Self-organizing map

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08 05 2020

Wstęp

Zadaniem było wykonanie analizy wybranego zbioru danych z wykorzystaniem samoorganizującej się mapy (SOM). https://clarkdatalabs.github.io/soms/SOM_NBA

```
head(NBA)
```

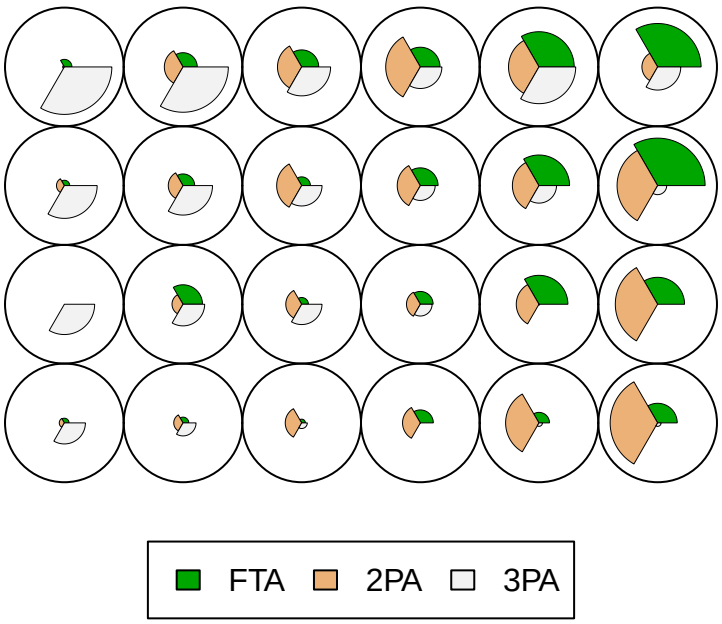
```
##                 Player            Pos Age  Tm  G GS   MP  FG  FGA   FG%  3P 3PA
## 1  1        Quincy Acy  Power Forward  25 SAC 59 29  876 4.9  8.8 0.556 0.8 2.0
## 2  2      Jordan Adams Shooting Guard  21 MEM  2  0   15 4.8 14.4 0.333 0.0 2.4
## 3  4     Arron Afflalo Shooting Guard  30 NYK 71 57 2371 5.4 12.1 0.443 1.4 3.6
## 4  5     Alexis Ajinca         Center  27 NOP 59 17  861 6.3 13.2 0.476 0.0 0.0
## 5  7 LaMarcus Aldridge  Power Forward  30 SAS 74 74 2261 8.5 16.6 0.513 0.0 0.3
## 6 10        Tony Allen Shooting Guard  34 MEM 64 57 1620 4.8 10.4 0.458 0.3 0.9
##     3P%  2P  2PA   2P%  FT  FTA   FT% ORB DRB  TRB AST STL BLK TOV  PF  PTS
## 1 0.388 4.1  6.8 0.606 2.1  2.8 0.735 2.7 5.1  7.7 1.1 1.2 1.0 1.1 4.2 12.6
## 2 0.000 4.8 12.0 0.400 7.2 12.0 0.600 0.0 4.8  4.8 7.2 7.2 0.0 4.8 4.8 16.8
## 3 0.382 4.0  8.5 0.469 1.7  2.0 0.840 0.3 3.7  4.0 2.2 0.4 0.2 1.2 2.2 13.8
## 4 0.000 6.3 13.1 0.478 2.2  2.6 0.839 3.1 8.1 11.2 1.3 0.8 1.5 2.3 5.6 14.7
## 5 0.000 8.5 16.4 0.521 4.1  4.8 0.858 2.8 7.3 10.1 1.8 0.6 1.3 1.6 2.4 21.2
## 6 0.357 4.4  9.5 0.468 2.0  3.1 0.652 2.3 4.3  6.6 1.6 2.4 0.4 1.7 3.9 11.9
```

```
colnames(NBA)
```

```
##  [1] ""       "Player" "Pos"    "Age"    "Tm"     "G"      "GS"     "MP"
##  [9] "FG"     "FGA"    "FG%"    "3P"     "3PA"    "3P%"    "2P"     "2PA"
## [17] "2P%"    "FT"     "FTA"    "FT%"    "ORB"    "DRB"    "TRB"    "AST"
## [25] "STL"    "BLK"    "TOV"    "PF"     "PTS"
```

