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import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.preprocessing import StandardScaler
from sklearn.cluster import KMeans
from sklearn.metrics import davies_bouldin_score
from sklearn.neighbors import NearestNeighbors
# Replace file paths with the actual paths to the downloaded CSV files
customers = pd.read_csv("Customers.csv")
products = pd.read_csv("Products.csv")
transactions = pd.read_csv("Transactions.csv")
# Quick overview of datasets
print(customers.info())
print(products.info())
print(transactions.info())

# Merging datasets for comprehensive analysis
merged_data = transactions.merge(customers, on="CustomerID").merge(products, on="ProductID")

# Top customers by total transaction value
top_customers = merged_data.groupby('CustomerID')['TotalValue'].sum().sort_values(ascending=False).head(10)

# Top-selling products
top_products = merged_data.groupby('ProductName')['Quantity'].sum().sort_values(ascending=False).head(10)

# Sales trends over time
merged_data['TransactionDate'] = pd.to_datetime(merged_data['TransactionDate'])
sales_trend = merged_data.groupby(merged_data['TransactionDate'].dt.to_period('M'))['TotalValue'].sum()

# Plotting
plt.figure(figsize=(10, 6))
sales_trend.plot(kind='bar')
plt.title("Monthly Sales Trend")
plt.xlabel("Month")
plt.ylabel("Total Sales")
plt.show()

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