AI AGENTS

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AI AGENTS

- an agent is anything that perceive its environment through sensors and acts upon that environment through effectors.
- Agents are autonomous programs that achieve tasks using language models.
- Phi data is used to build agents

- **We can think AI agents as a system which has virtual arms and legs such as tools(duckduck_go, Yfinance,etc) AI model which acts as brain, and need a specific and customized phrase to complete a specific task.**

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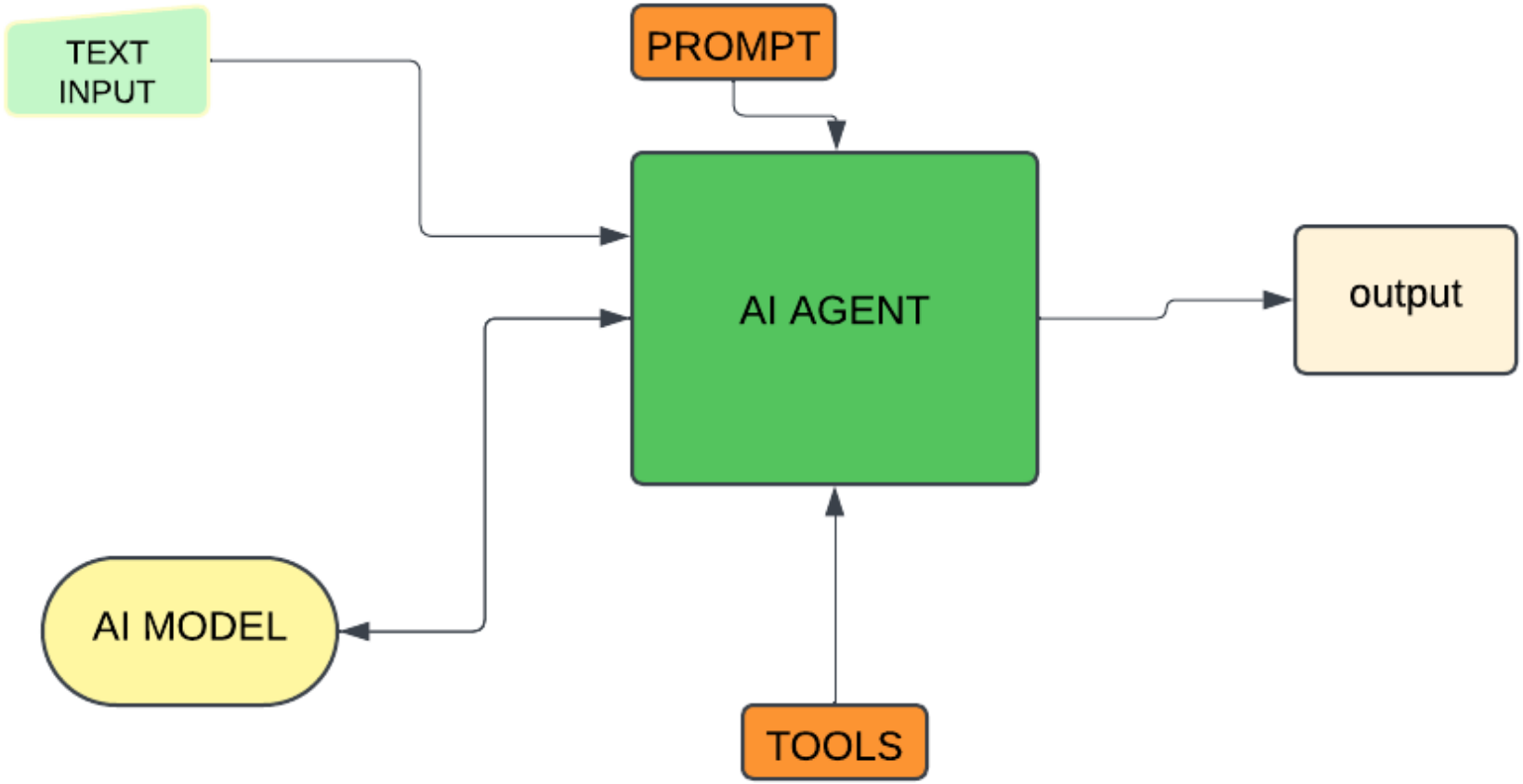
- Independent Agent:-an indivisual agent also referred as tool agent required to do specific independent task with a less number of tools is called a independent agent.

- Multimodal agent :-combination of agents to do a required task. It can be performed in sequence or in parellely . We can combine multiple Agents to form a team and tackle tasks as a cohesive unit.

