PROJECT REPORT

Supermarket Selles Transction Data Mining and Data Analysis Using Association Rule

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1

CONTENTS:

Part Ⅰ

Introduction

Introduction

Supermarket data, Association rule mining, Frequent items

Supermarkets have large number of customers checking into the items and to know customers need its better to identify which products bought frequently, which products are bought together,and association between items.

Association rule mining is one of the principal problems treated in KDD and can be defined as extracting the interesting correlation and relation among huge number of transactions.

Frequent itemset is generally adopted to generate association rules. As the amount of data stored supermarket database grows twice as fast as the speed of the fastest processor available to analyse it. Main purpose of analysing frequent itemset is to find the association relationship among the large number of database items. It is used to describe the patterns of customers' purchase in the supermarket.

Part Ⅱ

Motivation and Description

Motivation

Our motivation behined mining the supermarket data?

Finding inherent regularities in data is the motivation behind this supermarket data analysis project. Association rule mining is one of the technique to identify underlying relations between different items, it helps to identify which items of supermarket mostly bought together and their correlations.

For instance, if item A and B are bought together more frequently then several steps can be taken to increase the profit.

1.Do no go far away

A and B can be placed together so that when a customer buys one of the product he/she doesn't have to go far away to buy the other product.

2.Adverisement Campaign.

People who buy one of the products can be targeted through an advertisement campaign to buy the other one.

3.Collective Discount

Collective discounts can be offered on those products, if the customer buys both.

4. What to buy together

Both A and B can be packaged together.

Part Ⅲ

Objective

Objective

What do we want to achieve?

The objective of analysing supermarket transaction data is for identification of items that frequently occurred togehter in the traniction found in the databases so that the out come will increase effectiveness in supermarket sell.

Part Ⅳ

Methodology

Methodology

Data Preprocessing

The dataset has the following limitations

- Incomplete and Null values
- No header row is necessary
- Unused column

Step 1

Data Cleaning

1. Make complete the data by inserting default value for null values.
2. Remove header option from the dataset since it is not necessary so the first row of the dataset can not be treated as header.

Step 2

Data Reduction

Remove unused column from the dataset.

Step 3

Data Trnsformation

Transform the csv dataset to list data type.

Methodology

So the data is become understandable by the machine to be processed.

That is

Each row corresponds to a transaction and,

Each column corresponds to an item purchased in that specific transaction.

Detail On Data Preprocessing

The dataset dimension

```
In [49]:    #check its dimension
store_data.shape
```

```
Out[49]: (7500, 27)
```

7500 rows

27 columns

Detail On Data Preprocessing

Columns which are no more important in the dataset

```
In [89]: #count null values and convert tehm to NaN default value
store_data.isnull().sum()
```

```
Out[89]: shrimp                0
almonds               1754
avocado               3112
vegetables mix        4156
green grapes          4972
whole weat flour      5637
yams                  6132
cottage cheese        6520
energy drink          6847
tomato juice          7106
low fat yogurt        7245
green tea             7347
honey                 7414
salad                 7454
mineral water         7476
salmon                7493
antioxydant juice     7497
frozen smoothie       7497
spinach               7498
olive oil             7500
meat                  7500
onion                 7500
garlic                7500
dairy                 7500
apples                7500
seafood               7500
bananas               7500
dtype: int64
```

```
olive oil             7500
meat                  7500
onion                 7500
garlic                7500
dairy                 7500
apples                7500
seafood               7500
bananas               7500
dtype: int64
```

Are not important for our objectives

Must be removed.

Detail On Data Preprocessing

The first row as a header

The first row is treated as a header, must be transformed to normal row

True = The value is null
False = The value is not null

Out[50]:

	shrimp	almonds	avocado	vegetables mix	green grapes	whole weat flour	yams	cottage cheese	energy drink	tomato juice	...	frozen smoothie	spinach	olive oil	meat	pasta	soups	dairy	egg
0	False	False	False	True	True	True	True	True	True	True	...	True	True	True	True	True	True	True	Tr
1	False	True	True	True	True	True	True	True	True	True	...	True	True	True	True	True	True	True	Tr
2	False	False	True	True	True	True	True	True	True	True	...	True	True	True	True	True	True	True	Tr
3	False	False	False	False	False	True	True	True	True	True	...	True	True	True	True	True	True	True	Tr
4	False	True	True	True	True	True	True	True	True	True	...	True	True	True	True	True	True	True	Tr
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
7495	False	False	False	True	True	True	True	True	True	True	...	True	True	True	True	True	True	True	Tr
7496	False	False	False	False	False	False	True	True	True	True	...	True	True	True	True	True	True	True	Tr
7497	False	True	True	True	True	True	True	True	True	True	...	True	True	True	True	True	True	True	Tr
7498	False	False	True	True	True	True	True	True	True	True	...	True	True	True	True	True	True	True	Tr
7499	False	False	False	False	True	True	True	True	True	True	...	True	True	True	True	True	True	True	Tr

