Module 6 CT Option 2

Shaun Stearns

8/11/2019

R Packages and load data

```
library(arules)
```

```
## Loading required package: Matrix
```

```
## 
## Attaching package: 'arules'
```

```
## The following objects are masked from 'package:base':
## 
##     abbreviate, write
```

```
setwd("~/Desktop/CSU Global Data Analytics/MIS510/BookMaterials/DMBA-R-datasets/")
Cosmetics.df <- read.csv("Cosmetics.csv")
```

Data Exploration

```
#First six rows
head(Cosmetics.df)
```

```
##   Trans. Bag Blush Nail.Polish Brushes Concealer Eyebrow.Pencils Bronzer
## 1      1   0     1           1       1         1               0       1
## 2      2   0     0           1       0         1               0       1
## 3      3   0     1           0       0         1               1       1
## 4      4   0     0           1       1         1               0       1
## 5      5   0     1           0       0         1               0       1
## 6      6   0     0           0       0         1               0       0
##   Lip.liner Mascara Eye.shadow Foundation Lip.Gloss Lipstick Eyeliner
## 1         1       1          0          0         0        0        1
## 2         1       0          0          1         1        0        0
## 3         1       1          1          1         1        1        0
## 4         0       0          0          1         0        0        1
## 5         1       1          1          0         1        1        0
## 6         0       0          0          0         0        0        1
```

```
#Limit decimals to 4 places
options(digits = 4)
#Dimension of the frame
dim(Cosmetics.df)
```

```
## [1] 1000   15
```

```r
#Print the list in a useful column format
t(t(names(Cosmetics.df)))
```

```
##       [,1]
##  [1,] "Trans."
##  [2,] "Bag"
##  [3,] "Blush"
##  [4,] "Nail.Polish"
##  [5,] "Brushes"
##  [6,] "Concealer"
##  [7,] "Eyebrow.Pencils"
##  [8,] "Bronzer"
##  [9,] "Lip.liner"
## [10,] "Mascara"
## [11,] "Eye.shadow"
## [12,] "Foundation"
## [13,] "Lip.Gloss"
## [14,] "Lipstick"
## [15,] "Eyeliner"
```

```r
#Inspect dataset for missing values
data.frame(miss.val=sapply(Cosmetics.df, function(x)
  sum(length(which(is.na(x))))))
```

```
##                  miss.val
## Trans.                  0
## Bag                     0
## Blush                   0
## Nail.Polish             0
## Brushes                 0
## Concealer               0
## Eyebrow.Pencils         0
## Bronzer                 0
## Lip.liner               0
## Mascara                 0
## Eye.shadow              0
## Foundation              0
## Lip.Gloss               0
## Lipstick                0
## Eyeliner                0
```

Convert First Column and Convert to Matrix

```r
Cosmetics.mat <- as.matrix(Cosmetics.df[, -1])
```

Convert Binary into Transactional Database

```
Cosmetics.trans <- as(Cosmetics.mat, "transactions")
inspect(head(Cosmetics.trans), n = 6)
```

```
##     items
## [1] {Blush,
##      Nail.Polish,
##      Brushes,
##      Concealer,
##      Bronzer,
##      Lip.liner,
##      Mascara,
##      Eyeliner}
## [2] {Nail.Polish,
##      Concealer,
##      Bronzer,
##      Lip.liner,
##      Foundation,
##      Lip.Gloss}
## [3] {Blush,
##      Concealer,
##      Eyebrow.Pencils,
##      Bronzer,
##      Lip.liner,
##      Mascara,
##      Eye.shadow,
##      Foundation,
##      Lip.Gloss,
##      Lipstick}
## [4] {Nail.Polish,
##      Brushes,
##      Concealer,
##      Bronzer,
##      Foundation,
##      Eyeliner}
## [5] {Blush,
##      Concealer,
##      Bronzer,
##      Lip.liner,
##      Mascara,
##      Eye.shadow,
##      Lip.Gloss,
##      Lipstick}
## [6] {Concealer,
##      Eyeliner}
```

