TIJUANA INSTITUTE OF TECHNOLOGY

ACADEMIC

DEPARTMENT SYSTEMS AND COMPUTING DEPARTMENT
COMPUTER SYSTEMS ENGINEERING

SEMESTER FEBRUARY- JULY 2022

SUBJECT

BDD-1703SC9C Data Mining

Activity

#4

Professor

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Student

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Free Throws
You have been supplide data for two additiona in-game statics:
  * Free Throws
* Free Throws Attempt

You need to create three plots that portray the following insights:
  * Free Trows Attempts per game
* Accurance of Free Trhows
* Player playing style (2 vs 3 points preference) excluding Free Throws

*Each Free Throw is worth 1 Point

The data has been supplied in the form of vectors. You will have to Create the matrices before you proceed with the analysis.

```
#Seasons
Seasons <- c("2005","2006","2007","2008","2009","2010","2011","2012","2013","2014")

#Players
Players                                                                <-
c("KobeBryant","JoeJohnson","LeBronJames","CarmeloAnthony","DwightHoward","ChrisBosh","Chris
Paul","KevinDurant","DerrickRose","DwayneWade")

#Free Throws
KobeBryant_FT <- c(696,667,623,483,439,483,381,525,18,196)
JoeJohnson_FT <- c(261,235,316,299,220,195,158,132,159,141)
LeBronJames_FT <- c(601,489,549,594,593,503,387,403,439,375)
CarmeloAnthony_FT <- c(573,459,464,371,508,507,295,425,459,189)
DwightHoward_FT <- c(356,390,529,504,483,546,281,355,349,143)
ChrisBosh_FT <- c(474,463,472,504,470,384,229,241,223,179)
ChrisPaul_FT <- c(394,292,332,455,161,337,260,286,295,289)
KevinDurant_FT <- c(209,209,391,452,756,594,431,679,703,146)
DerrickRose_FT <- c(146,146,146,197,259,476,194,0,27,152)
DwayneWade_FT <- c(629,432,354,590,534,494,235,308,189,284)
#Matrix
#
# <put your code here>
FThrows   <-   rbind(KobeBryant_FT,   JoeJohnson_FT,   LeBronJames_FT,CarmeloAnthony_FT,
DwightHoward_FT,ChrisBosh_FT,
ChrisPaul_FT,KevinDurant_FT,DerrickRose_FT,DwayneWade_FT)
rm(KobeBryant_FT,          JoeJohnson_FT,          LeBronJames_FT,CarmeloAnthony_FT,
DwightHoward_FT,ChrisBosh_FT,
ChrisPaul_FT,KevinDurant_FT,DerrickRose_FT,DwayneWade_FT)
colnames(FThrows) <- Seasons
rownames(FThrows) <- Players
FThrows
#

#Free Throw Attempts
KobeBryant_FTA <- c(819,768,742,564,541,583,451,626,21,241)
JoeJohnson_FTA <- c(330,314,379,362,269,243,186,161,195,176)
LeBronJames_FTA <- c(814,701,771,762,773,663,502,535,585,528)
CarmeloAnthony_FTA <- c(709,568,590,468,612,605,367,512,541,237)
DwightHoward_FTA <- c(598,666,897,849,816,916,572,721,638,271)
```

```r
ChrisBosh_FTA <- c(581,590,559,617,590,471,279,302,272,232)
ChrisPaul_FTA <- c(465,357,390,524,190,384,302,323,345,321)
KevinDurant_FTA <- c(256,256,448,524,840,675,501,750,805,171)
DerrickRose_FTA <- c(205,205,205,250,338,555,239,0,32,187)
DwayneWade_FTA <- c(803,535,467,771,702,652,297,425,258,370)
#Matrix
#
# <put your code here>
FTattempts<-rbind(KobeBryant_FTA,
JoeJohnson_FTA,LeBronJames_FTA,CarmeloAnthony_FTA,DwightHoward_FTA,ChrisBosh_FTA,C
hrisPaul_FTA,KevinDurant_FTA,DerrickRose_FTA,DwayneWade_FTA)
rm(KobeBryant_FTA,
JoeJohnson_FTA,LeBronJames_FTA,CarmeloAnthony_FTA,DwightHoward_FTA,ChrisBosh_FTA,C
hrisPaul_FTA,KevinDurant_FTA,DerrickRose_FTA,DwayneWade_FTA)
colnames(FTattempts) <- Seasons
rownames(FTattempts) <- Players
FTattempts
#

myanalysis <- function(z, who=1:10) {
  matplot(t(z[who,,drop=F]), type="b", pch=15:18, col=c(1:4,6), main="Basketball Players Analysis")
  legend("bottomleft", inset=0.01, legend=Players[who], col=c(1:4,6), pch=15:18, horiz=F)
}
myanalysis(FThrows)
myanalysis(FTattempts)
#matriz de juegos
KobeBryant_Game <- c(69,66,62,48,53,68,78,42,58,79)
JoeJohnson_Game <- c(46,73,61,29,42,19,55,43,35,74)
LeBronJames_Game <- c(26,48,45,59,69,50,58,40,39,75)
CarmeloAnthony_Game <- c(57,45,46,37,50,50,29,42,45,18)
DwightHoward_Game <- c(35,39,52,50,48,54,28,35,34,14)
ChrisBosh_Game <- c(47,46,47,50,47,38,22,24,22,17)
ChrisPaul_Game <- c(39,49,33,45,56,33,26,68,29,28)
KevinDurant_Game <- c(20,20,31,45,75,59,43,67,70,14)
DerrickRose_Game <- c(14,46,46,17,59,47,19,0,27,25)
DwayneWade_Game <- c(62,43,35,59,54,49,23,30,18,28)

#games matrix
Games<-
