Experiment-2.2

Student Name: Ashish Kumar **UID: 23MAI10008**
Branch: ME CSE AIML **Section/Group: 23MAI-1**
Semester: 02 **Date of Performance: 06/03/2024**
Subject Name: Machine Learning Lab **Subject Code: 23CSH-651**

Aim of the Experiment :

Implementing Apriori Algorithm using Python.

Theory :

Apriori algorithm refers to the algorithm which is used to calculate the association rules between objects. It means how two or more objects are related to one another. The primary objective of the Apriori algorithm is to create the association rule between different objects. The association rule describes how two or more objects are related to one another. Apriori algorithm is also called frequent pattern mining. Generally, Apriori algorithm is operated on a database that consists of a huge number of transactions.

Assumptions of Apriori Algorithm:

1) All subsets of a frequent itemset must be frequent.
2) The subsets of an infrequent item set must be infrequent.
3) Fix a threshold support level.

Components of Apriori algorithm:

There are three components which comprise the Apriori algorithm:

1) Support: Support is the fraction of transactions that contain an itemset.

$$\text{Support(I)} = \frac{\text{Number of transactions containing I}}{\text{Total number of transactions}}$$

2) Confidence: Confidence measures how often items in Y appear in transactions that contain X.

$$\text{Confidence}(X \rightarrow Y) = \frac{\text{Number of transactions containing X and Y}}{\text{Number of transactions containing X}}$$

3) Lift: Lift provide the strength to any Rule.

$$\text{Lift}(X \rightarrow Y) = \frac{\text{Support}(X, Y)}{\text{Support}(X) * \text{Support}(Y)}$$

If Lift=1: Probability of occurrence of antecedent and consequent is independent of each other.

If Lift>1: It determines the degree to which the two items are dependent to each other.

If Lift=1: It tells us one item is substitute of another.

Code for Experiment :

```
# Import the required libraries
import numpy as np
import pandas as pd

# Load the dataset
store_data = pd.read_csv('Day1.csv', header=None)
store_data

# Shape of dataset
store_data.shape

# Convert the Pandas Dataframe into a list of lists
records = []
for i in range(0, 22):
    records.append([str(store_data.values[i,j]) for j in range(0, 6)])
```

```
from apyori import apriori
# Build the Apriori Model
# First parameter = list of list that you want to extract rules from.
# Second parameter(min_support) = select items with support values greater than the specified value.
# Third parameter (min_confidence) = filters rules having confidence greater than specified confidence.
# Fourth parameter (min_lift) = specifies the minimum lift value for the short listed rules.
# Fifth parameter (min_length) = specifies the minimum number of items that you want in your rules.

association_rules = apriori(records, min_support=0.45, min_confidence=0.6, min_lift=1.2,
                            min_length=2)
association_results = list(association_rules)

# Number of rules
print("Number of Rules: ",len(association_results))
print("\n")

for item in association_results:
    # first index of the inner list
    # Contains base item and add item
    pair = item[0]
    items = [x for x in pair]
    print("Rule: " + items[0] + " -> " + items[1])

    #second index of the inner list
    print("Support: " + str(item[1]))

    #third index of the list located at 0th of the third index of the inner list
    print("Confidence: " + str(item[2][0][2]))
    print("Lift: " + str(item[2][0][3]))
    print("=====================================")
```

Result/Output :

