Introduction to Artificial Intelligence

Harsh Porwal

Parul University

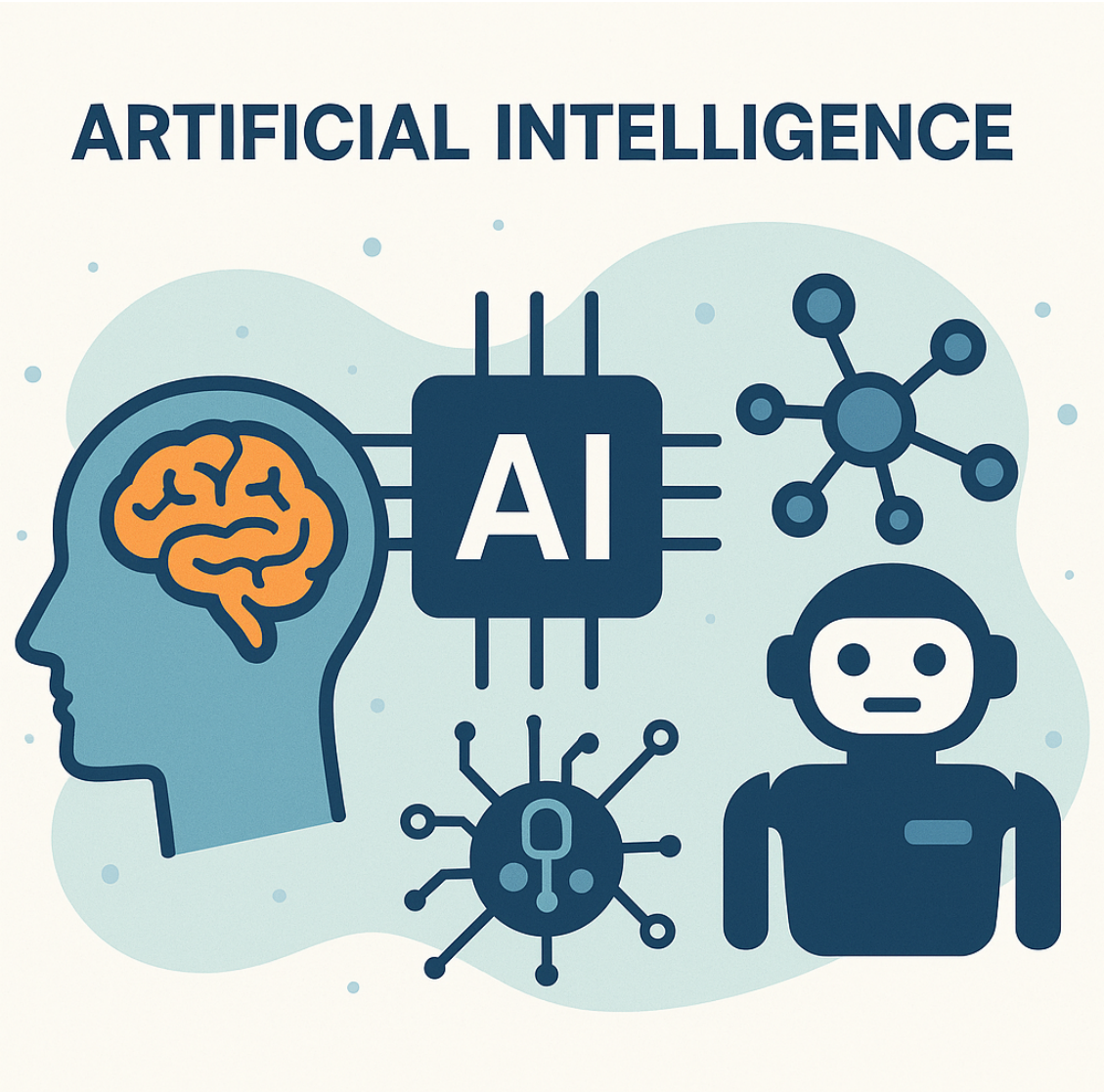
June 2025

Topics to be Covered

- Definition of AI
- Major Areas of AI
- AI Techniques
- History of AI
- AI Problems
- Production Systems
- Problem Characteristics
- Intelligent Agents
- Agent Architecture
- AI Applications (E-Commerce, Medicine)

What is Artificial Intelligence?

