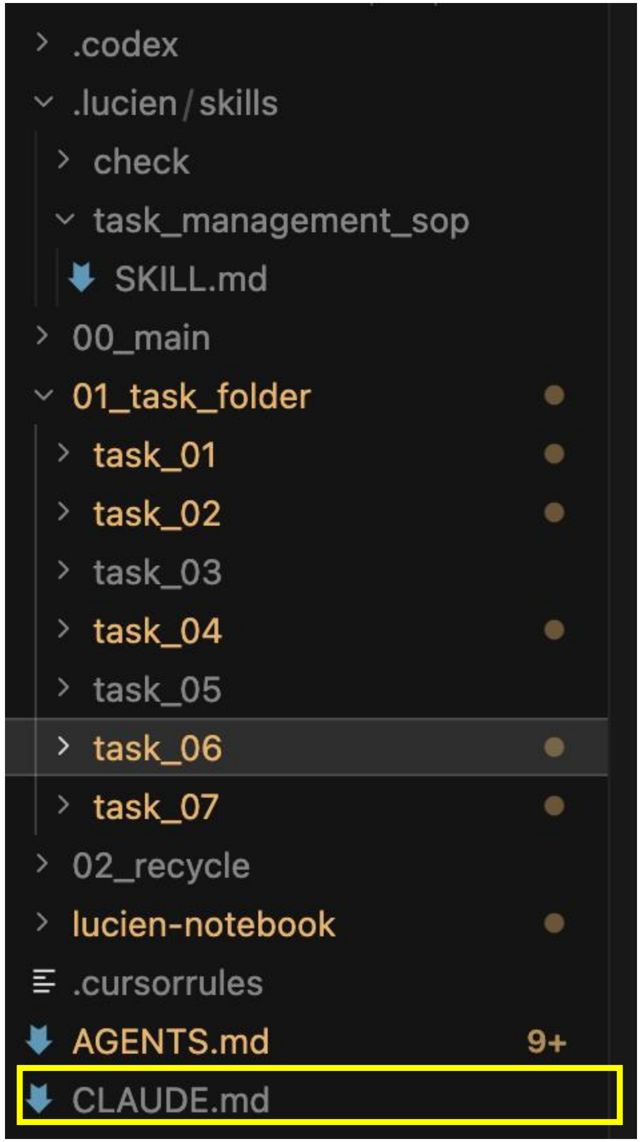


Preview CLAUDE.md

3. Workspace Architecture

The repository default workspace layout is strictly restricted to the following directories.

Anti-proliferation rule: do not create `02_execution`, `03_scripts`, or any other legacy top-level folders. Do not operate outside of the allowed directories unless the human explicitly changes the architecture.

`00_main/` (Global State)

Strictly contains only:

- `main_dashboard.md`: the global ledger; read this first every session.
- `system_prompt.md`: the master operating instructions.
- `history/`: historic, timestamped versions of `main_dashboard.md` and prompt files.
- Other optional files only if explicitly requested by the human.

`01_task_folder/` (Execution Zone)

Contains self-contained task folders such as `task_11/`. Every task or subtask should contain:

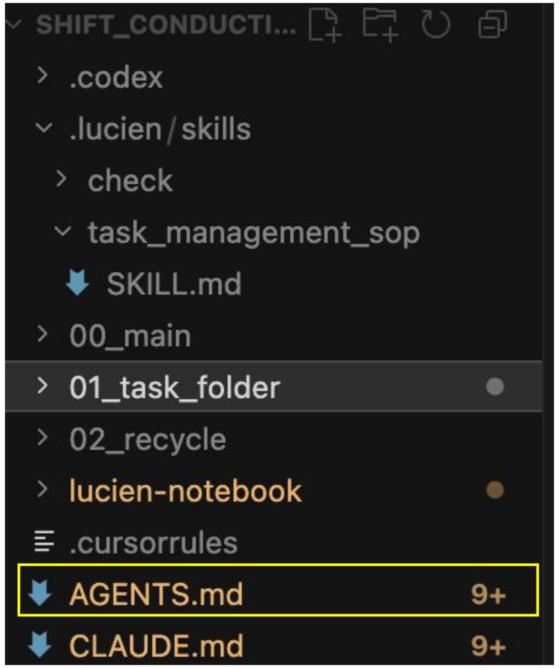
- `task_X_dashboard.md`
- `script/`
- `script/output/`
- `history/`
- Task-local generated outputs written under `script/output/` by default

`02_recycle/` (Archive / Graveyard)

Contains failed, deprecated, or archived task folders moved out of the active workspace.

