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Evaluation and Cross Validation

✔ Video: Cross Validation

6 min

✔ Reading: Evaluation and Cross Validation Demo

1h

✔ Reading: Cross Validation Case Study - CA Housing Price

1h

✔ Quiz: Evaluation and Cross Validation Quiz

Submitted

📖 Reading: Evaluation and Cross Validation Case Study

2h

💬 Discussion Prompt: Evaluation and Cross Validation Exploration Exercise

2h

Evaluation and Cross Validation Quiz

Review Learning Objectives

✔ Submit your assignment

Due Mar 10, 11:59 PM IST

✔ Receive grade

To Pass 60% or higher

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1. What is cross-validation used for in machine learning?

1 / 1 point

☒ To estimate the performance of a model and assess its generalization ability.

☐ To divide the dataset into training and test sets for model evaluation.

☐ To perform feature scaling on the dataset before training a model.

☐ To remove outliers from the dataset before training a model.

✔ Correct

Correct! Cross-validation is used to estimate the performance of a model and assess its generalization ability on unseen data.
2. What is the main purpose of cross-validation in model evaluation?

1 / 1 point

☐ To test the model on a separate validation set.

☒ To assess how well the model generalizes to new, unseen data.

☐ To train the model on a larger dataset for better performance.

☐ To evaluate the model only on the training data.

✔ Correct

Correct! The main purpose of cross-validation is to assess how well the model generalizes to new, unseen data, avoiding overfitting.
3. What is k-fold cross-validation?

1 / 1 point

☐ Dividing the dataset into two equal parts for training and testing.

☐ Training the model on one subset and testing it on another subset, excluding one data point at a time.

☐ Repeating the training process multiple times on the same dataset with different random seeds.

☒ Dividing the dataset into k subsets and using each subset as a testing set while the others are combined for training.

✔ Correct

Correct! In k-fold cross-validation, the dataset is divided into k subsets, and each subset is used as a testing set while the rest are combined for training.
4. What is the advantage of k-fold cross-validation over a single train-test split?

1 / 1 point

☐ k-fold cross-validation provides a larger training dataset for better model performance.

☐ k-fold cross-validation automatically handles feature scaling on the dataset.

☒ k-fold cross-validation provides a more reliable estimate of model performance by averaging results from multiple iterations.

☐ k-fold cross-validation prevents overfitting by using a smaller testing set.

✔ Correct

Correct! k-fold cross-validation provides a more reliable estimate of model performance by averaging results from multiple iterations on different subsets of data.
5. What is leave-one-out cross-validation?

1 / 1 point

☐ Dividing the dataset into k equal parts and using each part as a testing set while the others are combined for training.

☐ Repeating the training process multiple times on the same dataset with different random seeds.

☒ Training the model on all but one data point and testing it on the excluded data point for each iteration.

☐ Dividing the dataset into two equal parts for training and testing.

✔ Correct

Correct! Leave-one-out cross-validation involves training the model on all but one data point and testing it on the excluded data point for each iteration.
6. What is the main advantage of leave-one-out cross-validation over k-fold cross-validation?

1 / 1 point

☐ Leave-one-out cross-validation requires less computational time than k-fold cross-validation.

☒ Leave-one-out cross-validation provides a more precise estimate of model performance, especially on smaller datasets.

☐ Leave-one-out cross-validation allows more control over the proportion of data used for testing.

☐ Leave-one-out cross-validation uses a larger testing set, leading to better generalization.

✔ Correct

Correct! Leave-one-out cross-validation provides a more precise estimate of model performance, especially on smaller datasets, as each data point serves as a testing set.
7. In k-fold cross-validation, if we use a large value of k (e.g., k = 10), what is the trade-off?

1 / 1 point

☒ Increased computation time but less variance in the estimated performance.

☐ Reduced computation time but higher bias in the estimated performance.

☐ Increased computation time and higher bias in the estimated performance.

☐ Reduced computation time and less variance in the estimated performance.

✔ Correct

Correct! Using a large value of k in k-fold cross-validation increases computation time but reduces the variance in the estimated performance.
8. What is the purpose of shuffling the data before applying k-fold cross-validation?

1 / 1 point

☐ To ensure that the model generalizes well to all data points equally.

☐ To increase the model's performance on the training data.

☒ To ensure that each fold contains a representative sample of the data.

☐ To guarantee that the model's performance is consistent across different random seeds.

✔ Correct

Correct! Shuffling the data before applying k-fold cross-validation ensures that each fold contains a representative sample of the data, helping to avoid biased splits.

