

Assignment - 2

Q1 Define supervised learning. Explain the difference b/w Regression and classification with examples.

Answer: Supervised Learning:

Supervised learning is a type of machine learning where the model is trained on a labeled dataset. This means that each training example is paired with an output label. The model learns to map inputs to the correct output based on these examples.

Regression: Predicts a continuous output. For eg:
Predicting house price based on its features like size, location, etc.

Classification: Predicts a discrete label. For eg.
Classifying emails as 'spam' or 'not spam'.

Q2 What is supervised learning? Provide a real-world example of clustering.

Answer: Unsupervised learning involves training a model on data without labeled responses. The model tries to learn the underlying structure of the data.

A real-world example is customer segmentation in marketing, where customers are grouped based on purchasing behaviour.

Q3. Explain Reinforcement Learning. How it is different from other types of machine learning?

Answer: Reinforcement learning is a type of machine learning where an agent learns to make decisions by performing actions in an environment to maximize some notion of cumulative reward. It differs from supervised and unsupervised learning in that it focuses on learning from the consequences of actions, rather than from a fixed dataset.

Q4. What is semi-supervised learning? Discuss its advantages with an example.

Answer: Semi-supervised learning is a blend of supervised ^{and} unsupervised learning. It uses a small amount of labeled data and a large amount of unlabeled data for training. This approach can significantly improve learning accuracy when obtaining a fully labeled dataset is expensive or time-consuming.

Advantages:

- Cost-effective: Reduces the need for extensive labeled data.
- Improved performance: Can achieve better performance than purely supervised learning with limited labeled data.

Example: In image recognition, a small set of labeled images can be used along with a large set of unlabeled images to train a model more effectively.

Q5. Compare and contrast the three main types of Machine Learning:
Supervised, unsupervised and Reinforcement Learning

Answer:- Supervised Learning:
Uses Labeled data to predict outcomes. Eg. Regression and classification.

Unsupervised Learning: ~~type~~
Uses unlabeled data to find hidden patterns. Eg. Clustering.

Reinforcement Learning:
Uses an agent to learn from the environment through rewards and punishment.

Section B

Q1. How is Machine Learning being applied in Banking Sector for fraud detection?

Answer: Machine learning is revolutionizing fraud detection in the banking sector by analysing vast amounts of transaction data to identify patterns indicative of fraudulent activity. For instance, machine learning models can detect anomalies in transaction behaviour. This helps bank quickly flag and investigate suspicious activities, thereby protecting customers and reducing financial losses.

Q2. Discuss the use of AI and Machine Learning in improving Healthcare outcomes. Provide specific examples.

Answer: AI and machine learning are significantly improving healthcare outcomes by enhancing diagnostics, personalizing treatment plans, and streamlining administrative tasks.

Examples:

- AI algorithms analyze X-rays, MRIs and CT scans to detect abnormalities like tumors with greater accuracy.
- AI can predict patients' health risks by analysing large datasets, enabling early intervention and personalized treatment plans.

Q3. What are the benefits of using ML in Retail and supply chain industry?

Answer Benefits are:

- Predicting product demand to optimize inventory levels and reduce stockouts.
- Automating inventory ordering and reducing waste through accurate demand predictions.
- Enhancing customer experience by analyzing shopping behaviours and providing personalized recommendations.

Q4. Discuss how AI and Machine Learning can be applied to enhance transportation and logistics.

Answer AI and machine learning are transforming transportation and logistics by optimizing routing, predicting maintenance needs, and improving overall efficiency. Key applications include:-

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Route Optimization:- AI algorithms analyze traffic patterns to determine the most efficient delivery routes, reducing fuel consumption and delivery times.

Predictive Maintenance:- Machine learning models predict when vehicles will need maintenance, preventing breakdowns and reducing downtime.

Autonomous Vehicles:- AI powers self-driving cars and trucks, enhancing safety and efficiency in transportation.

Q5) Explain the significance of AI in the insurance industry for risk analysis and claim prediction.

(Answer) AI is playing a crucial role in the insurance industry by improving risk analysis and claim prediction. Some significant applications include:-

Risk Prediction:- AI models analyze historical data to predict future claims, helping insurers assess risk more accurately.

Claims Processing:- AI automates the claims process, reducing processing and errors.

Fraud Detection:- Machine learning algorithms detect fraudulent claims by identifying unusual

Patterns and behaviours.

These applications of AI and machine learning are not only enhancing efficiency and accuracy but also transforming the way industries operate, leading to better outcomes and improved customer experiences.