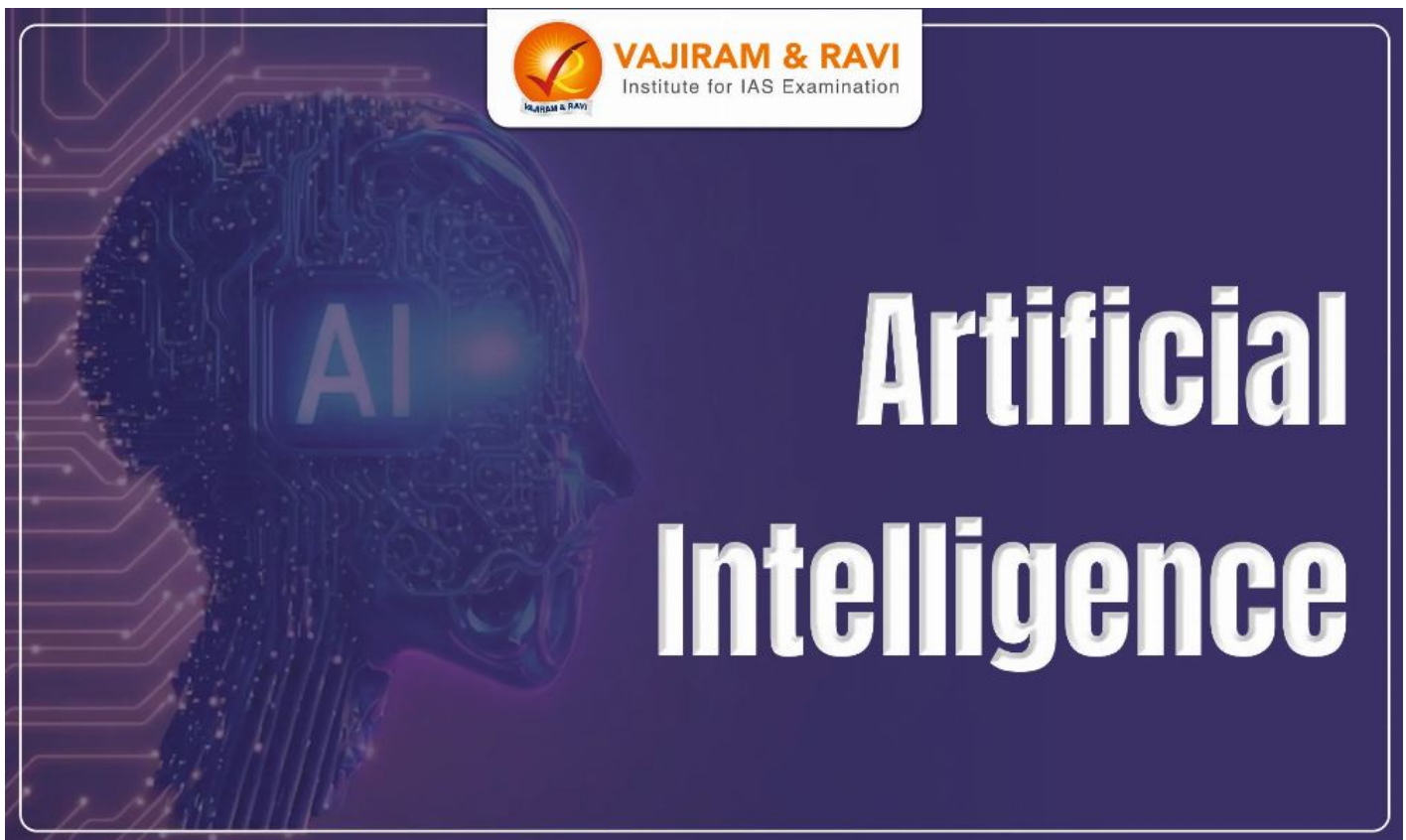


Artificial Intelligence, Definition, Advantages, Applications

July 10, 2026 • vajiramandravi.com



Artificial Intelligence (AI) is an emerging technology that enables computers and machines to simulate human intelligence and problem-solving capabilities. It involves the development of algorithms and models that enable computers **to perform tasks that would typically require human intelligence**, such as learning, reasoning, problem-solving, perception, and decision-making.

Artificial Intelligence has become increasingly prevalent in various domains, including **natural language processing**, computer vision, robotics, and decision support systems. As AI technology advances, it holds the potential to revolutionise numerous industries and aspects of our daily lives, while also raising important ethical considerations regarding its responsible development and deployment.

