Partitioning Clustering Quiz

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1. What is the main goal of clustering analysis in machine learning? **1 / 1 point**

- ○ To classify data points into predefined classes.
- ○ To identify outliers and remove them from the dataset.
- ○ To predict the target variable for each data point.
- ◉ To group data points into clusters based on their similarities, so that data points within the same cluster are more similar to each other than those in different clusters.

Correct
Correct! The main goal of clustering analysis is to group data points into clusters based on their similarities.

2. Which clustering method focuses on creating non-overlapping clusters where each data point belongs to only one cluster? **1 / 1 point**

- ○ Hierarchical clustering
- ◉ Partitioning clustering
- ○ Density-based clustering
- ○ Fuzzy clustering

Correct
Correct! Partitioning clustering methods assign each data point to exactly one cluster, ensuring non-overlapping clusters.

3. What is the main limitation of the k-means algorithm? **1 / 1 point**

- ○ It is computationally expensive and slow for large datasets.
- ○ It can only handle datasets with a small number of features.
- ◉ It is sensitive to the initial placement of centroids, which may lead to different final cluster assignments.
- ○ It is not suitable for high-dimensional data.

Correct
Correct! K-means is sensitive to the initial placement of centroids, and different initializations may lead to different cluster assignments.

4. Which of the following statements about the k-medoids algorithm is correct? **1 / 1 point**

- ○ K-medoids assigns data points to clusters based on the mean of their feature values.
- ○ K-medoids cannot handle high-dimensional data.
- ○ K-medoids is a density-based clustering algorithm.
- ◉ K-medoids is more robust to outliers compared to k-means.

Correct
Correct! K-medoids is more robust to outliers because it uses the medoid, which is less sensitive to extreme values.

5. What is the main difference between k-means and k-medoids? **1 / 1 point**

- ○ K-means aims to minimize the sum of squared distances, while k-medoids aims to minimize the sum of absolute distances.
- ◉ K-means uses the mean of the data points in each cluster as the cluster's center, while k-medoids uses the medoid.
- ○ K-means can handle overlapping clusters, while k-medoids cannot.
- ○ K-means is a density-based clustering algorithm, while k-medoids is a hierarchical clustering algorithm.

Correct
Correct! The main difference between k-means and k-medoids is that k-means uses the mean of data points as the cluster's center, while k-medoids uses the medoid, which is the data point closest to the cluster's center.

6. In which situation is k-means most suitable? **1 / 1 point**

- ○ When dealing with non-linearly separable data.
- ○ When the number of clusters is unknown or hard to determine.
- ◉ When the data has clear separation between clusters and low noise.
- ○ When dealing with datasets with a high number of features (dimensions).

Correct
Correct! K-means is most suitable when the data has distinct clusters and low noise.

7. What is the primary limitation of the k-medoids algorithm compared to k-means? **1 / 1 point**

- ○ K-medoids is more sensitive to the initial placement of centroids.
- ◉ K-medoids is less computationally efficient for large datasets.
- ○ K-medoids cannot handle high-dimensional data.
- ○ K-medoids is more sensitive to outliers compared to k-means.

Correct
This option is correct. K-medoids can be less computationally efficient, especially for large datasets, compared to k-means.