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# AGENTIC AI

**Agentic AI** refers to AI systems that can **autonomously make decisions**, **take actions**, and **pursue goals** with minimal human intervention. These systems behave like **agents** — they don’t just respond to prompts, they **act independently** based on objectives, rules, and environmental feedback.

## EXAMPLES

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| AI Health Assistant (Personal Agent)  Scenario: A patient says: "Help me manage my diabetes."  *Agentic AI Actions:*   1. Retrieves your medical history and prescriptions. 2. Sets reminders for medication and meals. 3. Orders refills from the pharmacy. 4. Alerts your doctor if blood sugar readings are abnormal. 5. Adjusts your diet plan based on recent activity.   ✅ Autonomous, goal-driven, multi-step behavior. |
| AI Executive Assistant (e.g., AutoGPT)  Scenario:You say: "Plan a business trip to Mumbai next week."  *Agentic AI Actions:*   1. Searches for flights and books the best one. 2. Reserves a hotel near your meeting location. 3. Schedules meetings with clients. 4. Adds everything to your calendar. 5. Sends confirmation emails.   ✅ It acts like a human assistant, not just a chatbot. |
| 3. DevOps Agent  Scenario: "Monitor my app and scale it if traffic spikes."  *Agentic AI Actions:*   * Monitors server metrics. * Detects a traffic spike. * Automatically scales up resources. * Sends a Slack alert to the team. * Rolls back if errors increase.   ✅ Autonomous infrastructure management. |
| E-commerce Store Manager Bot  Scenario:"Manage my online store."  *Agentic AI Actions:*   1. Updates product listings. 2. Adjusts prices based on competitor data. 3. Responds to customer queries. 4. Flags suspicious orders. 5. Launches a weekend sale campaign.   ✅ Acts with initiative and adapts to changing conditions. |

## MULTI-AGENT AGENTIC AI?

* **Multi-Agent Agentic AI** is an advanced design pattern where **multiple autonomous AI agents** collaborate (or sometimes compete) to solve **complex, multi-step problems**. Each agent is **specialized**, goal-driven, and capable of acting independently — but they also **communicate and coordinate** with each other to achieve a shared objective.

|  |  |
| --- | --- |
| Concept | Description |
| Agentic AI | AI that can act autonomously to achieve goals |
| Multi-Agent System (MAS) | A system where multiple agents interact to solve problems |
| Specialization | Each agent is skilled in a specific domain or task |
| Coordination | Agents share information and plan together |
| Autonomy | Agents can make decisions and take actions without human input |

Example 1: Software Development Team (AI Agents)

Imagine building a web app using only AI agents:

|  |  |
| --- | --- |
| Agent | Role |
| 🧠 Planner Agent | Breaks down the project into tasks |
| 💻 Coder Agent | Writes backend and frontend code |
| 🎨 Designer Agent | Creates UI/UX mockups |
| 🧪 Tester Agent | Writes and runs test cases |
| 📦 DevOps Agent | Deploys the app to the cloud |

They **collaborate like a real team**, using tools like GitHub, CI/CD pipelines, and Slack.

Example 2: Healthcare Automation

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| --- | --- |
| Agent | Task |
| 🩺 Diagnosis Agent | Analyzes symptoms and suggests possible conditions |
| 💊 Prescription Agent | Recommends medications based on diagnosis |
| 📅 Scheduling Agent | Books appointments and follow-ups |
| 📈 Monitoring Agent | Tracks patient vitals and alerts doctors |

Together, they provide **end-to-end patient care** with minimal human intervention.

Example 3: Travel Planning Assistant

User: *"Plan a 5-day trip to Japan under ₹1,00,000."*

|  |  |
| --- | --- |
| Agent | Task |
| ✈️ Flight Agent | Finds affordable flights |
| 🏨 Hotel Agent | Books budget-friendly hotels |
| 📍 Itinerary Agent | Plans daily activities |
| 💳 Budget Agent | Ensures total cost stays within limit |

They **negotiate trade-offs** (e.g., cheaper hotel = better flight) and deliver a complete plan.

Artificial Neural Networks (ANNs)

A diagram of a diagram

AI-generated content may be incorrect.

An ANN is made up of layers of **nodes (neurons)**:

1. **Input Layer** – Takes in the raw data/features (e.g., pixels of an image, words in a sentence).
2. **Hidden Layers** – Perform computations and extract features. There can be one or many of these.
3. **Output Layer** – Produces the final result (e.g., classification, prediction, generated content).

Input Layer – Where It All Begins

* This is the **first layer** of the network.
* It receives **raw data** like numbers, images, or text.
* The data is broken into **features** (e.g., for predicting apartment price: size, number of rooms, location).
* Each feature becomes an **input node** in the network.

Hidden Layers – The Brain of the Network

* These are the **intermediate layers** between input and output.
* They **process the input data** and extract deeper patterns or sub-features.
* More hidden layers = more ability to learn **complex relationships** in the data.

Output Layer – The Final Decision

* This layer gives the **final result** of the network.
* Depending on the task, it could:
  + Classify (e.g., spam or not spam),
  + Predict (e.g., apartment price),
  + Generate (e.g., new text or images).

Connections and Weights – How Learning Happens

* Every node is connected to others in the next layer.
* Each connection has a **weight**—a number that shows how important that connection is.
* During training, the network **adjusts these weights** to improve accuracy.
* For example, if “apartment size” is very important, its connection will have a **higher weight**.

Training the Network – Learning from Data

* The network learns by comparing its output to the correct answer and adjusting weights.This process is called **backpropagation**.
* Over time, the network learns which features are most important and how to combine them.