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import numpy as np
import pandas as pd
from mlxtend.frequent_patterns import apriori, association_rules

import pandas as pd
# Load the new dataset
df = pd.read_csv("Market_Basket_Optimisation.csv")
print("First 5 rows of dataset:")
print(df.head())

transactions = []
for i in range(0, len(df)):
    # Split each row into items and filter out 'nan'
    transactions.append([str(df.values[i,j]) for j in range(0, df.shape[1]) if str(df.values[i,j]) != 'nan'])

from mlxtend.preprocessing import TransactionEncoder
te = TransactionEncoder()
te_array = te.fit(transactions).transform(transactions)
df_encoded = pd.DataFrame(te_array, columns=te.columns_)

from mlxtend.frequent_patterns import apriori
# Adjusted min_support for the new dataset if needed
frequent_itemsets = apriori(df_encoded, min_support=0.01, use_colnames=True)
print("Total Frequent Itemsets:", frequent_itemsets.shape[0])

from mlxtend.frequent_patterns import association_rules
# Adjusted min_threshold for the new dataset if needed
rules = association_rules(frequent_itemsets, metric="confidence", min_threshold=0.1)
rules = rules[rules['antecedents'].apply(lambda x: len(x) >= 1) &
rules['consequents'].apply(lambda x: len(x) >= 1)]
print("Association Rules:", rules.shape[0])
rules[['antecedents', 'consequents', 'support', 'confidence', 'lift']].head(5)

import matplotlib.pyplot as plt
# For this dataset, we first need to flatten the list of transactions to count item frequencies
all_items = [item for sublist in transactions for item in sublist]
top_items = pd.Series(all_items).value_counts().head(10)

top_items.plot(kind='bar', title='Top 10 Most Purchased Items')
plt.xlabel("Item")
plt.ylabel("Count")
plt.show()

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