- Ability of machines to mimic human intelligence.
- Enables machines to think, learn, and make decisions.

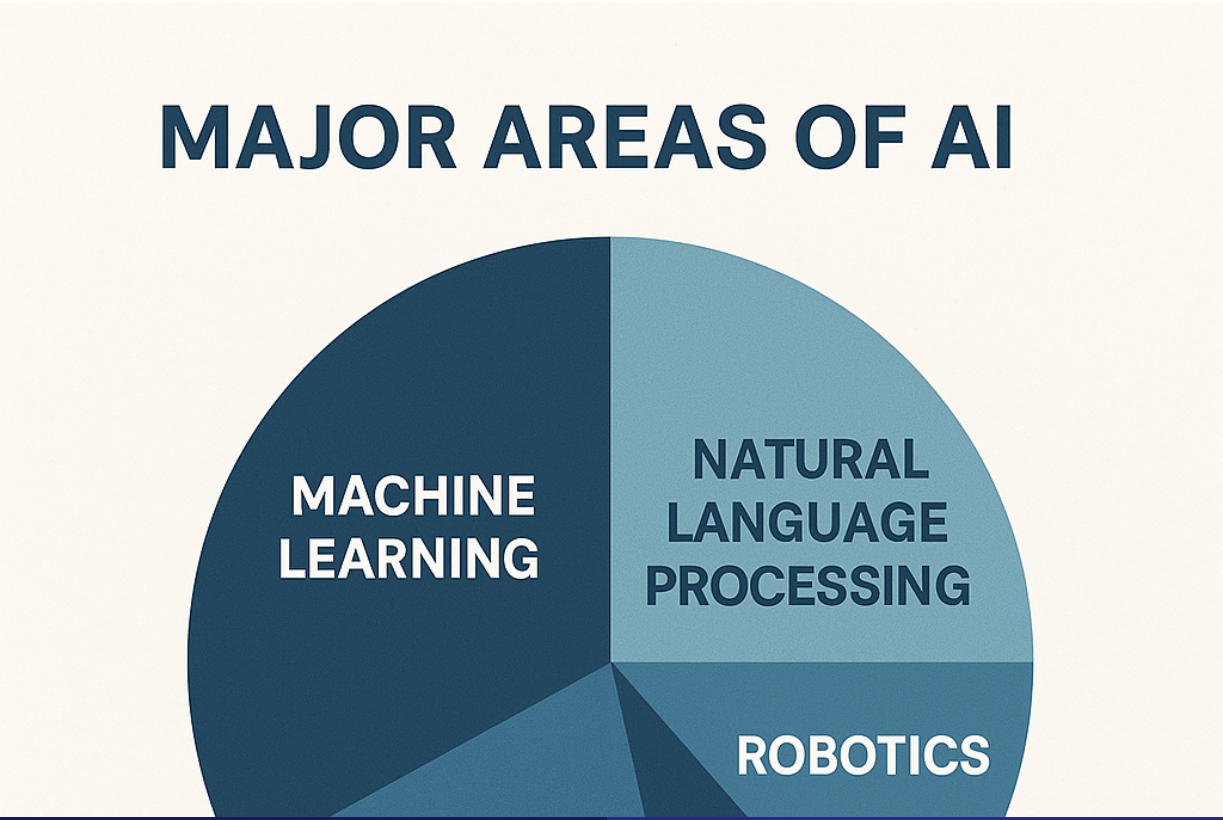


Definition of AI

- "AI is the science and engineering of making intelligent machines."
- Tasks that usually require human intelligence: learning, reasoning, problem-solving.

