VIGNAN'S NIRULA
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(Approved by AICTE, New Delhi & Affiliated to JNTU Kakinada)
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Innovative Practice

Faculty Name : M.Mallikarjuna Rao, Mr.R.VeeraBabu
Course Name : Machine Learning
Class : III B. Tech II Semester
Academic Year : 2022-2023
Title of the Topic : Types of Machine Learning system
Activity Name : Mind Mapping

Objective

The objective of understanding types of machine learning systems is to identify the most appropriate approach for solving specific problems based on data availability and task requirements. Supervised learning uses labeled data to predict outcomes, unsupervised learning discovers hidden patterns, reinforcement learning optimizes decision-making through feedback, and semi-supervised learning combines labeled and unlabeled data to improve performance.

Mind Map Creation

Key Concepts to Include:

Types of Machine Learning Systems

1. **Supervised Learning**
   - **Definition**: Learning from labeled data to predict outcomes.
   - **Algorithms**:
     - Decision Trees
     - Support Vector Machines (SVM)
     - Neural Networks
     - k-Nearest Neighbors (k-NN)
   - **Applications**:
     - Classification
     - Regression
2. **Unsupervised Learning**
   - **Definition**: Finding hidden patterns in unlabeled data.
   - **Algorithms**:
     - K-means Clustering
     - Principal Component Analysis (PCA)

- DBSCAN

- **Applications**:

  - Clustering
  - Dimensionality Reduction

3. **Semi-Supervised Learning**
   - **Definition**: Combines labeled and unlabeled data to improve performance.
   - **Applications**:

     - Image recognition
     - Speech processing

4. **Reinforcement Learning**
   - **Definition**: Learning through interactions with an environment and feedback.
   - **Algorithms**:

     - Q-learning
     - Deep Q Networks (DQN)
     - Actor-Critic

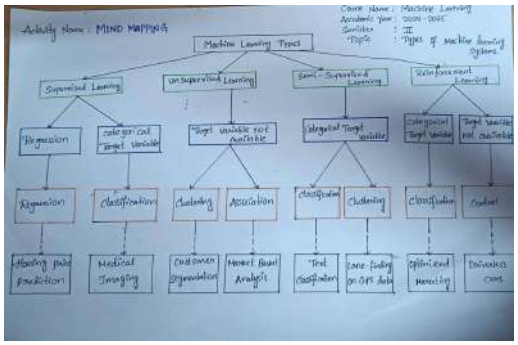
   - **Applications**:

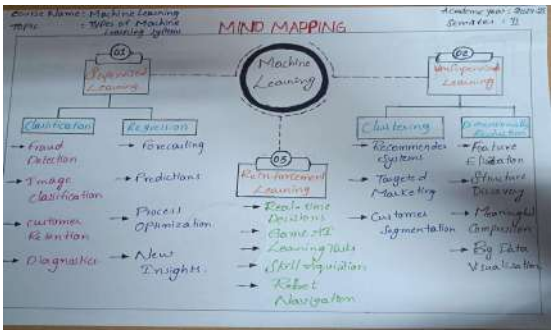
     - Robotics
     - Autonomous vehicles
     - Gaming (e.g., AlphaGo)

5. **Self-Supervised Learning**
   - **Definition**: System generates labels from input data itself to learn representations.
   - **Applications**:

     - Natural Language Processing (e.g., BERT)
     - Computer Vision (e.g., image inpainting)

Screenshot of the Practice





Central Node**:**

Branch 1: Supervised Learning

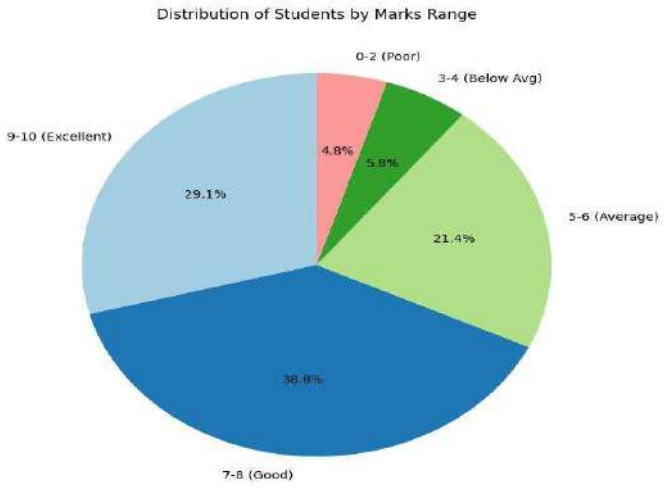
- **Sub-branches:**
    - **Classification:** Predict categorical outcomes (e.g., email spam detection).
    - **Regression:** Predict continuous values (e.g., house price prediction).
    - **Algorithms:** Decision Trees, SVM, k-NN, Neural Networks.
    - **Use Cases:** Image recognition, Financial forecasting, Customer segmentation.

Branch 2: Unsupervised Learning

- **Sub-branches:**
    - **Clustering:** Group similar data points together (e.g., K-means, DBSCAN).
    - **Dimensionality Reduction:** Reduce feature space (e.g., PCA).
    - **Algorithms:** K-means, Hierarchical Clustering, DBSCAN.
    - **Use Cases:** Customer segmentation, Anomaly detection, Market basket analysis.

Assessment analysis:

Marks Range	**Number of Students**	**Percentage**
9-10 (Excellent)	30	29.13%
7-8 (Good)	40	83%
5-6 (Average)	22	21.36%
3-4 (Below Avg)	6	5.83%
0-2 (Poor)	5	4.85%
Total	**100**	**100%**



Conclusion:

In conclusion, machine learning systems can be broadly categorized into three main types: supervised learning, unsupervised learning, and reinforcement learning. Supervised learning relies on labeled data to train models, making it ideal for tasks like classification and regression.

Signature of the Faculty **Head of the Department**