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University of
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Oral Assignment:

Topic: of discussion is machine learning



Task 3: Machine learning

DEFINATION: Machine learning is a subset of artificial intelligence (AI) that focuses on the development of algorithms and statistical models that enable computer systems to improve their performance on a specific task through learning and experience, without being explicitly programmed. In other words, machine learning allows computers to automatically discover patterns, make predictions, or optimize processes based on data.

▶ Key characteristics and components of machine learning include:

1. **Data:raw facts**
2. **Algorithms:rules design to solve a problem**
3. **Training:teaching a machine to solve problems**
4. **Testing and Evaluation:**
5. **Prediction and Decision**

▶ IMPORTANCE OF machine learning paradigms

- ▶ **Diversity of Applications:**
- ▶ **Customization to Problem Characteristics:**
- ▶ **Innovation and Advancement:**
- ▶ **Problem Complexity Handling:**
- ▶ **Interdisciplinary Collaboration:**
- ▶ **Balanced Use of Resources:**

KEY machine learning paradigms

Supervised Learning:

Unsupervised Learning:

Semi-

Supervised Learning:

Reinforcement Learning

g:

Reinforcement Learning

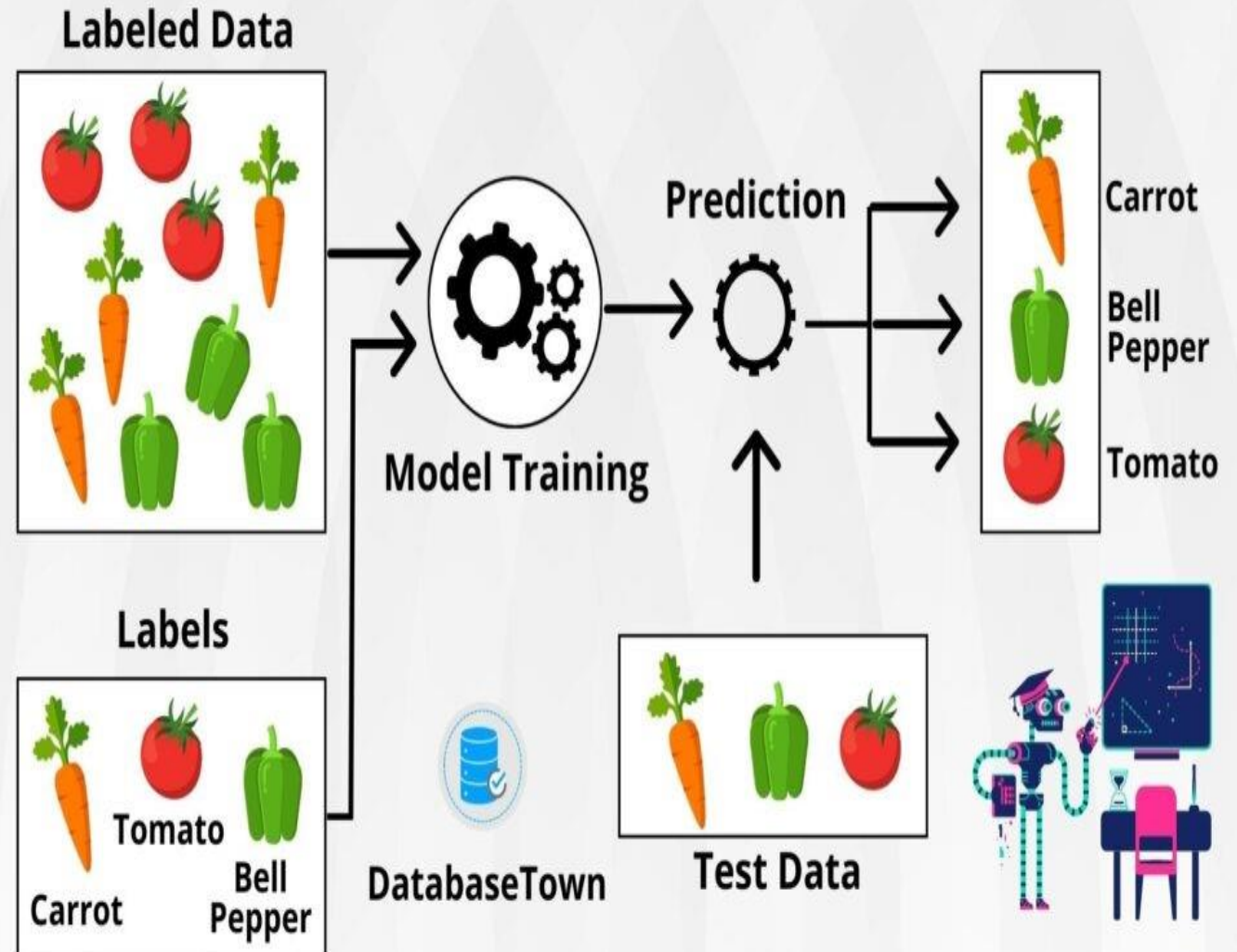
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Supervised Learning:

