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B.Tech. IT, Sem: VII

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EXPERIMENT – 6 (ASSOCIATION RULE MINING USING MLEXTEND)

Aim: To perform association rule mining using orange and mlextend packages in python.

Procedure:

1. Import libraries

```
## Importing Library
import numpy as np
import pandas as pd
from mlxtend.preprocessing import TransactionEncoder
from mlxtend.frequent_pattern import apriori, association_rules, fpgrrowth
```

2. Generate Dataset

```
## Generate Dataset
dataset = [['HP', 'Apple', 'Dell', 'Acer', 'Lenovo'],
           ['Asus', 'Apple', 'Dell', 'Acer', 'Lenovo'],
           ['HP', 'MSI', 'Acer', 'Acer'],
           ['HP', 'Microsoft Surface', 'Razer', 'Acer', 'Lenovo'],
           ['Razer', 'Apple', 'Apple', 'Dell', 'Samsung', 'Acer']]

te = TransactionEncoder()
te_arry = te.fit_transform(dataset)
df= pd.DataFrame(te_arry, columns= te.columns_)
df
```

	Acer	Apple	Asus	Dell	HP	Lenovo	MSI	Microsoft Surface	Razer	Samsung
0	True	True	False	True	True	True	False	False	False	False
1	True	True	True	True	False	True	False	False	False	False
2	True	False	False	False	True	False	True	False	False	False
3	True	False	False	False	True	True	False	True	True	False
4	True	True	False	True	False	False	False	False	True	True

3. Generate frequent items and association rule using apriori algorithm:

```
## Using Apriori Algorithm
apriori_frq_items = apriori(df, min_support = 0.6, use_colnames=True)
apriori_rules = association_rules(apriori_frq_items, metric='confidence',min_threshold=0.7)
display(apriori_frq_items, apriori_rules)
```

	support	itemsets
0	1.0	(Acer)
1	0.6	(Apple)
2	0.6	(Dell)
3	0.6	(HP)
4	0.6	(Lenovo)
5	0.6	(Apple, Acer)
6	0.6	(Dell, Acer)
7	0.6	(Acer, HP)
8	0.6	(Lenovo, Acer)
9	0.6	(Dell, Apple)
10	0.6	(Dell, Apple, Acer)

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage	conviction
0	(Apple)	(Acer)	0.6	1.0	0.6	1.0	1.000000	0.00	inf
1	(Dell)	(Acer)	0.6	1.0	0.6	1.0	1.000000	0.00	inf
2	(HP)	(Acer)	0.6	1.0	0.6	1.0	1.000000	0.00	inf
3	(Lenovo)	(Acer)	0.6	1.0	0.6	1.0	1.000000	0.00	inf
4	(Dell)	(Apple)	0.6	0.6	0.6	1.0	1.666667	0.24	inf
5	(Apple)	(Dell)	0.6	0.6	0.6	1.0	1.666667	0.24	inf
6	(Dell, Apple)	(Acer)	0.6	1.0	0.6	1.0	1.000000	0.00	inf
7	(Dell, Acer)	(Apple)	0.6	0.6	0.6	1.0	1.666667	0.24	inf
8	(Apple, Acer)	(Dell)	0.6	0.6	0.6	1.0	1.666667	0.24	inf
9	(Dell)	(Apple, Acer)	0.6	0.6	0.6	1.0	1.666667	0.24	inf
10	(Apple)	(Dell, Acer)	0.6	0.6	0.6	1.0	1.666667	0.24	inf

4. Generate frequent items and association rule using fpgrowth algorithm:

```
## FPGrowth Algorithm
fp_frq = fpgrowth(df, min_support=0.6, use_colnames=True)
fp_rules = association_rules(fp_frq, metric='confidence',min_threshold=0.7)
display(fp_frq, fp_rules)
```

	support	itemsets
0	1.0	(Acer)
1	0.6	(Lenovo)
2	0.6	(HP)
3	0.6	(Dell)
4	0.6	(Apple)
5	0.6	(Lenovo, Acer)
6	0.6	(Acer, HP)
7	0.6	(Dell, Acer)
8	0.6	(Dell, Apple)
9	0.6	(Apple, Acer)
10	0.6	(Dell, Apple, Acer)

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage	conviction
0	(Lenovo)	(Acer)	0.6	1.0	0.6	1.0	1.000000	0.00	inf
1	(HP)	(Acer)	0.6	1.0	0.6	1.0	1.000000	0.00	inf
2	(Dell)	(Acer)	0.6	1.0	0.6	1.0	1.000000	0.00	inf
3	(Dell)	(Apple)	0.6	0.6	0.6	1.0	1.666667	0.24	inf
4	(Apple)	(Dell)	0.6	0.6	0.6	1.0	1.666667	0.24	inf
5	(Apple)	(Acer)	0.6	1.0	0.6	1.0	1.000000	0.00	inf
6	(Dell, Apple)	(Acer)	0.6	1.0	0.6	1.0	1.000000	0.00	inf
7	(Dell, Acer)	(Apple)	0.6	0.6	0.6	1.0	1.666667	0.24	inf
8	(Apple, Acer)	(Dell)	0.6	0.6	0.6	1.0	1.666667	0.24	inf
9	(Dell)	(Apple, Acer)	0.6	0.6	0.6	1.0	1.666667	0.24	inf
10	(Apple)	(Dell, Acer)	0.6	0.6	0.6	1.0	1.666667	0.24	inf