



Lab Clinical Inference with AI Agents

FROM SIMPLE CHATTING TO DOING ACTUAL JOBS



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AGENDA

1

Part 1 - 15 min | Dr. He: Introduction to AI Agents

Overview of the AI agents and the key differences from chatbot

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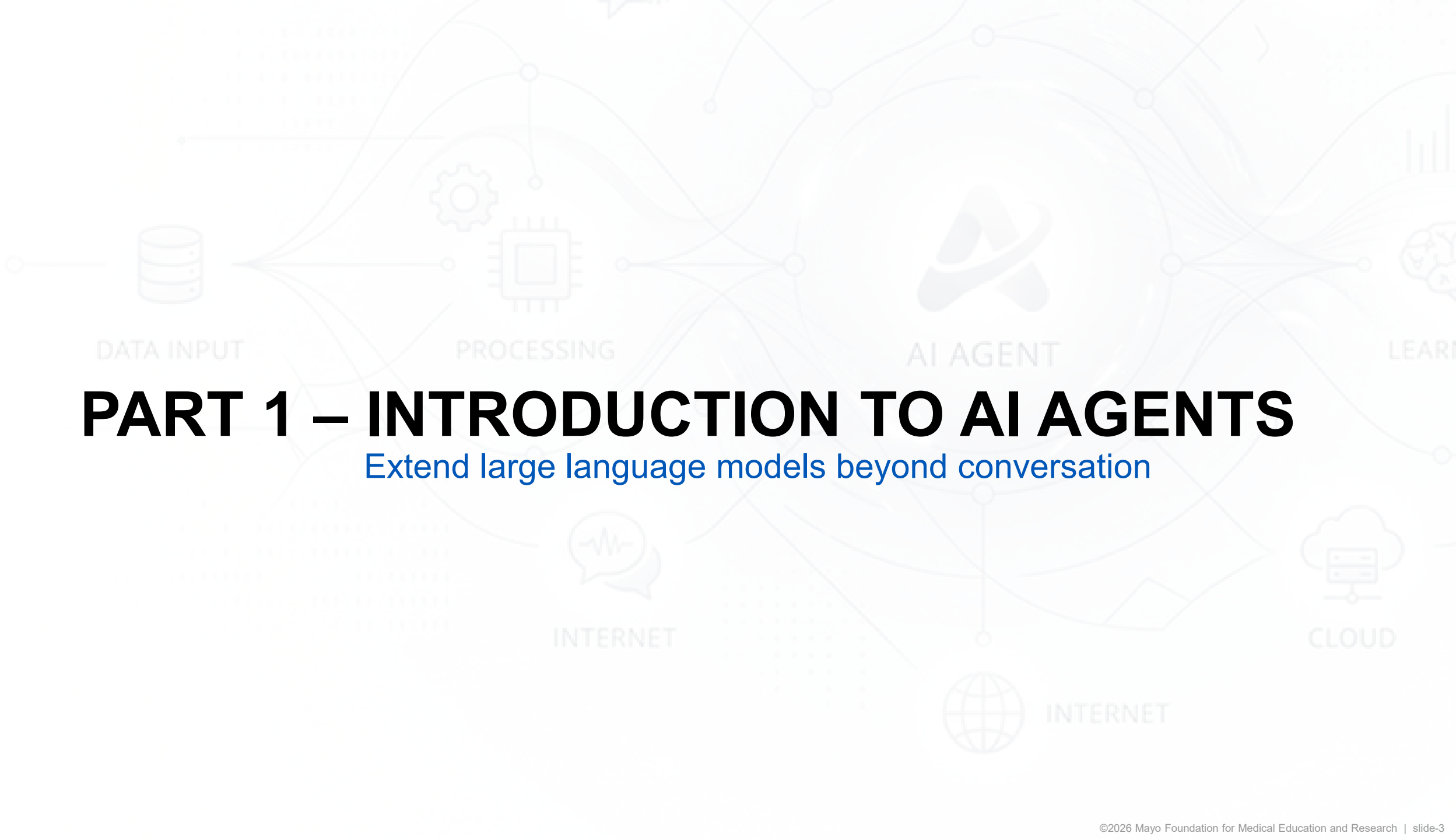
Part 2 - 20 min | Dr. Khan: Prompt Engineering and Agent Skills

Walkthrough of prompt engineering concepts and agent skills

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Part 3 - 55 min | Dr. Ayub: Hands-on Session

Hands-on coding session with a pathology report task



PART 1 – INTRODUCTION TO AI AGENTS

Extend large language models beyond conversation

Chatting with Large Language Models (LLMs)

With LLMs / simple chatbots, you can ask questions:

Knowledge Consulting

Serving as a sounding board based entirely on its pre-trained parametric memory.

