Task 11: Feature Reduction using PCA

Digits Dataset

1. Import Necessary Libraries
2. Load the digits dataset; load_digits from sklearn.datasets.
3. Apply PCA to reduce the dimensions (from 64 to 50).
4. Reconstruct the images from the reduced components and calculate the reduction in size.
5. Print out the original, reduced components, and reduction ratio.
6. Visualize the original and reconstructed images.

Wine Dataset

1. Load the wine dataset (13 features)
2. Apply K-Means clustering on the original high-dimensional data. Perform data normalization before applying K-Means.
3. Calculate the time for K-Means.
4. Visualize the clustering results in the original space (2 features only for plot)
5. Now apply PCA to reduce to 2 components.
6. Apply K-Means clustering on the PCA-reduced data and find time for K-Means again.
7. Visualize the clustering results on PCA-reduced data.