

Association Rule Mining Problem Statement: Identify buying patterns from market basket data using the Apriori algorithm.
Generate frequent itemsets and association rules. Activities: • Preprocess transactional data • Use mlxtend library • Interpret lift and confidence

```
#LOADING THE LIBRARIES.
```

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from mlxtend.frequent_patterns import apriori, association_rules
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```

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```

```
dataset = [
    ['milk', 'bread', 'nuts', 'apple'],
    ['milk', 'bread', 'nuts'],
    ['milk', 'bread'],
    ['milk', 'apple'],
    ['bread', 'apple'],
    ['milk', 'bread', 'apple'],
    ['milk', 'bread', 'apple'],
    ['bread', 'nuts']
]
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```
from mlxtend.preprocessing import TransactionEncoder
te= TransactionEncoder()
te_array = te.fit(dataset).transform(dataset)
df = pd.DataFrame(te_array, columns = te.columns_)
```

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```

```

print("One-Hot Encoded Transaction Data:")
print(df)

```

```

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One-Hot Encoded Transaction Data:
  apple  bread  milk  nuts
0   True   True   True   True
1  False   True   True   True
2  False   True   True  False
3   True  False   True  False
4   True   True  False  False
5   True   True   True  False
6   True   True   True  False
7  False   True  False   True
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```

```

frequent_itemsets = apriori(df, min_support = 0.3, use_colnames = True)
print("\n Frequent Itemsets:")
print(frequent_itemsets)

```

```

Frequent Itemsets:
  support  itemsets
0    0.625  (apple)
1    0.875  (bread)
2    0.750  (milk)
3    0.375  (nuts)
4    0.500  (bread, apple)
5    0.500  (milk, apple)
6    0.625  (milk, bread)
7    0.375  (nuts, bread)
8    0.375  (milk, bread, apple)
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```

```

rules = association_rules(frequent_itemsets, metric="lift", min_threshold = 1.0)
print("\n Association Rules:")
print(rules[['antecedents', 'consequents', 'support', 'confidence', 'lift']])

```

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```

Association Rules:

	antecedents	consequents	support	confidence	lift
0	(milk)	(apple)	0.500	0.666667	1.066667
1	(apple)	(milk)	0.500	0.800000	1.066667
2	(nuts)	(bread)	0.375	1.000000	1.142857
3	(bread)	(nuts)	0.375	0.428571	1.142857
4	(bread, apple)	(milk)	0.375	0.750000	1.000000
5	(milk)	(bread, apple)	0.375	0.500000	1.000000

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```

```

rules = rules.sort_values(by='lift', ascending=False)
print("\n Top Rules by Lift:")
print(rules[['antecedents', 'consequents', 'support', 'confidence', 'lift']])

```

Top Rules by Lift:

	antecedents	consequents	support	confidence	lift
3	(bread)	(nuts)	0.375	0.428571	1.142857
2	(nuts)	(bread)	0.375	1.000000	1.142857
1	(apple)	(milk)	0.500	0.800000	1.066667
0	(milk)	(apple)	0.500	0.666667	1.066667
4	(bread, apple)	(milk)	0.375	0.750000	1.000000
5	(milk)	(bread, apple)	0.375	0.500000	1.000000

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