Major Areas of AI

- Natural Language Processing (NLP)
- Robotics
- Expert Systems
- Machine Learning
- Computer Vision
- Speech Recognition

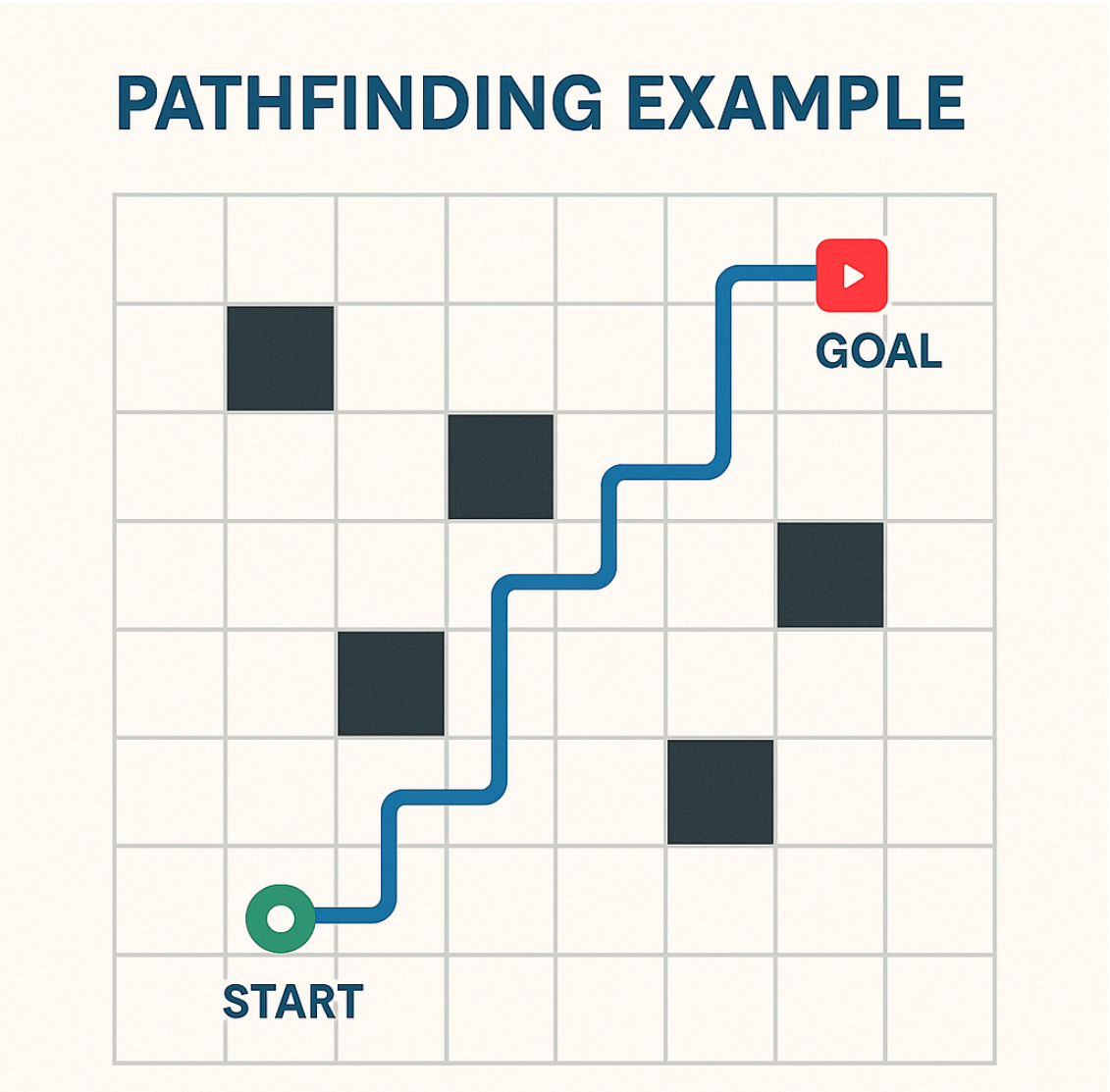


AI Techniques - Overview

- Search and Optimization
- Knowledge Representation
- Reasoning and Inference
- Learning
- Planning

