Use Case Activity

Machine Learning

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1. Supervised Learning Algorithm

- Algorithm: Logistic Regression
- Use Case: Email Spam Detection

Problem Statement: Email users receive many unwanted spam messages. The goal is to classify each incoming email as 'spam' or 'not spam'.

Solution: Logistic Regression is trained on labeled email data — words, frequency, and metadata — where each email is tagged as spam or not. The model learns the relationship between these features and the spam label, and then predicts probabilities for new emails.
Input: Email text features
Output: 0 (not spam) or 1 (spam)

2. Unsupervised Learning Algorithm

- Algorithm: K-Means Clustering
- Use Case: Customer Segmentation

Problem Statement: A retail store wants to group its customers based on purchasing behavior to target marketing campaigns effectively.

Solution: K-Means divides customers into k clusters based on spending habits, frequency, and product types purchased. Each cluster represents a distinct customer group (e.g., frequent buyers, budget shoppers, occasional spenders).
Input: Customer purchase data
Output: Cluster labels for segmentation

3. Reinforcement Learning Algorithm

- Algorithm: Q-Learning
- Use Case: Autonomous Robot Navigation

Problem Statement: A robot needs to learn how to reach a target location in a grid without hitting obstacles.

Solution: Q-Learning allows the robot to learn the best path through trial and error. It receives rewards for reaching closer to the goal and penalties for collisions. Over time, it learns the optimal path policy.
Input: Current state and possible actions
Output: Best action maximizing long-term reward