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- Decision Tree Classification
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Video: Decision Tree Classification

24 min
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Reading: Decision Tree Classification Demo

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Reading: Decision Tree Classification Case Study - Breast Cancer

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Quiz: Decision Tree Classification Quiz

Submitted
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Reading: Decision Tree Classification Case Study

2h
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Discussion Prompt: Decision Tree Classification Exploration Exercise

2h

# Decision Tree Classification Quiz

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## Review Learning Objectives

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Due Feb 11, 11:59 PM IST

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1. What is the primary goal of a Decision Tree algorithm in classification?

1 / 1 point

- ☐ To find the best-fitting regression line through the data points.
- ☐ To identify the most important features in the dataset.
- ☒ To create a tree-like structure that recursively splits the data into homogeneous groups based on the input features.
- ☐ To compute the probability distribution of the target variable in the dataset.
- ✔ Correct

Correct! Decision Trees create a tree-like structure by recursively splitting the data into homogeneous groups based on the input features for classification.

2. How does a Decision Tree handle categorical features during the splitting process?

1 / 1 point

- ☐ It converts the categorical features into numerical values before splitting.
- ☒ It performs discrete splitting for each category of the categorical features.
- ☐ It ignores categorical features and only considers numerical features for splitting.
- ☐ It averages the numerical values within each category of the categorical features.
- ✔ Correct

Correct! A Decision Tree performs discrete splitting for each category of the categorical features, creating separate branches for each category.

3. What is the splitting criterion used in Decision Trees that measures the reduction in entropy or uncertainty after a split?

1 / 1 point

- ☒ Information Gain.
- ☐ Gain Ratio.
- ☐ Gini Index.
- ☐ Mean Squared Error (MSE).
- ✔ Correct

Correct! Information Gain is the splitting criterion used to measure the reduction in entropy or uncertainty after a split.

4. Which splitting criterion in Decision Trees addresses the bias towards attributes with many distinct values?

1 / 1 point

- ☐ Information Gain.
- ☒ Gain Ratio.
- ☐ Gini Index.
- ☐ Mean Squared Error (MSE).
- ✔ Correct

Correct! Gain Ratio is a splitting criterion that accounts for the bias towards attributes with many distinct values by normalizing Information Gain.

5. What is the primary goal of using the Gini Index as the splitting criterion in Decision Trees?

1 / 1 point

- ☐ To maximize the information gain after a split.
- ☐ To maximize the gain ratio after a split.
- ☒ To minimize the impurity or the probability of misclassifying a randomly chosen data point after a split.
- ☐ To minimize the Mean Squared Error (MSE) after a split.
- ✔ Correct

Correct! The Gini Index is used to minimize the impurity, which is the probability of misclassifying a randomly chosen data point after a split.

6. What is overfitting in the context of Decision Trees?

1 / 1 point

- ☐ Overfitting occurs when the model is too simple and cannot capture the complexity of the data.
- ☐ Overfitting occurs when the model is too rigid and cannot adapt to new patterns in the data.
- ☐ Overfitting occurs when the model is too flexible and fits the training data perfectly.
- ☒ Overfitting occurs when the model is too complex and captures noise or random fluctuations in the training data.
- ✔ Correct

Correct! Overfitting occurs when the model is too complex and captures noise or random fluctuations in the training data, leading to poor generalization on unseen data.

7. What is underfitting in the context of Decision Trees?

1 / 1 point

- ☐ Underfitting occurs when the model is too complex and fits the noise in the training data.
- ☐ Underfitting occurs when the model is too flexible and captures noise or random fluctuations in the training data.
- ☐ Underfitting occurs when the model is too rigid and cannot adapt to new patterns in the data.
- ☒ Underfitting occurs when the model is too simple and fails to capture the complexity of the data in both the training and testing datasets.
- ✔ Correct

Correct! Underfitting occurs when the model is too simple and fails to capture the complexity of the data, leading to poor performance on both the training and testing datasets.

8. What can be done to reduce overfitting in Decision Trees?

1 / 1 point

- ☒ Decrease the depth of the tree to make it less complex.
- ☐ Increase the depth of the tree to capture more complex patterns in the data.
- ☐ Increase the number of features used for splitting in each node to improve accuracy.
- ☐ Use a larger training dataset to improve model generalization.
- ✔ Correct

Correct! Reducing the depth of the tree decreases its complexity, which can help reduce overfitting.

9. How can you create a Decision Tree classifier using Scikit-learn in Python?

1 / 1 point

- ☐ By importing the "DecisionTreeRegressor" class and calling the "fit" method with the training data.
- ☒ By importing the "DecisionTreeClassifier" class and calling the "fit" method with the training data.
- ☐ By importing the "RandomForestClassifier" class and calling the "fit" method with the training data.
- ☐ By importing the "LogisticRegression" class and calling the "predict" method with the training data.
- ✔ Correct

Correct! You can create a Decision Tree classifier using Scikit-learn by importing the "DecisionTreeClassifier" class and calling the "fit" method with the training data.

10. How can you set the maximum depth of the Decision Tree in Scikit-learn to control its complexity?

1 / 1 point

- ☐ By using the "max\_depth" attribute of the DecisionTreeClassifier object.
- ☐ By calling the "set\_max\_depth" method after training the Decision Tree classifier.
- ☒ By specifying the "max\_depth" parameter when creating the DecisionTreeClassifier object.
- ☐ By calling the "tree\_depth" method with the desired maximum depth value.
- ✔ Correct

Correct! You can set the maximum depth of the Decision Tree by specifying the "max\_depth" parameter when creating the DecisionTreeClassifier object.

