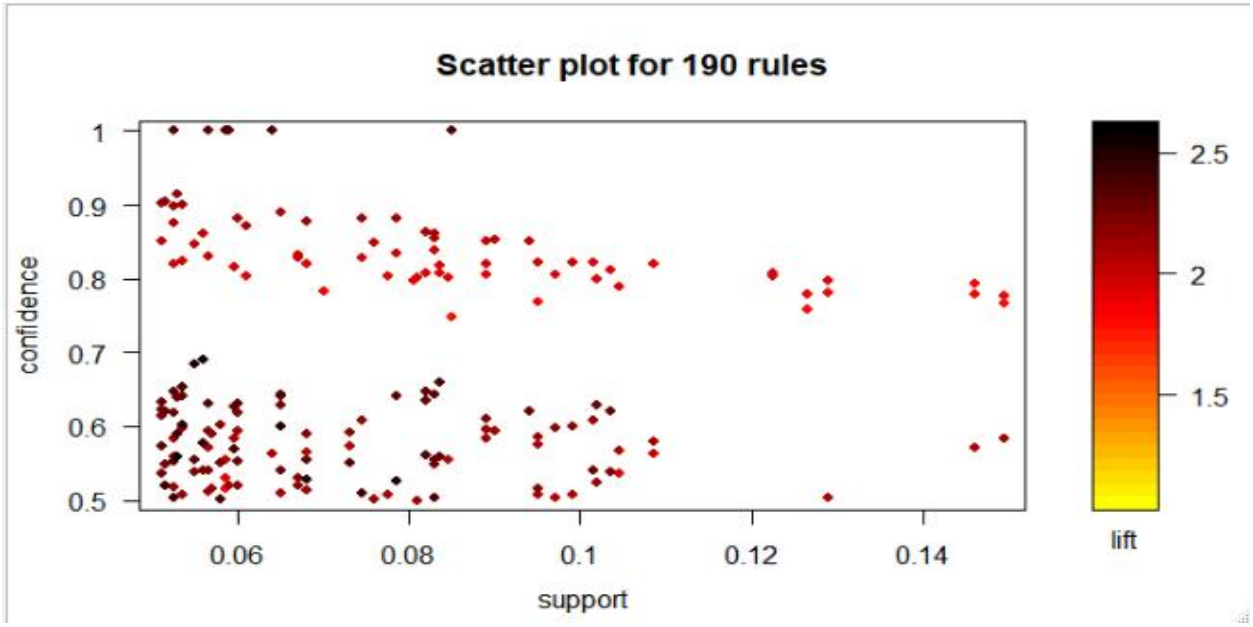
Association Rules

Example- Books Data set

Based on Apriori algorithm with support 0.02 and confidence 0.5 and minimum length as 3 we are getting 190 rules.




```
inspect(head(sort(Brules, by = "lift")))
```