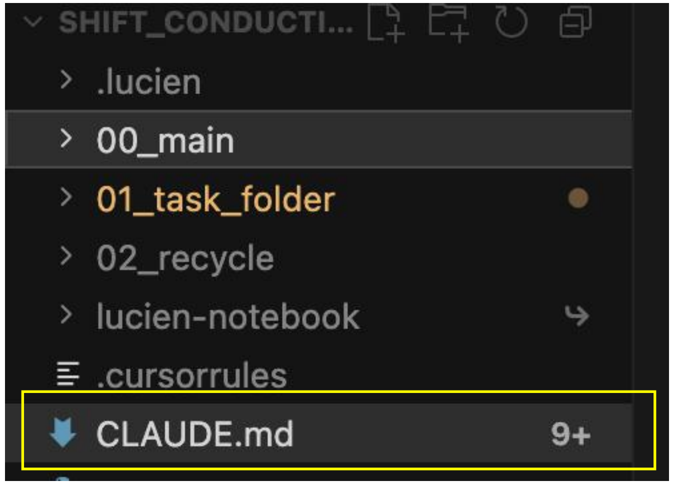
System Prompt

Codex



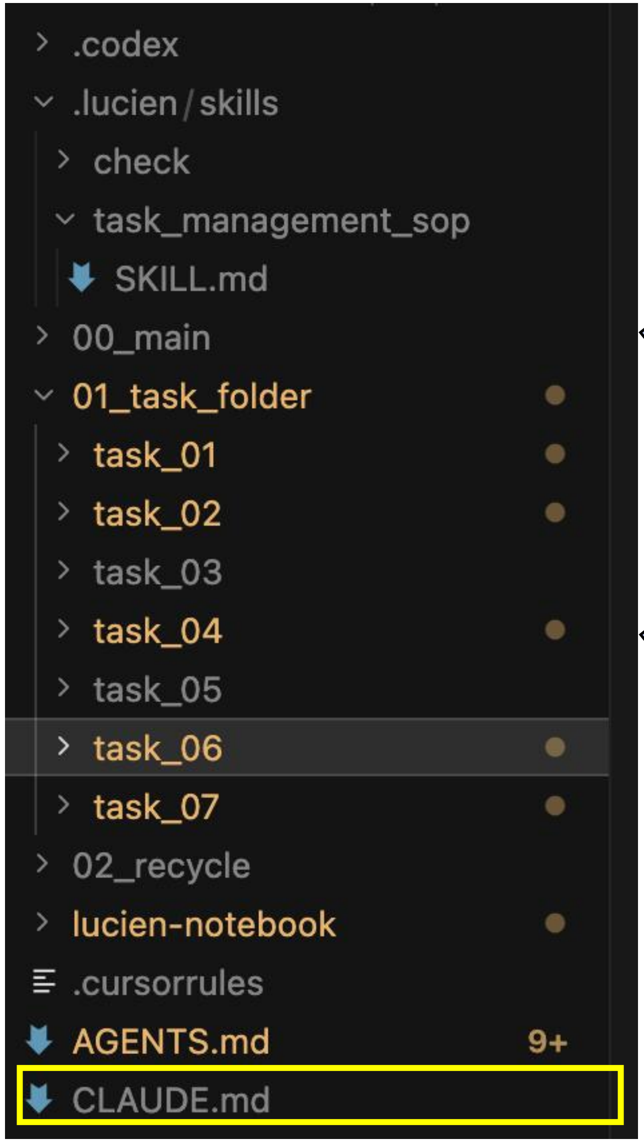
Setup Prompt

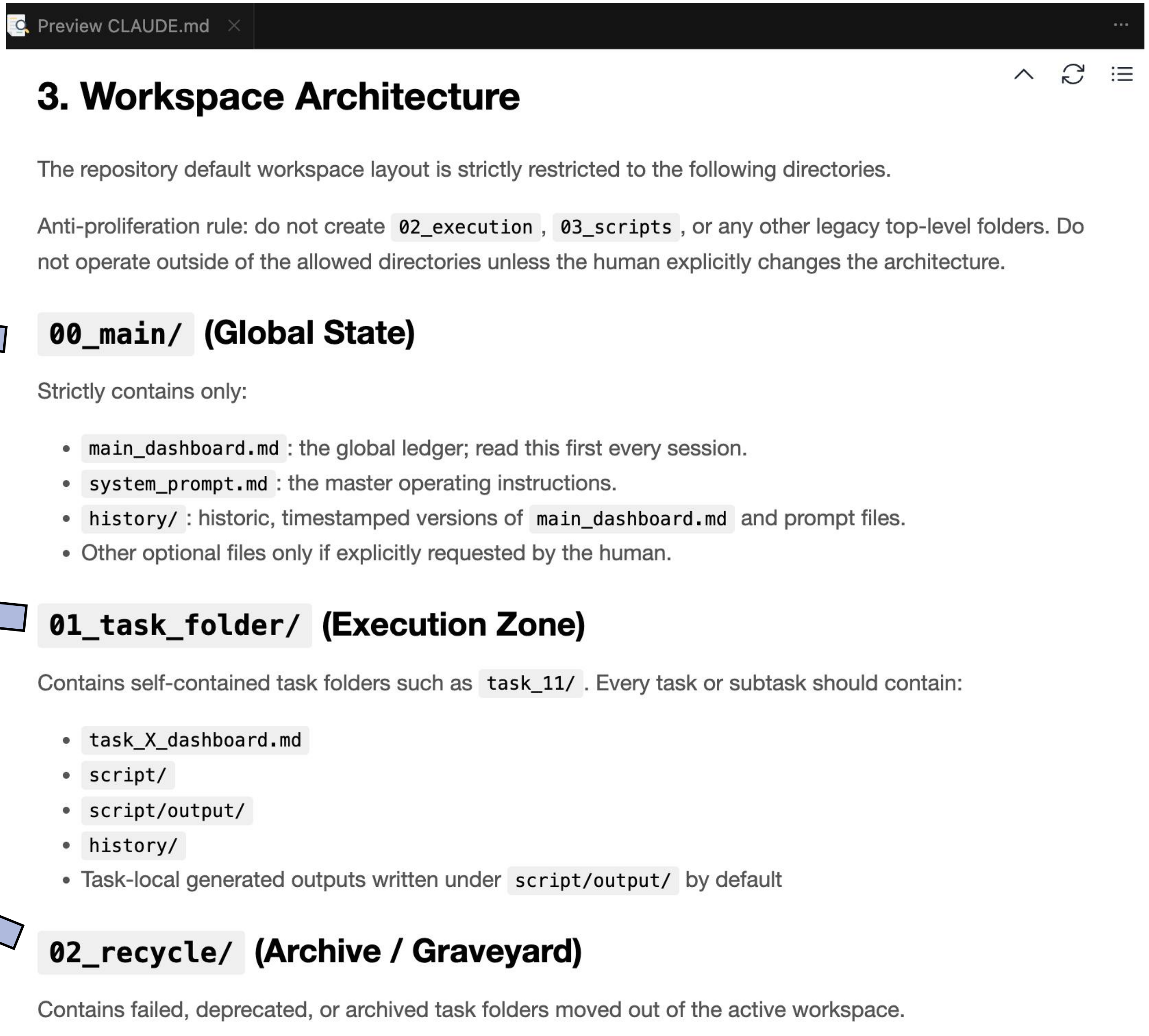
Claude Cowork