INDEPENDENT AI AGENT



HOW AI AGENTS WORK

- agent is a program or system that can perform autonomously by deciding workflow and utilizing tools
- LLM's is restricted to data trained , knowledge and reasoning. while agents can call tools and information will be obtained and optimum workflows will be created and subtasks will be formed.
- the agent will try to adopt to user expectations. it saves user conversations and takes future action.
- given the user goals and agent available tools the agents divide the task into subtasks (task decomposition) to increase the performance.

- knowledge base is a database of information that agent will search to improve its responses. But many times it does not have additional information.

- to overcome this they take help of tools and other agents that provide them information it recieves it keeps on updating the knowledge base.

- EXAMPLE:-asking for agent to know which would be the best weather condition for surfing.

HOW LEARNING AND REFLECTION WORKS

- Due to the user response the knowledge along with user feedback is stored to improve performance.
- if other agent is used for the same task then the multi agent feedback can be used.
- Reasoning paradigms:-
- this think act observe loop are used to solve problems are used to improve the responses also.we can instruct the model to reason slowly(break down complex task into simpler one's) and display the thaught.in this context agent updates its context with new reasoning.

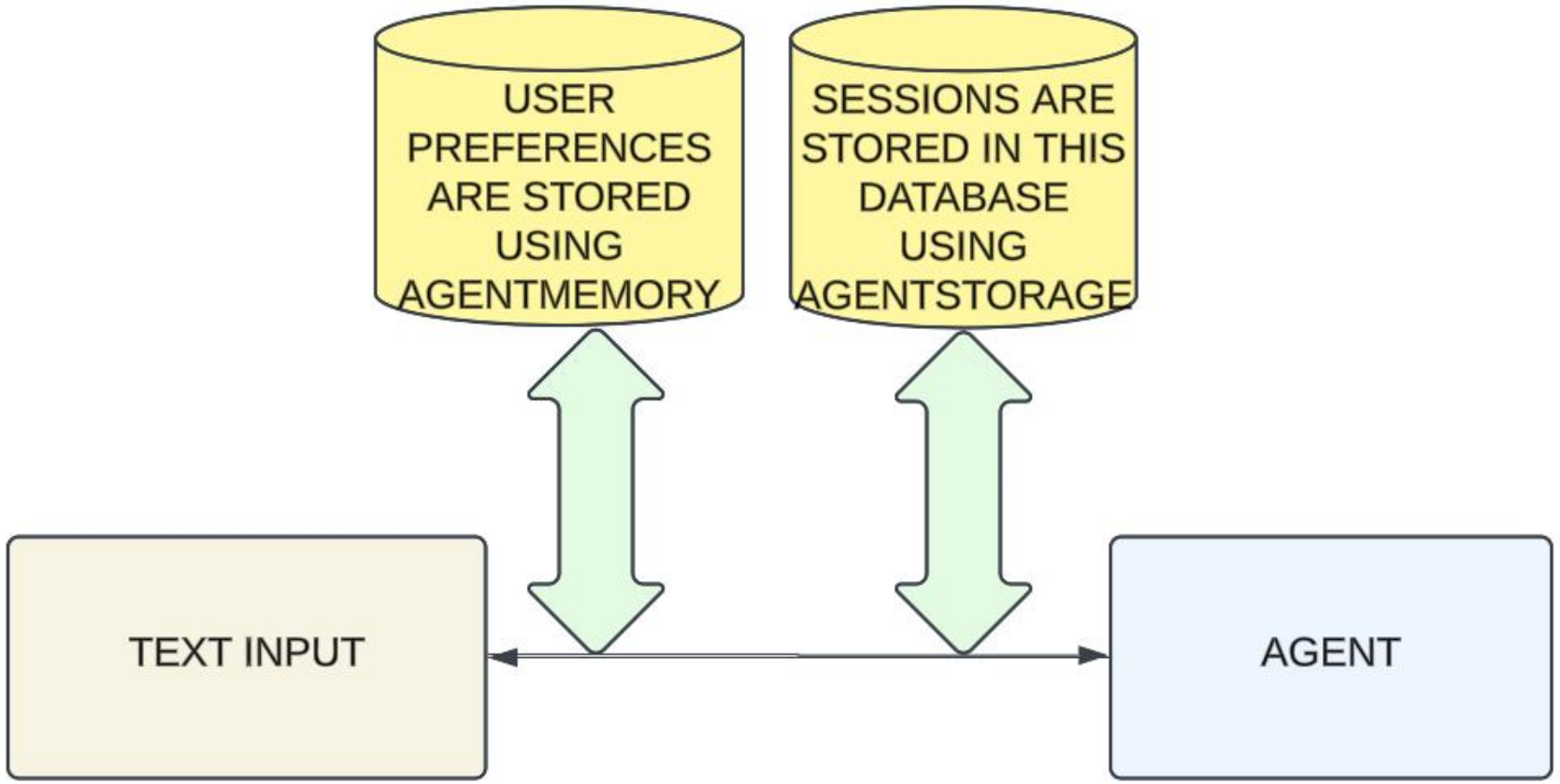
REAL LIFE AGENTS

- **Real life agent:-**are autonomous systems designed to perceive their environment, process information, and take actions to achieve specific goals. Eg:- Real Estate Agents.
  - **All real life agents have one thing in common. they are provided main task , they perceive environment , do nessesery steps and respond back.**
- **Real estate agent**:- a professional who arranges transactions between seller and buyer.
- **Travel Agent**: Plans and arranges travel for clients, including flights, hotels, and tours.
- **Literary Agent**: Helps authors find publishers and negotiate book deals.

HOW STORAGE WORKS

- **Agent-storage:-**this will be able to store the sessions and is better than built in memory. The sessions are stored in a database. It is better than built in memory because for it to store it needs its session ID to be active

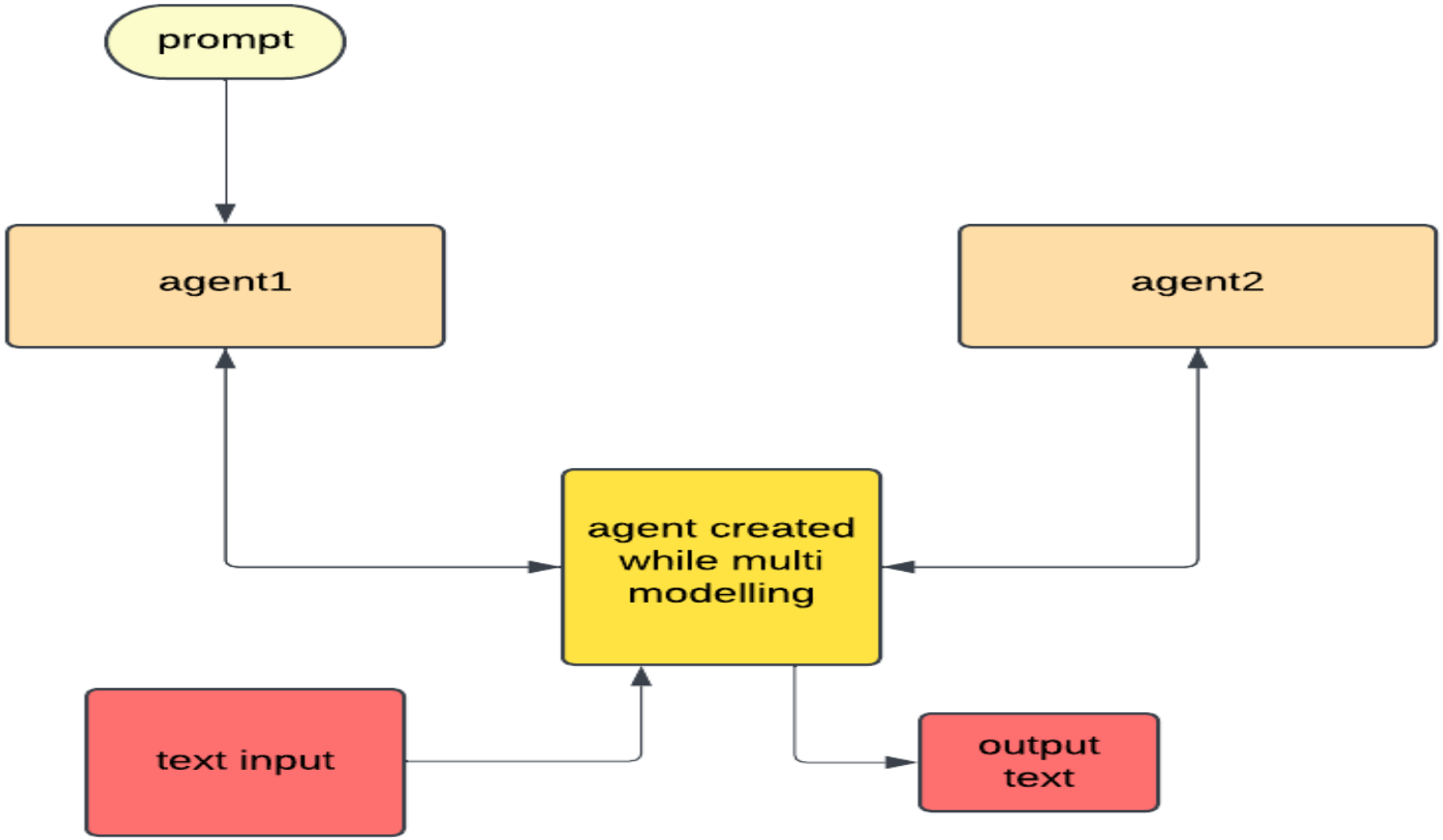
- **Agent memory:-** is used to classify and store user preferences . This will help to give better responses appropriate for the user