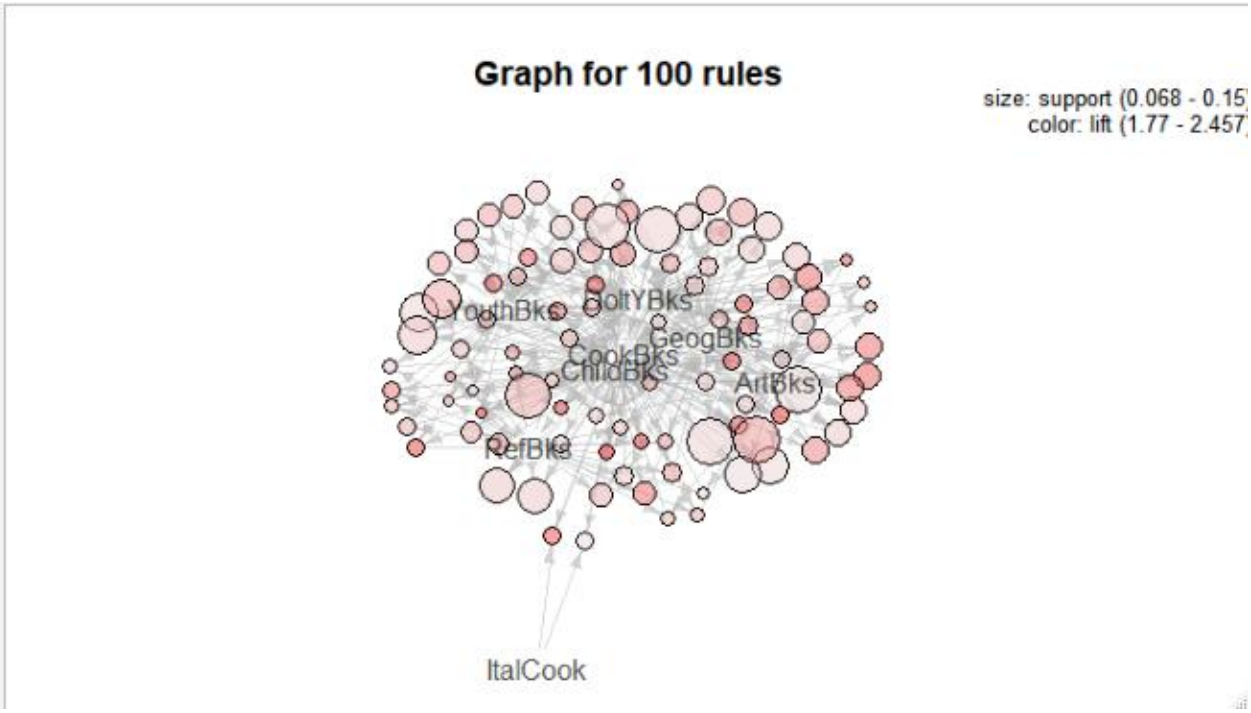
```
    lhs                                    rhs       support confidence lift     count
[1] {ChildBks,YouthBks,DoItYBks}        => {RefBks}  0.0530  0.5578947  2.600908 106
[2] {YouthBks,CookBks,ArtBks}           => {GeogBks} 0.0560  0.6913580  2.504920 112
[3] {ChildBks,CookBks,DoItYBks,GeogBks} => {ArtBks}  0.0535  0.6011236  2.494289 107
[4] {CookBks,DoItYBks,GeogBks}          => {ArtBks}  0.0650  0.5990783  2.485802 130
[5] {ChildBks,YouthBks,ArtBks}          => {GeogBks} 0.0550  0.6832298  2.475470 110
[6] {ChildBks,YouthBks,CookBks}         => {RefBks}  0.0680  0.5271318  2.457491 136
```

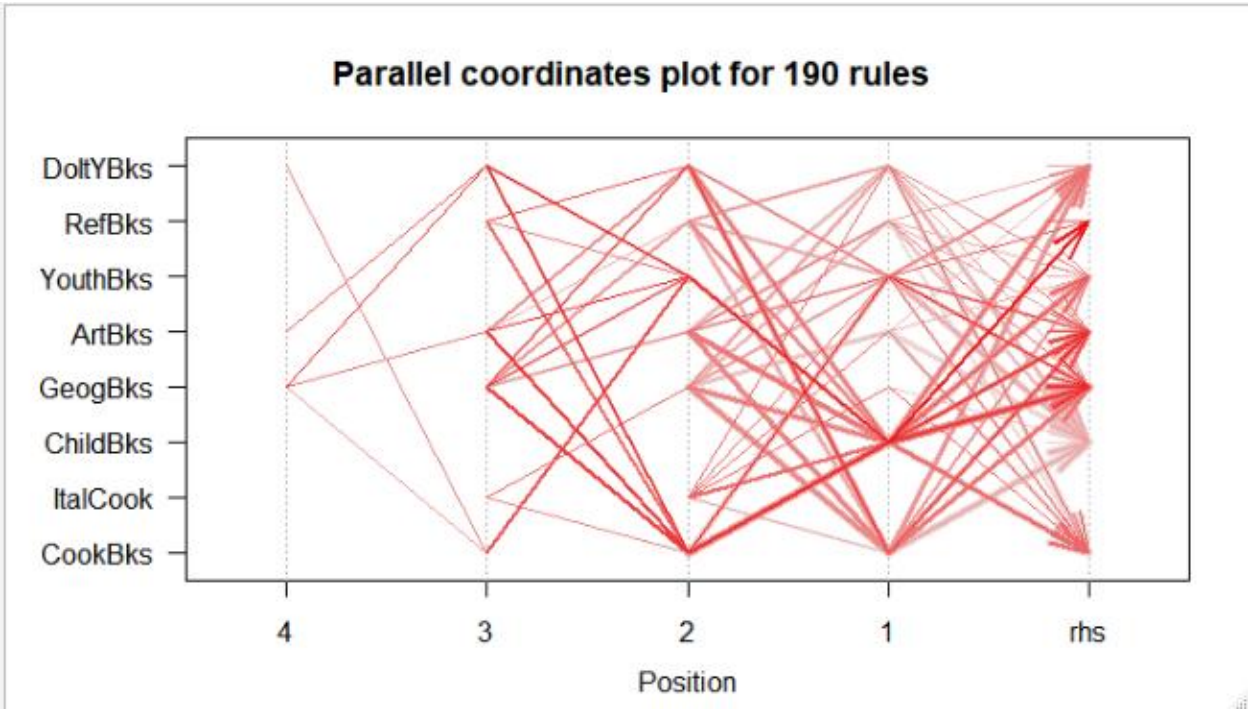
```
> inspect(head(sort(Brules, by = "confidence")))
```