CLAUDE.md

Project Folder Structure

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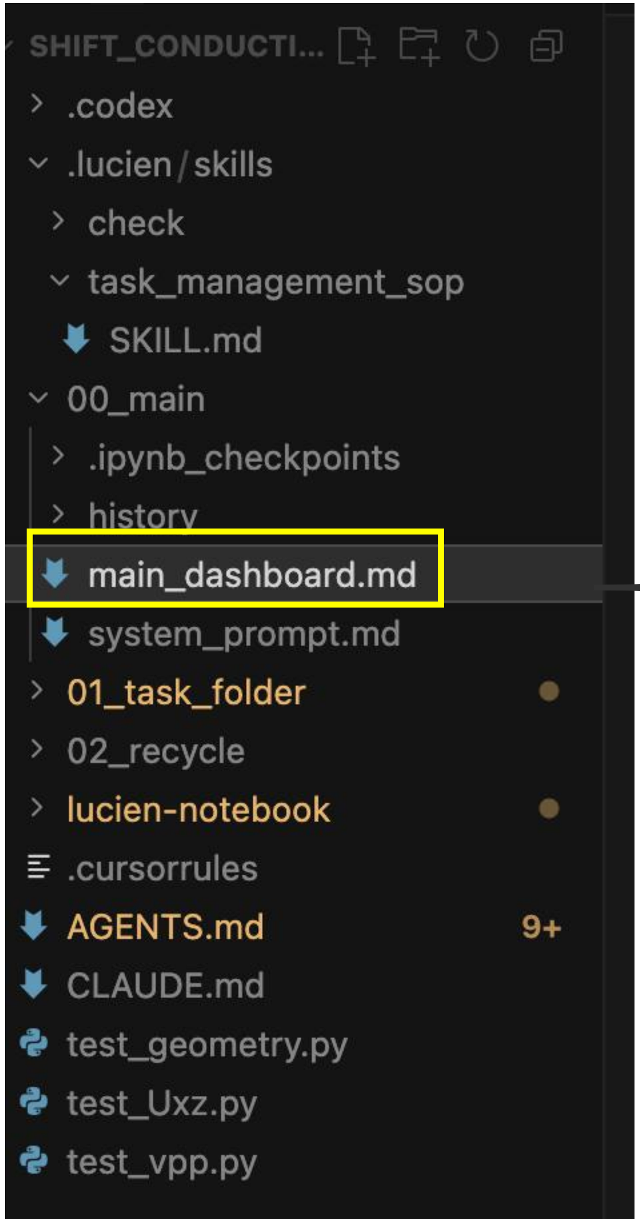
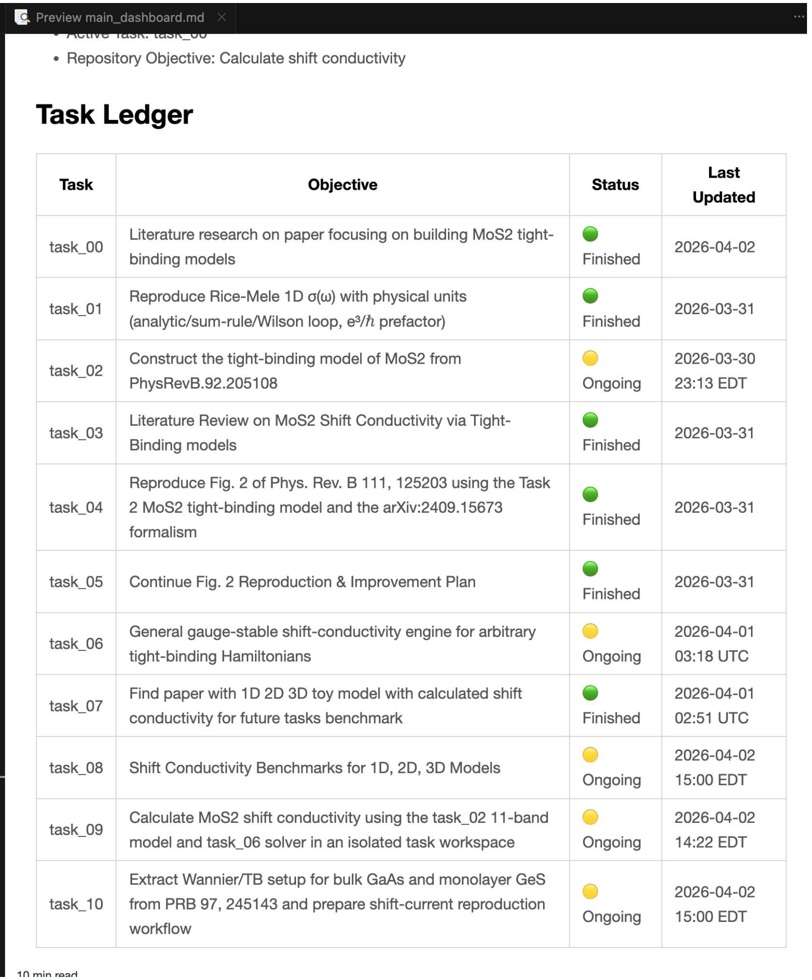
Main Dashboard