USER PREFERENCES ARE STORED USING AGENTMEMORY
SESSIONS ARE STORED IN THIS DATABASE USING AGENTSTORAGE
TEXT INPUT
AGENT

TASK PERFORMED

- NVDA stock reccomondation using multimodal agent
- Python agent giving code with steps involved regarding input problem query
- Sport agent used for combining responses from both agents and giving it in form of table.

NVDA STOCK RECCOMONDATION



TASK PERFORMERD

- AGENT 1 is web search agent that searches the web for information regarding query given (NVDA stock) and provides response.
- AGENT 2 is financial agent that access information regarding financial and market data.
- **Multimodal Agent is the agent that access and combines information from both agents and provides response .**

WHAT WAS PERFORMED

- Web search agent:-tools where duckduckgo, model used was LLAMA-3 along with prompt.
- Financial agent:-tools where Yfinance. model used was LLAMA-3
- Multimodal agent was created combining above 2.model used was LLAMA-3 .
- All the models where used using groq.
- Ran the same multimodal agents in phidata platform in playground by selecting an endpoint.

RESULTS

Here are the latest analyst recommendations for NVDA:

Recommendation	Number of Analysts
Buy	48
Hold	4
Sell	0
Strong Buy	12
Strong Sell	0

Recommendations from the past 3 months:

Timeframe	Buy	Hold	Sell	Strong Buy	Strong Sell
1 month ago	48	4	0	12	0
2 months ago	48	4	0	12	0
3 months ago	48	4	0	11	0

Please note that analyst recommendations can change rapidly and may not reflect the current market situation. For the most up-to-date information, it's always best to check the latest news and financial reports from reliable sources like Bloomberg, CNBC, or Yahoo Finance.

PYTHON AGENT

- the agent is built for the purpose of generating python code and also it provides the steps which are essential to produce the output.
- Its takes input query and interacts with its environment/tools (PhythonTools) which enables an agent to write and run python code.
- The agent I have created will write a python script of palindrome solution with required steps.
- The tool kit function has “save_and_run”(bool) which is used to save the script and run it. Can also be used for future

SPORT AGENT

- This agent is used to access and provide information about sports then convert it into table where each agent response is available. And was saved in file.
- AGENT1:-uses Wikipedia to access information and provide response.
- AGENT2:- uses websearch to access and provide information.
- Multi_agent:-is used to obtain responses from both agents and each agent with corresponding agent is stored in table and saved in file.

LIMITATIONS

- multi-agent-dependencies:-multi agents using the same foundational model for multi agent can lead to shared pitfall.
- infinite feedback loops:-some agents might not be able to find comprehensive plan or reflect findings due to which it might be calling the same tools due to which it can lead to infinite feedback loops.
- building AI agents from scratch can be computationaly expensive .

OVERCOMING LIMITATIONS

- to overcome the limitations of multi agent dependencies. developers can grant users access to log of actions
- preventing AI agents for long over running can be overcomed by implementing interuptibility.
- It will be sometimesnessessery for agents to get human feedback . apart from this it is better for human approvals.

BENEFITS OF AI AGENTS

- AI agents are AI tools that can solve complex tasks autonomously in turn this tasks are done inexpensivly,
- multi modal agent works better because more plans of actions are available to the agent due to which more learning and reflex occours.an AI and feedback from other agents helps in better way compared to models
- agents provide responses that are more accurate , personalised responses(user prefrences are stored).

NEXT STEP OF AI AGENTS

- **Integration with Internet of Things (IoT)**: AI agents will beintegrated with IoT, enabling seamless communication between devices and enhancing automation, data analysis.

- **Specialization in various fields**: AI agents will specialize in fields like finance and healthcare, with applications such as automated trading bots and virtual health advisors.

- **Autonomous decision-making**: by 2028, most of work decisions will be made autonomously through agentic AI, and also majority of organizations will integrate with Agents for tasks **like email generation, coding, and data analysis.**

- Additionally, multi-agent frameworks will leverage **hierarchies**. where some agents focus on high level objectives and other on specific task and report back.

THANK YOU