Search and Optimization

- Problem Solving by Searching
- Examples: Pathfinding in Google Maps, Puzzle Solving



Knowledge Representation

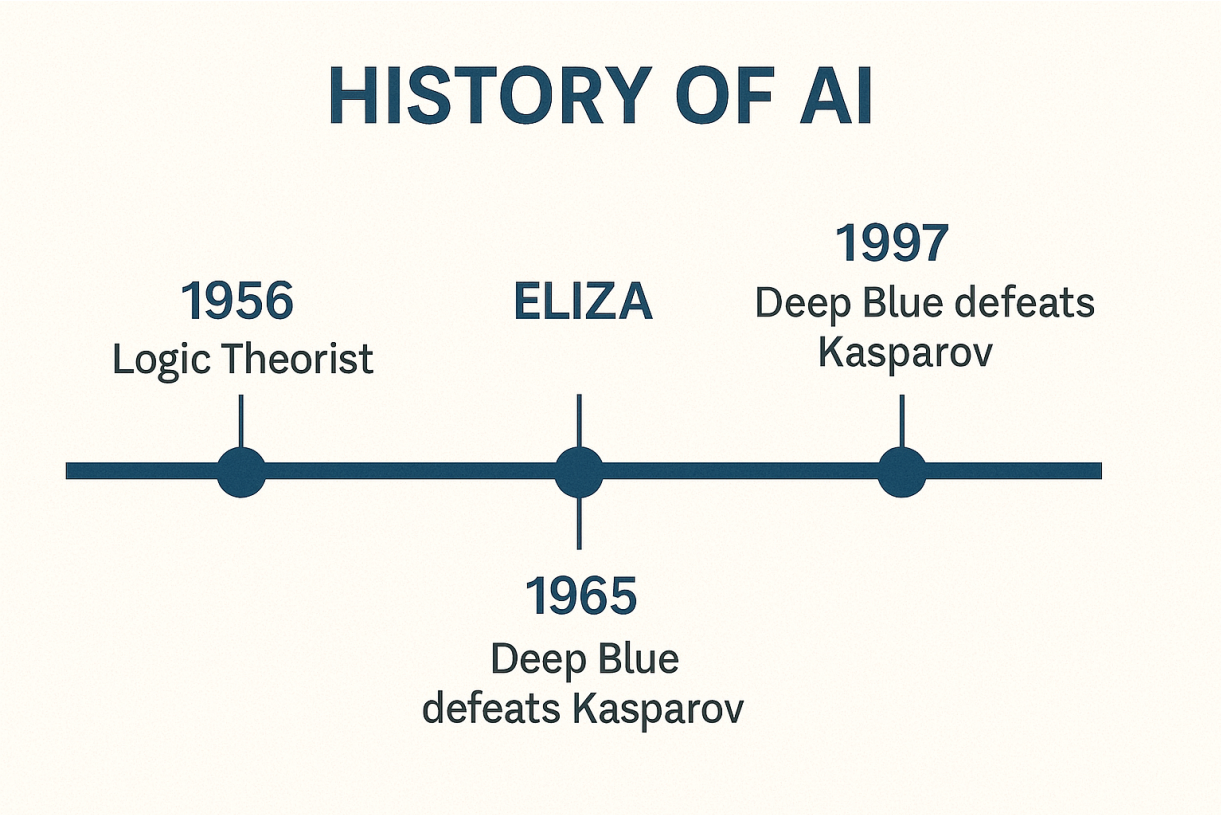
- How machines store and use knowledge.
- Example: Semantic networks, Frames, Ontologies.