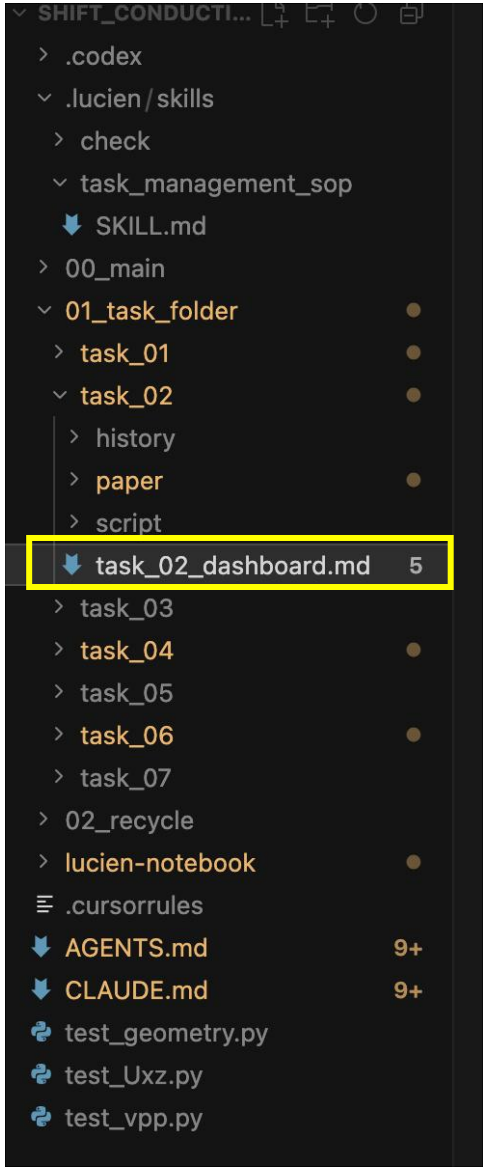


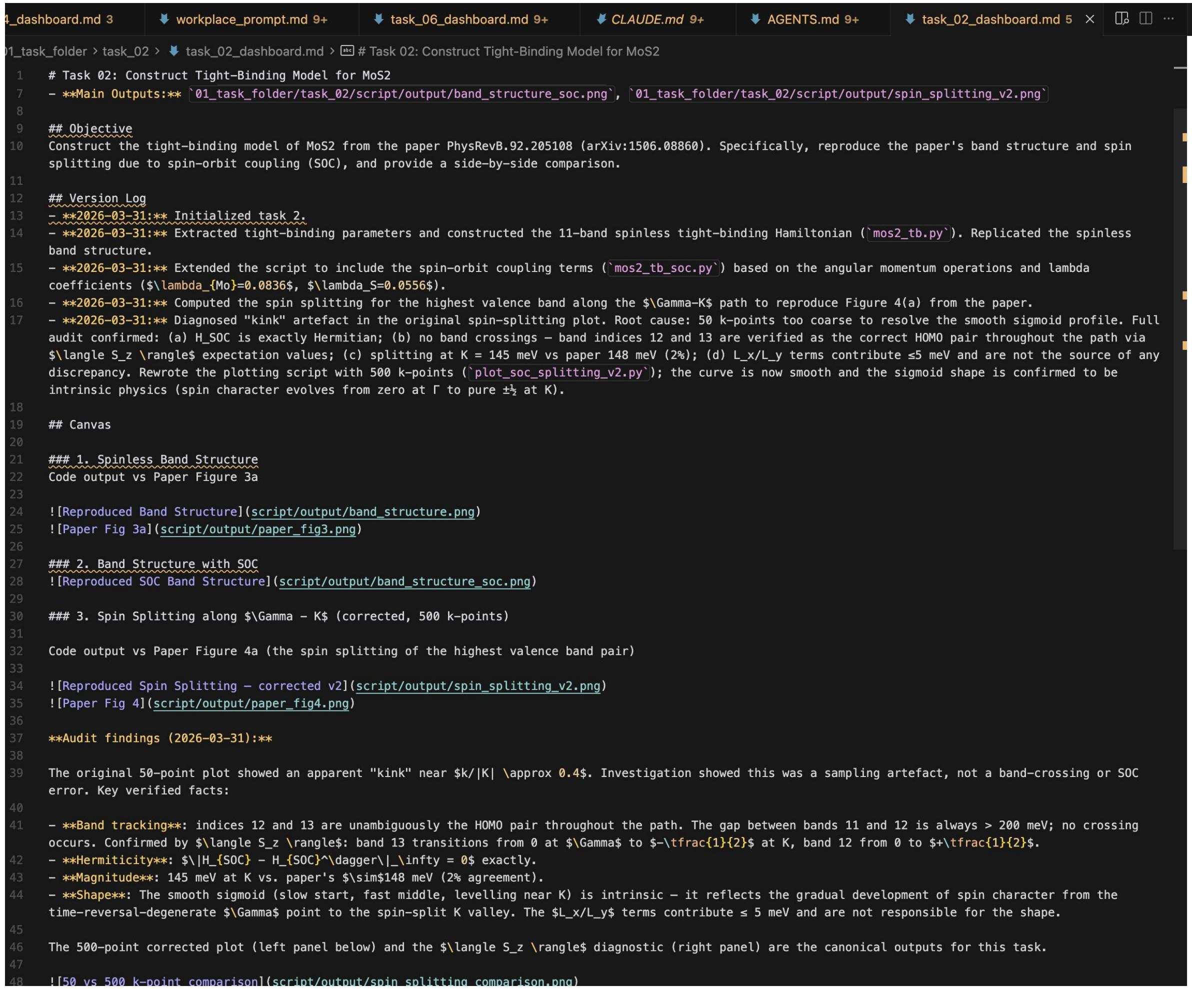


main_dashboard.md

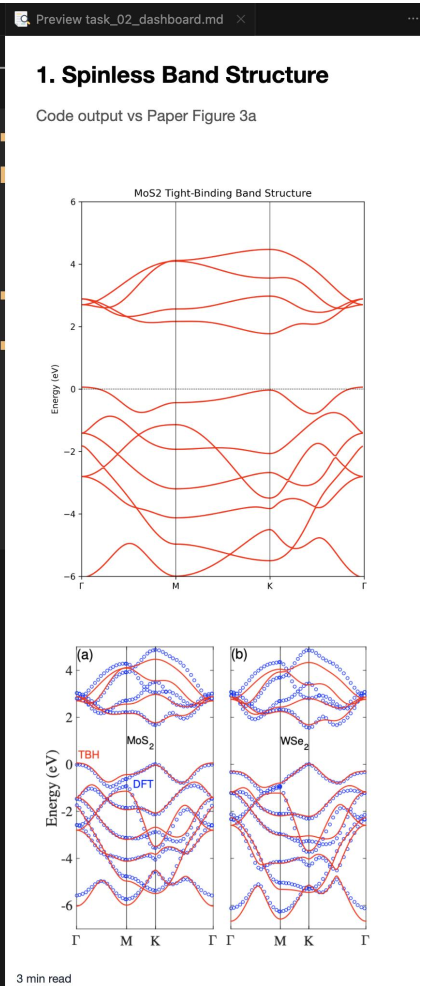
preview

Task Dashboard



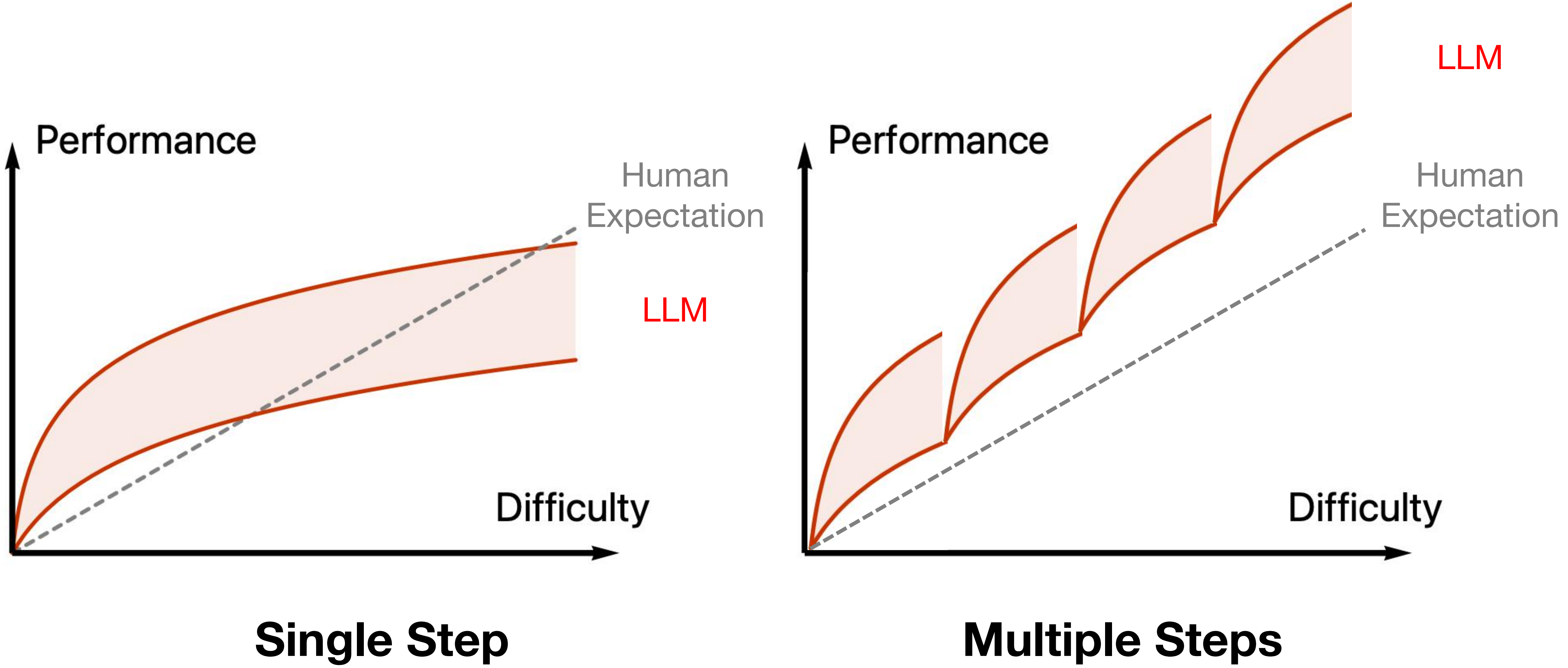


task_XX_dashboard.md

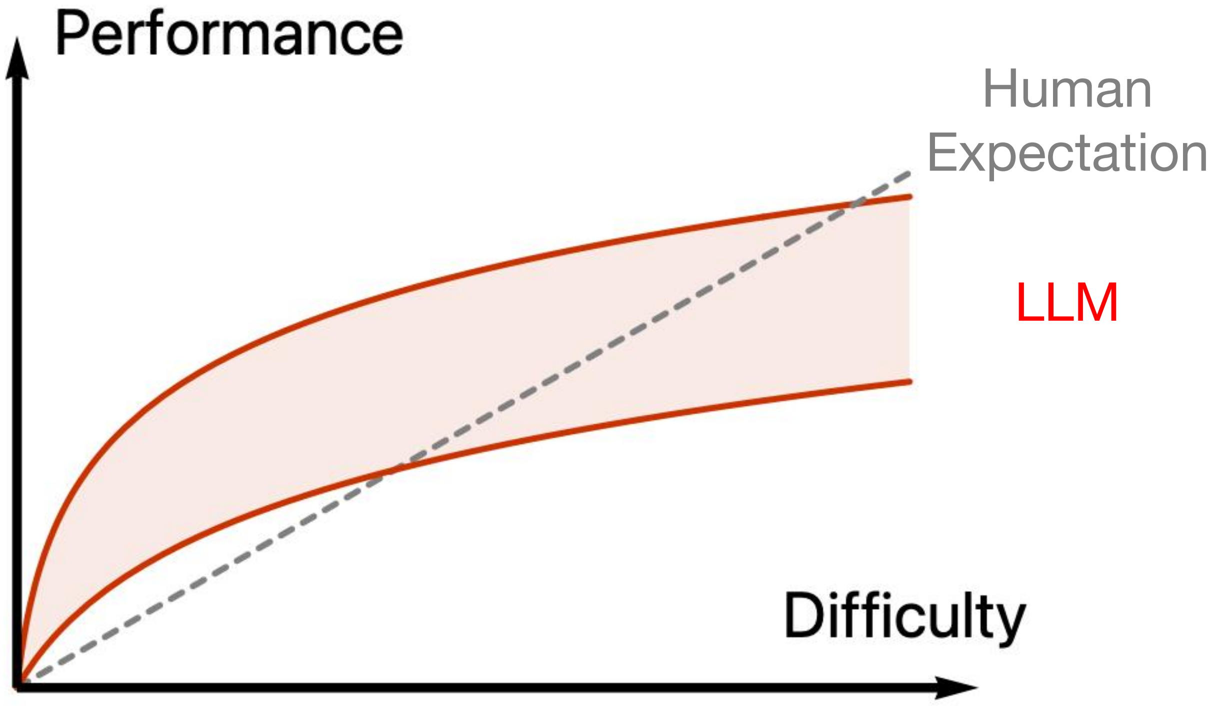


preview

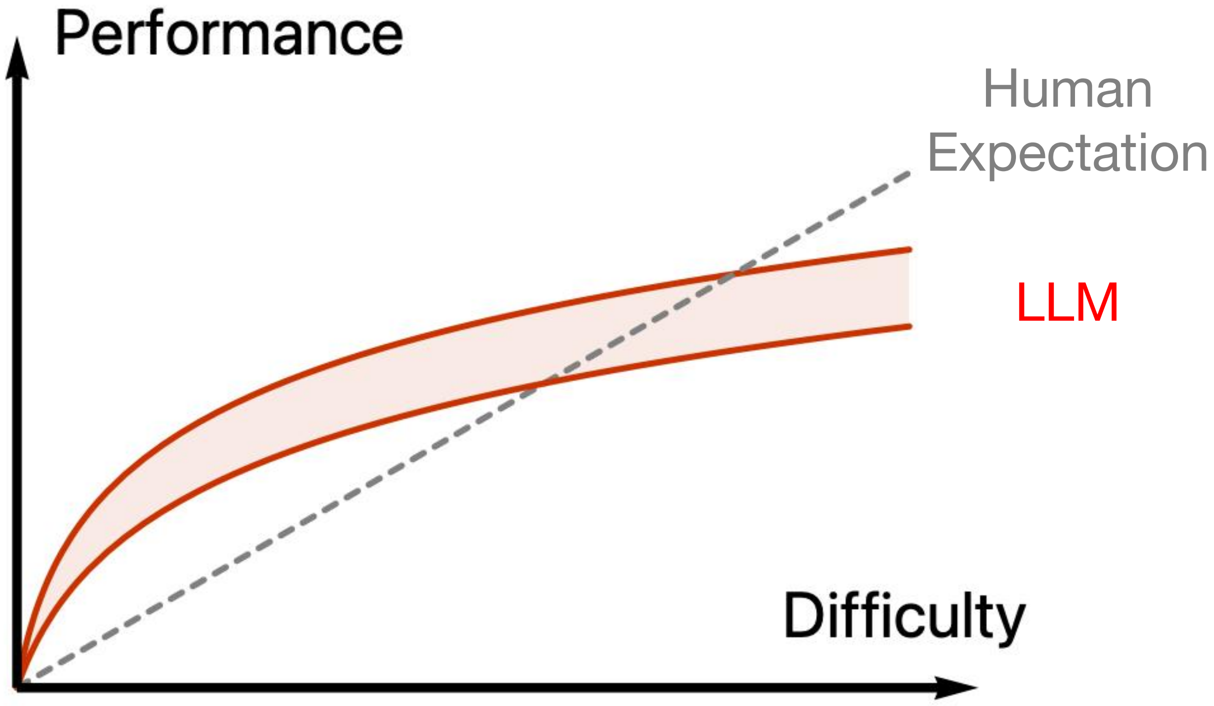
1 Difficult Step → 4 Easy Steps