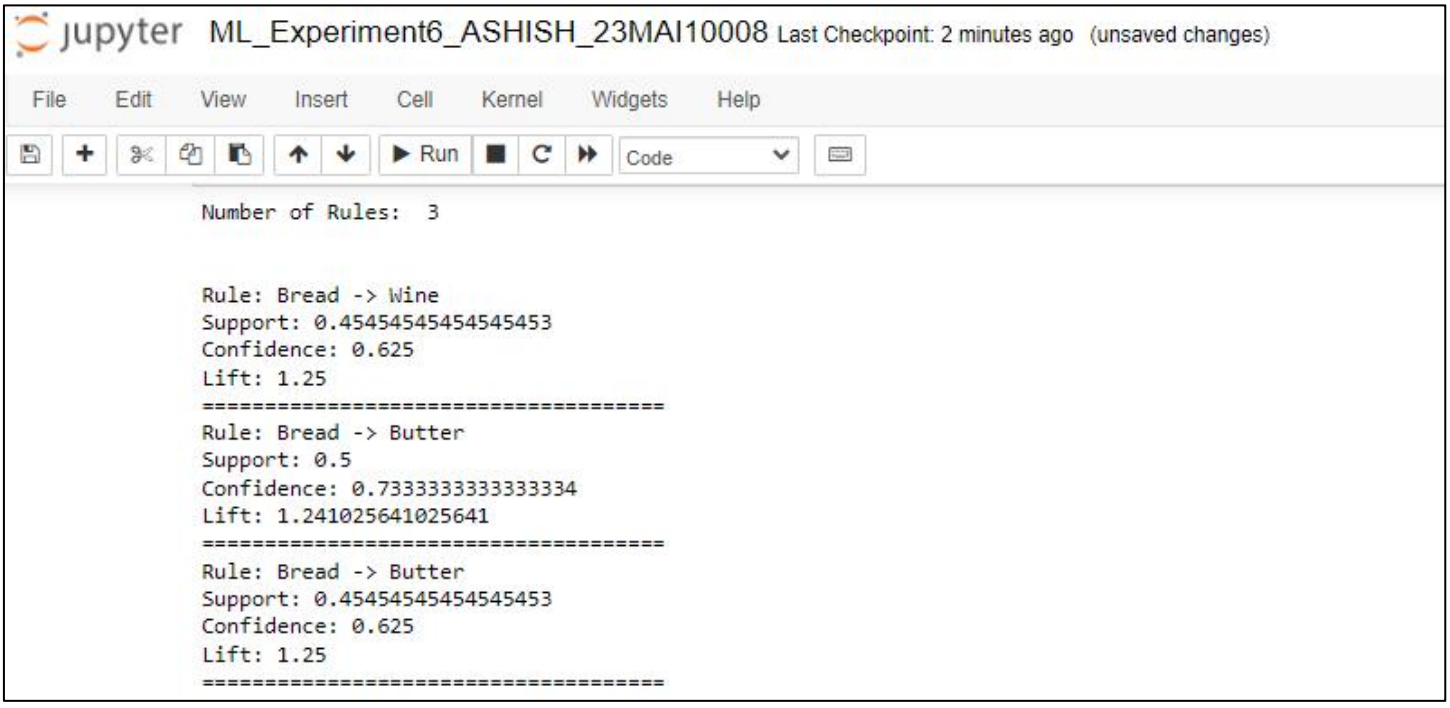
jupyter ML_Experiment6_ASHISH_23MAI10008 Last Checkpoint: a minute ago (unsaved changes)

File Edit View Insert Cell Kernel Widgets Help Trusted

Run Code

Out[1]:

	0	1	2	3	4	5
0	Wine	Chips	Bread	Butter	Milk	Apple
1	Wine	NaN	Bread	Butter	Milk	NaN
2	NaN	NaN	Bread	Butter	Milk	NaN
3	NaN	Chips	NaN	NaN	NaN	Apple
4	Wine	Chips	Bread	Butter	Milk	Apple
5	Wine	Chips	NaN	NaN	Milk	NaN
6	Wine	Chips	Bread	Butter	NaN	Apple
7	Wine	Chips	NaN	NaN	Milk	NaN
8	Wine	NaN	Bread	NaN	NaN	Apple
9	Wine	NaN	Bread	Butter	Milk	NaN
10	NaN	Chips	Bread	Butter	NaN	Apple
11	Wine	NaN	NaN	Butter	Milk	Apple
12	Wine	Chips	Bread	Butter	Milk	NaN
13	Wine	NaN	Bread	NaN	Milk	Apple
14	Wine	NaN	Bread	Butter	Milk	Apple
15	Wine	Chips	Bread	Butter	Milk	Apple
16	NaN	Chips	Bread	Butter	Milk	Apple
17	NaN	Chips	NaN	Butter	Milk	Apple
18	Wine	Chips	Bread	Butter	Milk	Apple
19	Wine	NaN	Bread	Butter	Milk	Apple
20	Wine	Chips	Bread	NaN	Milk	Apple
21	NaN	Chips	NaN	NaN	NaN	NaN



Learning outcomes (What I have learnt):

1. I learnt about various python libraries like pandas, numpy and apyori.
2. I learnt about the concept of Apriori Algorithm.
3. I learnt about Support, Confidence and Lift in Apriori algorithm.
4. I learnt about the different parameters of apriori() function.
5. I learnt about how to find the association rules using Apriori Algorithm.