Learning in AI

- Supervised Learning (Image Classification)
- Unsupervised Learning (Clustering Customer Data)
- Reinforcement Learning (Training robots)

History of AI

- 1950: Turing Test by Alan Turing
- 1956: Dartmouth Conference - AI term coined
- 1960s-70s: Symbolic AI
- 1980s: Expert Systems
- 2000s: Machine Learning and Deep Learning



AI Problems

- Game Playing (AlphaGo)
- Planning and Scheduling (Airline Scheduling)
- Machine Translation (Google Translate)
- Speech Understanding (Alexa, Siri)
- Robotics Navigation (Autonomous Cars)

Production Systems

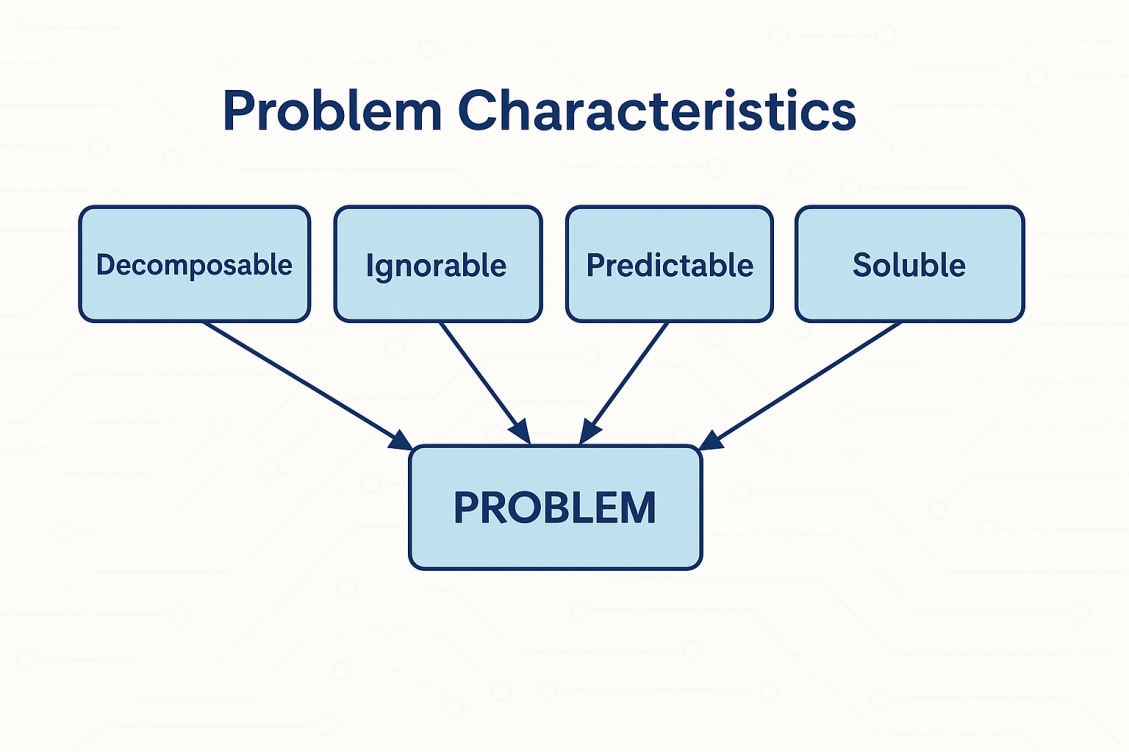
- IF-THEN Rules
- Working Memory
- Rule Interpreter
- Used in Expert Systems

Problem Characteristics

- Decomposability
- Predictability
- Static vs Dynamic
- Discrete vs Continuous

Intelligent Agents

- Perceive environment via sensors
- Act through actuators
- Example: Chatbots, Self-driving cars



Agent Architecture

- Simple Reflex Agents
- Model-based Reflex Agents
- Goal-based Agents
- Utility-based Agents

Applications of AI - E-Commerce

- Personalized Recommendations (Amazon)
- Customer Support (Chatbots)
- Fraud Detection
- Inventory Optimization

AI APPLICATION (E-COMMERCE)