rbind(KobeBryant_Game,JoeJohnson_Game,LeBronJames_Game,CarmeloAnthony_Game,DwightH
oward_Game,ChrisBosh_Game,ChrisPaul_Game,KevinDurant_Game,DerrickRose_Game,Dwayne
Wade_Game)
rm(KobeBryant_Game,JoeJohnson_Game,LeBronJames_Game,CarmeloAnthony_Game,DwightHo
ward_Game,ChrisBosh_Game,ChrisPaul_Game,KevinDurant_Game,DerrickRose_Game,DwayneW
ade_Game)
colnames(Games) <- Seasons
rownames(Games) <- Players
Games
#part 1
myanalysis(FTattempts/Games) # Graphic demonstration of the attempts of each player
#especially watching Chris paul who have few shot attempts

#part 2
# Field Annotations array
```

```r
KobeBryant_FG <- c(978,813,775,800,716,740,574,738,31,266)
JoeJohnson_FG <- c(632,536,647,620,635,514,423,445,462,446)
LeBronJames_FG <- c(875,772,794,789,768,758,621,765,767,624)
CarmeloAnthony_FG <- c(756,691,728,535,688,684,441,669,743,358)
DwightHoward_FG <- c(468,526,583,560,510,619,416,470,473,251)
ChrisBosh_FG <- c(549,543,507,615,600,524,393,485,492,343)
ChrisPaul_FG <- c(407,381,630,631,314,430,425,412,406,568)
KevinDurant_FG <- c(306,306,587,661,794,711,643,731,849,238)
DerrickRose_FG <- c(208,208,208,574,672,711,302,0,58,338)
DwayneWade_FG <- c(699,472,439,854,719,692,416,569,415,509)
FieldGoals <- rbind(KobeBryant_FG, JoeJohnson_FG, LeBronJames_FG, CarmeloAnthony_FG,
DwightHoward_FG, ChrisBosh_FG, ChrisPaul_FG, KevinDurant_FG, DerrickRose_FG,
DwayneWade_FG)
rm(KobeBryant_FG, JoeJohnson_FG, LeBronJames_FG, CarmeloAnthony_FG, DwightHoward_FG,
ChrisBosh_FG, ChrisPaul_FG, KevinDurant_FG, DerrickRose_FG, DwayneWade_FG)
colnames(FieldGoals) <- Seasons
rownames(FieldGoals) <- Players

myanalysis(FThrows/FTattempts) #  Here the precision that chris paul has is demonstrated #but that
dwight howard has the worst free throw accuracy
#FieldGoalAttempts
KobeBryant_FGA <- c(2173,1757,1690,1712,1569,1639,1336,1595,73,713)
JoeJohnson_FGA <- c(1395,1139,1497,1420,1386,1161,931,1052,1018,1025)
LeBronJames_FGA <- c(1823,1621,1642,1613,1528,1485,1169,1354,1353,1279)
CarmeloAnthony_FGA <- c(1572,1453,1481,1207,1502,1503,1025,1489,1643,806)
DwightHoward_FGA <- c(881,873,974,979,834,1044,726,813,800,423)
ChrisBosh_FGA <- c(1087,1094,1027,1263,1158,1056,807,907,953,745)
ChrisPaul_FGA <- c(947,871,1291,1255,637,928,890,856,870,1170)
KevinDurant_FGA <- c(647,647,1366,1390,1668,1538,1297,1433,1688,467)
DerrickRose_FGA <- c(436,436,436,1208,1373,1597,695,0,164,835)
DwayneWade_FGA <- c(1413,962,937,1739,1511,1384,837,1093,761,1084)
#Matrix
FieldGoalAttempts <- rbind(KobeBryant_FGA, JoeJohnson_FGA, LeBronJames_FGA,
CarmeloAnthony_FGA, DwightHoward_FGA, ChrisBosh_FGA, ChrisPaul_FGA, KevinDurant_FGA,
DerrickRose_FGA, DwayneWade_FGA)
rm(KobeBryant_FGA, JoeJohnson_FGA, LeBronJames_FGA, CarmeloAnthony_FGA,
DwightHoward_FGA, ChrisBosh_FGA, ChrisPaul_FGA, KevinDurant_FGA, DerrickRose_FGA,
DwayneWade_FGA)
colnames(FieldGoalAttempts) <- Seasons
rownames(FieldGoalAttempts) <- Players

myanalysis(FieldGoals/FieldGoalAttempts) # Here it is graphically demonstrated Dwight has more
annotations than free throws

#Player scores data is created

#Points
KobeBryant_PTS <- c(2832,2430,2323,2201,1970,2078,1616,2133,83,782)
JoeJohnson_PTS <- c(1653,1426,1779,1688,1619,1312,1129,1170,1245,1154)
LeBronJames_PTS <- c(2478,2132,2250,2304,2258,2111,1683,2036,2089,1743)
CarmeloAnthony_PTS <- c(2122,1881,1978,1504,1943,1970,1245,1920,2112,966)
DwightHoward_PTS <- c(1292,1443,1695,1624,1503,1784,1113,1296,1297,646)
ChrisBosh_PTS <- c(1572,1561,1496,1746,1678,1438,1025,1232,1281,928)
ChrisPaul_PTS <- c(1258,1104,1684,1781,841,1268,1189,1186,1185,1564)
```

```
KevinDurant_PTS <- c(903,903,1624,1871,2472,2161,1850,2280,2593,686)
DerrickRose_PTS <- c(597,597,597,1361,1619,2026,852,0,159,904)
DwayneWade_PTS <- c(2040,1397,1254,2386,2045,1941,1082,1463,1028,1331)
#Matrix
Points <- rbind(KobeBryant_PTS, JoeJohnson_PTS, LeBronJames_PTS, CarmeloAnthony_PTS,
DwightHoward_PTS, ChrisBosh_PTS, ChrisPaul_PTS, KevinDurant_PTS, DerrickRose_PTS,
DwayneWade_PTS)
rm(KobeBryant_PTS, JoeJohnson_PTS, LeBronJames_PTS, CarmeloAnthony_PTS,
DwightHoward_PTS, ChrisBosh_PTS, ChrisPaul_PTS, KevinDurant_PTS, DerrickRose_PTS,
DwayneWade_PTS)
colnames(Points) <- Seasons
rownames(Points) <- Players
```

