



17th April quiz

6 out of 6 correct

1. What is the key concept behind Gradient Boosting?

- ☒ Ensemble learning
- ☐ Feature engineering
- ☐ Gradient descent
- ☐ Hyperparameter tuning

Explanation: Gradient Boosting is an ensemble learning method, which means it combines the predictions of multiple weak models (usually decision trees) to create a stronger model. By sequentially building decision trees that correct the errors of previous trees, Gradient Boosting creates a powerful ensemble model that can make accurate predictions.

2. Which of the following is NOT a loss function used in Gradient Boosting?

- ☐ Mean Squared Error (MSE)
- ☐ Cross-Entropy
- ☐ Mean Absolute Percentage Error (MAPE)
- ☒ Support Vector Machine (SVM)

Explanation: Support Vector Machine (SVM) is a separate machine learning algorithm and not a loss function used in Gradient Boosting. Loss functions such as Mean Squared Error (MSE), Cross-Entropy, and Mean Absolute Percentage Error (MAPE) are commonly used in Gradient Boosting to measure the difference between predicted and actual values and guide the optimization process.



3. What is the purpose of regularization in Gradient Boosting?

- ☒ To prevent overfitting
- ☐ To increase model complexity
- ☐ To reduce training time
- ☐ To improve model interpretability

Explanation: Regularization techniques such as L1 (Lasso) and L2 (Ridge) regularization are used in Gradient Boosting to prevent overfitting. Overfitting occurs when the model learns to memorize the training data instead of generalizing from it, resulting in poor performance on unseen data. Regularization helps to constrain the model and prevent overfitting, leading to a more robust and accurate model.

4. What is the role of learning rate in Gradient Boosting?

- ☐ It determines the number of boosting iterations
- ☐ It controls the depth of decision trees
- ☐ It adjusts the weights of misclassified samples
- ☒ It scales the contribution of each tree to the ensemble

Explanation: The learning rate in Gradient Boosting determines the contribution of each tree to the final ensemble. A smaller learning rate reduces the impact of each tree, making the model more conservative, while a larger learning rate gives more weight to each tree, making the model more aggressive. Finding an appropriate learning rate is important as it affects the trade-off between bias and variance in the model.

5. What is the main advantage of Gradient Boosting over other machine learning algorithms?

- ☐ Ability to handle missing data
- ☐ Faster training time
- ☒ Higher accuracy

☐ Simpler implementation

Explanation: Gradient Boosting is known for its high accuracy and predictive power. By building an ensemble of weak models that correct

6. What is the effect of increasing the number of boosting iterations in Gradient Boosting?

☒ Increases the model complexity

☐ Decreases the model complexity

☐ Has no effect on the model complexity

☐ Improves model interpretability

Explanation: Increasing the number of boosting iterations in Gradient Boosting leads to a more complex model. Each iteration adds a new decision tree to the ensemble, and the combined effect of multiple trees can result in a more complex and powerful model. However, increasing the number of boosting iterations also increases the risk of overfitting, so it should be carefully tuned to find the optimal balance between complexity and generalization.

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