

Understanding AI Agents

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Understanding AI Agents

Definition

AI agents are autonomous computational entities designed to intelligently achieve specified goals.

- Powered by LLMs
- Perform tasks independently
- Learn from data
- Make decisions based on contextual inputs



Key Characteristics of AI Agents



Autonomy

Functions independently without human intervention.



Adaptability

Continuously learns and adjusts behavior based on environmental data.



Decision-Making

Utilizes logic, heuristics, or machine learning to achieve specific objectives.



Action-Oriented

Executes tasks efficiently to fulfill predefined goals.

How AI Agents Work



- 1 **Sensing**
Collecting data from sensors, APIs, or inputs
- 2 **Processing**
Using rules, ML models, or heuristics
- 3 **Acting**
Making decisions and executing tasks

Brief History & Evolution of AI Agents

1. Early AI Systems (Rules-Based)

Operated on predefined logic and rule-based decision-making.

3. Rise of AI Agents

AI evolved beyond static programs to autonomous agents. Capable of real-time decision-making and interaction.

2. Shift to Learning-Based Methods

Introduction of **machine learning**, **neural networks**, and **expert systems**.

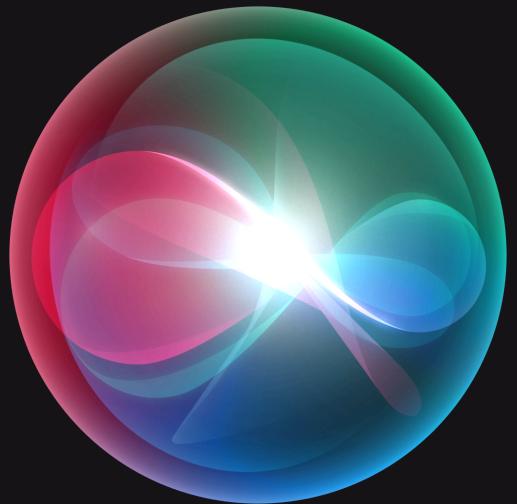
AI became more adaptable and data-driven.

4. Present-Day AI Agents

Found in **chatbots**, **automation**, **robotics**, and **self-learning systems**.

Integrated into industries like healthcare, finance, and education.

Real-World AI Agent Examples



Siri



Alexa

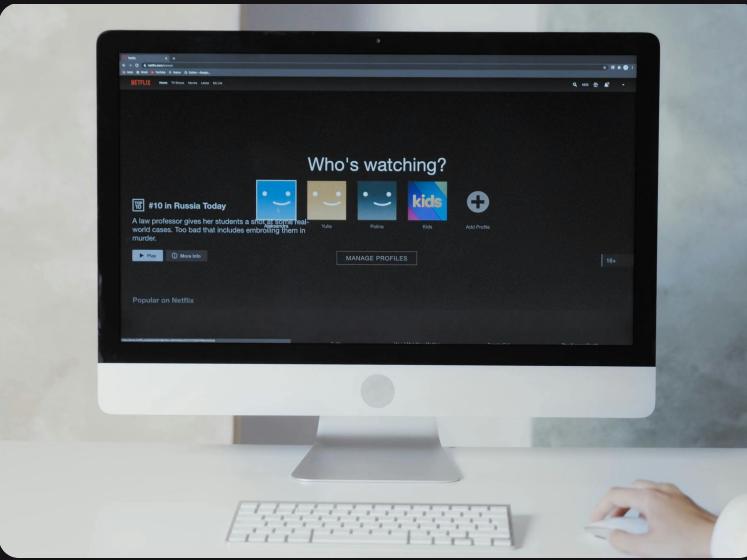


Google Assistant

Real-World AI Agent Examples



Customer Support
AI chatbots that handle complex,
multi-step queries.



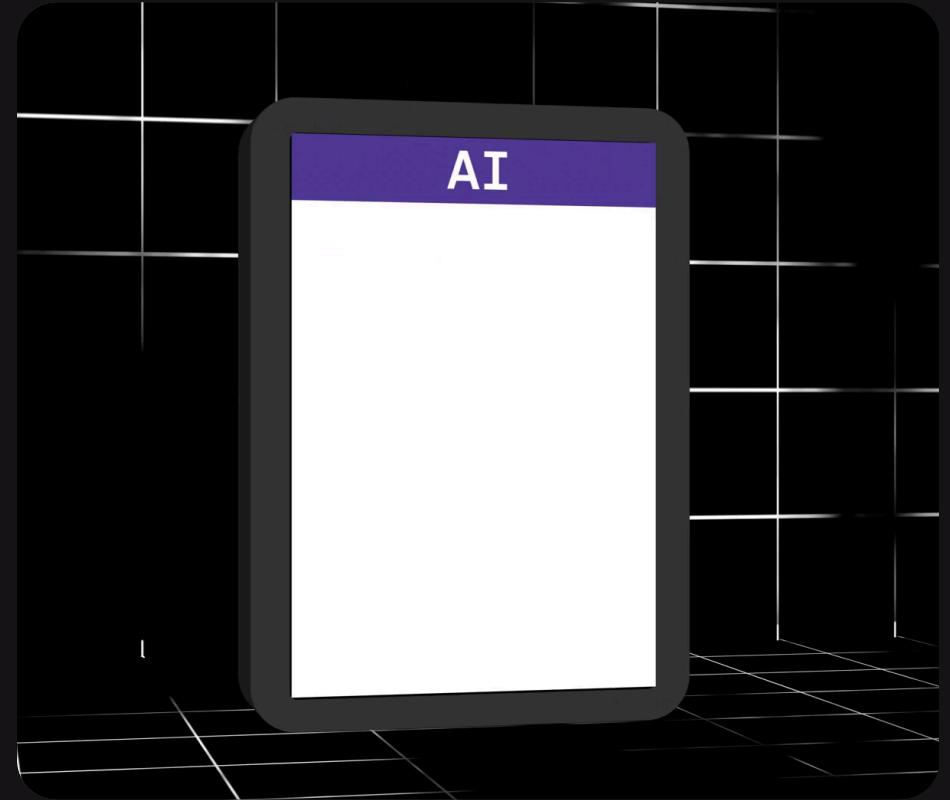
AI-driven recommendation
systems (Netflix, YouTube)