7500 rows × 27 columns

Detail On Data Preprocessing

Data reduction by removing irrelevant columns

```
In [57]: #as we can see from the result the 20th to 27th column has all null values so we can elimintate it.
         store_data.drop(store_data.columns[[19,20,21,22,23,24,25,26]], axis=1, inplace=True)

In [58]: store_data.isnull().sum()

Out[58]: 0        0
         1     1754
         2     3112
         3     4156
         4     4972
         5     5637
         6     6132
         7     6520
         8     6847
         9     7106
         10    7245
         11    7347
         12    7414
         13    7454
         14    7476
         15    7493
         16    7497
         17    7497
         18    7498
         dtype: int64
```

```
olive oil     7500
meat          7500
onion         7500
garlic        7500
dairy         7500
apples        7500
seafood       7500
bananas       7500
dtype: int64
```

8 Columns are Removed

Detail On Data Preprocessing

A header row is removed
Null is transformed to NaN value

Out[21]:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
shrimp	almonds	avocado	vegetables mix	green grapes	whole weat flour	yams	cottage cheese	energy drink	tomato juice	low fat yogurt	green tea	honey	salad	mineral water	salmon	antioxydant juice	frozen smoothie	spinach
burgers	meatballs	eggs	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
chutney	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
turkey	avocado	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
mineral water	milk	energy bar	whole wheat rice	green tea	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

A header row is removed
Null is transformed to NaN value

*** Now the dataset is clean enough**

Data Analysis

The apriori class requires some parameter values to work.

- The first parameter must be list of list that to extract rules from.
- The second parameter is the min_support parameter.
- The min_confidence parameter.

- he min_lift parameter specifies the minimum lift value for the short listed rules.
- Finally, the min_length parameter specifies the minimum number of items that you want in your rules.

We want to create rules for items purchased five times a day in one week

That means

7*5 = 35 times per week,

So the support = 35/7500 = 0.0045

Let

- Minimum confidence = 20% or 0.2
- Lift = 3
- Min length = 2

by this parameters
48 rules are dicovered

Part V

Evaluation

Evalution

First Rule

```
Rule: chicken -> light cream
Support: 0.004532728969470737
Confidence: 0.2905982905982906
Lift: 4.843950617283951
==========================================
```

- The support value is 0.0045. This number is calculated by dividing the number of transactions containing light cream divided by total number of transactions.
- .The support value is 0.0045. This number is calculated by dividing the number of transactions containing light cream divided by total number of transactions.
- The confidence level for the rule is 0.2905 which shows that out of all the transactions that contain light cream, 29.05% of the transactions also contain chicken.
- The lift of 4.84 tells us that chicken is 4.84 times more likely to be bought by the customers who buy light cream compared to the default likelihood of the sale of chicken.

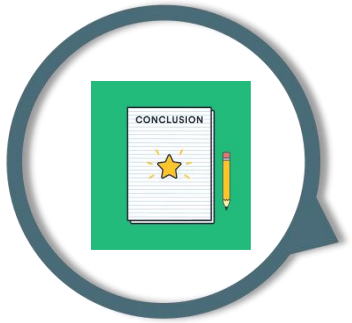
Evalution

Second Rule

```
Rule: mushroom cream sauce -> escalope
Support: 0.005732568990801226
Confidence: 0.3006993006993007
Lift: 3.790832696715049
=====================================
```

- The second rule states that **mushroom cream sauce** and **escalope** are bought frequently
- The support for mushroom cream sauce is 0.0057.
- The confidence for this rule is 0.3006 which means that out of all the transactions containing mushroom, 30.06% of the transactions are likely to contain escalope as well.
- Lift of 3.79 shows that the escalope is 3.79 more likely to be bought by the customers that buy mushroom cream sauce, compared to its default sale.

Conclusion



Association rule mining for supermarket dataset has been presented, Mining has been applied to sales data of dataset. In proposed project, the apriori algorithm has been used on super market dataset which gives associations of two products which has maximum support, It reduces the size of the itemsets in the database considerably providing a good performance. Thus, data mining helps consumers and industries better in the decision-making process.

Thank you for watching

Click here to add the text, the text is the extraction of your thought, in order to finally present the good effect of the release, please try to be concise and concise; if necessary, add or subtract the text.

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