SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
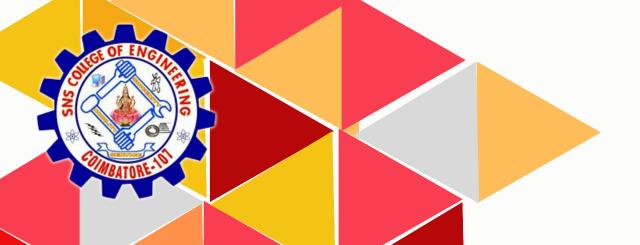
 ⬜ **DEPARTMENT OF MANAGEMENT STUDIES**

Subject Code & Name : 19BA336 - ARTIFICIAL INTELLIGENCE

Semester & Year : IV& II Year

Unit 1: MACHINES AND AI
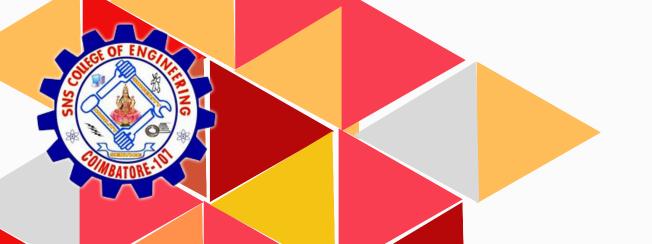
Topic: Types of Machine Learning

Supervised Learning

In supervised learning, the algorithm is trained on a labeled dataset, which means that each training example is paired with an output label. The goal is to learn a mapping from inputs to outputs.

Classification: The output variable is a category. Examples include spam detection (spam or not spam), image recognition (cat, dog, or other), and medical diagnosis (disease or no disease). Regression: The output variable is a continuous value. Examples include predicting house prices, stock prices, or temperature.

Unsupervised Learning

In unsupervised learning, the algorithm is given data without explicit instructions on what to do with it. The system tries to learn patterns and the structure of the data.

Clustering: The algorithm groups the data into clusters of similar items. Examples include customer segmentation, document clustering, and image compression.

Dimensionality Reduction: The algorithm reduces the number of random variables under consideration. Examples include Principal Component Analysis (PCA) and t-Distributed Stochastic Neighbor Embedding (t-SNE).

Anomaly Detection: Identifying rare items, events, or observations which raise suspicions by differing significantly from the majority of the data.

Reinforcement Learning

In reinforcement learning, an agent learns to make decisions by performing certain actions in an environment to maximize some notion of cumulative reward. The agent learns from the consequences of its actions, rather than from being told explicitly what to do.

Markov Decision Process (MDP): A mathematical framework for modeling decision-making where outcomes are partly random and partly under the control of the decision-maker.

Policies and Rewards: The agent uses a policy to determine actions and receives rewards based on the actions it takes. The objective is to develop a policy that maximizes the total cumulative reward.

Example Algorithms:

Linear Regression

Logistic Regression

Support Vector Machines (SVM)

Decision Trees and Random Forests

Neural Networks (in the context of supervised learning)

Example Algorithms:

K-means Clustering

Hierarchical Clustering

DBSCAN (Density-Based Spatial Clustering of Applications with Noise)

PCA

Autoencoders (in the context of unsupervised learning)

Example Algorithms:

Q-Learning

Deep Q-Networks (DQN)

Policy Gradient Methods

Proximal Policy Optimization (PPO)

AlphaGo (an application of deep reinforcement learning)

Thank you