

## Experiment - 10

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**Subject Name:** Machine Learning Lab

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**Subject Code:** 20CSP-317

**Aim:** Implement Association Rule Mining.

**Objective:** To prepare a model with Association Rule Mining.

**Data Set Chosen:** Association Rule Mining.

**Result and output:**

### Implement Association Rules Mining

```
In [10]: import pandas as pd  
import numpy as np  
from mlxtend.frequent_patterns import apriori, association_rules
```

```
In [11]: df = pd.read_csv('GroceryStoreDataSet.csv', names = ['products'], sep = ',')  
df.head()
```

```
Out[11]:
```

	products
0	MILK,BREAD,BISCUIT
1	BREAD,MILK,BISCUIT,CORNFLAKES
2	BREAD,TEA,BOURNVITA
3	JAM,MAGGI,BREAD,MILK
4	MAGGI,TEA,BISCUIT

```
In [12]: df.shape
```

```
Out[12]: (20, 1)
```

```
In [13]: data = list(df["products"].apply(lambda x:x.split(",") ))
data
```

```
Out[13]: [['MILK', 'BREAD', 'BISCUIT'],
 ['BREAD', 'MILK', 'BISCUIT', 'CORNFLAKES'],
 ['BREAD', 'TEA', 'BOURNVITA'],
 ['JAM', 'MAGGI', 'BREAD', 'MILK'],
 ['MAGGI', 'TEA', 'BISCUIT'],
 ['BREAD', 'TEA', 'BOURNVITA'],
 ['MAGGI', 'TEA', 'CORNFLAKES'],
 ['MAGGI', 'BREAD', 'TEA', 'BISCUIT'],
 ['JAM', 'MAGGI', 'BREAD', 'TEA'],
 ['BREAD', 'MILK'],
 ['COFFEE', 'COCK', 'BISCUIT', 'CORNFLAKES'],
 ['COFFEE', 'COCK', 'BISCUIT', 'CORNFLAKES'],
 ['COFFEE', 'SUGER', 'BOURNVITA'],
 ['BREAD', 'COFFEE', 'COCK'],
 ['BREAD', 'SUGER', 'BISCUIT'],
 ['COFFEE', 'SUGER', 'CORNFLAKES'],
 ['BREAD', 'SUGER', 'BOURNVITA'],
 ['BREAD', 'COFFEE', 'SUGER'],
 ['BREAD', 'COFFEE', 'SUGER'],
 ['TEA', 'MILK', 'COFFEE', 'CORNFLAKES']]
```

```
In [14]: from mlxtend.preprocessing import TransactionEncoder
a = TransactionEncoder()
a_data = a.fit(data).transform(data)
df = pd.DataFrame(a_data,columns=a.columns_)
df = df.replace(False,0)
df
```

Out[14]:

	BISCUIT	BOURNVITA	BREAD	COCK	COFFEE	CORNFLAKES	JAM	MAGGI	MILK	SUGER	TEA
0	True	0	True	0	0	0	0	0	True	0	0
1	True	0	True	0	0	True	0	0	True	0	0
2	0	True	True	0	0	0	0	0	0	0	True
3	0	0	True	0	0	0	True	True	True	0	0
4	True	0	0	0	0	0	0	True	0	0	True
5	0	True	True	0	0	0	0	0	0	0	True
6	0	0	0	0	0	True	0	True	0	0	True
7	True	0	True	0	0	0	0	True	0	0	True
8	0	0	True	0	0	0	True	True	0	0	True
9	0	0	True	0	0	0	0	0	True	0	0
10	True	0	0	True	True	True	0	0	0	0	0
11	True	0	0	True	True	True	0	0	0	0	0
12	0	True	0	0	True	0	0	0	0	True	0
13	0	0	True	True	True	0	0	0	0	0	0

14	True	0	True	0	0	0	0	0	0	True	0
15	0	0	0	0	True	True	0	0	0	True	0
16	0	True	True	0	0	0	0	0	0	True	0
17	0	0	True	0	True	0	0	0	0	True	0
18	0	0	True	0	True	0	0	0	0	True	0
19	0	0	0	0	True	True	0	0	True	0	True

```
In [15]: df = apriori(df, min_support = 0.2, use_colnames = True, verbose = 1)
df
```

Processing 42 combinations | Sampling itemset size 3

/opt/anaconda3/lib/python3.9/site-packages/mlxtend/frequent\_patterns/fpcommon.py:111: DeprecationWarning: DataFrames with non-bool types result in worse computational performance and their support might be discontinued in the future. Please use a DataFrame with bool type  
warnings.warn(

Out[15]:

	support	itemsets
0	0.35	(BISCUIT)
1	0.2	(BOURNVITA)
2	0.65	(BREAD)
3	0.4	(COFFEE)
4	0.3	(CORNFLAKES)
5	0.25	(MAGGI)
6	0.25	(MILK)
7	0.3	(SUGER)
8	0.35	(TEA)
9	0.2	(BISCUIT, BREAD)
10	0.2	(BREAD, MILK)
11	0.2	(BREAD, SUGER)
12	0.2	(BREAD, TEA)
13	0.2	(COFFEE, CORNFLAKES)
14	0.2	(SUGER, COFFEE)
15	0.2	(MAGGI, TEA)

```
In [16]: df_ar = association_rules(df, metric = "confidence", min_threshold = 0.6)
df_ar
```

Out[16]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage	conviction
0	(MILK)	(BREAD)	0.25	0.65	0.2	0.800000	1.230769	0.0375	1.75
1	(SUGER)	(BREAD)	0.30	0.65	0.2	0.666667	1.025641	0.0050	1.05
2	(CORNFLAKES)	(COFFEE)	0.30	0.40	0.2	0.666667	1.666667	0.0800	1.80
3	(SUGER)	(COFFEE)	0.30	0.40	0.2	0.666667	1.666667	0.0800	1.80
4	(MAGGI)	(TEA)	0.25	0.35	0.2	0.800000	2.285714	0.1125	3.25