

## Artificial Intelligence (AI)

Artificial Intelligence is the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem-solving.

## Machine Learning

Machine Learning is a subset of Artificial Intelligence that enables systems to learn and improve from experience without being explicitly programmed. It focuses on the development of computer programs that can access data and use it to learn for themselves.

### Types of Machine Learning:

1. Supervised Learning: The model is trained using labeled data.
2. Unsupervised Learning: The model finds patterns in unlabeled data.
3. Reinforcement Learning: The model learns through reward-based interactions.

## Deep Learning

Deep Learning is a subset of machine learning that uses artificial neural networks with multiple layers (deep neural networks). It is particularly effective for tasks such as image recognition, speech recognition, and natural language processing.

## Neural Networks

Artificial Neural Networks are inspired by the human brain. They consist of layers of interconnected nodes (neurons) that process input data and learn patterns.

### Applications of AI:

- Healthcare (disease diagnosis, medical imaging)
- Finance (fraud detection, algorithmic trading)
- Education (personalized learning)
- Autonomous Vehicles
- Natural Language Processing

#### Advantages of AI:

- Automation of repetitive tasks
- Faster decision making
- Improved accuracy

#### Limitations of AI:

- High data dependency
- Lack of human creativity
- Ethical and bias concerns