Artificial Intelligence and Machine Learning

LAB 4

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4. For a dataset, apply FP-tree algorithm, show the tree construction and identify the best rules based on support and confidence.

Program:

Fp tree algorithm

```
from mlxtend.preprocessing import TransactionEncoder
from mlxtend.frequent_patterns import fpgrowth, association_rules
import pandas as pd


transactions = [
    ['apple', 'banana', 'mango'],
    ['banana', 'orange'],
    ['apple', 'banana', 'orange', 'mango'],
    ['banana', 'mango'],
    ['apple', 'mango'],
    ['banana', 'mango'],
    ['apple', 'banana', 'mango'],
]

te = TransactionEncoder()
te_ary = te.fit(transactions).transform(transactions)
df = pd.DataFrame(te_ary, columns=te.columns_)

frequent_itemsets = fpgrowth(df, min_support=0.4, use_colnames=True)

print("Frequent Itemsets:")
print(frequent_itemsets)

rules = association_rules(frequent_itemsets, metric="confidence", min_threshold=0.7)

print("\nAssociation Rules:")
print(rules[['antecedents', 'consequents', 'support', 'confidence', 'lift']])
```

OUTPUT:

```
Frequent Itemsets:
    support                itemsets
0  0.857143                 (mango)
1  0.857143                (banana)
2  0.571429                 (apple)
3  0.714286         (mango, banana)
4  0.571429          (mango, apple)
5  0.428571         (banana, apple)
6  0.428571  (mango, banana, apple)

Association Rules:
       antecedents      consequents   support  confidence      lift
0          (mango)         (banana)  0.714286    0.833333  0.972222
1         (banana)          (mango)  0.714286    0.833333  0.972222
2          (apple)          (mango)  0.571429    1.000000  1.166667
3          (apple)         (banana)  0.428571    0.750000  0.875000
4   (mango, apple)         (banana)  0.428571    0.750000  0.875000
5  (banana, apple)          (mango)  0.428571    1.000000  1.166667
6          (apple)  (mango, banana)  0.428571    0.750000  1.050000
```