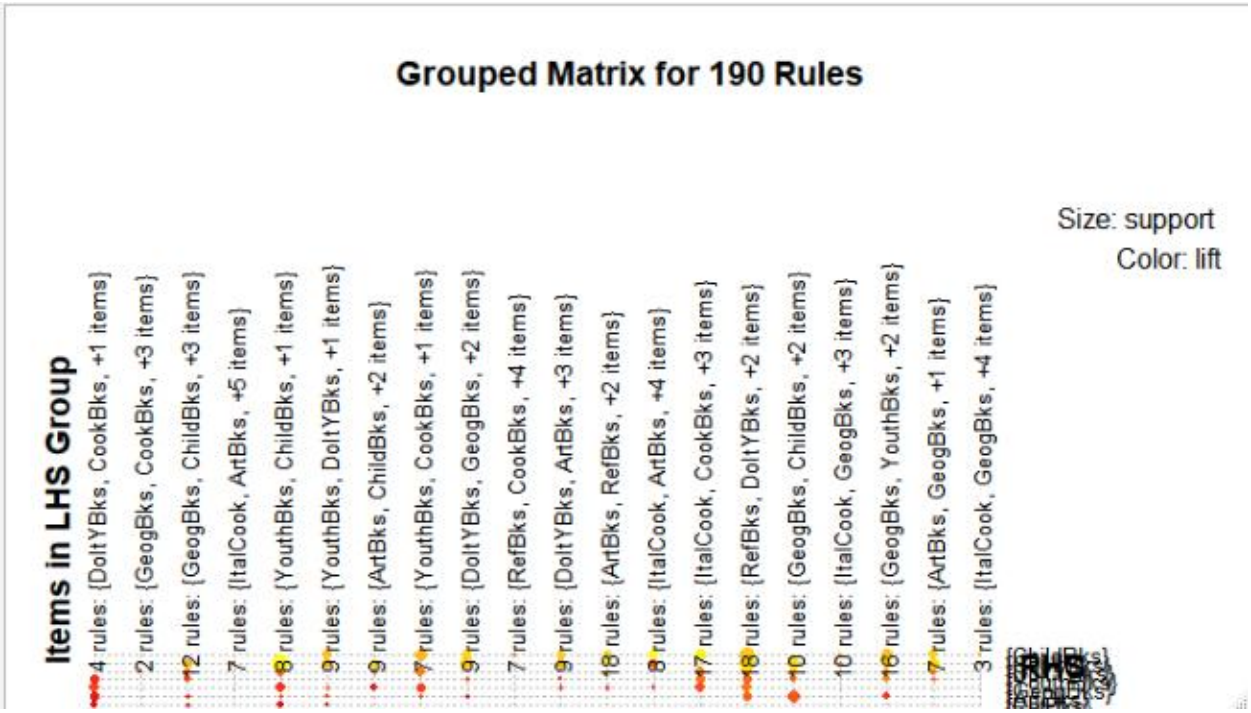
```
    lhs                             rhs       support confidence lift     count
[1] {YouthBks,ItalCook}          => {CookBks} 0.0590  1          2.320186 118
[2] {ArtBks,ItalCook}            => {CookBks} 0.0565  1          2.320186 113
[3] {DoItYBks,ItalCook}          => {CookBks} 0.0585  1          2.320186 117
[4] {GeogBks,ItalCook}           => {CookBks} 0.0640  1          2.320186 128
[5] {ChildBks,ItalCook}          => {CookBks} 0.0850  1          2.320186 170
[6] {ChildBks,GeogBks,ItalCook} => {CookBks} 0.0525  1          2.320186 105
```

