

AI AGENTS

~ The Brains Behind Smart System

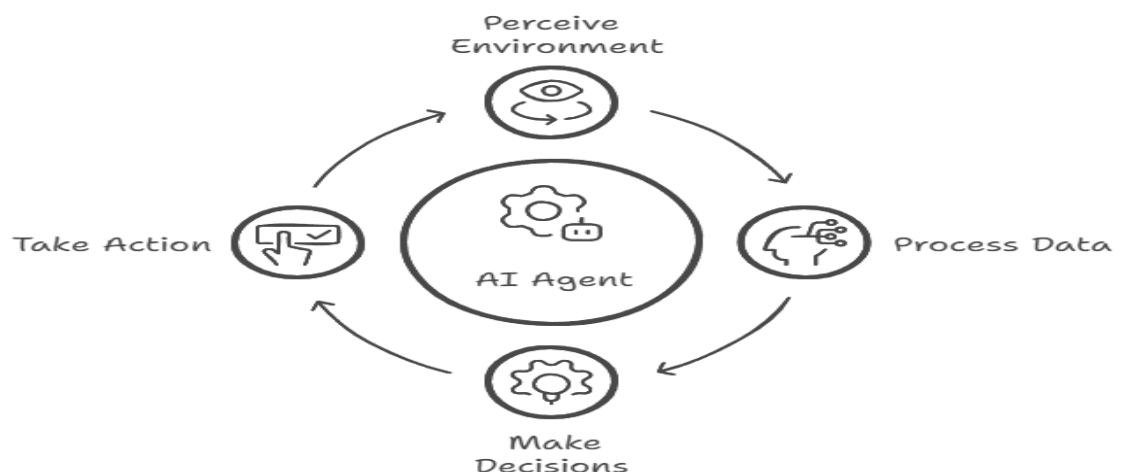
Artificial Intelligence (AI) is one of the most booming technologies today. It's changing the way we live, work, and communicate. From personal assistants like Siri and Alexa to self-driving cars and facial recognition – AI is all around us.

what is an **AI Agent**?

An AI Agent is any system that can observe its environment, process what it sees, and take an action to achieve a goal. In other words, it follows a simple logic – *see, think, act*.

Every AI Agent follows the Perceive–Think–Act cycle.

- **Perceive** - taking input from the environment using sensors – this could be a camera, a microphone, or any input from a user.
- **Process** – think of what to do in that situation, with the information. It may use pre-defined rules, logic, or machine learning algorithms.
- **Act** - make the output using effectors or output systems, like motors, speakers, or displays



AI Agents are categorized based on how advanced or intelligent they are. There are **five main types** of AI Agents

Different types of Learning Agents are:

1. Rule-Based Agent

2. Model-Based Reflex Agents

3. Goal-Based Agents

4. Utility-Based Agents

5. Learning Agents

1.Rule-Based Agent

Agent Type: Rule-Based / Classical AI Agent

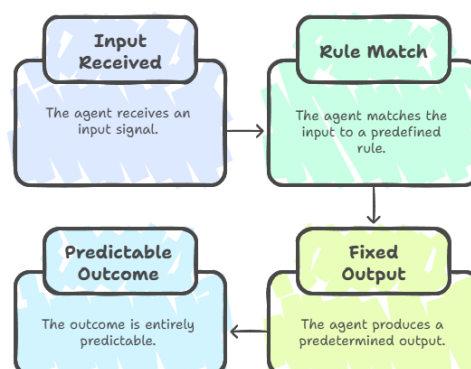
- Also called as **SIMPLE REFLEX AGENT** (an automatic response to a query that does not require brain to process the information needed).
- So here is the point where agents started! With just **RULE BASED LOGIC**. These types of agents don't learn/ adapt. They work on predefined conditions, they don't have any memory where an agent build's sequence of connected interactions
- Input → Rule match → Fixed output
- Entirely predictable

Goal: simply to provide the correct pre – programmed response to correct input

Example: Automated Phone Menu System

1. Press 1 for English, Press 2 for Hindi
2. Press 3 to talk to customer care
3. You have selected 'Balance Inquiry'. Please wait...