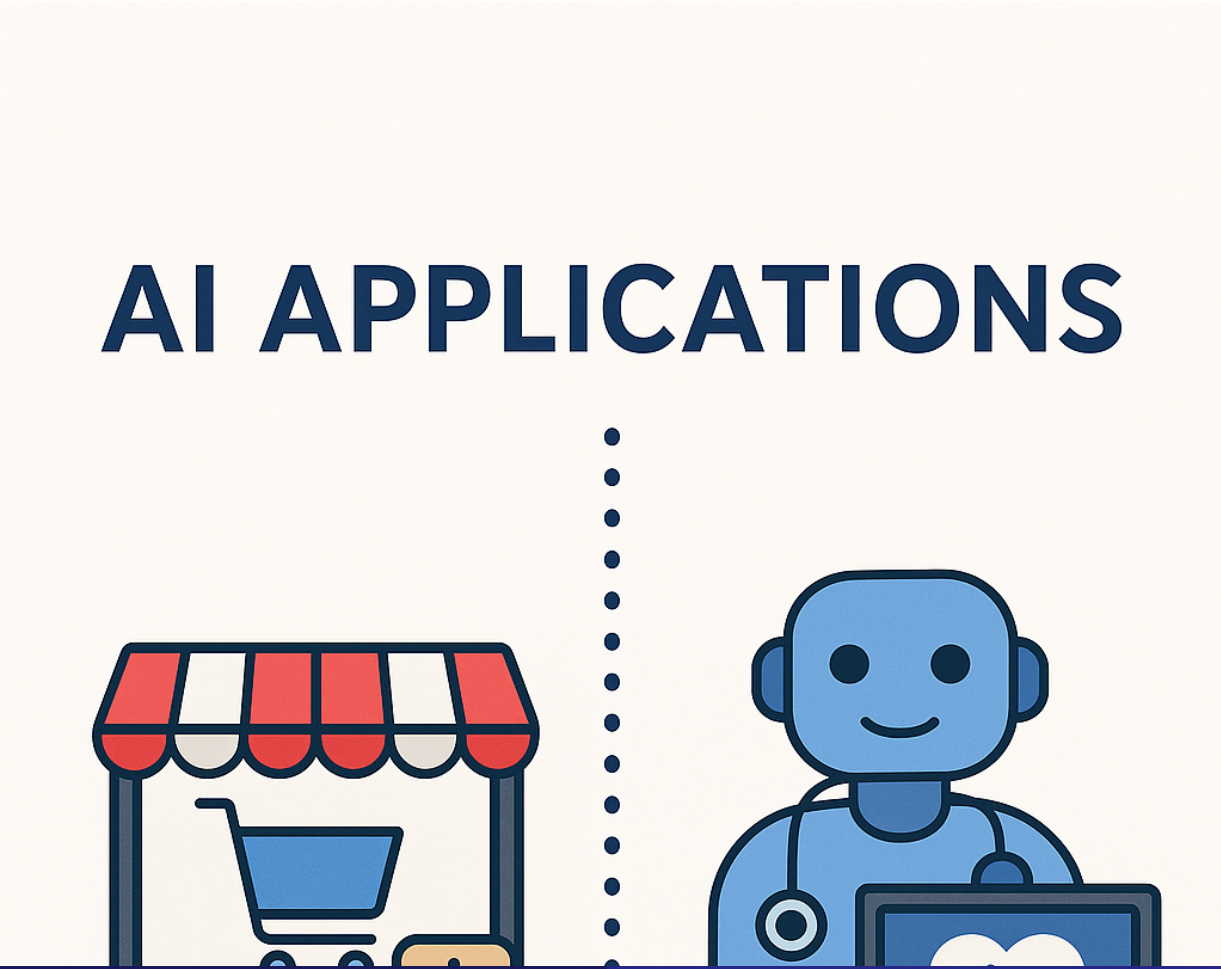
- Product recommendations
- Personalized advertising
- Fraud detection

AI APPLICATION (MEDICINE)

- Medical diagnosis
- Drug discovery
- Patient care

Applications of AI - Medicine

- Medical Image Analysis
- Disease Diagnosis
- Virtual Health Assistants
- Drug Discovery



Benefits of AI

- Automation of tasks
- Increased efficiency
- Improved decision-making
- Personalization of services

Challenges in AI

- Data Privacy
- Bias in AI
- Job Displacement
- Ethical Concerns

Future of AI

- General AI
- AI in Healthcare
- AI in Education
- AI in Daily Life

Thank You

Questions Discussions