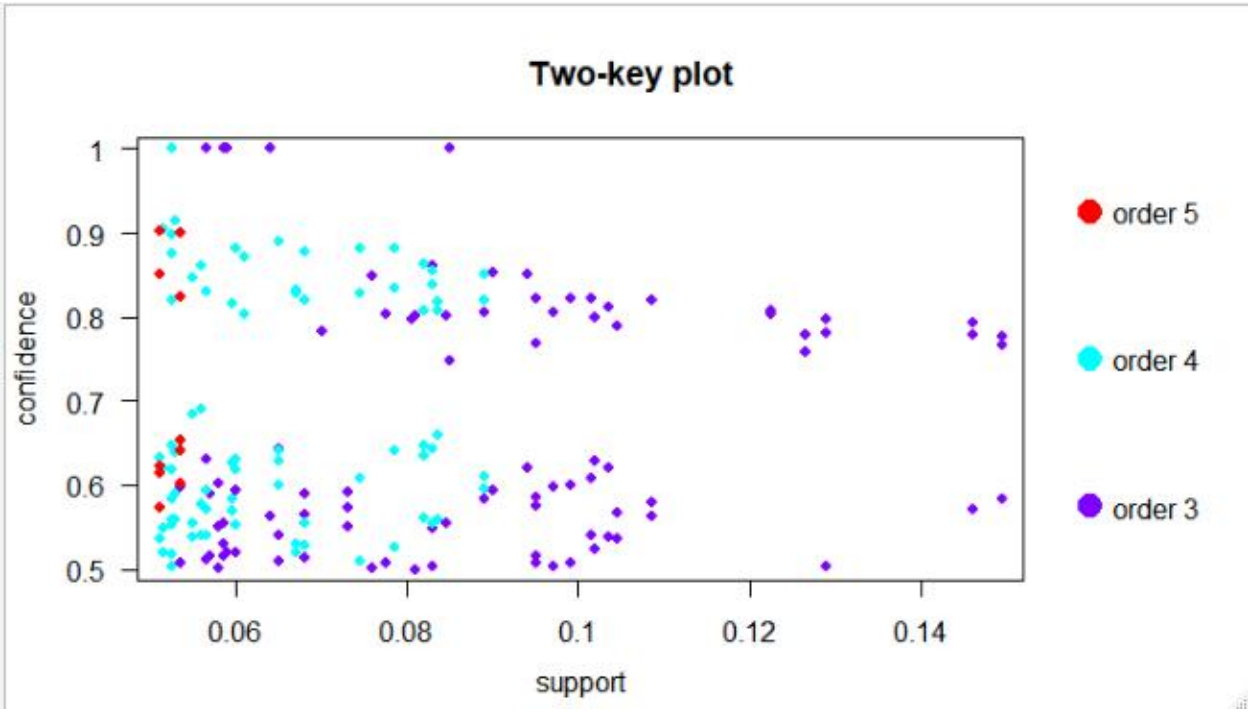
```
> inspect(head(sort(Brules, by = "support")))
```

