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# Introduction to AI
# Seventh lecture
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Artificial Intelligence (AI) is one of the most transformative technologies of our time. It enables machines to perform tasks that traditionally require human intelligence. These tasks include learning, reasoning, problem-solving, understanding natural language, and perception.

**Why is AI Important?**

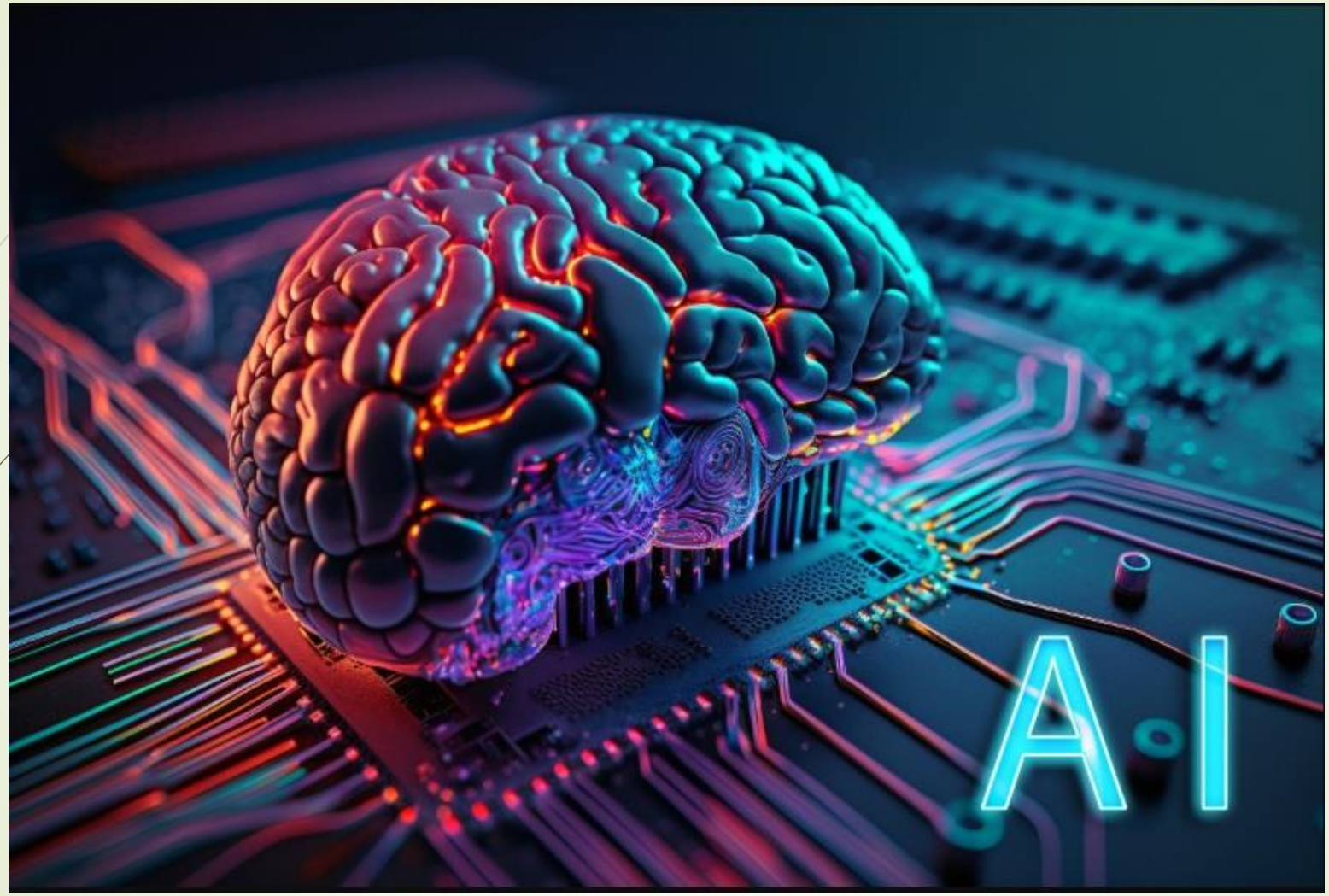
AI plays a critical role in modern life, powering applications in healthcare, finance, education, transportation, and entertainment. For example, AI algorithms assist doctors in diagnosing diseases, provide personalized learning experiences, and enable self-driving cars.