myanalysis ((Points-FThrows)/FieldGoals)# It is to see the change in styles of play # the difference between free throws and field goals # It is observed in the graph that one of the players never changes is dwight since # never takes free throws but always makes field goals so it doesn't change # And the player with the most change in the season is Joe since his annotations have changed # to score 2 to 3 point.
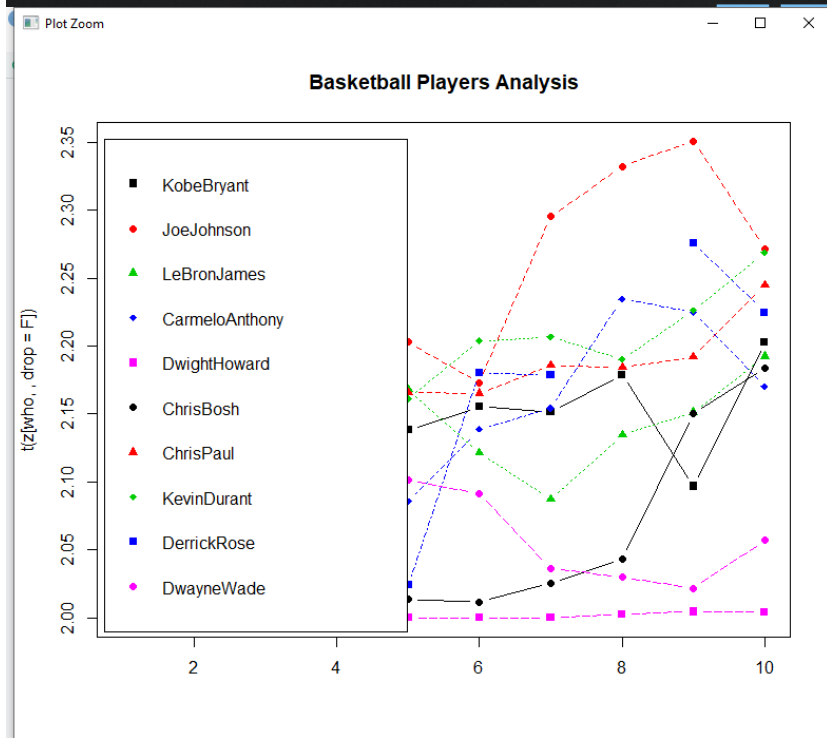
```
> FThrows
               2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
KobeBryant      696  667  623  483  439  483  381  525   18  196
JoeJohnson      261  235  316  299  220  195  158  132  159  141
LeBronJames     601  489  549  594  593  503  387  403  439  375
CarmeloAnthony  573  459  464  371  508  507  295  425  459  189
DwightHoward    356  390  529  504  483  546  281  355  349  143
ChrisBosh       474  463  472  504  470  384  229  241  223  179
ChrisPaul       394  292  332  455  161  337  260  286  295  289
KevinDurant     209  209  391  452  756  594  431  679  703  146
DerrickRose     146  146  146  197  259  476  194    0   27  152
DwayneWade      629  432  354  590  534  494  235  308  189  284
>
```

```
               2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
KobeBryant      819  768  742  564  541  583  451  626   21  241
JoeJohnson      330  314  379  362  269  243  186  161  195  176
LeBronJames     814  701  771  762  773  663  502  535  585  528
CarmeloAnthony  709  568  590  468  612  605  367  512  541  237
DwightHoward    598  666  897  849  816  916  572  721  638  271
ChrisBosh       581  590  559  617  590  471  279  302  272  232
ChrisPaul       465  357  390  524  190  384  302  323  345  321
KevinDurant     256  256  448  524  840  675  501  750  805  171
DerrickRose     205  205  205  250  338  555  239    0   32  187
DwayneWade      803  535  467  771  702  652  297  425  258  370
> myanalysis <- function(z, who=1:10) {
+    matplot(t(z[who,,drop=F]), type="b", pch=15:18, col=c(1:4,6), main="Basketball Players Analysis")
+    legend("bottomleft", inset=0.01, legend=Players[who], col=c(1:4,6), pch=15:18, horiz=F)
+ }
> |
```