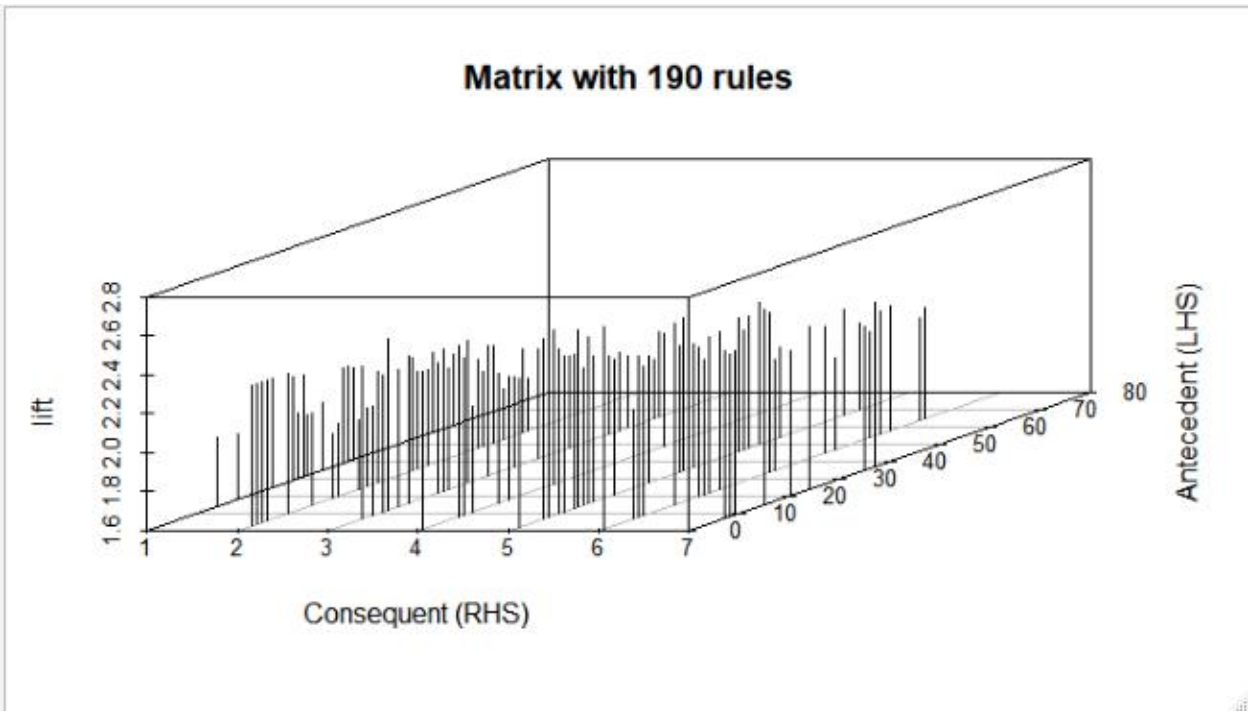
```
    lhs                    rhs         support confidence lift     count
[1] {ChildBks,GeogBks}  => {CookBks}  0.1495  0.7666667  1.778809 299
[2] {CookBks,GeogBks}   => {ChildBks} 0.1495  0.7766234  1.835989 299
[3] {ChildBks,CookBks}  => {GeogBks}  0.1495  0.5839844  2.115885 299
[4] {ChildBks,DoItYBks} => {CookBks}  0.1460  0.7934783  1.841017 292
[5] {CookBks,DoItYBks}  => {ChildBks} 0.1460  0.7786667  1.840820 292
[6] {ChildBks,CookBks}  => {DoItYBks} 0.1460  0.5703125  2.022385 292
```


Graph for 100 rules
size: support (0.068 - 0.15
color: lift (1.77 - 2.457
YouthBks
DoltYBks
GeogBks
CookBks
ChildBks
ArtBks
RefBks
ItalCook


Parallel coordinates plot for 190 rules
DoltYBks
RefBks
YouthBks
ArtBks
GeogBks
ChildBks
ItalCook
CookBks
4
3
2
1
rhs
Position


Grouped Matrix for 190 Rules
Size: support
Color: lift
Items in LHS Group
4 rules: {DoltYBks, CookBks, +1 items}
2 rules: {GeogBks, CookBks, +3 items}
12 rules: {GeogBks, ChildBks, +3 items}
7 rules: {ItalCook, ArtBks, +5 items}
8 rules: {YouthBks, ChildBks, +1 items}
9 rules: {YouthBks, DoltYBks, +1 items}
9 rules: {ArtBks, ChildBks, +2 items}
7 rules: {YouthBks, CookBks, +1 items}
9 rules: {DoltYBks, GeogBks, +2 items}
7 rules: {RefBks, CookBks, +4 items}
9 rules: {DoltYBks, ArtBks, +3 items}
18 rules: {ArtBks, RefBks, +2 items}
8 rules: {ItalCook, ArtBks, +4 items}
17 rules: {ItalCook, CookBks, +3 items}
18 rules: {RefBks, DoltYBks, +2 items}
10 rules: {GeogBks, ChildBks, +2 items}
10 rules: {ItalCook, GeogBks, +3 items}
16 rules: {GeogBks, YouthBks, +2 items}
7 rules: {ArtBks, GeogBks, +1 items}
3 rules: {ItalCook, GeogBks, +4 items}


Two-key plot
confidence
1
0.9
0.8
0.7
0.6
0.5
0.06
0.08
0.1
0.12
0.14
support
order 5
order 4
order 3




```
inspect(Youthrules[1:5])
    lhs                       rhs         support confidence lift     count
[1] {YouthBks,ItalCook} => {CookBks}   0.059   1.0000000  2.320186 118
[2] {CookBks,ItalCook}  => {YouthBks} 0.059   0.5198238  2.100298 118
[3] {YouthBks,RefBks}   => {DoItYBks} 0.058   0.6010363  2.131334 116
[4] {DoItYBks,RefBks}   => {YouthBks} 0.058   0.5497630  2.221265 116
[5] {YouthBks,DoItYBks} => {RefBks}   0.058   0.5021645  2.341093 116
```

Along with YouthBks, people are buying cookBks and RefBks as well.