Market Basket Analysis in R

Market Basket Analysis in R with example

How can we identify the different products which can be bundled together to increase the sales ? The answer of the question is Market Basket Analysis or Apriori Algorithm.

Do you know, how to run the Apriori algorithm in R ?

This article has been written in continuation of the previous article covering **Basic of Market Basket Analysis.**

We are taking a very common example of grocery store to make you understand the algorithm step by step. Sample snapshot of the data is given right side:

Please download the data file that would be used in this analysis.

There are only two variables in the datasets

1) Customer Id - Unique identity number of customers

2) Products - Products bought by the customers

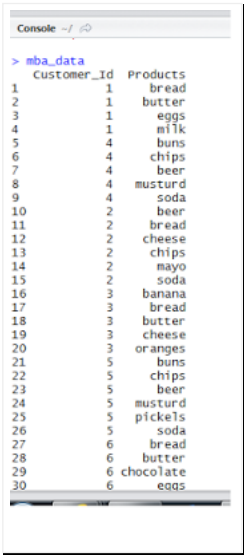
We would now cover all steps to run apriori algorithm in R

Customer_Id	Products
1	bread
1	butter
1	eggs
1	milk
2	beer
2	bread
2	cheese
2	chips
2	Mayo
2	soda
3	banana
3	bread
3	butter
3	cheese
3	oranges

1. Let's first import the data.

Code 1:

```
mba_data<-read.csv("C:\\MBA_data_new.csv")  # we are creating a data frame by importing csv file
```



<< Here is the screen shot of data in R.

mba_data(data frame in R) has two variable customer_id and products.

Each customer id has bought some products for example: customer id 1 has bought

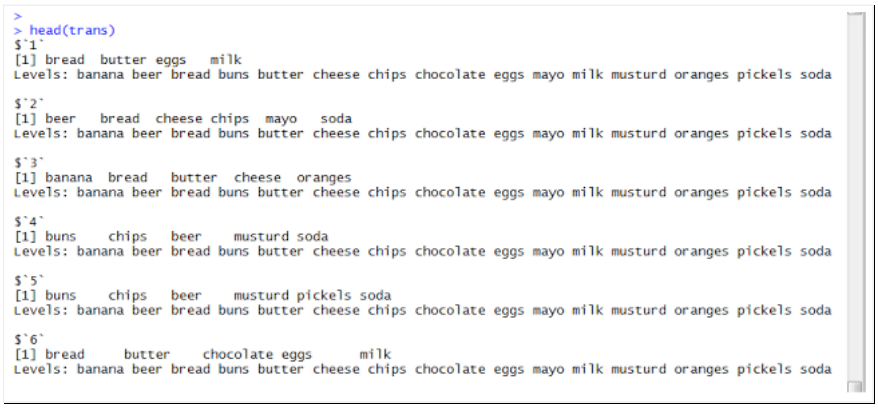
Bread
Butter
Eggs
Milk

2. We cannot directly use imported data to run apriori algorithm. We need to aggregate it first by customer id and transform into different format.

Code 2 :

```
trans <- split(mba_data$Products, mba_data$Customer_Id,"transactions")

head(trans)                    # you can check top 6 observation using head() function
```

Screenshot of top transaction :



We have transformed the data into the desired format to run the apriori algorithm. In order to run apriori algorithm, first, we need to install and load arules library package using below code.

Code 3:

```
install.packages("arules")    # install arules library package

library(arules)               # loading arules library
```

Below are the screenshots of R Console :