This automated call doesn't understand any language or input through your words, instead it reacts to your button presses with pre – defined rules!



2. Model-Based Reflex Agent

Agent Type: Model-Based

- Also Called **Rule based Agent with Internal State** – an improved version of rule-based agent with a memory
- These agents don't just depend on current state they do remember previous actions.
- This contains a internal model which helps in remembering:
 - What was last seen
 - What actions were taken
 - What effects those actions had

Input → Internal State Update → Rule Match → Output

Goal: To provide better responses using past knowledge and memory instead of only current input.

Example: Smart Chatbot with Context

Imagine you are talking with a banking chat bot where you have provided your banking details before and also had an interaction with it many times before

So here it has some information about previous interactions

so, when you enter: I want to know my balance

Bot: Sure. Are you referring to your savings or credit account?

So the bot understands the context and gets info about your accounts and give answers based on them

Choose the best agent type for handling complex tasks with memory requirements.



Model-Based Agent

Uses internal state for memory and context



Simple Reflex Agent

Reacts only to current input

3.Goal-Based Agents

Agent Type: Goal-Oriented Agent

- Goal based agent don't act upon predefined rules/ conditions, but based on the action that helps to reach the goal.
- They analyse the situation – compare all possible actions – choose the path that moves close to the goal!
- They don't pick useful option they pick the option that gets them closer to the goal (these steps can also be multiple) – this can handle complex tasks by better planning
- Input → Understand Goal → Plan Actions → Execute → Goal Achieved

Goal: complete an task by choosing actions that lead to goal, even if multiple steps are taken!

Example: I want to go Golconda fort from Machilipatnam - GPS Navigation

Goal is to reach the destination – we have multiple paths - the agent chooses the best path with less traffic no road blocks and minimum time – it can take multiple streets/ turnings but result is to reach the fort



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4. Utility-Based Agent

Agent Type: highest Utility Based Agent

- Utility agents don't just give a normal result, but they aim for best result which is beneficial to the user.
- These agents choose the best utility values – which can be preferences, goals or benefits assigned to the options included

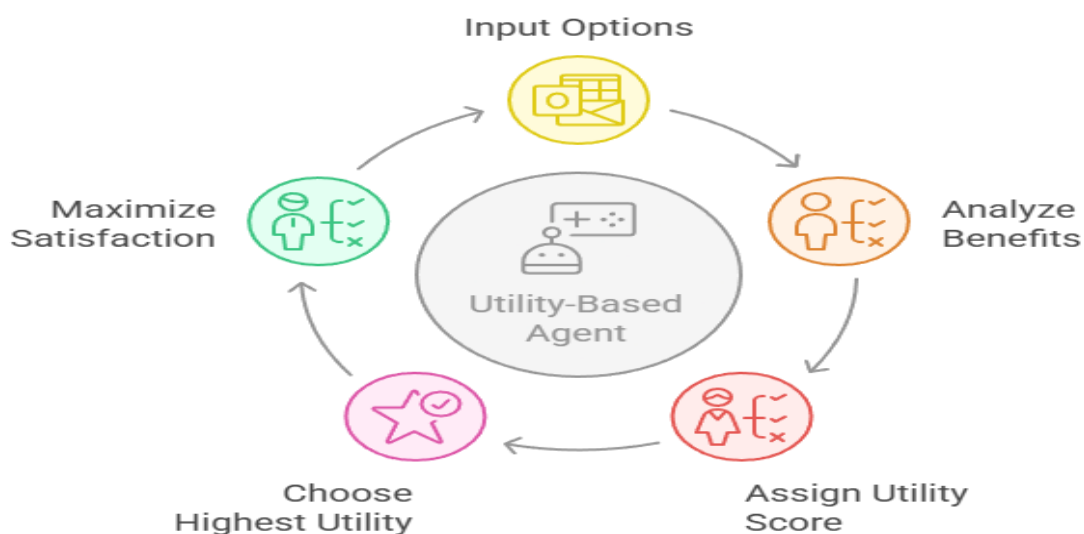
- They are smarter than other agents which maximise satisfaction or usefulness for the user!
- Input → Analyse Benefits → Assign Utility Score → Choose Option with Highest Utility
- They compare multiple options, evaluate and decide based on utility values

Goal: To maximize user satisfaction or benefit by choosing the most useful outcome among several.

