1. What is the model trying to learn in Supervised Learning?

    A. The model is trying to learn the best parameters for data collection.

    B. The model is trying to learn a mapping of input to output.

    C. The model is trying to learn how to identify errors in the training dataset.

    D. The model is trying to learn a mapping of output to input.

2. What do you mean by "achieving high generalization" in ML?

    A. Focusing on overfitting the training data

    B. Limiting the model's ability to adapt to new data

    C. Ability of model to effectively learn to make accurate predictions or classifications on new, unseen data

    D. Maximizing the model's sensitivity to noise in the data

3. Which of the following are true for Loss Function?

    A. It is primarily used to maximize the target labels.

    B. It is also known as the cost function or error function.

    C. It measures the distance to the target labels.

    D. High loss indicates a high level of model performance.

    E. Minimizing the loss function is a fundamental optimization problem in machine learning.

4. In the context of machine learning, what distinguishes the functional view from the probabilistic view?

    A. The functional view focuses on maximizing output accuracy, while the probabilistic view emphasizes input optimization.

    B. The functional view learns a function that maps inputs to outputs, while the probabilistic view calculates conditional probability distributions based on inputs.

    C. The functional view involves calculating conditional probability distributions, while the probabilistic view aims to map inputs to outputs.

    D. The functional view is primarily concerned with minimizing loss, while the probabilistic view focuses on maximizing loss.

5. You are working on a sales forecasting project for a retail store. Based on regression analysis, you have derived the following regression equation:

Sales (Y) = 7.5 * Advertising Expenditure (X) + 13.65.

Now, with a specific advertising expenditure in mind, you want to predict the sales. In the context of your sales forecasting project, if you have an advertising expenditure of $9, what is the predicted value of sales (Y)? (You may use a calculator, no need for manual calculation)

  A. Sales (Y) = $76.65

  B. Sales (Y) = $70.15

  C. Sales (Y) = $35.65

  D. Sales (Y) = $81.15

6. You are a data scientist tasked with developing a machine learning model for an autonomous drone that needs to navigate through a complex environment and make decisions in real-time. In the context of developing a machine learning model for the autonomous drone's decision-making, which learning method should you choose?

  A. Unsupervised learning

  B. Supervised learning   sequential decisions, explore actions and observe consequences, optimize reward, RL policy allows for real-time decision making

  C. Gradient descent

  D. Reinforcement learning

7. You are a medical researcher tasked with developing a diagnostic system to detect diseases based on a patient's medical history and test results. In the context of creating a diagnostic system for disease detection, which learning method should you choose?

  A. Unsupervised learning

  B. Supervised learning

  C. Gradient descent

  D. Reinforcement learning

8. You are a meteorologist analyzing weather data, specifically the temperature and humidity levels at various locations over a month. In the context of analyzing weather data, what should you use to approximate the joint distribution over temperature and humidity?

A. Binning — binning handle non-linear relationships, captures discrete patterns/categories, better for relationships represented by distinct ranges/intervals rather than a continuous function (regression)

B. Regression

C. Dimensionality Reduction

D. Reinforcement Learning

9. You are a financial analyst working with a dataset containing various economic indicators such as inflation rates, stock prices, and GDP growth rates for different countries. In the context of analyzing economic data with strong feature correlations, what should you do to reduce the number of features?

A. Normalize the values

B. Conduct sentiment analysis

C. Perform dimensionality reduction (manifold learning)

D. Apply k-means clustering

10. Consider a scenario where you are training a deep neural network for image recognition using a dataset of labelled images on a low memory device (e.g., a toy drone). What variation of gradient descent would you use to optimize your learning?

A. Batch Gradient Descent

B. Stochastic Gradient Descent — SGD updates model params based on the average gradient computed from the mini-batch (randomly selected subset of the training data)

memory-efficient, adds noise to escape local minima

C. Mini-batch Gradient Descent

11. What are some key characteristics of Reinforcement Learning? Select the true Statements:

A. Reinforcement Learning focuses on agent autonomy and trial-and-error learning.

B. In Reinforcement Learning, a teacher provides detailed instructions to the agent.

C. Reinforcement Learning often involves learning through reward and punishment.

D. In Reinforcement Learning, the reward function is typically manually specified.

12. You're developing a computer game character and want to train it to achieve certain objectives within the game. Which aspect of Reinforcement Learning plays a crucial role in guiding your character's behavior and decisions within the game environment?

A. Learning through trial and error

B. Manual specification of all character actions

C. Teaching the character the complete game rules

D. Focusing on state evaluation for each move

13. With regards to the Policy in Reinforcement Learning, select all that apply:

goal to find an optimal policy that maximizes the expected cumulative reward over time

A. Policy takes states as input and produces actions as output.

can be deterministic or stochastic

B. The primary goal of a policy is to maximize the sum of rewards.

C. Learning a policy in reinforcement learning requires no trial and error.

D. A policy typically needs to be manually specified by the user.

14. What are some key properties of quantum bits (qubits) that distinguish them from classical bits?

can hold an exponential number of states using superposition and entanglement (for parallel computation)

A. Qubits can store an exponential amount of data, while classical bits store a linear amount.

B. Qubits are represented by classical values like 0 or 1.

C. Qubits do not exhibit superposition and entanglement.

D. Quantum computers currently operate in the quantum advantage era.

15. What is a key advantage of Rotation Embedding as a data embedding strategy in Quantum Machine Learning?

A. It requires an exponential number of qubits.

B. It lacks the ability to provide infinite precision.

C. It involves a large runtime, which is impractical for most applications.

D. It is relatively simple to implement and uses only a linear number of qubits.