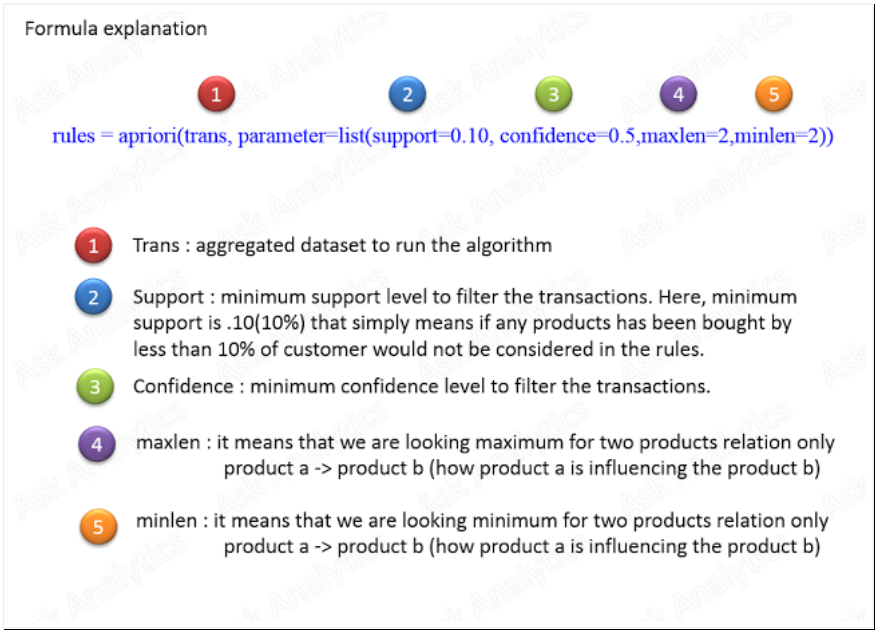
```
> install.packages("arules")
Loading required package: arules
Installing package into 'C:/Users/vinod.pandey/Documents/R/win-library/3.2'
(as 'lib' is unspecified)
trying URL 'http://cran.rstudio.com/bin/windows/contrib/3.2/arules_1.2-1.zip'
Content type 'application/zip' length 1873859 bytes (1.8 MB)
downloaded 1.8 MB

package 'arules' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
 C:\Users\vinod.pandey\AppData\Local\Temp\Rtmpc9acWL\downloaded_packages
```

```
> library(arules)
Loading required package: Matrix

Attaching package: 'arules'

The following objects are masked from 'package:base':

    %in%, abbreviate, write

Warning message:
package 'arules' was built under R version 3.2.2
>
```

We have installed the arules library. Now we can run the apriori algorithm using following statement:

Code 4:

```
rules = apriori(trans, parameter=list(support=0.10, confidence=0.5,maxlen=2,minlen=2))
```



Below are the screen shot of R result.

```
> rules = apriori(trans, parameter=list(support=0.10, confidence=0.5,maxlen=2,minlen=2))

Parameter specification:
 confidence minval smax arem  aval originalSupport support minlen maxlen target   ext
        0.5    0.1    1 none FALSE            TRUE     0.1      2      2  rules FALSE

Algorithmic control:
 filter tree heap memopt load sort verbose
    0.1 TRUE TRUE  FALSE TRUE    2    TRUE

Warning in apriori(trans, parameter = list(support = 0.1, confidence = 0.5,  :
  You chose a very low absolute support count of 1. You might run out of memory! Increase minimum support
.

apriori - find association rules with the apriori algorithm
version 4.21 (2004.05.09)        (c) 1996-2004   Christian Borgelt
set item appearances ...[0 item(s)] done [0.00s].
set transactions ...[15 item(s), 15 transaction(s)] done [0.00s].
sorting and recoding items ... [14 item(s)] done [0.00s].
creating transaction tree ... done [0.00s].
checking subsets of size 1 2 done [0.01s].
writing ... [66 rule(s)] done [0.00s].
creating S4 object  ... done [0.00s].
```

We have successfully derived 66 rules(written second last line in the above screenshot).

Now lets have a look on those rules.