Where's the capital of France? What is the highest mountain?

Information Extraction

Pulling structured data out of unstructured text by given questions or variables.

Looking at the provided paragraph, what names are mentioned?

Content Generation & Drafting

Translating a rough outline or idea into polished, standard prose

Write a bedtime story about magical train, unicorn, and a princess.

Document Summarization

Condensing large volumes of provided text into high-level themes.

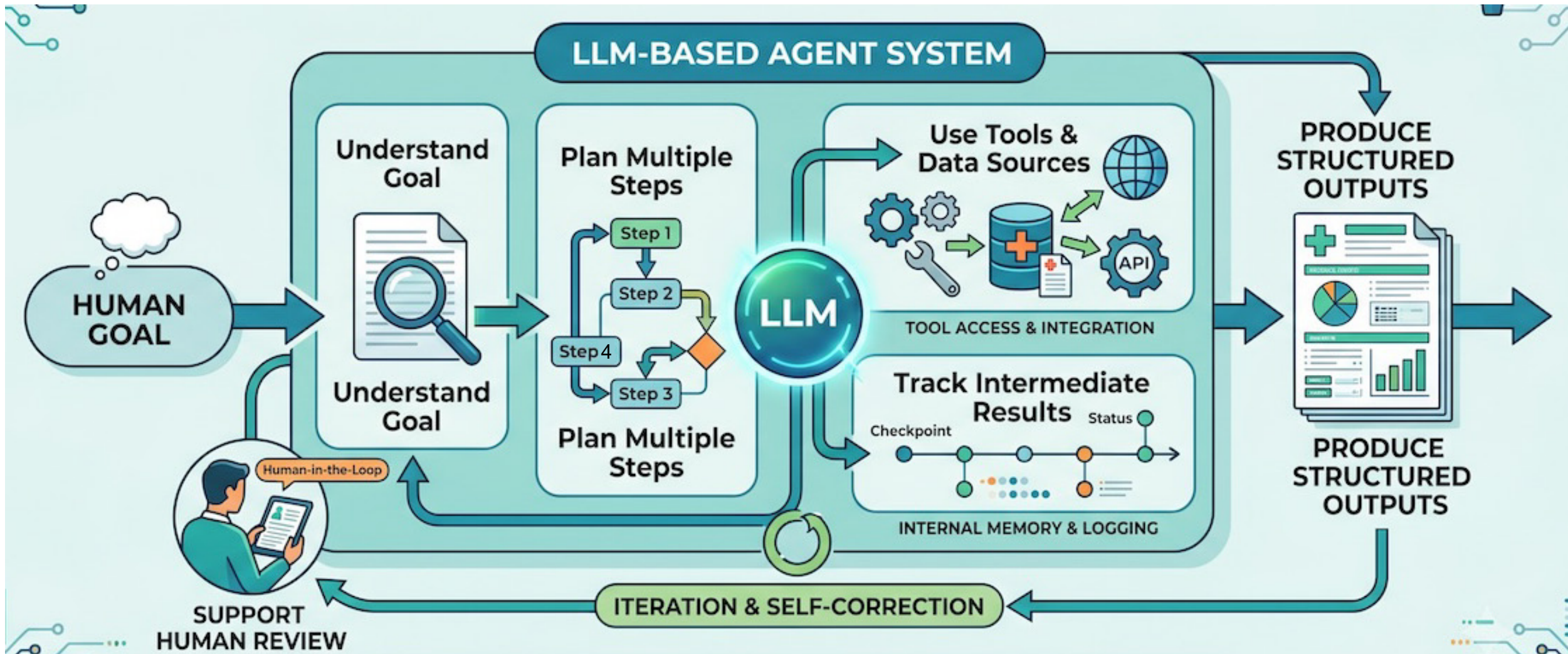
Summarize this 50p long bedtime story about a brave princess into a 1p.