What is Artificial Intelligence?

Artificial Intelligence refers to machines performing human-like tasks. Its main components are Machine Learning algorithms that train on data, Neural Networks that mimic the brain's structure, and **Natural Language Processing** that understands human language. AI systems work by taking inputs, processing them with algorithms,

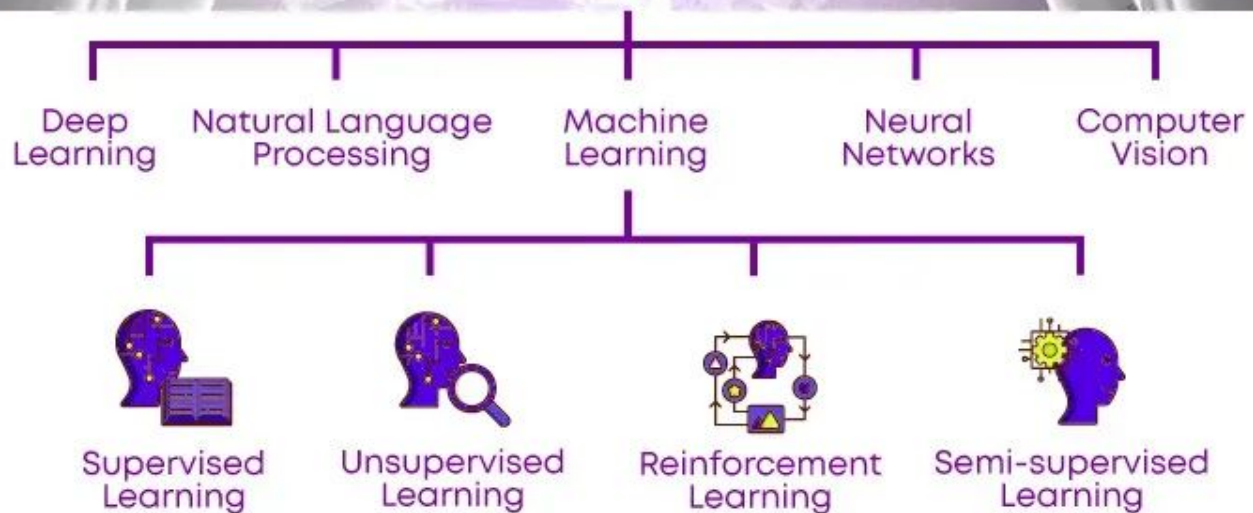
and providing intelligent outputs that mimic human cognition and reasoning abilities.

Brief History of Artificial Intelligence

- **1950s: Birth of the modern AI field**
 - Alan Turing proposed "**Turing Test**" to evaluate machine intelligence
 - John McCarthy coined the term "Artificial Intelligence"
- **1960s-1970s: Early symbolic AI systems and expert systems**
 - Based on hard-coded rules
 - Examples: **DENDRAL** (chemical analysis), **MYCIN** (medical diagnosis)
- **1980s: Shift to machine learning**
 - Algorithms like decision trees and neural networks
 - Systems learn from data instead of hard-coded rules
- **1990s-2000s: Neural networks and deep learning**
 - Inspired by human brain structure and function
 - Excelled in computer vision and natural language processing
- **21st century: AI resurgence**
 - Driven by large datasets (e.g., ImageNet), computing power (GPUs)
 - Algorithmic advances like deep learning
 - Major tech companies invested heavily in AI research
- **2010s-present: Significant breakthroughs**
 - Natural language processing (e.g., ChatGPT by OpenAI)
 - Computer vision (e.g., object detection by DeepMind)
 - Reinforcement learning (e.g., AlphaGo by DeepMind)
 - Widespread adoption of AI technologies across industries

Elements of Artificial Intelligence

Artificial Intelligence



- **Machine learning:** It is a branch of artificial intelligence that allows systems to learn on their own and become more intelligent over time without the need for explicit programming.
 - **Example:** Spam filtering in email clients, which learns to identify spam emails based on patterns in the data.
- **Deep learning:** It is a subset of machine learning that uses artificial neural networks with multiple layers to learn hierarchical representations of data.
 - **Example:** Facial recognition systems used for tagging people in photos or unlocking smartphones.
- **Natural language processing (NLP):** NLP is a branch of artificial intelligence that deals with enabling computers to understand, interpret, and generate human language.
 - **Example:** Virtual assistants like Siri or Alexa that can understand and respond to voice commands.
- **Computer vision:** It is an artificial intelligence interdisciplinary field that allows computers to comprehend and interpret digital images or videos to represent the visual world.
 - **Example:** Self-driving cars that can detect and recognize objects, pedestrians, and traffic signals.
- **Neural networks:** Neural networks are a type of machine learning model inspired by the human brain's neural connections.
 - They consist of interconnected nodes or neurons that process input data, learn to recognize patterns and make decisions or predictions based on that learning.
 - **Example:** Recommendation systems used by streaming platforms like Netflix to suggest movies and shows based on user preferences.

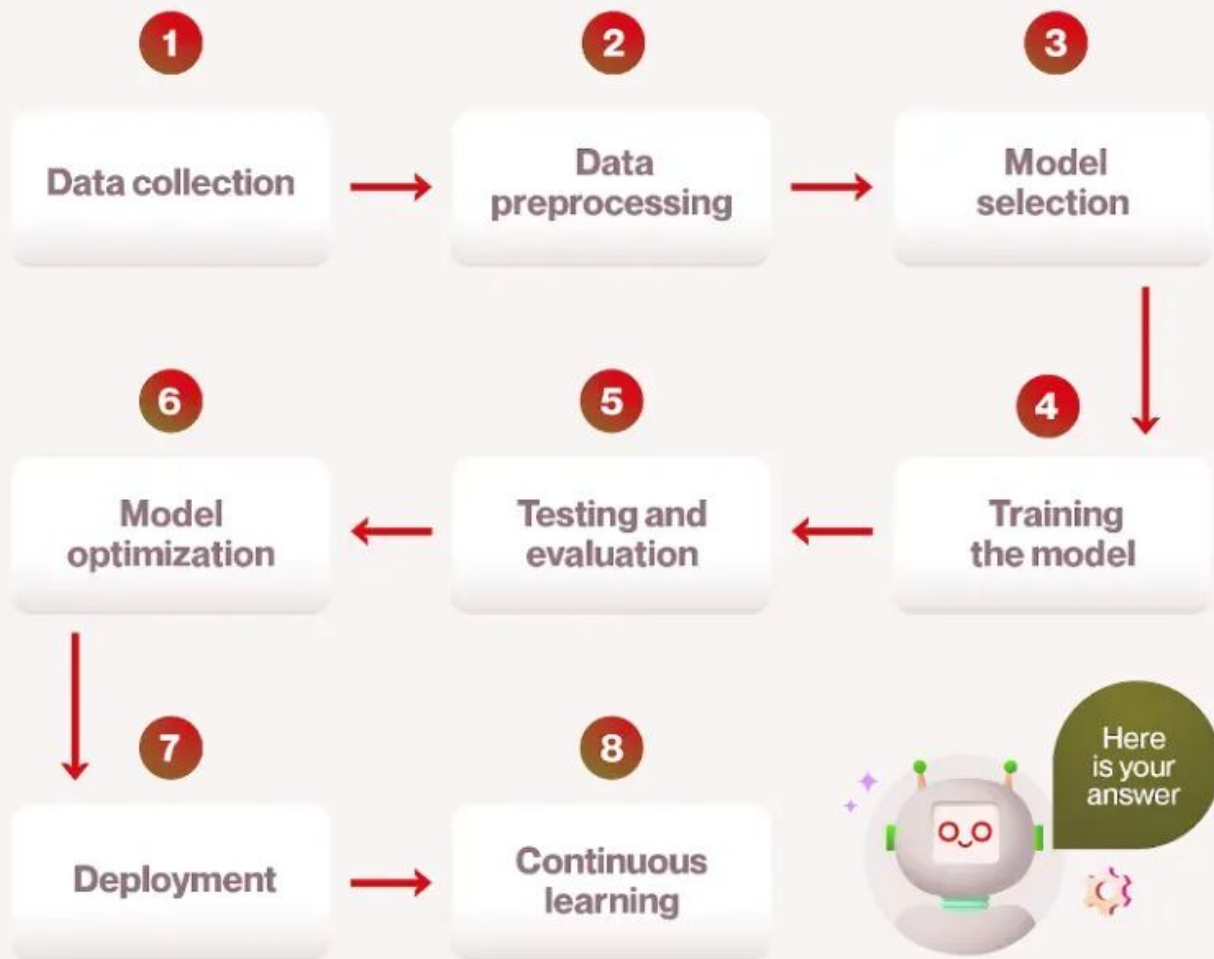
Types of Artificial Intelligence

- **Based on capabilities:**
 - **Narrow AI (Weak AI)**
 - Narrow AI is designed for **specific tasks** and operates within predefined boundaries.
 - Examples: Virtual assistants, chess-playing programs, speech recognition, spam filters
 - **General AI (Strong AI)**
 - General Artificial Intelligence aims to mimic human intelligence across various tasks.
 - Unlike narrow AI, AGI can reason, learn, and adapt like a human.
 - **Super AI**
 - A future form of AI surpasses human intelligence significantly.
- **Based on functionality:**
 - **Reactive Machines**
 - These AI systems operate in the present moment, reacting to current data without memory or past experiences.
 - Examples: IBM's Deep Blue (chess-playing AI) and Google's AlphaGo
 - **Limited Memory Machines**
 - Artificial Intelligence with limited memory can use past data to make decisions but does not have a full history of interactions.
 - Examples: Self-driving cars, language translation software
 - **Theory of Mind AI**
 - This type aims to understand human emotions, beliefs, intentions and thought processes.
 - This type of AI is still in its infancy.
 - **Self-Aware AI**
 - AI that has a sense of self-awareness and consciousness, similar to human consciousness.
 - It is highly speculative and not yet achieved.

How does AI work?

- AI systems **acquire** data, **preprocess** it, and extract relevant features.
- Appropriate algorithms like machine learning, deep learning, or rules are selected and trained on the data to learn patterns.
- The trained models are evaluated, optimized, and deployed to make predictions or decisions based on new input data.
- Artificial Intelligence combines techniques like natural language processing, computer vision, and reasoning to mimic human-like intelligence.
- It continuously learns and improves through exposure to more data and feedback.

How AI works



Applications of Artificial Intelligence

Artificial intelligence has numerous applications across various industries. Some of the most common applications include:

- **E-commerce:** Helps in personalised recommendations, fraud detection, and chatbots for customer support.
- **Education:** Used for adaptive learning, personalised learning plans, and intelligent tutoring systems.
- **Robotics:** Powers robots for automation, inspection, and assembly line tasks.