- What It Does: In supervised learning, the algorithm is trained on a labelled dataset, where both the input data and the desired output are provided. The goal is to learn a mapping from inputs to outputs.
- Common Use Cases: Classification (e.g., email spam detection), regression (e.g., predicting house prices).

SUPERVISED LEARNING

Supervised machine learning is a branch of artificial intelligence that focuses on training models to make predictions or decisions based on labeled training data.



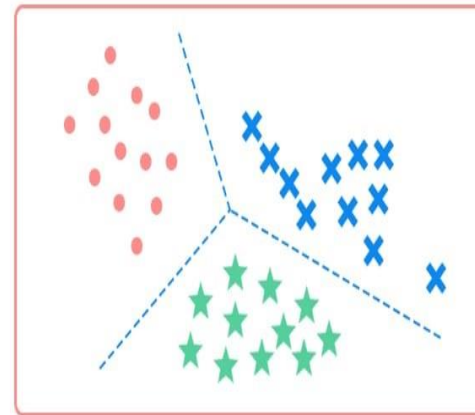
Unsupervised Learning:

- What It Does: Unsupervised learning involves working with unlabelled data to discover patterns or structures within the data. It doesn't have access to predefined output labels.
- Common Use Cases: Clustering (e.g., customer segmentation), dimensionality reduction (e.g., principal component analysis).



