Sample Notes: Introduction to Machine Learning

Machine Learning (ML) is a branch of artificial intelligence that focuses on building systems that can learn from data.

There are three main types of ML: supervised learning, unsupervised learning, and reinforcement learning.

Supervised learning uses labeled data to train models, commonly used for classification and regression tasks.

Unsupervised learning involves discovering hidden patterns or intrinsic structures in input data, often used for clustering and association.

Reinforcement learning is a type of learning where an agent learns to make decisions by performing actions in an environment to maximize cumulative reward.

Common algorithms include:

- Linear Regression
- Logistic Regression
- Decision Trees
- Support Vector Machines (SVM)
- k-Nearest Neighbors (k-NN)
- Neural Networks

Applications of ML include image recognition, speech recognition, medical diagnosis, stock trading, and many more.

Key Concepts:

- Overfitting and Underfitting
- Bias-Variance Tradeoff
- Cross-validation
- Feature Engineering
- Model Evaluation Metrics (Accuracy, Precision, Recall, F1-score)