**Key Benefits**:

Automating repetitive tasks.

Enhancing productivity.

Providing insights through data analysis.


AI

**What is AI?**
AI refers to the simulation of human intelligence in machines programmed to think, learn, and make decisions. It enables systems to mimic human cognitive functions.
**Types of AI**:
**Narrow AI**: AI designed for specific tasks (e.g., voice assistants, spam filters).
**General AI**: Hypothetical AI capable of performing any intellectual task a human can do.
**Super AI**: Future AI that surpasses human intelligence in all aspects (currently speculative).
**Core AI Capabilities**:
**Learning**: Machines improve performance over time through data.
**Reasoning**: AI systems make decisions based on available information.
**Perception**: Analyzing visual and sensory data for interpretation.

**History of AI**

**Early Beginnings**:

•**1943**: McCulloch and Pitts proposed the first artificial neuron model.

•**1950**: Alan Turing introduced the Turing Test, a method to evaluate a machine's ability to exhibit intelligent behavior.

**The Birth of AI**:

•**1956**: Dartmouth Conference officially coined the term "Artificial Intelligence."

**Key Milestones**:

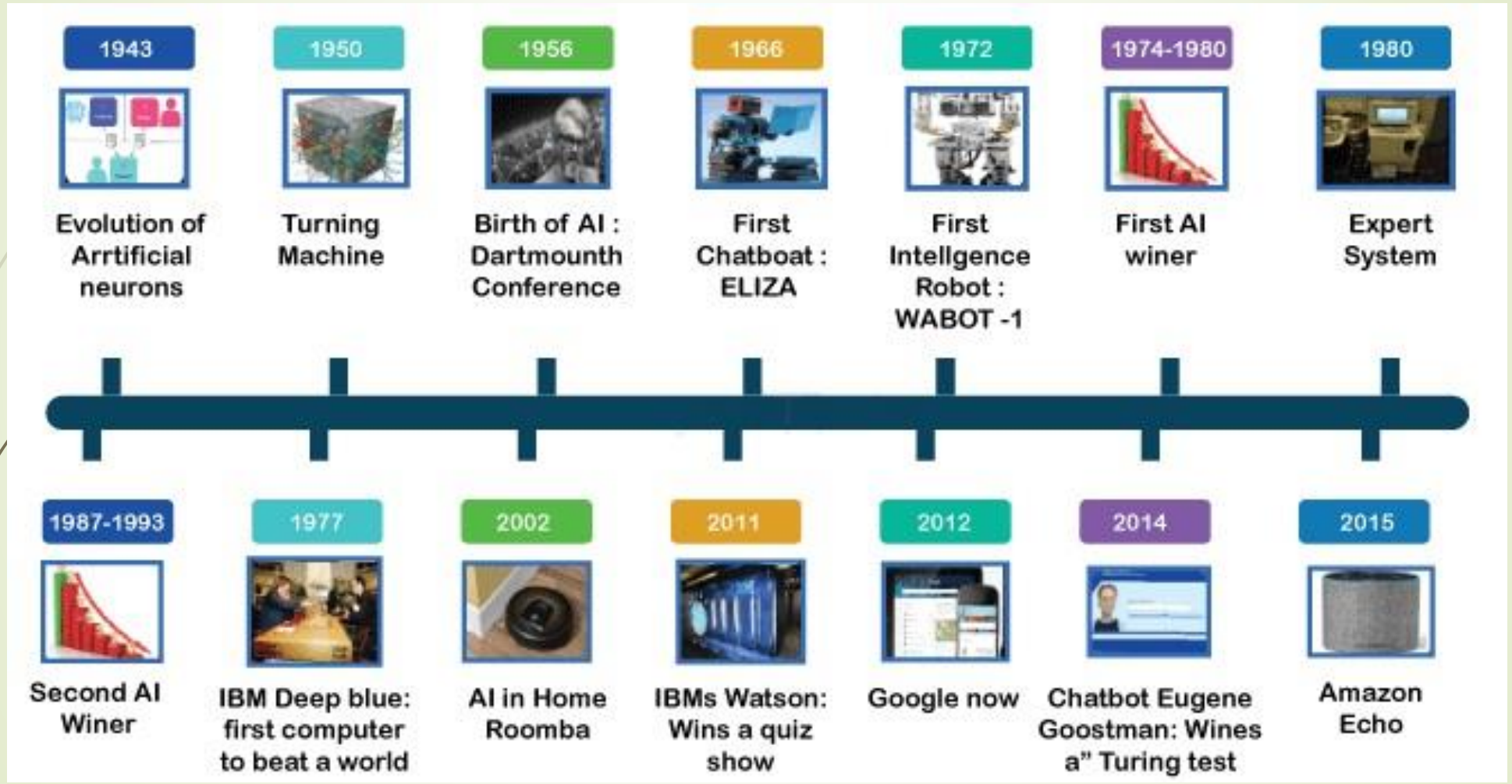
**1.1960s**: Development of early AI programs like ELIZA, a natural language processing tool.

