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1. How might dimension reduction enhance model performance during the clustering process?

1 / 1 point

- Removes preprocessing steps
- Increases feature count
- Simplifies data and improves efficiency
- Prevents feature loss

Correct

Dimension reduction simplifies data structures, aiding visualization, and enhancing computational efficiency in clustering. However, this might come at the cost of reduced accuracy if too much information is lost in the process.

2. How can clustering facilitate feature selection in a dataset?

1 / 1 point

- Increases dataset dimensionality
- Treats all features equally
- Identifies redundant features
- Eliminates feature engineering

Correct

By grouping similar features together, you can select a representative feature from each cluster, which helps in simplifying the model and reducing the risk of overfitting.

3. How does Principal Component Analysis (PCA) contribute to model accuracy in face recognition?

1 / 1 point

- Extracts key facial features
- Increases training features
- Ensures equal representation
- Randomly selects faces

Correct

PCA extracts eigenfaces highlighting key facial features, which can be selected to reduce dimensionality, helping to accurately identify faces while reducing computational load.

4. Which dimensionality reduction algorithm works with complex, high-dimensional data that requires local and global structure preservation for clustering?

1 / 1 point

- Principal Component Analysis (PCA)
- Dimensionality reduction is irrelevant when working with complex, high-dimensional data
- Uniform Manifold Approximation and Projection (UMAP)
- t-distributed Stochastic Neighbor Embedding (t-SNE)

Correct

UMAP is designed to preserve local and global data structures, making it suitable for clustering applications.

5. What is the primary purpose of dimensionality reduction algorithms?

1 / 1 point

- Remove all data noise
- Simplify data and maintain information content
- Increase data set features
- Enhance data complexity

 **Correct**

The main purpose of dimensionality reduction is to simplify the data set while preserving critical information.