In real-world works, tasks are more than just text-processing

Large data file analysis, constantly monitoring a system, search literature ... and more

LLM-based Agents

Agent: LLM + Planning + Tools + Memory



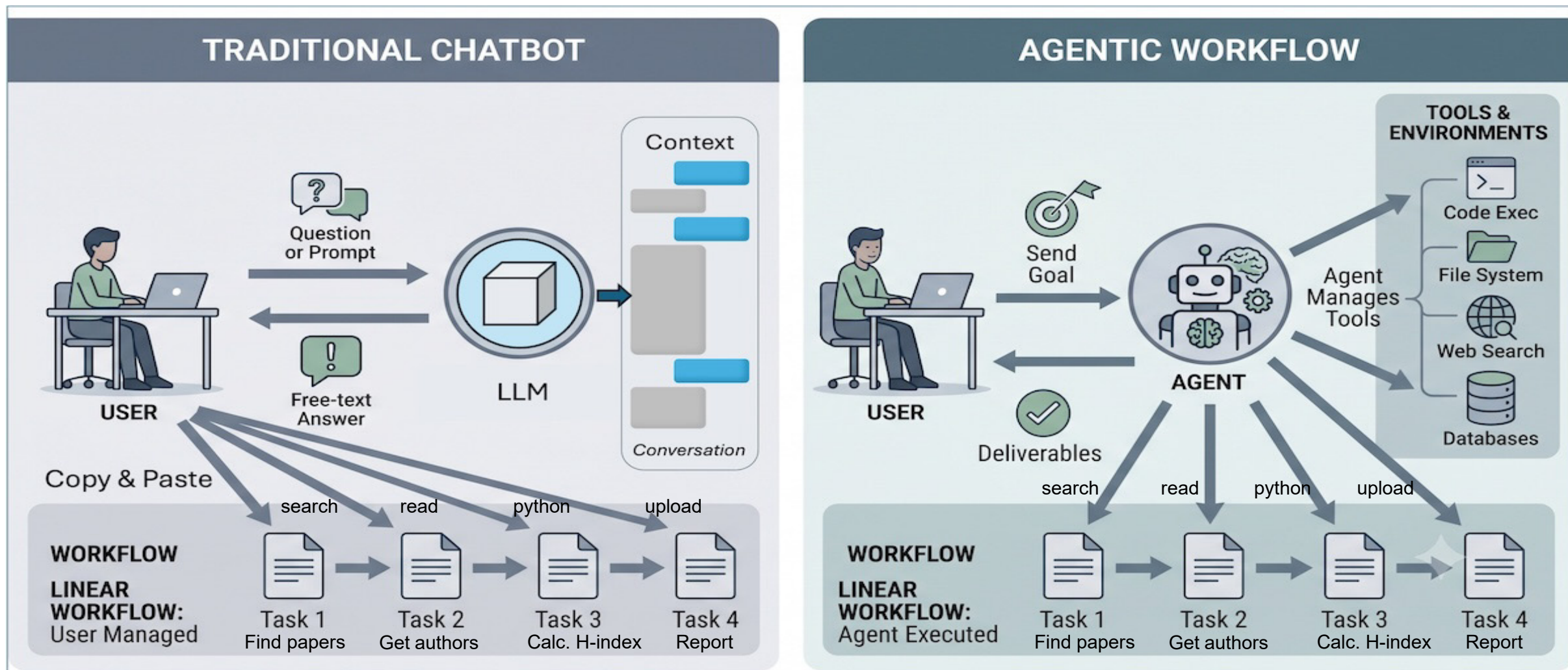
What's the differences?