**2.1997**: IBM's Deep Blue defeated world chess champion Garry Kasparov.

**3.2011**: IBM Watson won the quiz show *Jeopardy!*

**4.2016**: Google DeepMind's Alpha Go defeated Go champion Lee Se dol.

**5.2020s**: Generative AI models like GPT-3 revolutionized natural language understanding.


1943
Evolution of Arrtificial neurons
1950
Turning Machine
1956
Birth of AI : Dartmounth Conference
1966
First Chatboat : ELIZA
1972
First Intellgence Robot : WABOT -1
1974-1980
First AI winer
1980
Expert System
1987-1993
Second AI Winer
1977
IBM Deep blue: first computer to beat a world
2002
AI in Home Roomba
2011
IBMs Watson: Wins a quiz show
2012
Google now
2014
Chatbot Eugene Goostman: Wines a" Turing test
2015
Amazon Echo

## AI Techniques and Approaches

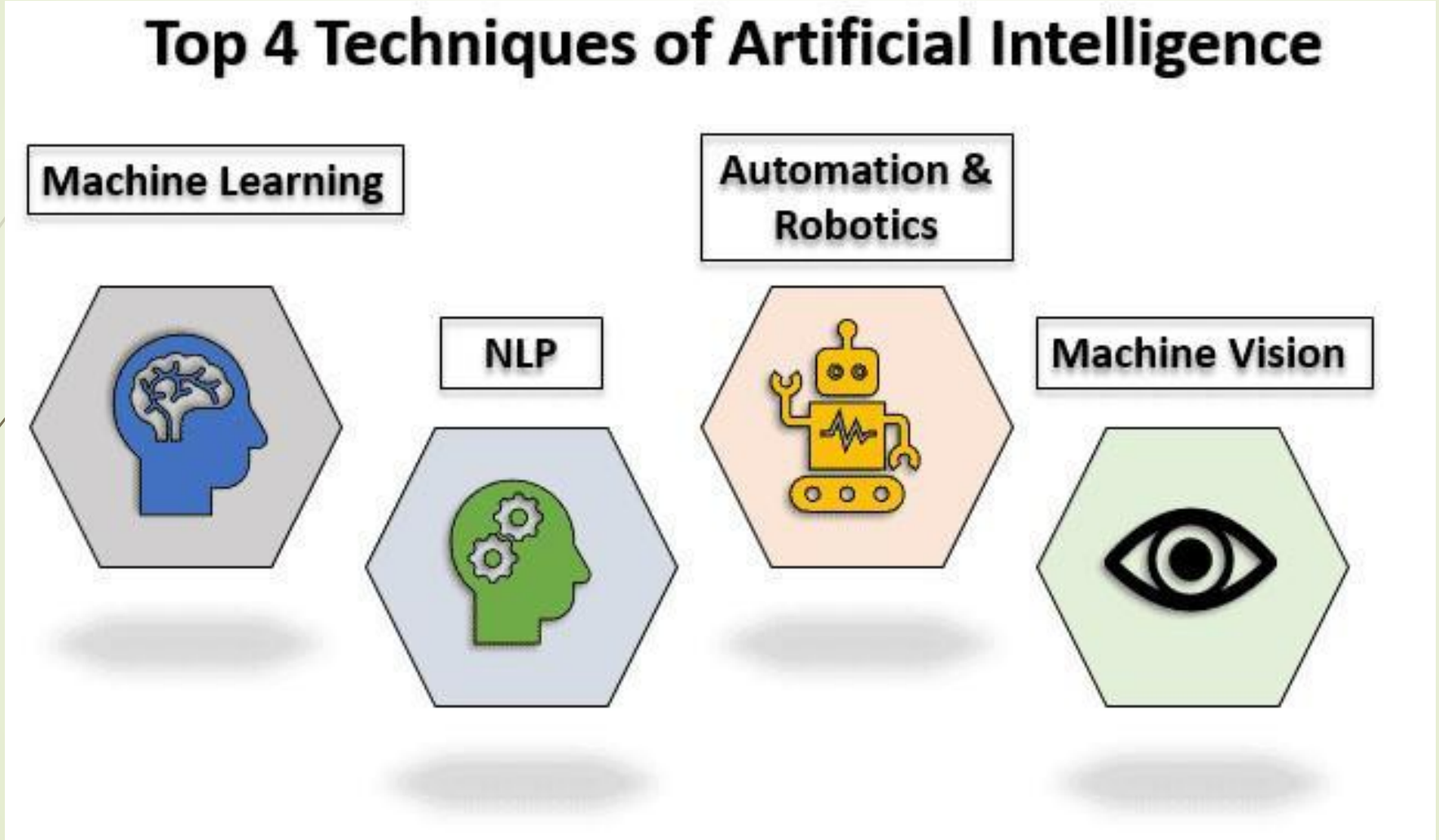
### 1. Machine Learning (ML)

**Definition**: A subset of AI focused on algorithms that learn from data to make predictions or decisions.

- **Types of ML**:
  - **Supervised Learning**: Training with labeled data.
  - **Unsupervised Learning**: Finding patterns in unlabeled data.
  - **Reinforcement Learning**: Learning through trial and error with rewards and penalties.

**Applications**:

- Fraud detection, recommendation systems, and weather prediction.


Top 4 Techniques of Artificial Intelligence
Machine Learning
NLP
Automation & Robotics
Machine Vision

## 2. Neural Networks

**Definition**: Computational models inspired by the structure of the human brain.

•**How It Works**:

- Consists of layers of interconnected nodes (neurons).
- Processes input data to detect patterns and relationships.

**Applications**:

•Image recognition, autonomous vehicles, and speech recognition.

## 3. Natural Language Processing (NLP)

**Definition**: The ability of AI systems to understand, interpret, and generate human language.

•**Techniques**: Tokenization, sentiment analysis, machine translation.

•**Examples**: Chatbots (e.g., ChatGPT), voice assistants, and translation services.

**4. Robotics**

**Definition**: The integration of AI into machines that perform physical tasks autonomously.

•**Applications**:

- Industrial automation.
- Healthcare (e.g., surgical robots).
- Agriculture (e.g., harvesting robots).

**Challenges in AI**

AI offers numerous benefits but comes with several challenges:

**1. Data Dependency**

AI systems require vast amounts of high-quality data to function effectively.

**2. Bias in Algorithms**

Training data often contains biases, leading to unfair decisions or discrimination in AI systems.