Art of Prompt: Precise & Concise



Vague Prompt



Precise Prompt

Coding v.s. Prompting

```python
def get_k_path():
    Gamma = np.array([0.0, 0.0])
    M = np.array([np.pi, np.pi/np.sqrt(3)])
    K = np.array([4*np.pi/3, 0.0])

    nodes = [Gamma, M, K, Gamma]
    labels = [r'$\Gamma$', r'$M$', r'$K$', r'$\

    n_points = 100
    k_path = []
    k_dist = []
    ticks = [0]
    current_dist = 0

    for i in range(len(nodes)-1):
        start = nodes[i]
        end = nodes[i+1]
        length = np.linalg.norm(end - start)

        for t in np.linspace(0, 1, n_points, en
```

- “**Get** {Bi2Se3} band structure from arXiv: XXXX.XXXXX”

“Band structure in Fig. X (x)” -

- “**Generate** {Bi2Se3} band structure with code”

[Generated Figure.jpg] -

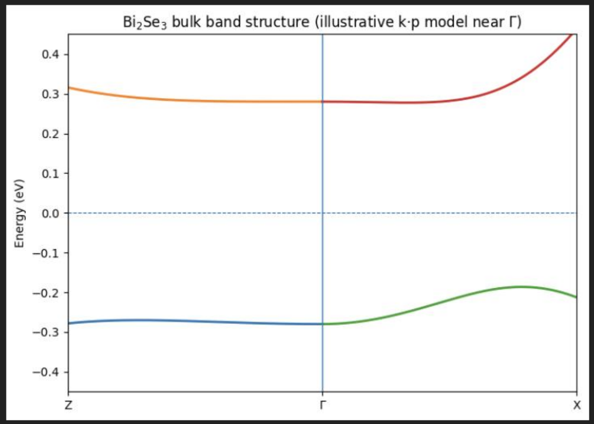
- “**Compare** your band structure with Bi2Se3 band structure”

“Similarity 99.9%” -

generate band structure of Bi2Se3

Thought for 13s >

Bi$_2$Se$_3$ bulk band structure (illustra...



Here is an illustrative Bi2Se3 bulk band structure generated from a standard near-Γ $k \cdot p$ model:

Coding

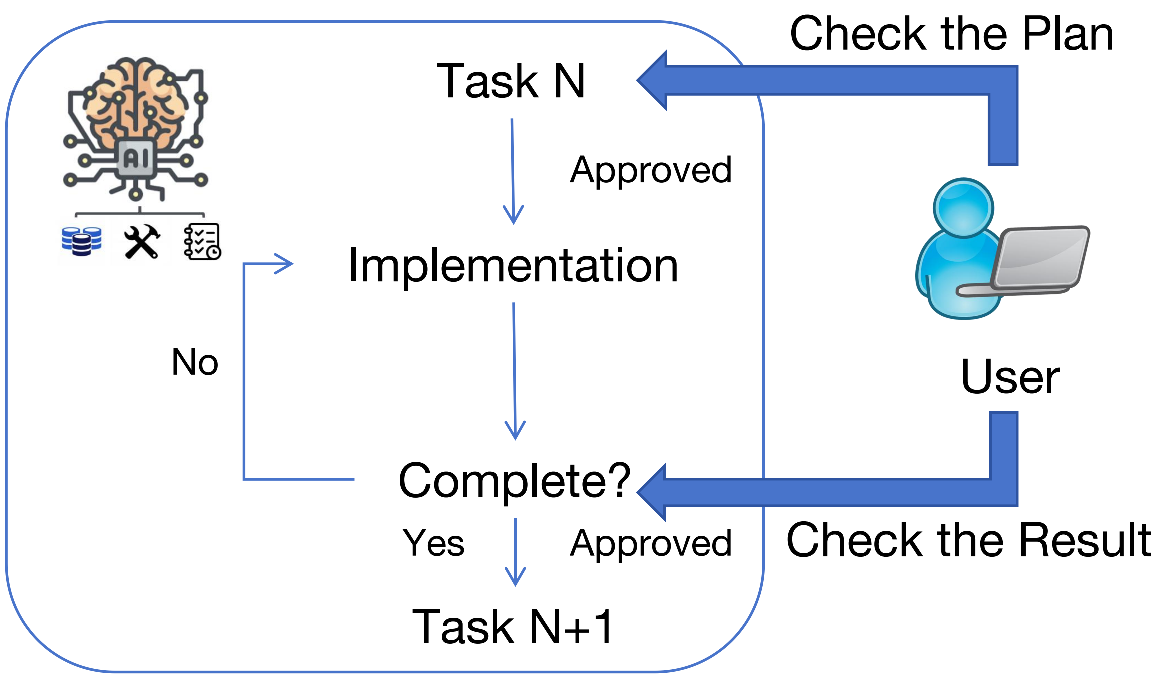
LLM Workflow

Prompt

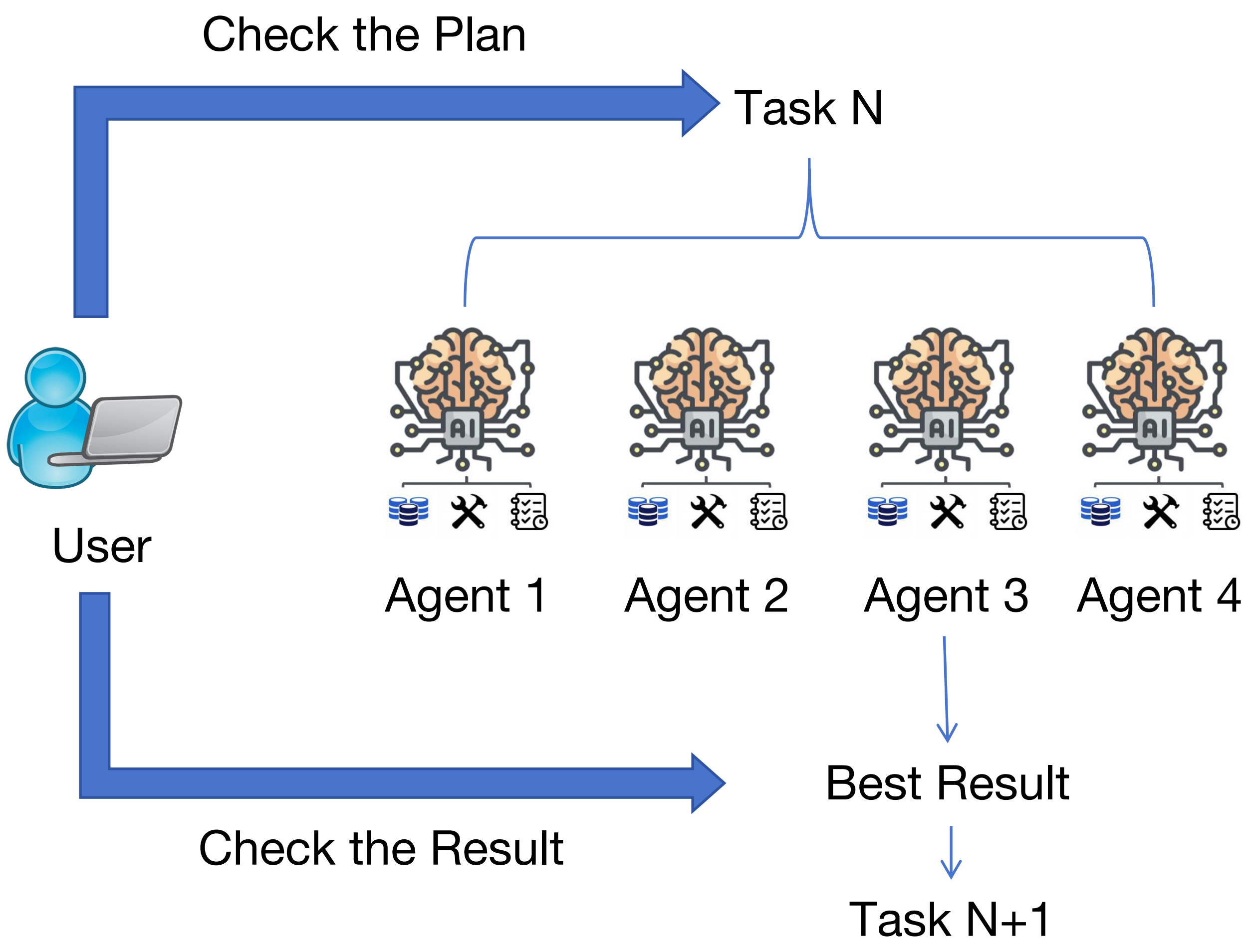
Precise ⟷ Vague

Further Automization

Automized Workflow



Massive Test



Further Automization