Vaibhav Bansal - 229310063 - AIML 5E

Experiment 11: To implement association rule mining for various datasets.

```
pip install apyori
```

```
Requirement already satisfied: apyori in /usr/local/lib/python3.7/dist-packages (1.1.2)
```

#Read data and Display

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from apyori import apriori
```

```
store_data = pd.read_csv("store_data.csv", header=None)
display(store_data.head())
print(store_data.shape)
```

	0	1	2	3	4	5	6	7	8	9	10	1
0	shrimp	almonds	avocado	vegetables mix	green grapes	whole weat flour	yams	cottage cheese	energy drink	tomato juice	low fat yogurt	gree te
1	burgers	meatballs	eggs	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	Na
2	chutney	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	Na
3	turkey	avocado	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	Na
4	mineral water	milk	energy bar	whole wheat rice	green tea	NaN	NaN	NaN	NaN	NaN	NaN	Na

```
(7501, 20)
```

#Preprocessing on Data

```
records = []
for i in range(1, 7501):
    records.append([str(store_data.values[i, j]) for j in range(0, 20)])
```

```
print(type(records))
```

```
<class 'list'>
```

Apriori

```
association_rules = apriori(records, min_support=0.0045, min_confidence=0.2, min_lift=3, min_length=
association_results = list(association_rules)
```

```
print("There are {} Relation derived.".format(len(association_results)))
```

```
There are 48 Relation derived.
```

```
for i in range(0, len(association_results)):
    print(association_results[i][0])
```

```
frozenset({'light cream', 'chicken'})
frozenset({'mushroom cream sauce', 'escalope'})
frozenset({'escalope', 'pasta'})
frozenset({'ground beef', 'herb & pepper'})
frozenset({'ground beef', 'tomato sauce'})
frozenset({'olive oil', 'whole wheat pasta'})
frozenset({'shrimp', 'pasta'})
frozenset({'light cream', 'nan', 'chicken'})
frozenset({'frozen vegetables', 'chocolate', 'shrimp'})
frozenset({'ground beef', 'cooking oil', 'spaghetti'})
frozenset({'mushroom cream sauce', 'nan', 'escalope'})
frozenset({'nan', 'escalope', 'pasta'})
frozenset({'ground beef', 'frozen vegetables', 'spaghetti'})
frozenset({'olive oil', 'milk', 'frozen vegetables'})
frozenset({'mineral water', 'frozen vegetables', 'shrimp'})
frozenset({'olive oil', 'frozen vegetables', 'spaghetti'})
frozenset({'frozen vegetables', 'shrimp', 'spaghetti'})
frozenset({'tomatoes', 'frozen vegetables', 'spaghetti'})
frozenset({'ground beef', 'grated cheese', 'spaghetti'})
frozenset({'ground beef', 'mineral water', 'herb & pepper'})
frozenset({'ground beef', 'nan', 'herb & pepper'})
frozenset({'ground beef', 'spaghetti', 'herb & pepper'})
frozenset({'ground beef', 'milk', 'olive oil'})
frozenset({'ground beef', 'tomato sauce', 'nan'})
frozenset({'ground beef', 'shrimp', 'spaghetti'})
frozenset({'olive oil', 'milk', 'spaghetti'})
frozenset({'mineral water', 'soup', 'olive oil'})
frozenset({'olive oil', 'whole wheat pasta', 'nan'})
frozenset({'nan', 'shrimp', 'pasta'})
frozenset({'olive oil', 'pancakes', 'spaghetti'})
frozenset({'nan', 'frozen vegetables', 'chocolate', 'shrimp'})
frozenset({'ground beef', 'cooking oil', 'nan', 'spaghetti'})
frozenset({'ground beef', 'frozen vegetables', 'nan', 'spaghetti'})
frozenset({'mineral water', 'milk', 'frozen vegetables', 'spaghetti'})
frozenset({'olive oil', 'milk', 'frozen vegetables', 'nan'})
frozenset({'mineral water', 'frozen vegetables', 'nan', 'shrimp'})
frozenset({'olive oil', 'frozen vegetables', 'nan', 'spaghetti'})
frozenset({'spaghetti', 'frozen vegetables', 'nan', 'shrimp'})
frozenset({'tomatoes', 'frozen vegetables', 'nan', 'spaghetti'})
frozenset({'ground beef', 'grated cheese', 'nan', 'spaghetti'})
frozenset({'ground beef', 'mineral water', 'nan', 'herb & pepper'})
frozenset({'ground beef', 'nan', 'spaghetti', 'herb & pepper'})
frozenset({'ground beef', 'milk', 'nan', 'olive oil'})
frozenset({'ground beef', 'spaghetti', 'nan', 'shrimp'})
frozenset({'olive oil', 'milk', 'nan', 'spaghetti'})
frozenset({'mineral water', 'soup', 'nan', 'olive oil'})
frozenset({'olive oil', 'pancakes', 'nan', 'spaghetti'})
frozenset({'nan', 'spaghetti', 'mineral water', 'milk', 'frozen vegetables'})
```

```
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("====================================")
```

```
Rule: light cream -> chicken
Support: 0.004533333333333334
Confidence: 0.2905982905982906
Lift: 4.843304843304844
====================================
Rule: mushroom cream sauce -> escalope
Support: 0.005733333333333333
Confidence: 0.30069930069930073
Lift: 3.7903273197390845
====================================
Rule: escalope -> pasta
Support: 0.005866666666666667
Confidence: 0.37288135593220345
Lift: 4.700185158809287
====================================
Rule: ground beef -> herb & pepper
Support: 0.016
Confidence: 0.3234501347708895
Lift: 3.2915549671393096
====================================
Rule: ground beef -> tomato sauce
Support: 0.005333333333333333
Confidence: 0.33735849056603776
Lift: 3.840147461662528
====================================
Rule: olive oil -> whole wheat pasta
Support: 0.008
Confidence: 0.2714932126696833
Lift: 4.130221288078346
====================================
Rule: shrimp -> pasta
Support: 0.005066666666666666
Confidence: 0.3220338983050848
Lift: 4.514493901473151
====================================
Rule: light cream -> nan
Support: 0.004533333333333334
Confidence: 0.2905982905982906
Lift: 4.843304843304844
====================================
Rule: frozen vegetables -> chocolate
Support: 0.005333333333333333
Confidence: 0.23255813953488372
Lift: 3.260160834601174
====================================
Rule: ground beef -> cooking oil
Support: 0.0048
Confidence: 0.5714285714285714
Lift: 3.281557646029315
====================================
Rule: mushroom cream sauce -> nan
Support: 0.005733333333333333
```

```
Confidence: 0.30069930069930073
Lift: 3.7903273197390845
====================================
Rule: nan -> escalope
Support: 0.005866666666666667
Confidence: 0.3728813559322034
```