**3. Explainability**

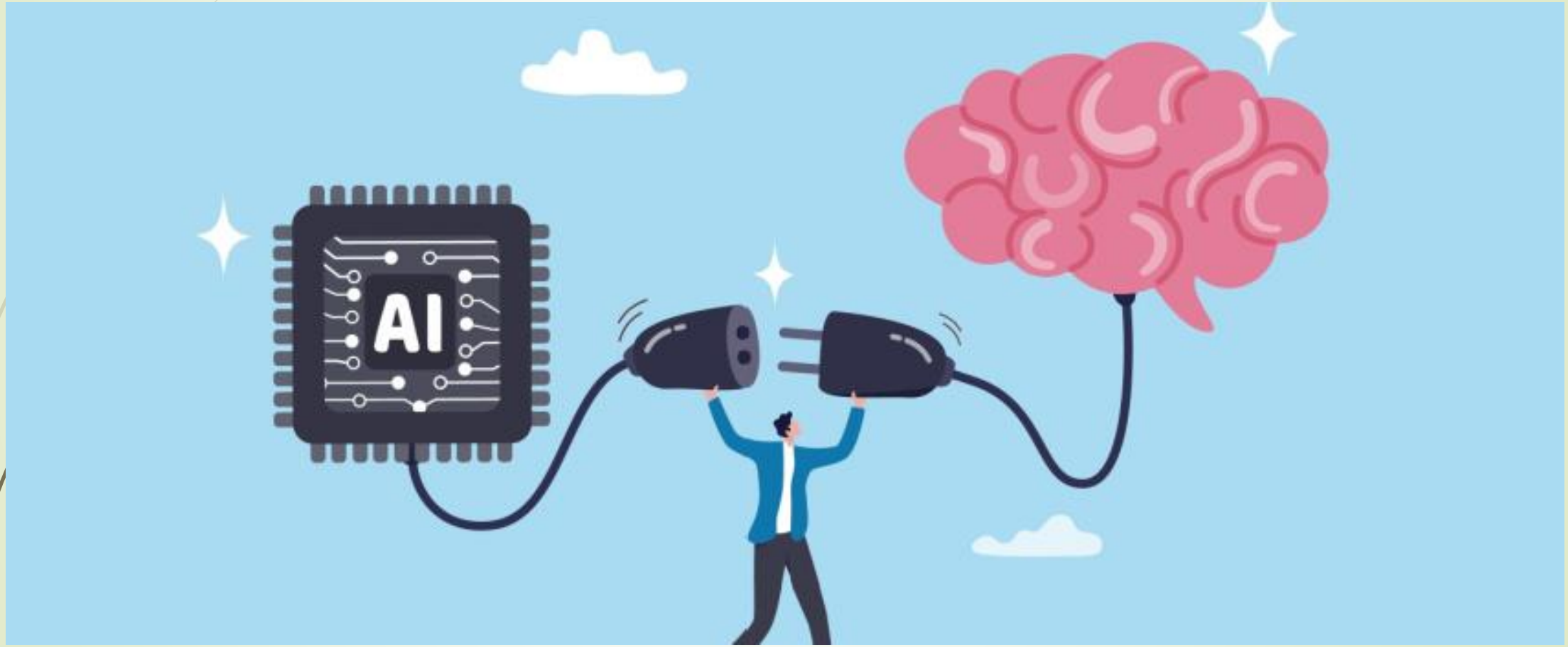
Many AI models, such as deep learning, act as "black boxes," making it difficult to understand how they make decisions.

**4. Security Risks**

AI is vulnerable to adversarial attacks and misuse by malicious actors.

**5. Resource Intensiveness**

Building and training AI models require significant computational power and resources.


AI

## Ethical Considerations

### 1. Privacy Concerns

AI relies on collecting and analyzing personal data, raising issues about how data is used and stored.

### 2. Job Displacement

Automation powered by AI may replace human jobs, especially in repetitive and manual roles.

### 3. Accountability

Determining who is responsible for AI-driven decisions can be challenging, particularly in critical fields like healthcare and autonomous driving.


AI

**4. Weaponization of AI**

The use of AI in military applications poses ethical dilemmas, including autonomous weapons.

**5. Ensuring Fairness**

Developers must ensure that AI systems operate without bias, promoting equality and fairness.

**Call for Ethical AI**:

•Implementing global standards for AI governance.

•Ensuring transparency in AI decision-making processes.

# Thank you for listening