Code 5:

```
inspect(rules)       # to get the rules
```

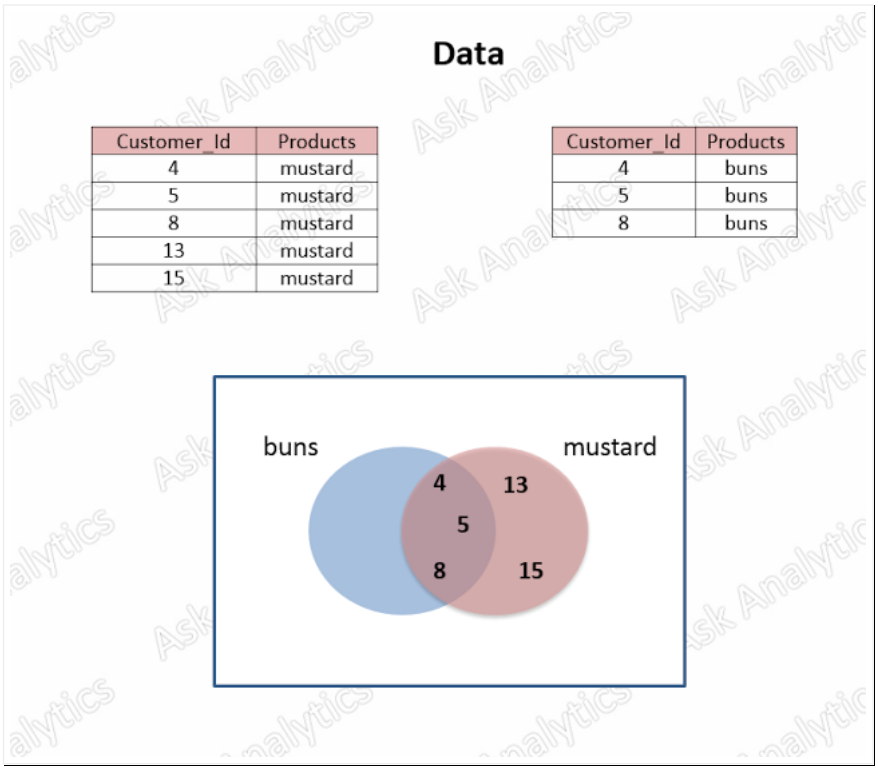
Screenshot for R.

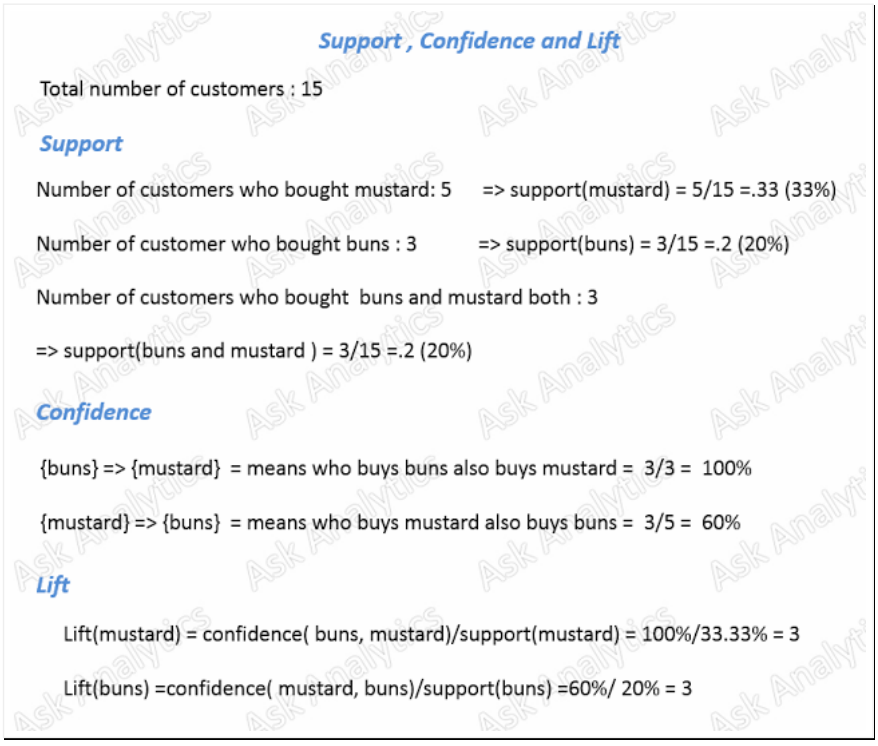
```
> inspect(rules)
   lhs             rhs          support   confidence lift
1  {buns}       => {mustard}    0.2000000 1.0000000  3.0000000
2  {mustard}    => {buns}       0.2000000 0.6000000  3.0000000
3  {buns}       => {chips}      0.2000000 1.0000000  2.5000000
4  {chips}      => {buns}       0.2000000 0.5000000  2.5000000
5  {buns}       => {soda}       0.2000000 1.0000000  2.1428571
6  {buns}       => {beer}       0.2000000 1.0000000  2.1428571
7  {mayo}       => {mustard}    0.1333333 0.6666667  2.0000000
8  {mayo}       => {chips}      0.2000000 1.0000000  2.5000000
9  {chips}      => {mayo}       0.2000000 0.5000000  2.5000000
10 {mayo}       => {cheese}     0.2000000 1.0000000  2.5000000
11 {cheese}     => {mayo}       0.2000000 0.5000000  2.5000000
12 {mayo}       => {soda}       0.2000000 1.0000000  2.1428571
13 {mayo}       => {beer}       0.2000000 1.0000000  2.1428571
14 {mayo}       => {bread}      0.2000000 1.0000000  1.3636364
15 {oranges}    => {banana}     0.2000000 0.7500000  2.2500000
16 {banana}     => {oranges}    0.2000000 0.6000000  2.2500000
17 {oranges}    => {eggs}       0.1333333 0.5000000  1.2500000
18 {oranges}    => {butter}     0.1333333 0.5000000  1.0714286
19 {oranges}    => {milk}       0.2000000 0.7500000  1.6071429
20 {oranges}    => {cheese}     0.1333333 0.5000000  1.2500000
21 {oranges}    => {bread}      0.2000000 0.7500000  1.0227273
22 {chocolate}  => {eggs}       0.2000000 0.7500000  1.8750000
23 {eggs}       => {chocolate}  0.2000000 0.5000000  1.8750000
24 {chocolate}  => {butter}     0.1333333 0.5000000  1.0714286
25 {chocolate}  => {milk}       0.2000000 0.7500000  1.6071429
26 {chocolate}  => {bread}      0.2000000 0.7500000  1.0227273
27 {banana}     => {cheese}     0.2000000 0.6000000  1.5000000
28 {cheese}     => {banana}     0.2000000 0.5000000  1.5000000
29 {banana}     => {bread}      0.2000000 0.6000000  0.8181818
```

