

MACHINE LEARNING FUNDAMENTALS

Introduction to Machine Learning

Machine Learning (ML) is a subset of artificial intelligence that enables computers to learn from data without being explicitly programmed. ML algorithms build mathematical models based on sample data, known as training data, to make predictions or decisions.

Types of Machine Learning

1. Supervised Learning

- Uses labeled training data
- Common tasks: classification, regression
- Examples: spam detection, price prediction

2. Unsupervised Learning

- Works with unlabeled data
- Finds hidden patterns
- Examples: customer segmentation, anomaly detection

3. Reinforcement Learning

- Learns through trial and error
- Receives rewards or penalties
- Examples: game playing, robotics

Key Concepts

Neural Networks: Computational models inspired by biological neural networks

Deep Learning: Neural networks with multiple layers

Feature Engineering: Selecting and transforming input variables

Model Evaluation: Assessing performance using metrics like accuracy

Applications

- Healthcare: Disease diagnosis, drug discovery
- Finance: Fraud detection, algorithmic trading
- Transportation: Autonomous vehicles, route optimization
- Natural Language: Translation, sentiment analysis

This document is designed for OCR testing purposes.