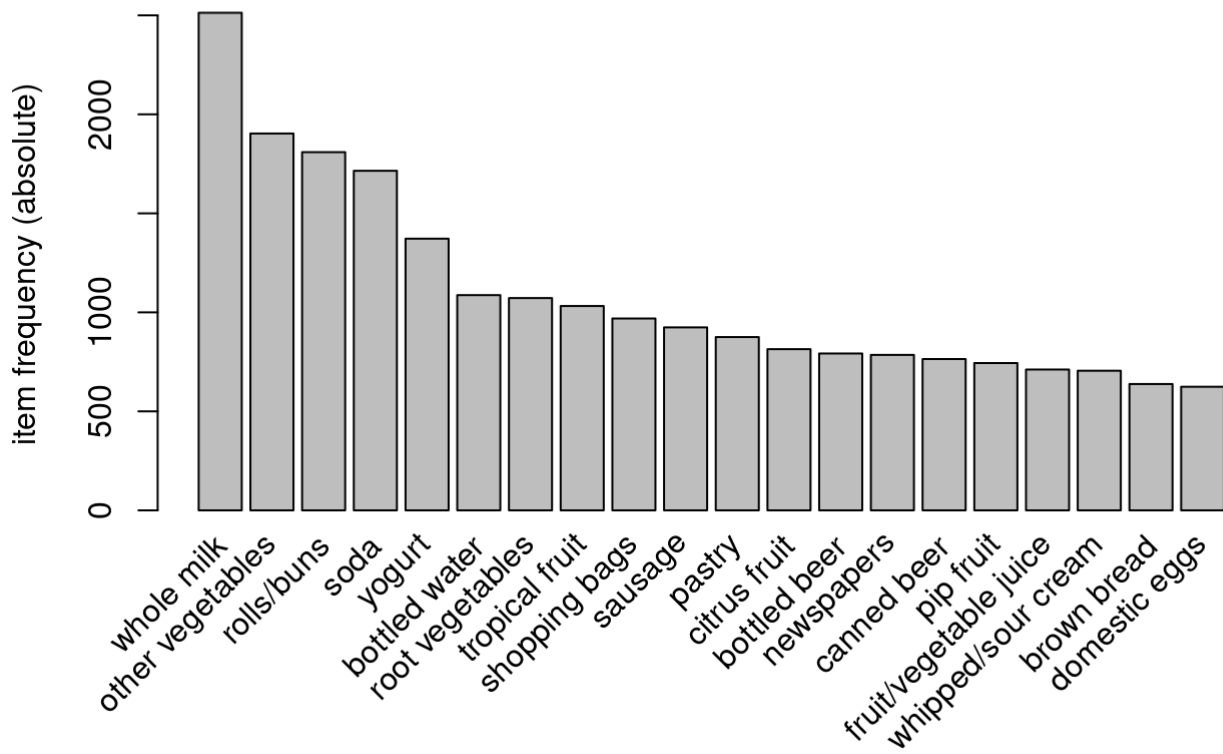# 43260_Groceries.r

rstudio-user

2021-11-23

```
library("arules")
```

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

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

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

```
library("arulesViz")

data("Groceries")

itemFrequencyPlot(Groceries, topN=20, type="absolute")
```

```
association.rules <- apriori(Groceries, parameter = list(supp=0.001, conf=0.9, maxlen
=10))
```

```
## Apriori
##
## Parameter specification:
##  confidence minval smax arem  aval originalSupport maxtime support minlen
##         0.9    0.1    1 none FALSE            TRUE       5   0.001      1
##  maxlen target  ext
##      10  rules TRUE
##
## Algorithmic control:
##  filter tree heap memopt load sort verbose
##     0.1 TRUE TRUE  FALSE TRUE    2    TRUE
##
## Absolute minimum support count: 9
##
## set item appearances ...[0 item(s)] done [0.00s].
## set transactions ...[169 item(s), 9835 transaction(s)] done [0.00s].
## sorting and recoding items ... [157 item(s)] done [0.00s].
## creating transaction tree ... done [0.00s].
## checking subsets of size 1 2 3 4 5 6 done [0.01s].
## writing ... [129 rule(s)] done [0.00s].
## creating S4 object  ... done [0.00s].
```

```
inspect(association.rules)
```

```
##       lhs                              rhs                 support confidence
coverage     lift count
## [1]   {liquor,
##        red/blush wine}        => {bottled beer}   0.001931876  0.9047619 0.0
02135231 11.235269     19
## [2]   {curd,
##        cereals}               => {whole milk}     0.001016777  0.9090909 0.0
01118454  3.557863     10
## [3]   {soups,
##        bottled beer}          => {whole milk}     0.001118454  0.9166667 0.0
01220132  3.587512     11
## [4]   {whipped/sour cream,
##        house keeping products} => {whole milk}    0.001220132  0.9230769 0.0
01321810  3.612599     12
## [5]   {pastry,
##        sweet spreads}         => {whole milk}     0.001016777  0.9090909 0.0
01118454  3.557863     10
## [6]   {rice,
##        sugar}                 => {whole milk}     0.001220132  1.0000000 0.0
01220132  3.913649     12
## [7]   {rice,
##        bottled water}         => {whole milk}     0.001220132  0.9230769 0.0
01321810  3.612599     12
## [8]   {canned fish,
##        hygiene articles}      => {whole milk}     0.001118454  1.0000000 0.0
01118454  3.913649     11
## [9]   {grapes,
##        onions}                => {other vegetables} 0.001118454  0.9166667 0.0
01220132  4.737476     11
## [10]  {hard cheese,
##        oil}                   => {other vegetables} 0.001118454  0.9166667 0.0
01220132  4.737476     11
## [11]  {root vegetables,
##        butter,
##        rice}                  => {whole milk}     0.001016777  1.0000000 0.0
01016777  3.913649     10
## [12]  {herbs,
##        whole milk,
##        fruit/vegetable juice} => {other vegetables} 0.001016777  0.9090909 0.0
01118454  4.698323     10
## [13]  {citrus fruit,
##        tropical fruit,
##        herbs}                 => {whole milk}     0.001118454  0.9166667 0.0
01220132  3.587512     11
## [14]  {root vegetables,
##        whipped/sour cream,
##        flour}                 => {whole milk}     0.001728521  1.0000000 0.0
01728521  3.913649     17
## [15]  {butter,
##        soft cheese,
##        domestic eggs}         => {whole milk}     0.001016777  1.0000000 0.0
01016777  3.913649     10
## [16]  {tropical fruit,
##        whipped/sour cream,
##        soft cheese}           => {other vegetables} 0.001220132  0.9230769 0.0
01321810  4.770605     12
## [17]  {root vegetables,
```

```
##          whipped/sour cream,
##          soft cheese}              => {whole milk}        0.001220132 0.9230769 0.0
01321810  3.612599    12
## [18]  {citrus fruit,
##          root vegetables,
##          soft cheese}              => {other vegetables} 0.001016777 1.0000000 0.0
01016777  5.168156    10
## [19]  {frankfurter,
##          tropical fruit,
##          frozen meals}             => {other vegetables} 0.001016777 0.9090909 0.0
01118454  4.698323    10
## [20]  {frankfurter,
##          tropical fruit,
##          frozen meals}             => {whole milk}        0.001016777 0.9090909 0.0
01118454  3.557863    10
## [21]  {tropical fruit,
##          butter,
##          frozen meals}             => {whole milk}        0.001016777 0.9090909 0.0
01118454  3.557863    10
## [22]  {tropical fruit,
##          whipped/sour cream,
##          hard cheese}              => {other vegetables} 0.001016777 0.9090909 0.0
01118454  4.698323    10
## [23]  {pork,
##          whole milk,
##          butter milk}              => {other vegetables} 0.001016777 0.9090909 0.0
01118454  4.698323    10
## [24]  {pip fruit,
##          butter milk,
##          fruit/vegetable juice}    => {other vegetables} 0.001016777 0.9090909 0.0
01118454  4.698323    10
## [25]  {frankfurter,
##          root vegetables,
##          sliced cheese}            => {whole milk}        0.001016777 0.9090909 0.0
01118454  3.557863    10
## [26]  {butter,
##          whipped/sour cream,
##          sliced cheese}            => {whole milk}        0.001220132 0.9230769 0.0
01321810  3.612599    12
## [27]  {yogurt,
##          oil,
##          coffee}                   => {other vegetables} 0.001016777 0.9090909 0.0
01118454  4.698323    10
## [28]  {root vegetables,
##          onions,
##          napkins}                  => {other vegetables} 0.001016777 0.9090909 0.0
01118454  4.698323    10
## [29]  {sausage,
##          berries,
##          butter}                   => {whole milk}        0.001016777 0.9090909 0.0
01118454  3.557863    10
## [30]  {hamburger meat,
##          tropical fruit,
##          whipped/sour cream}       => {other vegetables} 0.001016777 0.9090909 0.0
01118454  4.698323    10
## [31]  {butter,
##          hygiene articles,
##          napkins}                  => {whole milk}        0.001016777 0.9090909 0.0
```

```
01118454  3.557863      10
## [32]  {pip fruit,
##        butter,
##        hygiene articles}        => {whole milk}        0.001016777  1.0000000 0.0
01016777  3.913649      10
## [33]  {tropical fruit,
##        butter,
##        hygiene articles}        => {whole milk}        0.001220132  0.9230769 0.0
01321810  3.612599      12
## [34]  {tropical fruit,
##        domestic eggs,
##        hygiene articles}        => {whole milk}        0.001220132  0.9230769 0.0
01321810  3.612599      12
## [35]  {root vegetables,
##        whipped/sour cream,
##        hygiene articles}        => {whole milk}        0.001016777  1.0000000 0.0
01016777  3.913649      10
## [36]  {pip fruit,
##        root vegetables,
##        hygiene articles}        => {whole milk}        0.001016777  1.0000000 0.0
01016777  3.913649      10
## [37]  {cream cheese ,
##        domestic eggs,
##        sugar}                   => {whole milk}        0.001118454  1.0000000 0.0
01118454  3.913649      11
## [38]  {other vegetables,
##        cream cheese ,
##        sugar}                   => {whole milk}        0.001525165  0.9375000 0.0
01626843  3.669046      15
## [39]  {curd,
##        domestic eggs,
##        sugar}                   => {whole milk}        0.001016777  1.0000000 0.0
01016777  3.913649      10
## [40]  {citrus fruit,
##        domestic eggs,
##        sugar}                   => {whole milk}        0.001423488  0.9333333 0.0
01525165  3.652739      14
## [41]  {tropical fruit,
##        domestic eggs,
##        sugar}                   => {whole milk}        0.001118454  0.9166667 0.0
01220132  3.587512      11
## [42]  {yogurt,
##        domestic eggs,
##        sugar}                   => {whole milk}        0.001423488  0.9333333 0.0
01525165  3.652739      14
## [43]  {root vegetables,
##        whipped/sour cream,
##        sugar}                   => {whole milk}        0.001220132  0.9230769 0.0
01321810  3.612599      12
## [44]  {pork,
##        rolls/buns,
##        waffles}                 => {whole milk}        0.001016777  0.9090909 0.0
01118454  3.557863      10
## [45]  {whipped/sour cream,
##        long life bakery product,
##        napkins}                 => {whole milk}        0.001016777  0.9090909 0.0
01118454  3.557863      10
## [46]  {tropical fruit,
```

```
##       long life bakery product,
##       napkins}                      => {whole milk}       0.001220132 0.9230769 0.0
01321810  3.612599     12
## [47] {sausage,
##       butter,
##       long life bakery product} => {whole milk}       0.001016777 0.9090909 0.0
01118454  3.557863     10
## [48] {tropical fruit,
##       dessert,
##       whipped/sour cream}       => {other vegetables} 0.001118454 0.9166667 0.0
01220132  4.737476     11
## [49] {cream cheese ,
##       domestic eggs,
##       napkins}                      => {whole milk}       0.001118454 1.0000000 0.0
01118454  3.913649     11
## [50] {root vegetables,
##       butter,
##       cream cheese }            => {yogurt}          0.001016777 0.9090909 0.0
01118454  6.516698     10
## [51] {root vegetables,
##       butter,
##       cream cheese }            => {whole milk}       0.001016777 0.9090909 0.0
01118454  3.557863     10
## [52] {pip fruit,
##       whipped/sour cream,
##       cream cheese }            => {whole milk}       0.001321810 0.9285714 0.0
01423488  3.634103     13
## [53] {sausage,
##       pip fruit,
##       cream cheese }            => {whole milk}       0.001016777 0.9090909 0.0
01118454  3.557863     10
## [54] {citrus fruit,
##       root vegetables,
##       cream cheese }            => {other vegetables} 0.001220132 0.9230769 0.0
01321810  4.770605     12
## [55] {root vegetables,
##       butter,
##       white bread}              => {whole milk}       0.001118454 0.9166667 0.0
01220132  3.587512     11
## [56] {butter,
##       whipped/sour cream,
##       coffee}                   => {whole milk}       0.001220132 0.9230769 0.0
01321810  3.612599     12
## [57] {root vegetables,
##       domestic eggs,
##       coffee}                   => {whole milk}       0.001016777 0.9090909 0.0
01118454  3.557863     10
## [58] {butter,
##       curd,
##       domestic eggs}            => {whole milk}       0.001118454 0.9166667 0.0
01220132  3.587512     11
## [59] {citrus fruit,
##       butter,
##       curd}                     => {whole milk}       0.001118454 0.9166667 0.0
01220132  3.587512     11
## [60] {domestic eggs,
##       margarine,
##       bottled beer}             => {whole milk}       0.001016777 0.9090909 0.0
```

```
01118454  3.557863    10
## [61]  {pip fruit,
##        whipped/sour cream,
##        brown bread}                => {other vegetables} 0.001118454  1.0000000 0.0
01118454  5.168156    11
## [62]  {domestic eggs,
##        margarine,
##        fruit/vegetable juice}      => {whole milk}       0.001118454  0.9166667 0.0
01220132  3.587512    11
## [63]  {pip fruit,
##        butter,
##        whipped/sour cream}         => {whole milk}       0.001830198  0.9000000 0.0
02033554  3.522284    18
## [64]  {butter,
##        whipped/sour cream,
##        soda}                       => {other vegetables} 0.001321810  0.9285714 0.0
01423488  4.799002    13
## [65]  {pip fruit,
##        butter,
##        pastry}                     => {other vegetables} 0.001321810  0.9285714 0.0
01423488  4.799002    13
## [66]  {tropical fruit,
##        whipped/sour cream,
##        domestic eggs}              => {whole milk}       0.001830198  0.9000000 0.0
02033554  3.522284    18
## [67]  {tropical fruit,
##        whipped/sour cream,
##        fruit/vegetable juice}      => {other vegetables} 0.001931876  0.9047619 0.0
02135231  4.675950    19
## [68]  {root vegetables,
##        other vegetables,
##        yogurt,
##        rice}                       => {whole milk}       0.001321810  0.9285714 0.0
01423488  3.634103    13
## [69]  {root vegetables,
##        whole milk,
##        yogurt,
##        rice}                       => {other vegetables} 0.001321810  0.9285714 0.0
01423488  4.799002    13
## [70]  {tropical fruit,
##        root vegetables,
##        herbs,
##        other vegetables}           => {whole milk}       0.001016777  0.9090909 0.0
01118454  3.557863    10
## [71]  {tropical fruit,
##        grapes,
##        whole milk,
##        yogurt}                     => {other vegetables} 0.001016777  1.0000000 0.0
01016777  5.168156    10
## [72]  {tropical fruit,
##        pip fruit,
##        yogurt,
##        frozen meals}               => {whole milk}       0.001016777  0.9090909 0.0
01118454  3.557863    10
## [73]  {root vegetables,
##        other vegetables,
##        yogurt,
##        hard cheese}                => {whole milk}       0.001220132  0.9230769 0.0
```

```
01321810  3.612599     12
## [74]  {ham,
##        tropical fruit,
##        pip fruit,
##        yogurt}                     => {other vegetables} 0.001016777  1.0000000 0.0
01016777  5.168156     10
## [75]  {ham,
##        tropical fruit,
##        pip fruit,
##        whole milk}                 => {other vegetables} 0.001118454  1.0000000 0.0
01118454  5.168156     11
## [76]  {tropical fruit,
##        butter,
##        yogurt,
##        sliced cheese}              => {whole milk}       0.001016777  0.9090909 0.0
01118454  3.557863     10
## [77]  {tropical fruit,
##        whole milk,
##        butter,
##        sliced cheese}              => {yogurt}           0.001016777  0.9090909 0.0
01118454  6.516698     10
## [78]  {tropical fruit,
##        root vegetables,
##        yogurt,
##        oil}                        => {other vegetables} 0.001016777  0.9090909 0.0
01118454  4.698323     10
## [79]  {tropical fruit,
##        root vegetables,
##        yogurt,
##        oil}                        => {whole milk}       0.001118454  1.0000000 0.0
01118454  3.913649     11
## [80]  {root vegetables,
##        other vegetables,
##        yogurt,
##        oil}                        => {whole milk}       0.001423488  1.0000000 0.0
01423488  3.913649     14
## [81]  {root vegetables,
##        whole milk,
##        yogurt,
##        oil}                        => {other vegetables} 0.001423488  0.9333333 0.0
01525165  4.823612     14
## [82]  {root vegetables,
##        other vegetables,
##        yogurt,
##        waffles}                    => {whole milk}       0.001016777  0.9090909 0.0
01118454  3.557863     10
## [83]  {other vegetables,
##        curd,
##        whipped/sour cream,
##        cream cheese }              => {yogurt}           0.001016777  0.9090909 0.0
01118454  6.516698     10
## [84]  {citrus fruit,
##        whole milk,
##        whipped/sour cream,
##        cream cheese }              => {other vegetables} 0.001118454  0.9166667 0.0
01220132  4.737476     11
## [85]  {pip fruit,
##        root vegetables,
```

```
##        other vegetables,
##        cream cheese }              => {whole milk}        0.001016777  0.9090909 0.0
01118454  3.557863     10
## [86]  {pip fruit,
##        other vegetables,
##        yogurt,
##        cream cheese }              => {whole milk}        0.001118454  0.9166667 0.0
01220132  3.587512     11
## [87]  {tropical fruit,
##        butter,
##        yogurt,
##        white bread}               => {other vegetables} 0.001016777  0.9090909 0.0
01118454  4.698323     10
## [88]  {tropical fruit,
##        other vegetables,
##        butter,
##        white bread}               => {yogurt}           0.001016777  0.9090909 0.0
01118454  6.516698     10
## [89]  {root vegetables,
##        other vegetables,
##        butter,
##        white bread}               => {whole milk}        0.001016777  1.0000000 0.0
01016777  3.913649     10
## [90]  {root vegetables,
##        whole milk,
##        butter,
##        white bread}               => {other vegetables} 0.001016777  0.9090909 0.0
01118454  4.698323     10
## [91]  {citrus fruit,
##        other vegetables,
##        yogurt,
##        frozen vegetables}         => {whole milk}        0.001016777  0.9090909 0.0
01118454  3.557863     10
## [92]  {beef,
##        tropical fruit,
##        yogurt,
##        rolls/buns}                => {whole milk}        0.001321810  0.9285714 0.0
01423488  3.634103     13
## [93]  {tropical fruit,
##        curd,
##        yogurt,
##        domestic eggs}             => {whole milk}        0.001118454  0.9166667 0.0
01220132  3.587512     11
## [94]  {citrus fruit,
##        tropical fruit,
##        curd,
##        yogurt}                    => {whole milk}        0.001016777  0.9090909 0.0
01118454  3.557863     10
## [95]  {other vegetables,
##        butter,
##        whipped/sour cream,
##        napkins}                   => {whole milk}        0.001016777  0.9090909 0.0
01118454  3.557863     10
## [96]  {pork,
##        other vegetables,
##        butter,
##        whipped/sour cream}        => {whole milk}        0.001016777  1.0000000 0.0
01016777  3.913649     10
```

```
## [97]  {pork,
##        root vegetables,
##        other vegetables,
##        butter}                      => {whole milk}      0.001016777  0.9090909 0.0
01118454  3.557863     10
## [98]  {frankfurter,
##        tropical fruit,
##        root vegetables,
##        yogurt}                      => {whole milk}      0.001220132  0.9230769 0.0
01321810  3.612599     12
## [99]  {pip fruit,
##        root vegetables,
##        other vegetables,
##        brown bread}                 => {whole milk}      0.001220132  0.9230769 0.0
01321810  3.612599     12
## [100] {root vegetables,
##        other vegetables,
##        rolls/buns,
##        brown bread}                 => {whole milk}      0.001016777  0.9090909 0.0
01118454  3.557863     10
## [101] {other vegetables,
##        butter,
##        whipped/sour cream,
##        domestic eggs}               => {whole milk}      0.001220132  1.0000000 0.0
01220132  3.913649     12
## [102] {tropical fruit,
##        butter,
##        yogurt,
##        domestic eggs}               => {whole milk}      0.001220132  0.9230769 0.0
01321810  3.612599     12
## [103] {root vegetables,
##        butter,
##        yogurt,
##        domestic eggs}               => {whole milk}      0.001118454  0.9166667 0.0
01220132  3.587512     11
## [104] {tropical fruit,
##        butter,
##        whipped/sour cream,
##        fruit/vegetable juice}       => {other vegetables} 0.001016777  1.0000000 0.0
01016777  5.168156     10
## [105] {whole milk,
##        butter,
##        whipped/sour cream,
##        soda}                        => {other vegetables} 0.001016777  0.9090909 0.0
01118454  4.698323     10
## [106] {citrus fruit,
##        other vegetables,
##        butter,
##        bottled water}               => {whole milk}      0.001016777  0.9090909 0.0
01118454  3.557863     10
## [107] {whole milk,
##        rolls/buns,
##        soda,
##        newspapers}                  => {other vegetables} 0.001016777  1.0000000 0.0
01016777  5.168156     10
## [108] {pip fruit,
##        other vegetables,
##        whipped/sour cream,
```

```
##         domestic eggs}            => {whole milk}        0.001220132  0.9230769 0.0
01321810  3.612599     12
## [109] {citrus fruit,
##        whole milk,
##        whipped/sour cream,
##        domestic eggs}            => {other vegetables} 0.001220132  0.9230769 0.0
01321810  4.770605     12
## [110] {tropical fruit,
##        yogurt,
##        whipped/sour cream,
##        domestic eggs}            => {whole milk}        0.001118454  0.9166667 0.0
01220132  3.587512     11
## [111] {tropical fruit,
##        other vegetables,
##        whipped/sour cream,
##        domestic eggs}            => {whole milk}        0.001118454  0.9166667 0.0
01220132  3.587512     11
## [112] {citrus fruit,
##        tropical fruit,
##        other vegetables,
##        domestic eggs}            => {whole milk}        0.001016777  0.9090909 0.0
01118454  3.557863     10
## [113] {tropical fruit,
##        yogurt,
##        whipped/sour cream,
##        fruit/vegetable juice}    => {other vegetables} 0.001118454  0.9166667 0.0
01220132  4.737476     11
## [114] {tropical fruit,
##        whole milk,
##        whipped/sour cream,
##        fruit/vegetable juice}    => {other vegetables} 0.001016777  0.9090909 0.0
01118454  4.698323     10
## [115] {pip fruit,
##        root vegetables,
##        yogurt,
##        fruit/vegetable juice}    => {whole milk}        0.001118454  0.9166667 0.0
01220132  3.587512     11
## [116] {citrus fruit,
##        other vegetables,
##        soda,
##        fruit/vegetable juice}    => {root vegetables}  0.001016777  0.9090909 0.0
01118454  8.340400     10
## [117] {citrus fruit,
##        whipped/sour cream,
##        rolls/buns,
##        pastry}                   => {whole milk}        0.001016777  1.0000000 0.0
01016777  3.913649     10
## [118] {citrus fruit,
##        tropical fruit,
##        root vegetables,
##        whipped/sour cream}       => {other vegetables} 0.001220132  1.0000000 0.0
01220132  5.168156     12
## [119] {pip fruit,
##        root vegetables,
##        other vegetables,
##        bottled water}            => {whole milk}        0.001118454  1.0000000 0.0
01118454  3.913649     11
## [120] {tropical fruit,
```

```
##       root vegetables,
##       yogurt,
##       pastry}                  => {whole milk}       0.001016777  0.9090909 0.0
01118454  3.557863     10
## [121] {sausage,
##       tropical fruit,
##       root vegetables,
##       yogurt}                  => {whole milk}       0.001525165  0.9375000 0.0
01626843  3.669046     15
## [122] {sausage,
##       tropical fruit,
##       root vegetables,
##       rolls/buns}              => {whole milk}       0.001016777  1.0000000 0.0
01016777  3.913649     10
## [123] {tropical fruit,
##       root vegetables,
##       rolls/buns,
##       bottled water}           => {whole milk}       0.001118454  0.9166667 0.0
01220132  3.587512     11
## [124] {tropical fruit,
##       root vegetables,
##       other vegetables,
##       yogurt,
##       oil}                     => {whole milk}       0.001016777  1.0000000 0.0
01016777  3.913649     10
## [125] {tropical fruit,
##       root vegetables,
##       whole milk,
##       yogurt,
##       oil}                     => {other vegetables} 0.001016777  0.9090909 0.0
01118454  4.698323     10
## [126] {tropical fruit,
##       other vegetables,
##       whole milk,
##       yogurt,
##       oil}                     => {root vegetables}  0.001016777  0.9090909 0.0
01118454  8.340400     10
## [127] {tropical fruit,
##       other vegetables,
##       butter,
##       yogurt,
##       domestic eggs}           => {whole milk}       0.001016777  0.9090909 0.0
01118454  3.557863     10
## [128] {citrus fruit,
##       root vegetables,
##       whole milk,
##       yogurt,
##       whipped/sour cream}      => {other vegetables} 0.001016777  0.9090909 0.0
01118454  4.698323     10
## [129] {citrus fruit,
##       tropical fruit,
##       root vegetables,
##       whole milk,
##       yogurt}                  => {other vegetables} 0.001423488  0.9333333 0.0
01525165  4.823612     14
```

```
inspect(head(sort(association.rules, by=c("conf", "supp"))))
```

```
##        lhs                       rhs                   support confidence    coverage
lift count
## [1] {root vegetables,
##      whipped/sour cream,
##      flour}                  => {whole milk}      0.001728521          1 0.001728521
3.913649    17
## [2] {root vegetables,
##      other vegetables,
##      yogurt,
##      oil}                    => {whole milk}      0.001423488          1 0.001423488
3.913649    14
## [3] {rice,
##      sugar}                  => {whole milk}      0.001220132          1 0.001220132
3.913649    12
## [4] {other vegetables,
##      butter,
##      whipped/sour cream,
##      domestic eggs}          => {whole milk}      0.001220132          1 0.001220132
3.913649    12
## [5] {citrus fruit,
##      tropical fruit,
##      root vegetables,
##      whipped/sour cream}  => {other vegetables} 0.001220132          1 0.001220132
5.168156    12
## [6] {canned fish,
##      hygiene articles}    => {whole milk}        0.001118454          1 0.001118454
3.913649    11
```

```
shorter.association.rules <- apriori(Groceries, parameter = list(supp=0.001, conf=0.8
, maxlen=3))
```

```
## Apriori
##
## Parameter specification:
##  confidence minval smax arem  aval originalSupport maxtime support minlen
##         0.8    0.1    1 none FALSE            TRUE       5   0.001      1
##  maxlen target   ext
##       3  rules TRUE
##
## Algorithmic control:
##  filter tree heap memopt load sort verbose
##     0.1 TRUE TRUE  FALSE TRUE    2    TRUE
##
## Absolute minimum support count: 9
##
## set item appearances ...[0 item(s)] done [0.00s].
## set transactions ...[169 item(s), 9835 transaction(s)] done [0.00s].
## sorting and recoding items ... [157 item(s)] done [0.00s].
## creating transaction tree ... done [0.00s].
## checking subsets of size 1 2 3
```

```
## Warning in apriori(Groceries, parameter = list(supp = 0.001, conf = 0.8, :
## Mining stopped (maxlen reached). Only patterns up to a length of 3 returned!
```

```
##   done [0.00s].
## writing ... [29 rule(s)] done [0.00s].
## creating S4 object  ... done [0.00s].
```

```
inspect(shorter.association.rules)
```

```
##         lhs                        rhs               support confidence    cove
rage      lift count
## [1]  {liquor,
##         red/blush wine}          => {bottled beer}      0.001931876  0.9047619 0.00213
5231 11.235269     19
## [2]  {curd,
##         cereals}                 => {whole milk}        0.001016777  0.9090909 0.00111
8454  3.557863     10
## [3]  {yogurt,
##         cereals}                 => {whole milk}        0.001728521  0.8095238 0.00213
5231  3.168192     17
## [4]  {butter,
##         jam}                     => {whole milk}        0.001016777  0.8333333 0.00122
0132  3.261374     10
## [5]  {soups,
##         bottled beer}            => {whole milk}        0.001118454  0.9166667 0.00122
0132  3.587512     11
## [6]  {napkins,
##         house keeping products}  => {whole milk}        0.001321810  0.8125000 0.00162
6843  3.179840     13
## [7]  {whipped/sour cream,
##         house keeping products}  => {whole milk}        0.001220132  0.9230769 0.00132
1810  3.612599     12
## [8]  {pastry,
##         sweet spreads}           => {whole milk}        0.001016777  0.9090909 0.00111
8454  3.557863     10
## [9]  {turkey,
##         curd}                    => {other vegetables} 0.001220132  0.8000000 0.00152
5165  4.134524     12
## [10] {rice,
##         sugar}                   => {whole milk}        0.001220132  1.0000000 0.00122
0132  3.913649     12
## [11] {butter,
##         rice}                    => {whole milk}        0.001525165  0.8333333 0.00183
0198  3.261374     15
## [12] {domestic eggs,
##         rice}                    => {whole milk}        0.001118454  0.8461538 0.00132
1810  3.311549     11
## [13] {rice,
##         bottled water}           => {whole milk}        0.001220132  0.9230769 0.00132
1810  3.612599     12
## [14] {yogurt,
##         rice}                    => {other vegetables} 0.001931876  0.8260870 0.00233
8587  4.269346     19
## [15] {oil,
##         mustard}                 => {whole milk}        0.001220132  0.8571429 0.00142
3488  3.354556     12
## [16] {canned fish,
##         hygiene articles}        => {whole milk}        0.001118454  1.0000000 0.00111
8454  3.913649     11
## [17] {herbs,
##         fruit/vegetable juice}   => {other vegetables} 0.001220132  0.8000000 0.00152
5165  4.134524     12
## [18] {herbs,
##         shopping bags}           => {other vegetables} 0.001931876  0.8260870 0.00233
8587  4.269346     19
## [19] {tropical fruit,
```

```
##         herbs}                      => {whole milk}         0.002338587  0.8214286 0.00284
6975  3.214783     23
## [20] {herbs,
##         rolls/buns}                 => {whole milk}         0.002440264  0.8000000 0.00305
0330  3.130919     24
## [21] {pickled vegetables,
##         chocolate}                  => {whole milk}         0.001220132  0.8571429 0.00142
3488  3.354556     12
## [22] {grapes,
##         onions}                     => {other vegetables} 0.001118454  0.9166667 0.00122
0132  4.737476     11
## [23] {meat,
##         margarine}                  => {other vegetables} 0.001728521  0.8500000 0.00203
3554  4.392932     17
## [24] {hard cheese,
##         oil}                        => {other vegetables} 0.001118454  0.9166667 0.00122
0132  4.737476     11
## [25] {onions,
##         butter milk}                => {other vegetables} 0.001321810  0.8125000 0.00162
6843  4.199126     13
## [26] {pork,
##         butter milk}                => {other vegetables} 0.001830198  0.8571429 0.00213
5231  4.429848     18
## [27] {onions,
##         waffles}                    => {other vegetables} 0.001220132  0.8000000 0.00152
5165  4.134524     12
## [28] {hamburger meat,
##         curd}                       => {whole milk}         0.002541942  0.8064516 0.00315
2008  3.156169     25
## [29] {hamburger meat,
##         bottled beer}               => {whole milk}         0.001728521  0.8095238 0.00213
5231  3.168192     17
```

```
milk.association.rules <- apriori(Groceries, parameter = list(supp=0.001, conf=0.9),
  appearance = list(default='lhs', rhs='whole milk'))
```

```
## Apriori
##
## Parameter specification:
##  confidence minval smax arem  aval originalSupport maxtime support minlen
##         0.9    0.1    1 none FALSE            TRUE       5   0.001      1
##  maxlen target  ext
##      10  rules TRUE
##
## Algorithmic control:
##  filter tree heap memopt load sort verbose
##     0.1 TRUE TRUE  FALSE TRUE    2    TRUE
##
## Absolute minimum support count: 9
##
## set item appearances ...[1 item(s)] done [0.00s].
## set transactions ...[169 item(s), 9835 transaction(s)] done [0.00s].
## sorting and recoding items ... [157 item(s)] done [0.00s].
## creating transaction tree ... done [0.00s].
## checking subsets of size 1 2 3 4 5 6 done [0.01s].
## writing ... [85 rule(s)] done [0.00s].
## creating S4 object  ... done [0.00s].
```

```
inspect(milk.association.rules)
```

```
##       lhs                          rhs              support confidence  coverag
e    lift count
## [1]  {curd,
##       cereals}                  => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863   10
## [2]  {soups,
##       bottled beer}             => {whole milk} 0.001118454  0.9166667 0.00122013
2 3.587512   11
## [3]  {whipped/sour cream,
##       house keeping products}   => {whole milk} 0.001220132  0.9230769 0.00132181
0 3.612599   12
## [4]  {pastry,
##       sweet spreads}            => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863   10
## [5]  {rice,
##       sugar}                    => {whole milk} 0.001220132  1.0000000 0.00122013
2 3.913649   12
## [6]  {rice,
##       bottled water}            => {whole milk} 0.001220132  0.9230769 0.00132181
0 3.612599   12
## [7]  {canned fish,
##       hygiene articles}         => {whole milk} 0.001118454  1.0000000 0.00111845
4 3.913649   11
## [8]  {root vegetables,
##       butter,
##       rice}                     => {whole milk} 0.001016777  1.0000000 0.00101677
7 3.913649   10
## [9]  {citrus fruit,
##       tropical fruit,
##       herbs}                    => {whole milk} 0.001118454  0.9166667 0.00122013
2 3.587512   11
## [10] {root vegetables,
##       whipped/sour cream,
##       flour}                    => {whole milk} 0.001728521  1.0000000 0.00172852
1 3.913649   17
## [11] {butter,
##       soft cheese,
##       domestic eggs}            => {whole milk} 0.001016777  1.0000000 0.00101677
7 3.913649   10
## [12] {root vegetables,
##       whipped/sour cream,
##       soft cheese}              => {whole milk} 0.001220132  0.9230769 0.00132181
0 3.612599   12
## [13] {frankfurter,
##       tropical fruit,
##       frozen meals}             => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863   10
## [14] {tropical fruit,
##       butter,
##       frozen meals}             => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863   10
## [15] {frankfurter,
##       root vegetables,
##       sliced cheese}            => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863   10
## [16] {butter,
##       whipped/sour cream,
```

```
##       sliced cheese}          => {whole milk} 0.001220132  0.9230769 0.00132181
0 3.612599    12
## [17] {sausage,
##      berries,
##      butter}                  => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863    10
## [18] {butter,
##      hygiene articles,
##      napkins}                 => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863    10
## [19] {pip fruit,
##      butter,
##      hygiene articles}        => {whole milk} 0.001016777  1.0000000 0.00101677
7 3.913649    10
## [20] {tropical fruit,
##      butter,
##      hygiene articles}        => {whole milk} 0.001220132  0.9230769 0.00132181
0 3.612599    12
## [21] {tropical fruit,
##      domestic eggs,
##      hygiene articles}        => {whole milk} 0.001220132  0.9230769 0.00132181
0 3.612599    12
## [22] {root vegetables,
##      whipped/sour cream,
##      hygiene articles}        => {whole milk} 0.001016777  1.0000000 0.00101677
7 3.913649    10
## [23] {pip fruit,
##      root vegetables,
##      hygiene articles}        => {whole milk} 0.001016777  1.0000000 0.00101677
7 3.913649    10
## [24] {cream cheese ,
##      domestic eggs,
##      sugar}                   => {whole milk} 0.001118454  1.0000000 0.00111845
4 3.913649    11
## [25] {other vegetables,
##      cream cheese ,
##      sugar}                   => {whole milk} 0.001525165  0.9375000 0.00162684
3 3.669046    15
## [26] {curd,
##      domestic eggs,
##      sugar}                   => {whole milk} 0.001016777  1.0000000 0.00101677
7 3.913649    10
## [27] {citrus fruit,
##      domestic eggs,
##      sugar}                   => {whole milk} 0.001423488  0.9333333 0.00152516
5 3.652739    14
## [28] {tropical fruit,
##      domestic eggs,
##      sugar}                   => {whole milk} 0.001118454  0.9166667 0.00122013
2 3.587512    11
## [29] {yogurt,
##      domestic eggs,
##      sugar}                   => {whole milk} 0.001423488  0.9333333 0.00152516
5 3.652739    14
## [30] {root vegetables,
##      whipped/sour cream,
##      sugar}                   => {whole milk} 0.001220132  0.9230769 0.00132181
0 3.612599    12
```

```
## [31] {pork,
##       rolls/buns,
##       waffles}                       => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863    10
## [32] {whipped/sour cream,
##       long life bakery product,
##       napkins}                       => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863    10
## [33] {tropical fruit,
##       long life bakery product,
##       napkins}                       => {whole milk} 0.001220132  0.9230769 0.00132181
0 3.612599    12
## [34] {sausage,
##       butter,
##       long life bakery product}  => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863    10
## [35] {cream cheese ,
##       domestic eggs,
##       napkins}                       => {whole milk} 0.001118454  1.0000000 0.00111845
4 3.913649    11
## [36] {root vegetables,
##       butter,
##       cream cheese }                 => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863    10
## [37] {pip fruit,
##       whipped/sour cream,
##       cream cheese }                 => {whole milk} 0.001321810  0.9285714 0.00142348
8 3.634103    13
## [38] {sausage,
##       pip fruit,
##       cream cheese }                 => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863    10
## [39] {root vegetables,
##       butter,
##       white bread}                   => {whole milk} 0.001118454  0.9166667 0.00122013
2 3.587512    11
## [40] {butter,
##       whipped/sour cream,
##       coffee}                        => {whole milk} 0.001220132  0.9230769 0.00132181
0 3.612599    12
## [41] {root vegetables,
##       domestic eggs,
##       coffee}                        => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863    10
## [42] {butter,
##       curd,
##       domestic eggs}                 => {whole milk} 0.001118454  0.9166667 0.00122013
2 3.587512    11
## [43] {citrus fruit,
##       butter,
##       curd}                          => {whole milk} 0.001118454  0.9166667 0.00122013
2 3.587512    11
## [44] {domestic eggs,
##       margarine,
##       bottled beer}                  => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863    10
## [45] {domestic eggs,
##       margarine,
```

```
##      fruit/vegetable juice}      => {whole milk} 0.001118454  0.9166667 0.00122013
## 2 3.587512     11
## [46] {pip fruit,
##      butter,
##      whipped/sour cream}         => {whole milk} 0.001830198  0.9000000 0.00203355
## 4 3.522284     18
## [47] {tropical fruit,
##      whipped/sour cream,
##      domestic eggs}              => {whole milk} 0.001830198  0.9000000 0.00203355
## 4 3.522284     18
## [48] {root vegetables,
##      other vegetables,
##      yogurt,
##      rice}                       => {whole milk} 0.001321810  0.9285714 0.00142348
## 8 3.634103     13
## [49] {tropical fruit,
##      root vegetables,
##      herbs,
##      other vegetables}           => {whole milk} 0.001016777  0.9090909 0.00111845
## 4 3.557863     10
## [50] {tropical fruit,
##      pip fruit,
##      yogurt,
##      frozen meals}               => {whole milk} 0.001016777  0.9090909 0.00111845
## 4 3.557863     10
## [51] {root vegetables,
##      other vegetables,
##      yogurt,
##      hard cheese}                => {whole milk} 0.001220132  0.9230769 0.00132181
## 0 3.612599     12
## [52] {tropical fruit,
##      butter,
##      yogurt,
##      sliced cheese}              => {whole milk} 0.001016777  0.9090909 0.00111845
## 4 3.557863     10
## [53] {tropical fruit,
##      root vegetables,
##      yogurt,
##      oil}                        => {whole milk} 0.001118454  1.0000000 0.00111845
## 4 3.913649     11
## [54] {root vegetables,
##      other vegetables,
##      yogurt,
##      oil}                        => {whole milk} 0.001423488  1.0000000 0.00142348
## 8 3.913649     14
## [55] {root vegetables,
##      other vegetables,
##      yogurt,
##      waffles}                    => {whole milk} 0.001016777  0.9090909 0.00111845
## 4 3.557863     10
## [56] {pip fruit,
##      root vegetables,
##      other vegetables,
##      cream cheese }              => {whole milk} 0.001016777  0.9090909 0.00111845
## 4 3.557863     10
## [57] {pip fruit,
##      other vegetables,
##      yogurt,
```

```
##        cream cheese }          => {whole milk} 0.001118454  0.9166667 0.00122013
2 3.587512    11
## [58] {root vegetables,
##      other vegetables,
##      butter,
##      white bread}             => {whole milk} 0.001016777  1.0000000 0.00101677
7 3.913649    10
## [59] {citrus fruit,
##      other vegetables,
##      yogurt,
##      frozen vegetables}       => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863    10
## [60] {beef,
##      tropical fruit,
##      yogurt,
##      rolls/buns}              => {whole milk} 0.001321810  0.9285714 0.00142348
8 3.634103    13
## [61] {tropical fruit,
##      curd,
##      yogurt,
##      domestic eggs}           => {whole milk} 0.001118454  0.9166667 0.00122013
2 3.587512    11
## [62] {citrus fruit,
##      tropical fruit,
##      curd,
##      yogurt}                  => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863    10
## [63] {other vegetables,
##      butter,
##      whipped/sour cream,
##      napkins}                 => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863    10
## [64] {pork,
##      other vegetables,
##      butter,
##      whipped/sour cream}      => {whole milk} 0.001016777  1.0000000 0.00101677
7 3.913649    10
## [65] {pork,
##      root vegetables,
##      other vegetables,
##      butter}                  => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863    10
## [66] {frankfurter,
##      tropical fruit,
##      root vegetables,
##      yogurt}                  => {whole milk} 0.001220132  0.9230769 0.00132181
0 3.612599    12
## [67] {pip fruit,
##      root vegetables,
##      other vegetables,
##      brown bread}             => {whole milk} 0.001220132  0.9230769 0.00132181
0 3.612599    12
## [68] {root vegetables,
##      other vegetables,
##      rolls/buns,
##      brown bread}             => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863    10
## [69] {other vegetables,
```

```
##       butter,
##       whipped/sour cream,
##       domestic eggs}              => {whole milk} 0.001220132  1.0000000 0.00122013
2 3.913649     12
## [70] {tropical fruit,
##       butter,
##       yogurt,
##       domestic eggs}              => {whole milk} 0.001220132  0.9230769 0.00132181
0 3.612599     12
## [71] {root vegetables,
##       butter,
##       yogurt,
##       domestic eggs}              => {whole milk} 0.001118454  0.9166667 0.00122013
2 3.587512     11
## [72] {citrus fruit,
##       other vegetables,
##       butter,
##       bottled water}             => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863     10
## [73] {pip fruit,
##       other vegetables,
##       whipped/sour cream,
##       domestic eggs}              => {whole milk} 0.001220132  0.9230769 0.00132181
0 3.612599     12
## [74] {tropical fruit,
##       yogurt,
##       whipped/sour cream,
##       domestic eggs}              => {whole milk} 0.001118454  0.9166667 0.00122013
2 3.587512     11
## [75] {tropical fruit,
##       other vegetables,
##       whipped/sour cream,
##       domestic eggs}              => {whole milk} 0.001118454  0.9166667 0.00122013
2 3.587512     11
## [76] {citrus fruit,
##       tropical fruit,
##       other vegetables,
##       domestic eggs}              => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863     10
## [77] {pip fruit,
##       root vegetables,
##       yogurt,
##       fruit/vegetable juice}     => {whole milk} 0.001118454  0.9166667 0.00122013
2 3.587512     11
## [78] {citrus fruit,
##       whipped/sour cream,
##       rolls/buns,
##       pastry}                    => {whole milk} 0.001016777  1.0000000 0.00101677
7 3.913649     10
## [79] {pip fruit,
##       root vegetables,
##       other vegetables,
##       bottled water}             => {whole milk} 0.001118454  1.0000000 0.00111845
4 3.913649     11
## [80] {tropical fruit,
##       root vegetables,
##       yogurt,
##       pastry}                    => {whole milk} 0.001016777  0.9090909 0.00111845
```

```
4 3.557863    10
## [81] {sausage,
##        tropical fruit,
##        root vegetables,
##        yogurt}                   => {whole milk} 0.001525165  0.9375000 0.00162684
3 3.669046    15
## [82] {sausage,
##        tropical fruit,
##        root vegetables,
##        rolls/buns}               => {whole milk} 0.001016777  1.0000000 0.00101677
7 3.913649    10
## [83] {tropical fruit,
##        root vegetables,
##        rolls/buns,
##        bottled water}            => {whole milk} 0.001118454  0.9166667 0.00122013
2 3.587512    11
## [84] {tropical fruit,
##        root vegetables,
##        other vegetables,
##        yogurt,
##        oil}                      => {whole milk} 0.001016777  1.0000000 0.00101677
7 3.913649    10
## [85] {tropical fruit,
##        other vegetables,
##        butter,
##        yogurt,
##        domestic eggs}            => {whole milk} 0.001016777  0.9090909 0.00111845
4 3.557863    10
```

```
inspect(head(sort(milk.association.rules, by=c("conf", "supp"))))
```

```
##      lhs                      rhs                support confidence   coverage     l
ift count
## [1] {root vegetables,
##      whipped/sour cream,
##      flour}               => {whole milk} 0.001728521          1 0.001728521 3.913
649     17
## [2] {root vegetables,
##      other vegetables,
##      yogurt,
##      oil}                 => {whole milk} 0.001423488          1 0.001423488 3.913
649     14
## [3] {rice,
##      sugar}               => {whole milk} 0.001220132          1 0.001220132 3.913
649     12
## [4] {other vegetables,
##      butter,
##      whipped/sour cream,
##      domestic eggs}       => {whole milk} 0.001220132          1 0.001220132 3.913
649     12
## [5] {canned fish,
##      hygiene articles}    => {whole milk} 0.001118454          1 0.001118454 3.913
649     11
## [6] {cream cheese ,
##      domestic eggs,
##      sugar}               => {whole milk} 0.001118454          1 0.001118454 3.913
649     11
```

```
top10Rules <- head(milk.association.rules, n=10, by="confidence")

plot(top10Rules, method="graph", engine="htmlwidget")
```

Select by id