- **Healthcare:** Aids in medical diagnosis, drug discovery, and patient monitoring.
- **Social Media:** Used for content moderation, recommendation systems, and sentiment analysis.
- **Agriculture:** Helps in precision farming, crop monitoring, and yield prediction.
- **Manufacturing:** Used for quality control, predictive maintenance, supply chain optimization, and robotics.
- **Finance:** Aids in fraud detection, risk assessment, and investment management.
- **Transportation:** Used for self-driving cars, traffic management, and route optimization.
- **Environment:** Helps in climate modelling, pollution monitoring, and renewable energy management.

Examples of AI in Daily Life

Artificial Intelligence is an integral part of our lives, enhancing convenience, efficiency, and decision-making across various domains.

- **Chatbots:** ChatGPT by OpenAI, Copilot by Microsoft Bing
- **Smart assistants:** Siri, Alexa, and Cortana
- **Recommendation algorithms:** Google's search algorithm, Netflix's personalised content recommendations
- **Face Recognition:** FaceID on iPhones, Security cameras
- **Navigation apps:** Google Maps, Waze
- **Social Media algorithms:** Instagram, Facebook, and Twitter's curated feeds.
- **Ridesharing apps:** Uber, Ola

Advantages and Disadvantages of Artificial Intelligence

Artificial Intelligence (AI) offers immense potential for innovation and efficiency but comes with challenges such as ethical concerns, job displacement, and data privacy issues.

Significance of AI

- **Productivity boost:** AI automates tasks, reducing human effort and time.
 - **Example:** Robotic process automation in finance for data entry and report generation.
- **Improved decision-making:** Machine learning models analyse data to identify patterns and insights.
 - **Example:** Predictive analytics in retail for demand forecasting and inventory optimization.
- **Task automation:** AI systems can handle repetitive and mundane tasks with high accuracy.
 - **Example:** Chatbots for customer service inquiries in various industries.
- **Consistent outcomes:** AI algorithms follow defined rules, ensuring consistency across processes.
 - **Example:** Credit risk assessment in banking using machine learning models.
- **New frontiers:** AI enables breakthroughs in healthcare, research, and education.
 - **Example:** AI-assisted drug discovery and personalized medicine.

