

Machine Learning

1 Overview

Machine Learning is a subfield of artificial intelligence that focuses on algorithms and models capable of learning patterns from data. Instead of relying on explicit instructions, machine learning systems infer rules and relationships directly from examples.

2 Types of Machine Learning

- **Supervised Learning:** Models are trained using labeled data to learn a mapping from inputs to outputs.
- **Unsupervised Learning:** Models discover hidden structure in unlabeled data.
- **Reinforcement Learning:** An agent learns optimal behavior through interaction with an environment and reward signals.

3 Learning Models

Common machine learning models include linear regression, decision trees, support vector machines, and neural networks. The choice of model depends on the task, data size, and interpretability requirements.

4 Applications

Machine learning is used in image recognition, natural language processing, recommendation systems, fraud detection, and scientific discovery.