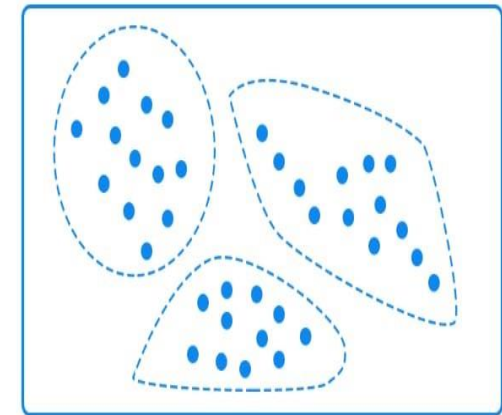
Supervised vs. Unsupervised Learning

Classification

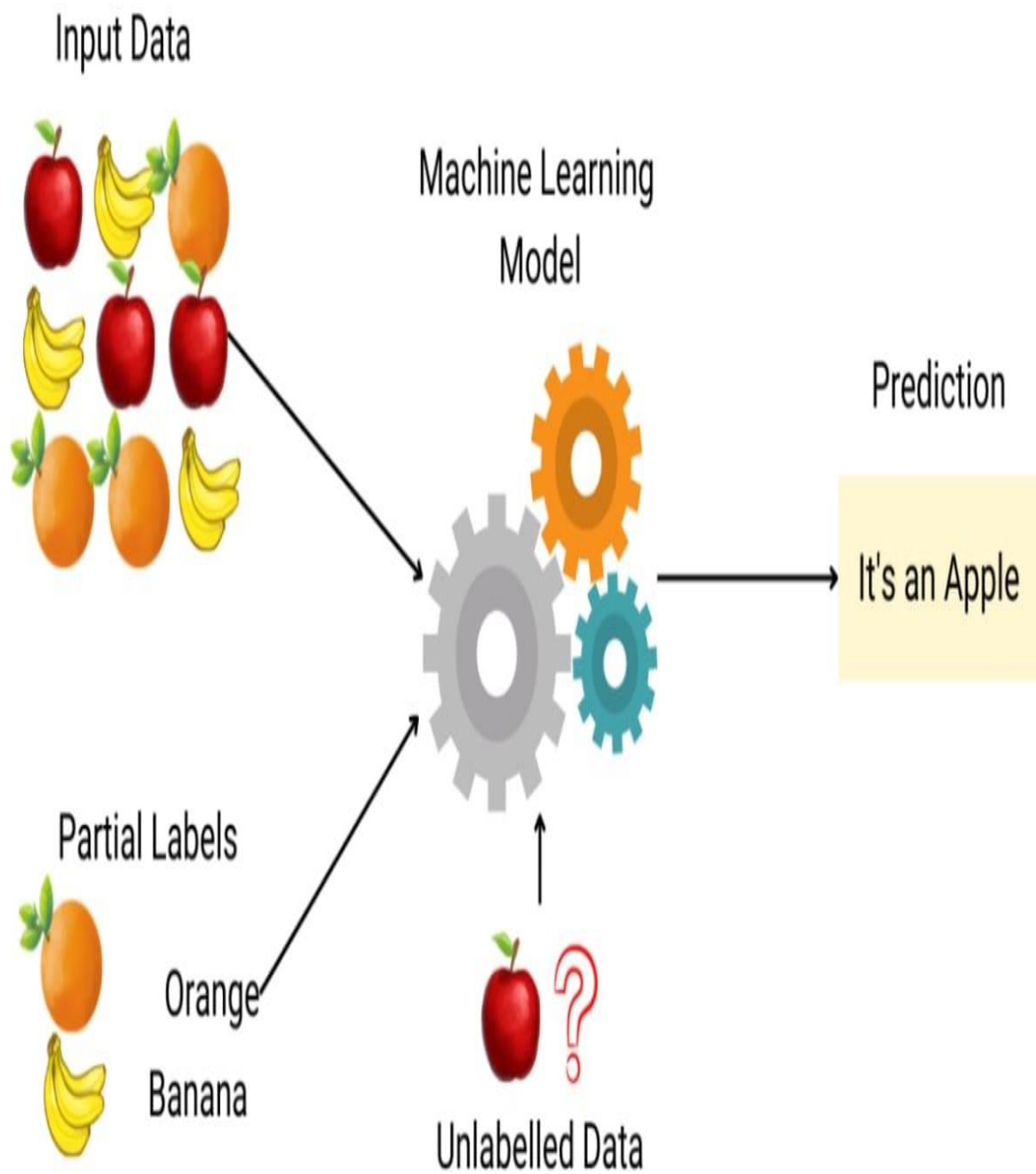


Supervised learning

Clustering



Unsupervised learning



Semi-Supervised Learning:

- What It Does: This paradigm combines elements of both supervised and unsupervised learning. It leverages a small amount of labelled data and a larger amount of unlabelled data for training.
- Common Use Cases: Anomaly detection, text classification with limited labelled data.

How does K-Means clustering works.

1. Initialization:
2. Assignment:
3. Update:
4. Convergence Check:
5. Results:
6. Assignment:
7. Update:
8. [link](#)



Real-life problem using K-Means clustering to analysis it.

- ▶ Certainly, here's a real-life analytical problem where K-Means clustering can be applied:
- ▶ Problem: Customer Segmentation for an E-commerce Platform
- ▶ Background: Imagine you are working for a large e-commerce platform, and the company wants to better understand and segment its customer base for more effective marketing and customer service. The platform has a vast customer dataset, and the company wants to group customers based on their purchasing behaviour and preferences.
- ▶ **Objective:**
- ▶ **Data:**
- ▶ **Data Pre-processing:**
- ▶ **Choosing K:**
- ▶ **Interpretation:**