Concerns Related to Artificial Intelligence

- **Job loss:** AI automation can lead to job displacement, especially in repetitive and routine tasks.
 - **Example:** Self-checkout systems in retail reducing the need for cashiers.
- **Ethical concerns: AI systems can perpetuate biases present in training data or algorithms.**
 - **Example:** Facial recognition systems showing bias against certain ethnicities.
- **Potential misuse:** Artificial Intelligence technologies can be misused for malicious purposes like privacy breaches or cyber-attacks.
 - **Example:** DeepFakes for spreading misinformation and propaganda.
- **Data dependence:** AI models require large, high-quality datasets for effective training and learning.
 - **Example:** Inaccurate medical diagnoses due to incomplete or biased patient data.
- **Lack of human traits:** AI lacks human qualities like creativity, emotional intelligence, and empathy.
 - **Example:** Chatbots failing to provide emotional support in mental health applications.
- **High costs:** Developing and implementing AI systems can be resource-intensive and costly.

- **Example:** Significant investment required for AI research and development.
- **Interpretability challenges:** Complex Artificial Intelligence models can be opaque, making it difficult to understand their decision-making processes.
 - **Example:** Lack of transparency in AI-based loan approval systems.

India & Artificial Intelligence

The Indian government and various organisations have taken several initiatives to promote the development and adoption of AI in the country. Here are some key initiatives:

- **National Strategy for AI (2018):** It outlines the vision, mission, and a comprehensive plan to leverage Artificial Intelligence for economic growth and social development.
- **Sector-specific AI initiatives:**
 - **AI for All:** To promote AI education and research.
 - **Responsible AI for Social Empowerment (RAISE):** To develop AI-based solutions for social good.
 - **AI for Agriculture:** To improve agricultural productivity and farmer welfare.
 - **Responsible AI for Youth: To equip young people with the necessary skills and mindset for AI readiness.**
- **AI Centers of Excellence:** The government has established AI Centers of Excellence in various institutes and universities, such as IITs, to promote research and development in AI.
- **FutureSkills PRIME:** It is, a joint initiative by **NASSCOM and MeitY**, a skill development program aimed at reskilling and upskilling IT professionals in emerging technologies, including artificial intelligence, to bridge the talent gap.
- **INDIAai:** It is the **National AI Portal of India**, and serves as a knowledge portal, a research organization, and an ecosystem-building initiative.

AI Action Summit 2025

The **AI Action Summit** serves as a premier international platform where global leaders, policymakers, tech experts, and industry stakeholders converge to deliberate on the ethical use, governance, and societal implications of artificial intelligence. The **2025 Paris Summit** marked the third in the series, following the **Bletchley Park Summit** (UK, 2023) and the **Seoul Summit** (South Korea, 2024).

- **Bletchley Park Declaration (28 nations):** Emphasized the development of AI that is secure, centered around human values, and ethically accountable.
- **Seoul Summit (27 countries):** Highlighted the importance of global collaboration and suggested creating a network of institutions dedicated to AI safety.
- **Major Focus Areas at the Paris AI Summit 2025:**
 - AI for Public Good
 - Workforce and AI
 - Culture and Innovation
 - Building Trust
 - Global Regulation

AI Action Summit 2025 Outcomes

A **Joint Statement** titled "*Inclusive and Sustainable Artificial Intelligence for People and the Planet*" was endorsed by 58 nations including India, China, and EU members. However, **the US and UK opted out**, citing overregulation concerns.

- The summit also launched a **Public Interest AI Platform and Incubator**, aiming to unite public-private efforts, strengthen transparency, improve data access, and promote responsible financing.
- The event strongly advocated for **human-centered AI** that respects human rights, tackles digital inequality, and enhances global cooperation. Global priorities discussed included AI accessibility, environmental sustainability, job creation, and effective governance.
- The summit aligned its vision with existing multilateral frameworks, such as **UN resolutions**, the **Global Digital Compact**, **UNESCO guidelines**, the **AU AI strategy**, and AI principles laid out by **OECD**, **G7**, and **G20**.

Artificial Intelligence UPSC PYQs

Q1: Consider the following statements regarding AI Action Summit held in Grand Palais, Paris in February 2025:

(UPSC Prelims 2025)

1. Co-chaired with India, the event builds on the advances made at the. Bletchley Park Summit held in 2023 and the Seoul Summit held in 2024.
2. Along with other countries, US and UK also signed the declaration on inclusive and sustainable AI.

Which of the statements given above is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

Answer: (a)

Source: <https://vajiramandravi.com/upsc-exam/artificial-intelligence/>

© Vajiram & Ravi. For personal use only.