Lets manually validate the first two rules (buns => mustard and mustard => buns).

I hope that you would have read our last blog on Market Basket Analysis. In our last article we have explicitly explained ***support, confidence and lift***.

Please read that article before getting into below calculation to understand it better.





If you want to export the rule file into csv file, you can get it by below mentioned code.
Code 6:

```
write(rules,file="mba_rules1.csv",sep=",",row.names = FALSE)
```

I hope, the article is useful in understanding the market basket analysis

Enjoy reading our other articles and stay tuned with ...

Kindly do provide your feedback in the 'Comments' Section and share as much as possible.

Posted by Vinod Pandey

Email ThisBlogThis!Share to TwitterShare to FacebookShare to Pinterest

+5 Recommend this on Google

Newer Post Older Post Home
Subscribe to: Post Comments (Atom)

Finally it happened !

On your plate

statistics R Advanced SAS Base SAS Linear Regression interview Text Mining Logistic Regression cluster analysis Magic of Excel Python Base SAS certification time-series Decision Science forecasting Macro ARIMA Market Basket Analysis NLP R Visualization SAS Gems Sentiment Analysis automation Cool Dashboards Factor Analysis Principal Component Analysis SAS Projetcs Conjoint Analysis X Commands guesstimate

Ask Analytics @ Facebook

Search This Blog

Loading...

Popular Posts

Create your own Google in Excel
Learn to create G o o g l e in Excel Excited ? Confused ? ... Don't be, as you are one click away from learning how to create y...

SQL in SAS
SQL and Excel are omnipresent ! I am stating from my experience in Analytics industry. Every analyst in his/her life time, sometime would n...

SAS Macros - Part 4 - A finishing touch to Macro
We have already covered most about Macros our previous articles. This article has been written in order to give it a finishing touch. ...

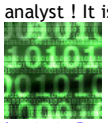
Text Mining in R - Part 7
Sentiment Analysis in R - Coolest Method So Far So far we have discussed all the basics, a rudimentary method, an evolved method and a c...

Fun with Beer and of course Excel
Ever got High over the Beer 'n' Excel punch?? It's been long, may be since our school days, that we all are using Excel as a...

Understanding p-value
A tale about p-value You keep seeing the term 'p-value' every now and then, but don't understand what it really mean...

Time Series Forecasting - Part 5
ARIMA using SAS We have covered basics about time series and also the basic methods of forecasting. It is time to learn the most importa...

Descriptive Statistics With Proc Univariate
Feel your data ! Before going to a battle, a warrior better know what he is fighting against and so a data analyst ! It is advised to ...



Logistic Regression - Part 1 - Theory
In the Movie Matrix, while sentiment machines captured the world with a "Matrix" designed with a binary logic (1 and 0)...

Market Basket Analysis in R
Market Basket Analysis in R with example How can we identify the different products which can be bundled together to increase the sal...

Follow by Email

Email address... Submit

loading...

Impress with your

Solution of previous

Fall in love with excel