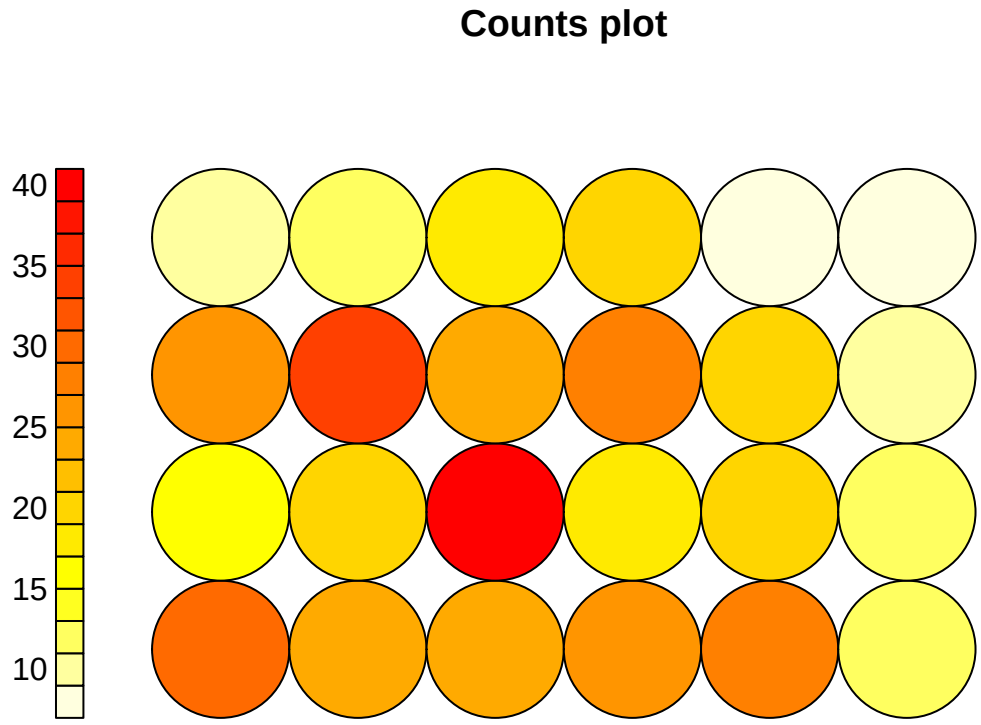
Basic SOM

```
NBA.measures1 <- c("FTA", "2PA", "3PA")
NBA.SOM1 <- som(scale(NBA[NBA.measures1]), grid = somgrid(6, 4, "rectangular"))
plot(NBA.SOM1)
```



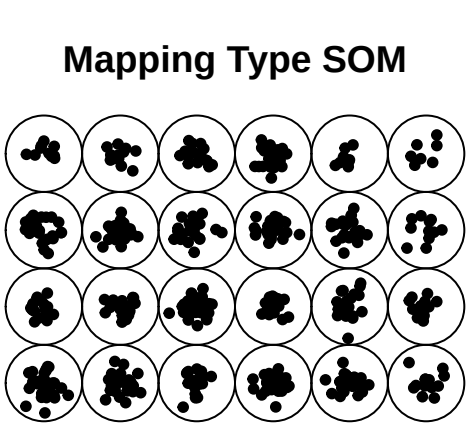
Heatmap SOM

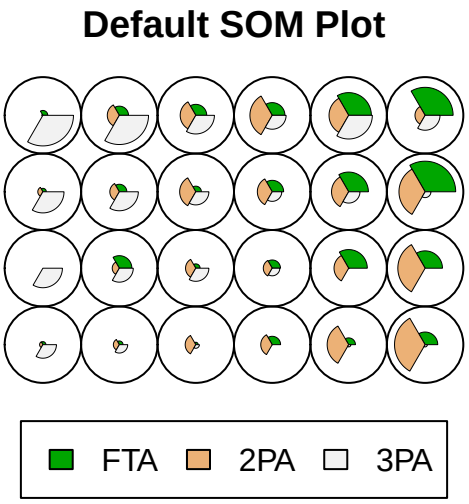
```
# reverse color ramp
colors <- function(n, alpha = 1) {
    rev(heat.colors(n, alpha))
}
plot(NBA.SOM1, type = "counts", palette.name = colors, heatkey = TRUE)
```



Plotting points

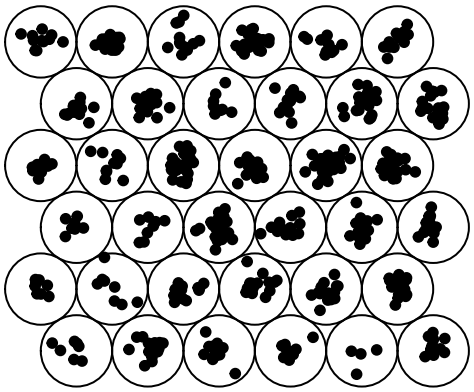
```
par(mfrow = c(1, 2))
plot(NBA.SOM1, type = "mapping", pchs = 20, main = "Mapping Type SOM")
plot(NBA.SOM1, main = "Default SOM Plot")
```