R 3.6.2 · ~/

```
> #matriz de juegos
> Games<-rbind(KobeBryant_Game,JoeJohnson_Game,LeBronJames_Game,CarmeloAnthony_Game,DwightHoward_Game,Chri
sBosh_Game,ChrisPaul_Game,KevinDurant_Game,DerrickRose_Game,DwayneWade_Game)
> rm(KobeBryant_Game,JoeJohnson_Game,LeBronJames_Game,CarmeloAnthony_Game,DwightHoward_Game,ChrisBosh_Gam
e,ChrisPaul_Game,KevinDurant_Game,DerrickRose_Game,DwayneWade_Game)
> colnames(Games) <- Seasons
> rownames(Games) <- Players
> Games
               2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
KobeBryant       69   66   62   48   53   68   78   42   58   79
JoeJohnson       46   73   61   29   42   19   55   43   35   74
LeBronJames      26   48   45   59   69   50   58   40   39   75
CarmeloAnthony   57   45   46   37   50   50   29   42   45   18
DwightHoward     35   39   52   50   48   54   28   35   34   14
ChrisBosh        47   46   47   50   47   38   22   24   22   17
ChrisPaul        39   49   33   45   56   33   26   68   29   28
KevinDurant      20   20   31   45   75   59   43   67   70   14
DerrickRose      14   46   46   17   59   47   19    0   27   25
DwayneWade       62   43   35   59   54   49   23   30   18   28
> #part 1
> myanalysis(FTattempts/Games) #Demostracion grafica de los intentos de cada jugador
> |
```