Autonomous robots (vacuum
cleaners, drones)

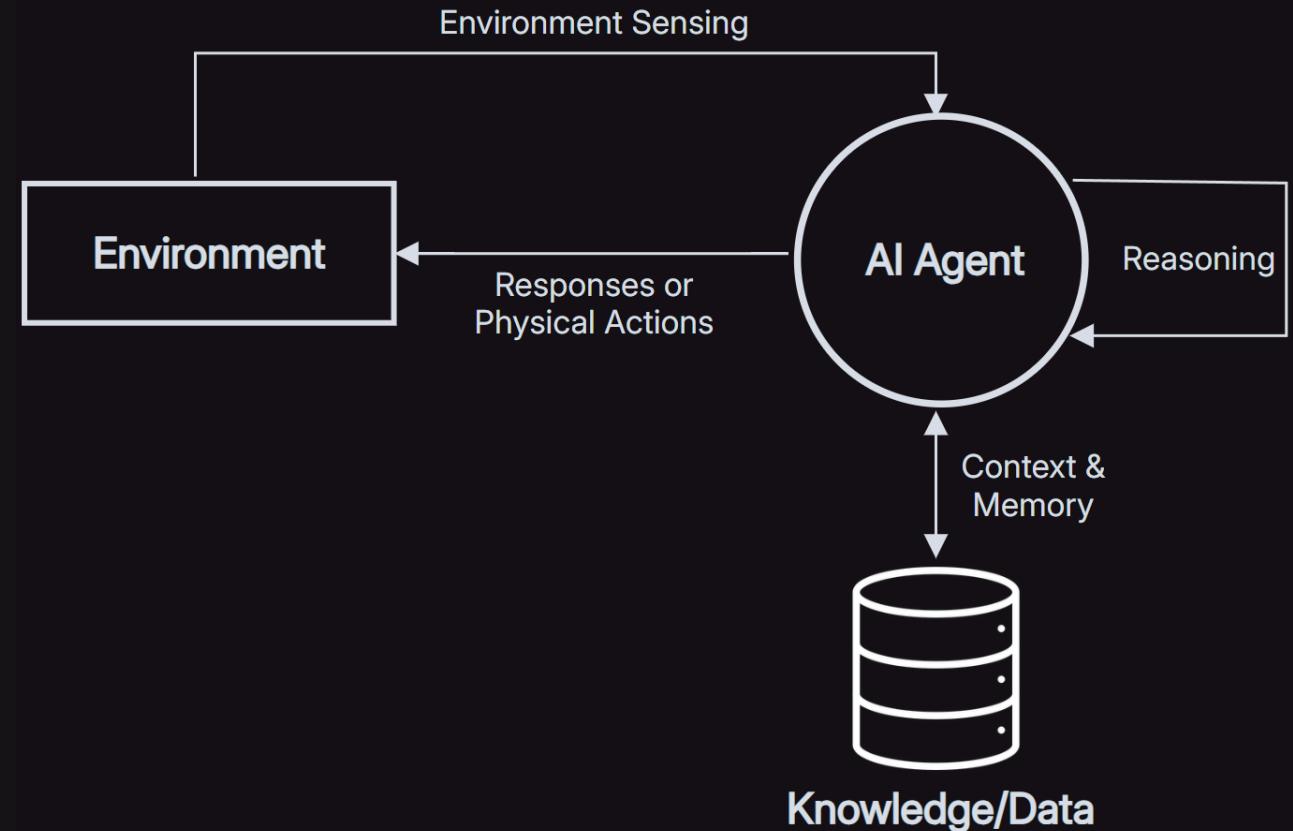
AI Agents in Customer Support

- Chatbots and virtual assistants
- Automated ticketing and issue resolution
- Sentiment analysis for customer interactions



Key Components of an AI Agent Architecture

- Environment sensing (inputs)
- Reasoning engine (decision-making)
- Actuators/outputs (responses or physical actions)
- Data/knowledge base (context and memory)



How AI Agents Learn and Improve

- Machine Learning and/or NLP for advanced capabilities
- Feedback loops: user interactions or performance outcomes
- Continuous improvement from new data



Why AI Agents Matter?



Increased Efficiency & Productivity



24/7 Availability & Customer Support
real-time insights



Data-Driven Decision-Making



Personalized & Context-Aware
Interactions

Challenges and Limitations

- Understanding complex queries
- Ethical concerns:
 - Bias in training data
 - Privacy and security issues
 - Transparency in decision-making
 - Importance of a human-in-the-loop for critical decisions
- Integration with existing systems

Next Steps

- Explore AI agent types
- Introduction to multi-agent systems
- Build a project-based AI agent

Thanks