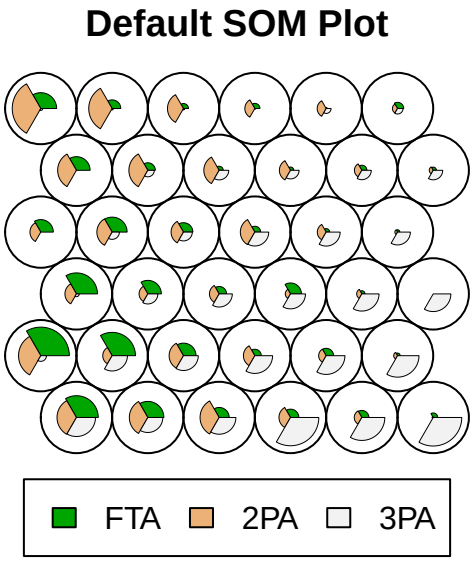




Toroidal SOMs

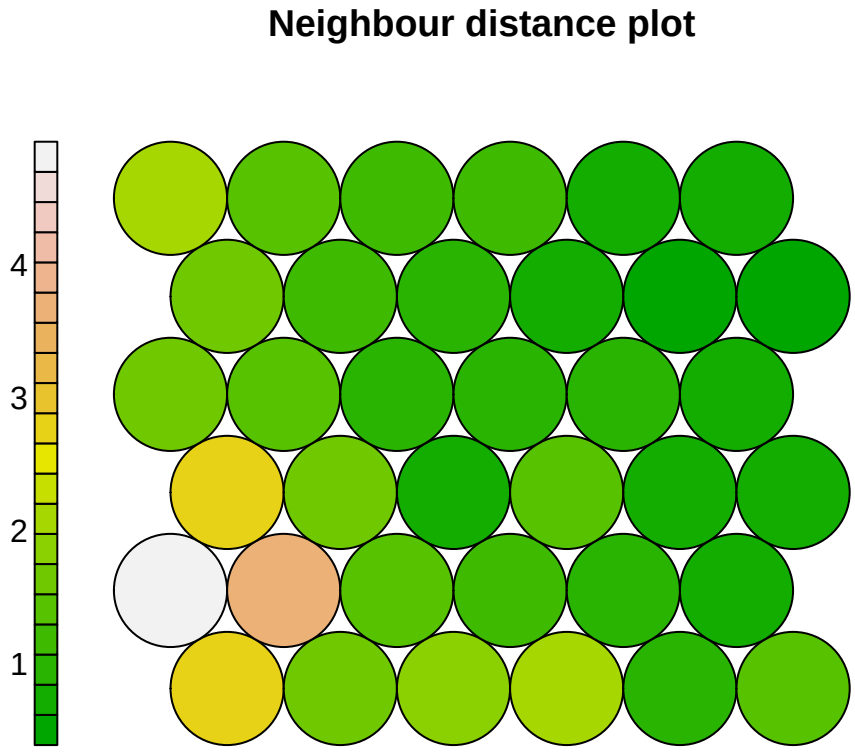
```
#NBA.SOM2 <- som(scale(NBA[NBA.measures1]), grid = somgrid(6, 6, "hexagonal"), toroidal = TRUE)
NBA.SOM2 <- som(scale(NBA[NBA.measures1]), grid = somgrid(6, 6, "hexagonal"))
par(mfrow = c(1, 2))
plot(NBA.SOM2, type = "mapping", pchs = 20, main = "Mapping Type SOM")
plot(NBA.SOM2, main = "Default SOM Plot")
```





Mapping Distance

```
plot(NBA.SOM2, type = "dist.neighbours", palette.name = terrain.colors)
```



Supervised SOMs

```
NBA.measures2 <- c("FTA", "FT", "2PA", "2P", "3PA", "3P", "AST", "ORB", "DRB",
    "TRB", "STL", "BLK", "TOV")
```

The xyf() Function

```
training_indices <- sample(nrow(NBA), 200)
NBA.training <- scale(NBA[training_indices, NBA.measures2])
NBA.testing <- scale(NBA[-training_indices, NBA.measures2], center = attr(NBA.training,
    "scaled:center"), scale = attr(NBA.training, "scaled:scale"))
```