Basketball Players Analysis

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

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```
122  #Matrix
123  FieldGoalAttempts <- rbind(KobeBryant_FGA, JoeJohnson_FGA, LeBronJames_FGA, CarmeloAnthony_FGA, Dwi
124  rm(KobeBryant_FGA, JoeJohnson_FGA, LeBronJames_FGA, CarmeloAnthony_FGA, DwightHoward_FGA, ChrisBosh
125  colnames(FieldGoalAttempts) <- Seasons
126  rownames(FieldGoalAttempts) <- Players
127
128  myanalysis(FieldGoals/FieldGoalAttempts) #Aqui se demuestra graficamente Dwight tiene mas anotacione
129  #a diferencia de los tiros libre
130
131
132
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```

129:1

Console

R R 3.6
> #Ta u
> #Se o
> #nunc
> #Y el
> #de a
> myana
> |

Environment History Connections Tutorial

Import Dataset ▾   125 MiB ▾

R ▾   Global Environment ▾

Games   num [1:10, 1:10] 69 46 26 37 35 47...
Points   num [1:10, 1:10] 2832 1653 2478 21...

Values
Players   chr [1:10] "KobeBryant" "JoeJohnson"...
Seasons   chr [1:10] "2005" "2006" "2007" "200...

Functions
myanalysis function (z, who = 1:10)

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Zoom   Export ▾

Basketball Players Analysis

t(z[who, , drop = F])

Plot Zoom   — □ ×

Basketball Players Analysis

■ KobeBryant
● JoeJohnson
▲ LeBronJames
◆ CarmeloAnthony
■ DwightHoward
● ChrisBosh
▲ ChrisPaul
◆ KevinDurant
■ DerrickRose
● DwayneWade

22°C Soleado   ESP   06:03 p.m. 15/03/2022