Example: Smart Career Decision Agent

Imagine you're choosing a career.

1. You enter:
 - Option A: Software Engineer (Score: 8, Reason: "I'm passionate and it's high paying")
 - Option B: Graphic Designer (Score: 7, Reason: "I love creativity and freedom")
2. The AI analyses the scores and reasons, finds useful keywords like passion, freedom, etc... and gives a final adjusted score.
3. It chooses the career with highest total utility score — not based on rules, but based on what's most beneficial to you.



5. Learning Agents

Agent Type: Learning Agent / Adaptive AI Agent

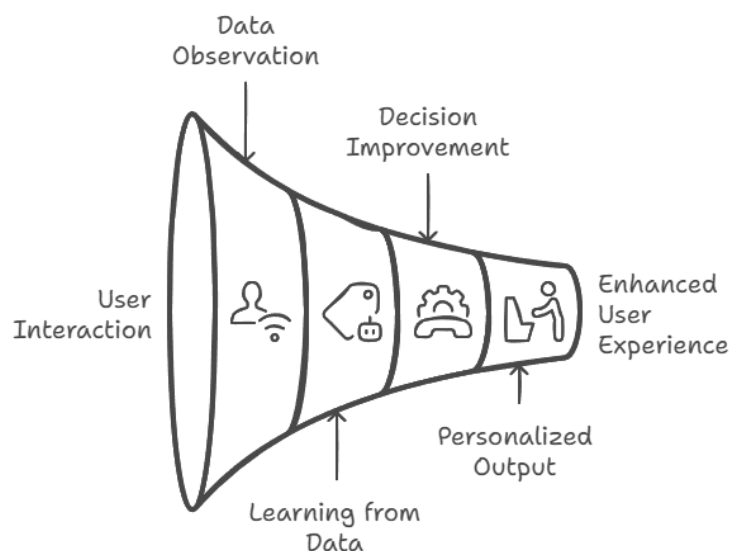
- These agents learn from experience or the data, improve their performance over time.
- They don't have any predefined conditions or outputs they act based on user interaction
- They store previous experience's / interaction in the memory, use them for adaptive behaviour and can modify their interaction.
- Not entirely predictable, capable of handling new, unseen scenarios
- Input → Observes → Learns from Data → Improves Decision Over Time → Output

Goal: to continuously improve performance using learning mechanisms

Example: Netflix or YouTube Recommendations

Based on your past search / view content the agent learns what you like the most!

Over time -> it learns -> adapts -> give more personalized content



Summary:

- **Rule-Based** = Fixed responses
- **Model-Based** = Has memory
- **Goal-Based** = Chooses actions to reach a goal
- **Utility-Based** = Chooses best possible outcome
- **Learning Agent** = Learns and adapts over time

Today, AI isn't just a buzzword – it's a booming industry. Cursor AI is attracting nearly \$100 billion in investments for its intelligent code generation capabilities, and Lovable.ai, which builds websites using just a user prompt, earned \$75 million within 7 months.

These examples show that AI Agents aren't just futuristic dreams — they're the driving force of real-world success.

Applications

- **Healthcare** – Virtual doctors, patient monitoring agents
- **Education** – Intelligent tutoring systems
- **Finance** – Fraud detection systems
- **Gaming** – AI opponents that adapt to your strategy

Challenges

- Bias in Training Data
- Privacy Issues
- Unpredictable Behaviour
- Lack of Common Sense

~ With AI Agents, we're not just solving problems — we're redefining possibilities ~

Thank you for your attention!

Team: Code Cub Community

Meet 1 - @Aditya_karnati

For any questions or discussion, feel free to reach out!