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import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.cluster import KMeans
from sklearn.decomposition import PCA
from sklearn.preprocessing import StandardScaler
from sklearn.datasets import load_breast_cancer
data = load_breast_cancer()
df = pd.DataFrame(data.data, columns=data.feature_names)
actual_labels = data.target
print(df.head())
print(df.info())
print(df.shape)
scaler = StandardScaler()
df_scaled = scaler.fit_transform(df)
kmeans = KMeans(n_clusters=2, random_state=42, n_init=10)
kmeans.fit(df_scaled)
cluster_labels = kmeans.labels_
pca = PCA(n_components=2)
df_pca = pca.fit_transform(df_scaled)
df_visual = pd.DataFrame(df_pca, columns=['PC1', 'PC2'])
df_visual['Cluster'] = cluster_labels
df_visual['Actual'] = actual_labels
plt.figure(figsize=(12, 5))
plt.subplot(1, 2, 1)
sns.scatterplot(x='PC1', y='PC2', hue='Cluster', data=df_visual, palette='Set1')
plt.title('K-Means Clustering on Wisconsin Breast Cancer Dataset')
plt.subplot(1, 2, 2)
sns.scatterplot(x='PC1', y='PC2', hue='Actual', data=df_visual, palette='Set2')
plt.title('Actual Diagnosis')
plt.tight_layout()
plt.show()
```