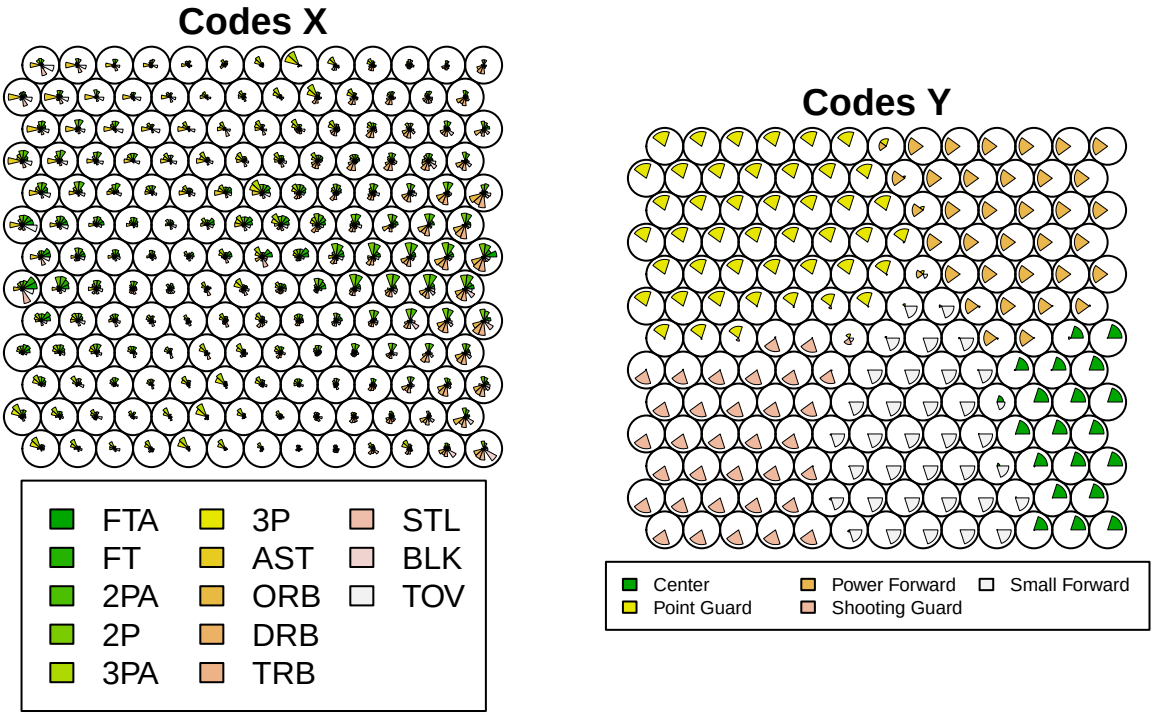
```
#NBA.SOM3 <- xyf(NBA.training, classvec2classmat(NBA$Pos[training_indices]), grid = somgrid(13, 13, "hes
NBA.SOM3 <- xyf(NBA.training, classvec2classmat(NBA$Pos[training_indices]), grid = somgrid(13, 13, "hexa
```

```
# !!! w poniższej linijce wywala błąd "data type not allowed"!!!
# po znalezieniu błędu odkomentować obie linijki
#pos.prediction <- predict(NBA.SOM3, newdata = NBA.testing)

#table(NBA[-training_indices, "Pos"], pos.prediction$prediction)
```

Visualizing predictions: "Codes" SOMs

```
#NBA.SOM4 <- xyf(scale(NBA[, NBA.measures2]), classvec2classmat(NBA[, "Pos"]), grid = somgrid(13, 13, "
NBA.SOM4 <- xyf(scale(NBA[, NBA.measures2]), classvec2classmat(NBA[, "Pos"]), grid = somgrid(13, 13, "he
```

```r
par(mfrow = c(1, 2))

plot(NBA.SOM4, type = "codes", main = c("Codes X", "Codes Y"))
```




```r
# !!! błąd w poniższej linijce !!!
# odkomentować obie po rozwiązaniu
#NBA.SOM4.hc <- cutree(hclust(dist(NBA.SOM4$codes$Y)), 5)
#add.cluster.boundaries(NBA.SOM4, NBA.SOM4.hc)
```

Podsumowanie i wnioski

NA RAZIE PISZĘ TU TO CO TRZEBABY BYŁO ZROBIĆ:

1. sprawdzenie o co chodzi z błędem "unused arguments". Przez niego zakomentowałam niektóre linijki i pod spodem wrzuciłam ich wersje z usuniętymi problematycznymi argumentami (pytanie czy to czegoś nie zmienia?) - linia 65, 91, 104
2. sprawdzenie o co chodzi z błędami w liniach 95, 112
3. ostatnia sekcja cała zakomentowana, bo cała sypała błędami
4. zastanowić się, czy to wszystko nam potrzebne i czy czegoś nie usunąć/dodać z innego źródła
5. sensownie podzielić na bloki
6. ustawić flagę include=FALSE przy blokach, z których kodu nie chcemy pokazywać
7. opisać kolejne kroki, co tam właściwie się dzieje
8. dodać wstęp (opis co my właściwie badamy, co to za zbiór, źródło do tutoriala) i wnioski

jeszcze może tu coś fajnego będzie: https://www.shanelynn.ie/self-organising-maps-for-customer-segmentation-using-r/