Agents turn simple LLM inference into an executable process

Dimension	LLM	Agent
User input	A question	A task with goal, workflow, and data
Execution	Single response	Multi-step process
Context	Mostly in the prompt	Prompt, data files, tool outputs
Tools	Optional or manual	Integrated into the workflow
Output	Free-text answer	User-defined deliverables e.g., slides, code repo, structured data files, or any formats users specified

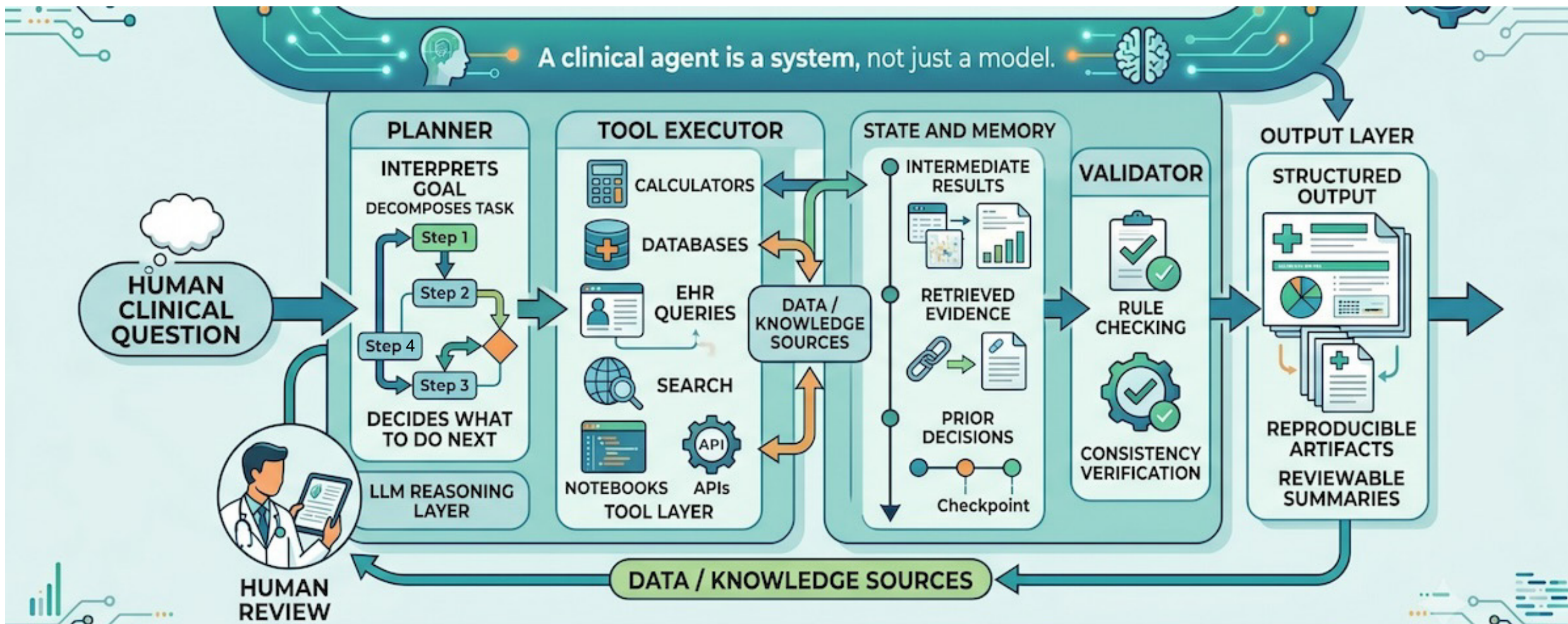
What's the differences in your work?

Agents can really do something for you



Architecture for a Clinical Agent

LLMs act as a planner / coordinator, use pre-defined workflows, tools, and medical knowledge to address clinical questions.





Validation is important

Clinical agent outputs must be grounded, traceable, and bounded.

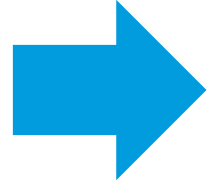
Data validation by domain experts

- Are the required data available for input?
- Are the instructions clearly defined in the prompts?
- Is every result item correct?

Process validation by engineers

- Were the correct tools used?
- Were intermediate results stored?
- Did the agents follow the intended workflow?

Keep human in the loop



NEXT – PROMPT AND AGENT SKILLS