

assignment=36

August 1, 2023

1 Q1- Explain the following with an example?

- 1) Artificial Intelligence : Artificial Intelligence (AI) refers to the ability of a machine or computer program to perform tasks that typically require human intelligence, such as learning, problem-solving, decision-making, perception, and natural language understanding. AI can be implemented in various fields such as gaming, robotics, healthcare, and finance. Example: An AI-powered virtual assistant, such as Apple's Siri or Amazon's Alexa, can understand voice commands and respond to questions, play music, set reminders, and control smart home devices, among other things.
- 2) Machine Learning: Machine Learning (ML) is a subset of AI that involves training algorithms on a large dataset to learn from patterns and make predictions without being explicitly programmed. ML algorithms can be supervised, unsupervised, or semi-supervised, and they can be used for tasks such as image and speech recognition, natural language processing, and recommendation systems. Example: A spam filter that learns to distinguish between spam and legitimate emails based on patterns in the content, sender, and subject line.
- 3) Deep Learning: Deep Learning (DL) is a subset of ML that uses artificial neural networks with multiple layers to learn from data and make predictions. DL algorithms can be used for tasks such as image and speech recognition, natural language processing, and autonomous driving. Example: A DL algorithm that can recognize images of different breeds of dogs by learning from millions of labeled images of dogs with different features, such as fur color, snout length, and ear shape.

2 Q2- What is supervised learning? List some examples of supervised learning.

Ans: Supervised learning is a type of machine learning where an algorithm is trained on a labeled dataset. The goal is to use this training to make accurate predictions or classifications on new, unlabeled data. Examples include image recognition, spam filtering, and language translation.

3 Q3- What is unsupervised learning? List some examples of unsupervised learning.

Ans: Unsupervised learning is a type of machine learning where the model learns to identify patterns and relationships in the data without guidance or labels. Examples of unsupervised learning include clustering similar data points, dimensionality reduction, and anomaly detection.

4 Q4- What is the difference between AI, ML, DL, and DS?

Ans: AI (Artificial Intelligence) is a broad field that encompasses various techniques and approaches to simulate human intelligence, such as perception, reasoning, and learning.

ML (Machine Learning) is a subset of AI that involves training algorithms to make predictions.

DL (Deep Learning) is a subset of ML that uses artificial neural networks to learn from large amounts of data.

DS (Data Science) is a field that involves extracting insights and knowledge from data using statistical and computational methods.

to make informed business decisions.

5 Q5- What are the main differences between supervised, unsupervised and semi-supervised learning?

Ans: Supervised learning: In supervised learning, the machine learning algorithm is trained on labeled data, where each input example is associated with a specific label or output.

Examples of supervised learning include image classification, sentiment analysis, and regression.

Unsupervised learning: In unsupervised learning, the machine learning algorithm is trained on unlabeled data, where there is no explicit label provided for each input example.

The algorithm learns to identify patterns and relationships in the data without any supervision.

Examples of unsupervised learning include clustering, dimensionality reduction, and association rule mining.

Semi-supervised learning: In semi-supervised learning, the machine learning algorithm is trained on a mix of labeled and unlabeled data.

The algorithm learns to use the labeled examples to make predictions and the unlabeled examples to improve its performance.

Semi-supervised learning is useful when labeled data is scarce or expensive to obtain.

Examples of semi-supervised learning include image and speech recognition.

In summary, supervised learning requires labeled data, unsupervised learning does not require labeled data, and semi-supervised learning requires both labeled and unlabeled data.

6 Q6- What is train, test and validation split? Explain the importance of each term.

Ans: Train, test, and validation split is a technique used in machine learning to divide a dataset into three parts.

The training set is used to train the model, the validation set is used to evaluate the performance of the model during training, and the test set is used to evaluate the final performance of the model after training.

This split is important because a model that performs well on the training data and poorly on new data.

7 Q7- How can unsupervised learning be used in anomaly detection?

Ans: Unsupervised learning can be used in anomaly detection by training a model to learn the normal behavior of the data.

The model then identifies data points that do not fit those patterns as anomalies. The model does not need to be explicitly told what an anomaly is; it learns the norm on its own.

8 Q8- List down some commonly used supervised learning algorithms and unsupervised learning algorithms.

Ans: Supervised Learning Algorithms:

- Linear Regression
- Logistic Regression
- Decision Tree
- Random Forest
- Support Vector Machines (SVM)
- K-Nearest Neighbors (KNN)
- Naive Bayes

Unsupervised Learning Algorithms:

- K-Means Clustering
- Hierarchical Clustering
- PCA (Principal Component Analysis)
- Apriori Algorithm
- Anomaly Detection
- Isolation Forest
- Autoencoders

[]: