Latihan Perlombongan Aturan Sekutuan / Mining Association Rule

Dapatkan deskriptif statistik

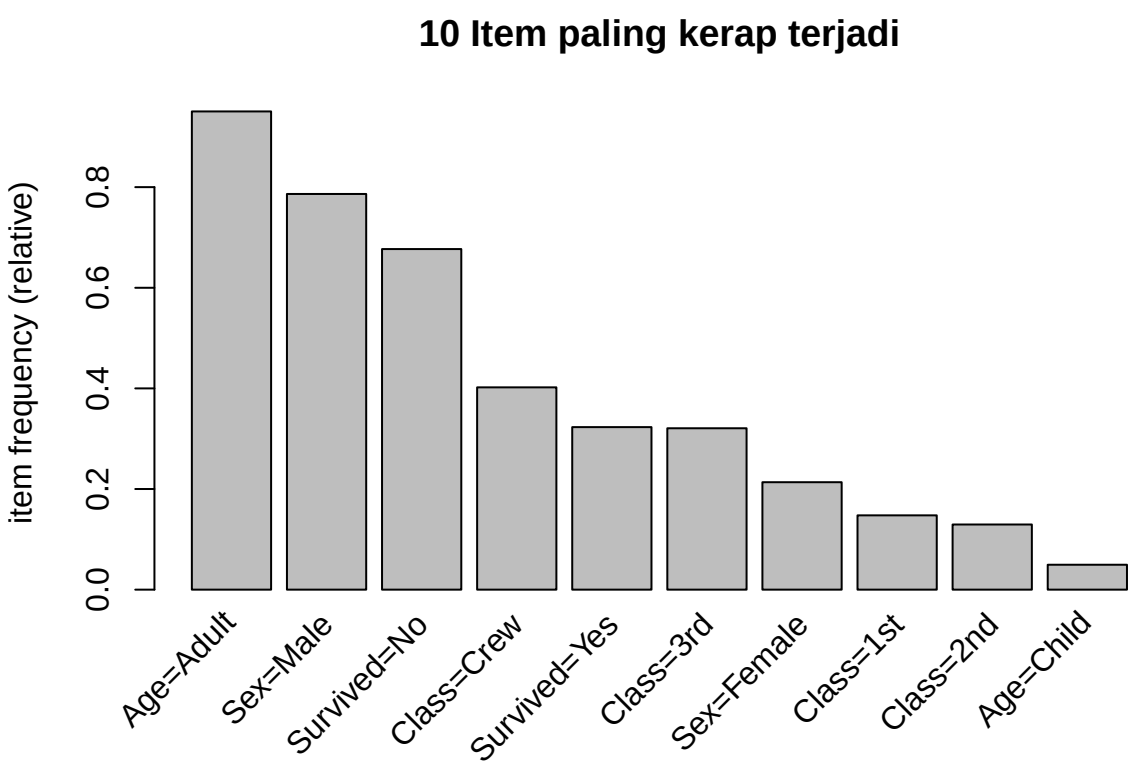
```
load("G:/My Drive/Master-Data-Science/Semester_1/Data_Mining/Data/titanic.raw.rdata")
head(titanic.raw,10)
```

```
##    Class  Sex   Age Survived
## 1    3rd Male Child       No
## 2    3rd Male Child       No
## 3    3rd Male Child       No
## 4    3rd Male Child       No
## 5    3rd Male Child       No
## 6    3rd Male Child       No
## 7    3rd Male Child       No
## 8    3rd Male Child       No
## 9    3rd Male Child       No
## 10   3rd Male Child       No
```

```
data = as(titanic.raw, 'transactions')
data
```

```
## transactions in sparse format with
##  2201 transactions (rows) and
##  10 items (columns)
```

```
itemFrequencyPlot(data, topN=10,
                  main='10 Item paling kerap terjadi')
```



Tentukan aturan sekutuan yang memenuhi nilai ambang minimum supp=0.1, conf=0.6.

```
Aturan.S1 = apriori(data,
                    parameter=list(supp=0.1,conf=0.6))
```

```
## Apriori
##
## Parameter specification:
##  confidence minval smax arem  aval originalSupport maxtime support minlen
##         0.6    0.1    1 none FALSE            TRUE       5     0.1      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: 220
##
## set item appearances ...[0 item(s)] done [0.00s].
## set transactions ...[10 item(s), 2201 transaction(s)] done [0.00s].
```

```
## sorting and recoding items ... [9 item(s)] done [0.00s].
## creating transaction tree ... done [0.00s].
## checking subsets of size 1 2 3 4 done [0.00s].
## writing ... [44 rule(s)] done [0.00s].
## creating S4 object  ... done [0.00s].
```

```
head(inspect(Aturan.S1),10)
```

```
##      lhs                                      rhs            support
## [1]  {}                                    => {Survived=No}  0.6769650
## [2]  {}                                    => {Sex=Male}     0.7864607
## [3]  {}                                    => {Age=Adult}    0.9504771
## [4]  {Class=2nd}                           => {Age=Adult}    0.1185825
## [5]  {Class=1st}                           => {Age=Adult}    0.1449341
## [6]  {Sex=Female}                          => {Survived=Yes} 0.1562926
## [7]  {Sex=Female}                          => {Age=Adult}    0.1930940
## [8]  {Class=3rd}                           => {Survived=No}  0.2398910
## [9]  {Class=3rd}                           => {Sex=Male}     0.2317129
## [10] {Class=3rd}                           => {Age=Adult}    0.2848705
## [11] {Survived=Yes}                        => {Age=Adult}    0.2971377
## [12] {Class=Crew}                          => {Survived=No}  0.3057701
## [13] {Class=Crew}                          => {Sex=Male}     0.3916402
## [14] {Class=Crew}                          => {Age=Adult}    0.4020900
## [15] {Survived=No}                         => {Sex=Male}     0.6197183
## [16] {Sex=Male}                            => {Survived=No}  0.6197183
## [17] {Survived=No}                         => {Age=Adult}    0.6533394
## [18] {Age=Adult}                           => {Survived=No}  0.6533394
## [19] {Sex=Male}                            => {Age=Adult}    0.7573830
## [20] {Age=Adult}                           => {Sex=Male}     0.7573830
## [21] {Sex=Female, Survived=Yes}            => {Age=Adult}    0.1435711
## [22] {Sex=Female, Age=Adult}               => {Survived=Yes} 0.1435711
## [23] {Class=3rd, Survived=No}              => {Sex=Male}     0.1917310
## [24] {Class=3rd, Sex=Male}                 => {Survived=No}  0.1917310
## [25] {Class=3rd, Survived=No}              => {Age=Adult}    0.2162653
## [26] {Class=3rd, Age=Adult}                => {Survived=No}  0.2162653
## [27] {Class=3rd, Sex=Male}                 => {Age=Adult}    0.2099046
## [28] {Class=3rd, Age=Adult}                => {Sex=Male}     0.2099046
## [29] {Sex=Male, Survived=Yes}              => {Age=Adult}    0.1535666
## [30] {Class=Crew, Survived=No}             => {Sex=Male}     0.3044071
## [31] {Class=Crew, Sex=Male}                => {Survived=No}  0.3044071
## [32] {Class=Crew, Survived=No}             => {Age=Adult}    0.3057701
## [33] {Class=Crew, Age=Adult}               => {Survived=No}  0.3057701
## [34] {Class=Crew, Sex=Male}                => {Age=Adult}    0.3916402
## [35] {Class=Crew, Age=Adult}               => {Sex=Male}     0.3916402
## [36] {Sex=Male, Survived=No}               => {Age=Adult}    0.6038164
## [37] {Age=Adult, Survived=No}              => {Sex=Male}     0.6038164
## [38] {Sex=Male, Age=Adult}                 => {Survived=No}  0.6038164
## [39] {Class=3rd, Sex=Male, Survived=No}    => {Age=Adult}    0.1758292
## [40] {Class=3rd, Age=Adult, Survived=No}   => {Sex=Male}     0.1758292
## [41] {Class=3rd, Sex=Male, Age=Adult}      => {Survived=No}  0.1758292
## [42] {Class=Crew, Sex=Male, Survived=No}   => {Age=Adult}    0.3044071
## [43] {Class=Crew, Age=Adult, Survived=No}  => {Sex=Male}     0.3044071
## [44] {Class=Crew, Sex=Male, Age=Adult}     => {Survived=No}  0.3044071
##      confidence coverage  lift      count
```

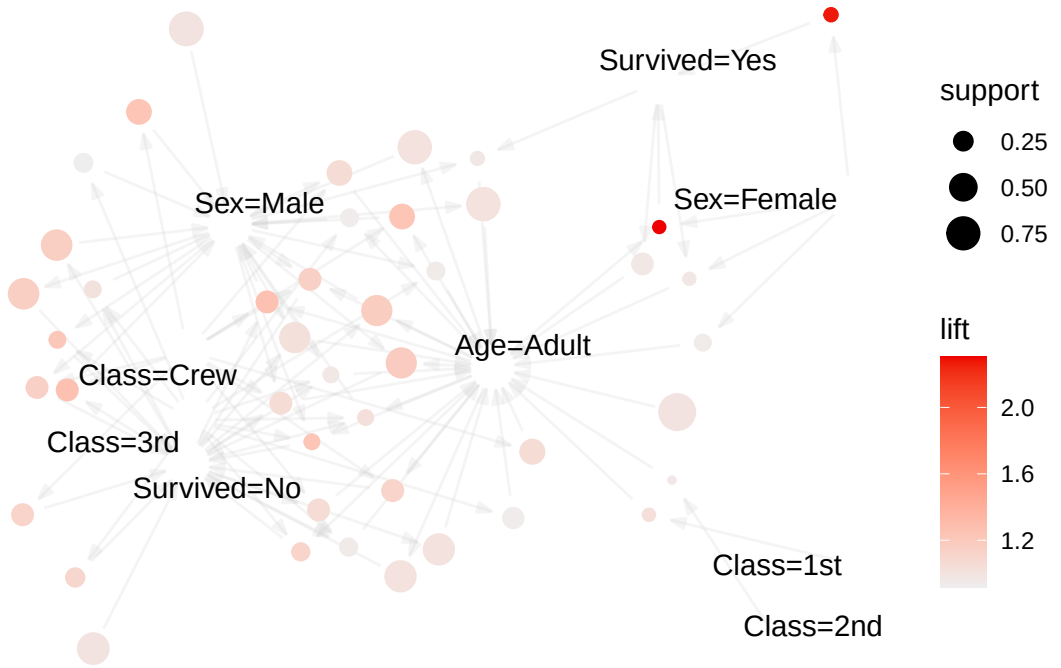
```
## [1]  0.6769650  1.0000000 1.0000000 1490
## [2]  0.7864607  1.0000000 1.0000000 1731
## [3]  0.9504771  1.0000000 1.0000000 2092
## [4]  0.9157895  0.1294866 0.9635051  261
## [5]  0.9815385  0.1476602 1.0326798  319
## [6]  0.7319149  0.2135393 2.2657450  344
## [7]  0.9042553  0.2135393 0.9513700  425
## [8]  0.7478754  0.3207633 1.1047474  528
## [9]  0.7223796  0.3207633 0.9185196  510
## [10] 0.8881020  0.3207633 0.9343750  627
## [11] 0.9198312  0.3230350 0.9677574  654
## [12] 0.7604520  0.4020900 1.1233254  673
## [13] 0.9740113  0.4020900 1.2384742  862
## [14] 1.0000000  0.4020900 1.0521033  885
## [15] 0.9154362  0.6769650 1.1639949 1364
## [16] 0.7879838  0.7864607 1.1639949 1364
## [17] 0.9651007  0.6769650 1.0153856 1438
## [18] 0.6873805  0.9504771 1.0153856 1438
## [19] 0.9630272  0.7864607 1.0132040 1667
## [20] 0.7968451  0.9504771 1.0132040 1667
## [21] 0.9186047  0.1562926 0.9664669  316
## [22] 0.7435294  0.1930940 2.3016993  316
## [23] 0.7992424  0.2398910 1.0162522  422
## [24] 0.8274510  0.2317129 1.2222950  422
## [25] 0.9015152  0.2398910 0.9484870  476
## [26] 0.7591707  0.2848705 1.1214326  476
## [27] 0.9058824  0.2317129 0.9530818  462
## [28] 0.7368421  0.2848705 0.9369090  462
## [29] 0.9209809  0.1667424 0.9689670  338
## [30] 0.9955423  0.3057701 1.2658514  670
## [31] 0.7772622  0.3916402 1.1481571  670
## [32] 1.0000000  0.3057701 1.0521033  673
## [33] 0.7604520  0.4020900 1.1233254  673
## [34] 1.0000000  0.3916402 1.0521033  862
## [35] 0.9740113  0.4020900 1.2384742  862
## [36] 0.9743402  0.6197183 1.0251065 1329
## [37] 0.9242003  0.6533394 1.1751385 1329
## [38] 0.7972406  0.7573830 1.1776688 1329
## [39] 0.9170616  0.1917310 0.9648435  387
## [40] 0.8130252  0.2162653 1.0337773  387
## [41] 0.8376623  0.2099046 1.2373791  387
## [42] 1.0000000  0.3044071 1.0521033  670
## [43] 0.9955423  0.3057701 1.2658514  670
## [44] 0.7772622  0.3916402 1.1481571  670
```

```
##               lhs               rhs   support confidence  coverage      lift
## [1]            {} =>  {Survived=No} 0.6769650  0.6769650 1.0000000 1.0000000
## [2]            {} =>     {Sex=Male} 0.7864607  0.7864607 1.0000000 1.0000000
## [3]            {} =>    {Age=Adult} 0.9504771  0.9504771 1.0000000 1.0000000
## [4]   {Class=2nd} =>    {Age=Adult} 0.1185825  0.9157895 0.1294866 0.9635051
## [5]   {Class=1st} =>    {Age=Adult} 0.1449341  0.9815385 0.1476602 1.0326798
## [6]  {Sex=Female} => {Survived=Yes} 0.1562926  0.7319149 0.2135393 2.2657450
## [7]  {Sex=Female} =>    {Age=Adult} 0.1930940  0.9042553 0.2135393 0.9513700
## [8]   {Class=3rd} =>  {Survived=No} 0.2398910  0.7478754 0.3207633 1.1047474
```

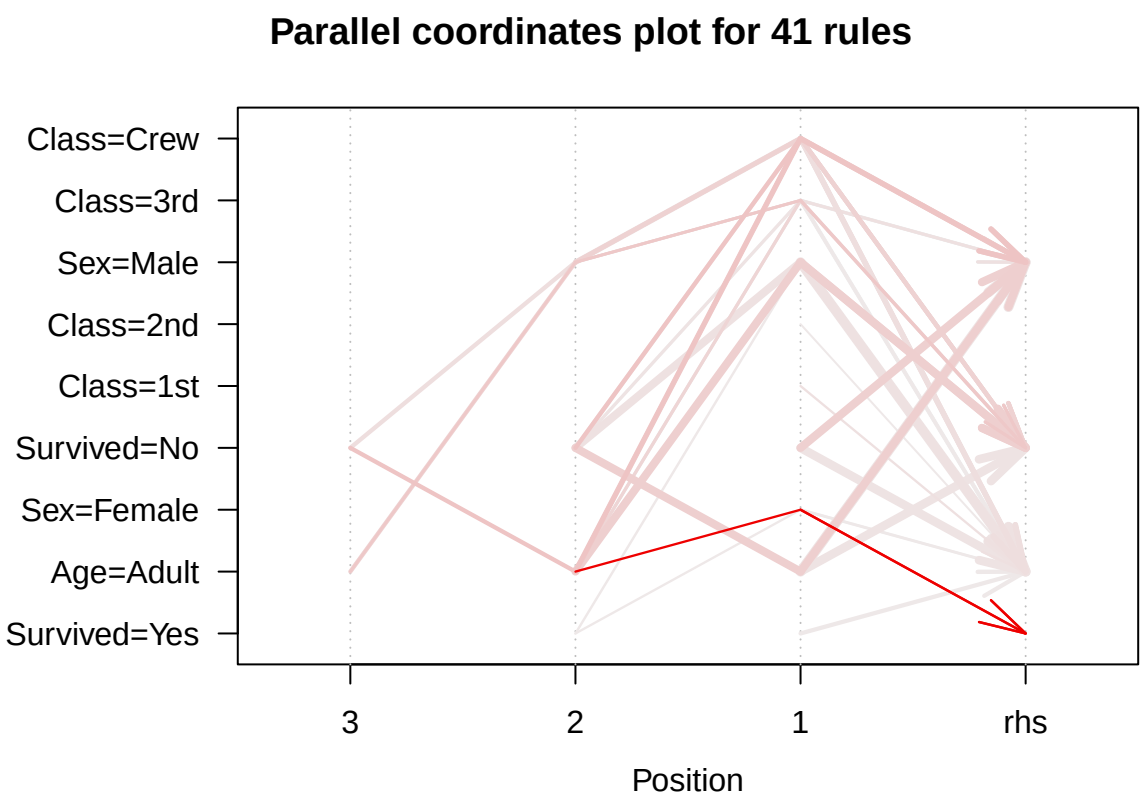
```
## [9]   {Class=3rd} =>     {Sex=Male} 0.2317129  0.7223796 0.3207633 0.9185196
## [10]  {Class=3rd} =>    {Age=Adult} 0.2848705  0.8881020 0.3207633 0.9343750
##       count
## [1]    1490
## [2]    1731
## [3]    2092
## [4]     261
## [5]     319
## [6]     344
## [7]     425
## [8]     528
## [9]     510
## [10]    627
```

Plotkan aturan sekutuan yg diperoleh dalam ii) menggunakan plot-plot yang sesuai.

```
plot(Aturan.S1, method='graph')
```




```
plot(Aturan.S1, method='paracoord',
     control=list(reorder=T))
```



Dapatkan aturan sekutuan yang menunjukkan ciri-ciri individu yang terselamat dari tragedi titanic (rhs: p/ubah survival).

```
Aturan.S2 = apriori(data,
                    parameter=list(supp=0.1, conf=0.6),
                    appearance = list(default='lhs',rhs='Survived=Yes'))
```

```
## Apriori
##
## Parameter specification:
##  confidence minval smax arem  aval originalSupport maxtime support minlen
##         0.6    0.1    1 none FALSE            TRUE       5     0.1      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: 220
##
## set item appearances ...[1 item(s)] done [0.00s].
```

```
## set transactions ...[10 item(s), 2201 transaction(s)] done [0.00s].
## sorting and recoding items ... [9 item(s)] done [0.00s].
## creating transaction tree ... done [0.00s].
## checking subsets of size 1 2 3 4 done [0.00s].
## writing ... [2 rule(s)] done [0.00s].
## creating S4 object  ... done [0.00s].
```

```
inspect(Aturan.S2)
```

```
##     lhs                          rhs            support   confidence coverage
## [1] {Sex=Female}              => {Survived=Yes} 0.1562926 0.7319149  0.2135393
## [2] {Sex=Female, Age=Adult} => {Survived=Yes} 0.1435711 0.7435294  0.1930940
##     lift     count
## [1] 2.265745 344
## [2] 2.301699 316
```

Dapatkan aturan sekutuan bagi orang yang terselamat daripada kelas 1, 2 & 3 (rhs ialah "Survived=Yes" dan lhs mengandungi info Class=1st, 2nd & 3rd; Age=Child & Adult)

```
Aturan.S3 = apriori(data,
                    parameter=list(supp=0.1, conf=0.05),
                    appearance = list(lhs=c('Class=1st', 'Class=2nd','Class=3rd','Age=Child','Age=Adult
```

```
## Apriori
##
## Parameter specification:
##  confidence minval smax arem  aval originalSupport maxtime support minlen
##        0.05    0.1    1 none FALSE            TRUE       5     0.1      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: 220
##
## set item appearances ...[6 item(s)] done [0.00s].
## set transactions ...[6 item(s), 2201 transaction(s)] done [0.00s].
## sorting and recoding items ... [5 item(s)] done [0.00s].
## creating transaction tree ... done [0.00s].
## checking subsets of size 1 2 done [0.00s].
## writing ... [2 rule(s)] done [0.00s].
## creating S4 object  ... done [0.00s].
```

```
inspect(Aturan.S3)
```

```
##     lhs             rhs            support   confidence coverage  lift
## [1] {}          => {Survived=Yes} 0.3230350 0.3230350  1.0000000 1.0000000
## [2] {Age=Adult} => {Survived=Yes} 0.2971377 0.3126195  0.9504771 0.9677574
##     count
## [1] 711
## [2] 654
```