Get Rules = 0.1 and inspect the first 6 rules

```
rules <- apriori(Cosmetics.trans, parameter = list(supp = 0.1, conf = 0.1,
target = "rules"))
```

```
## Apriori
## 
## Parameter specification:
##  confidence minval smax arem  aval originalSupport maxtime support minlen
##         0.1    0.1    1 none FALSE            TRUE       5     0.1      1
##  maxlen target   ext
##      10  rules FALSE
## 
## Algorithmic control:
##  filter tree heap memopt load sort verbose
##     0.1 TRUE TRUE  FALSE TRUE    2    TRUE
## 
## Absolute minimum support count: 100 
## 
## set item appearances ...[0 item(s)] done [0.00s].
## set transactions ...[14 item(s), 1000 transaction(s)] done [0.00s].
## sorting and recoding items ... [12 item(s)] done [0.00s].
## creating transaction tree ... done [0.00s].
## checking subsets of size 1 2 3 4 done [0.00s].
## writing ... [234 rule(s)] done [0.00s].
## creating S4 object  ... done [0.00s].
```

```
inspect(head(sort(rules, by = "lift"), n = 6))
```

```
##     lhs                             rhs           support confidence lift 
## [1] {Brushes}                    => {Nail.Polish} 0.149   1.0000     3.571
## [2] {Nail.Polish}                => {Brushes}     0.149   0.5321     3.571
## [3] {Blush,Concealer,Eye.shadow} => {Mascara}     0.119   0.9597     2.688
## [4] {Blush,Eye.shadow}           => {Mascara}     0.169   0.9286     2.601
## [5] {Nail.Polish,Eye.shadow}     => {Mascara}     0.119   0.9084     2.545
## [6] {Concealer,Bronzer}          => {Lip.liner}   0.103   0.5886     2.515
##     count
## [1] 149  
## [2] 149  
## [3] 119  
## [4] 169  
## [5] 119  
## [6] 103
```

Get Rules = 0.5 and inspect the first 6 rules

```
rules <- apriori(Cosmetics.trans, parameter = list(supp = 0.1, conf = 0.5,
target = "rules"))
```

```
## Apriori
## 
```

```
## Parameter specification:
##  confidence minval smax arem  aval originalSupport maxtime support minlen
##         0.5    0.1    1 none FALSE            TRUE       5     0.1      1
##  maxlen target   ext
##      10  rules FALSE
##
## Algorithmic control:
##  filter tree heap memopt load sort verbose
##     0.1 TRUE TRUE  FALSE TRUE    2    TRUE
##
## Absolute minimum support count: 100
##
## set item appearances ...[0 item(s)] done [0.00s].
## set transactions ...[14 item(s), 1000 transaction(s)] done [0.00s].
## sorting and recoding items ... [12 item(s)] done [0.00s].
## creating transaction tree ... done [0.00s].
## checking subsets of size 1 2 3 4 done [0.00s].
## writing ... [125 rule(s)] done [0.00s].
## creating S4 object  ... done [0.00s].
```

```
inspect(head(sort(rules, by = "lift"), n = 6))
```

```
##     lhs                             rhs           support confidence lift
## [1] {Brushes}                    => {Nail.Polish} 0.149   1.0000     3.571
## [2] {Nail.Polish}                => {Brushes}     0.149   0.5321     3.571
## [3] {Blush,Concealer,Eye.shadow} => {Mascara}     0.119   0.9597     2.688
## [4] {Blush,Eye.shadow}           => {Mascara}     0.169   0.9286     2.601
## [5] {Nail.Polish,Eye.shadow}     => {Mascara}     0.119   0.9084     2.545
## [6] {Concealer,Bronzer}          => {Lip.liner}   0.103   0.5886     2.515
##     count
## [1] 149
## [2] 149
## [3] 119
## [4] 169
## [5] 119
## [6] 103
```