MVA_WorldHappinessAnalysis.R

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```
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#Assignment: World Happiness Analysis
#Loading the data
worldh <- read.csv("C:/Users/Soukhyada/Desktop/WH_2017.csv")

#Loading packages required for the analysis
library(plyr)
library(plotly)
```

```
## Warning: package 'plotly' was built under R version 3.5.2
```

```
## Loading required package: ggplot2
```

```
## Warning: package 'ggplot2' was built under R version 3.5.2
```

```
##
## Attaching package: 'plotly'
```

```
## The following object is masked from 'package:ggplot2':
##
##     last_plot
```

```
## The following objects are masked from 'package:plyr':
##
##     arrange, mutate, rename, summarise
```

```
## The following object is masked from 'package:stats':
##
##     filter
```

```
## The following object is masked from 'package:graphics':
##
##     layout
```

```
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 3.5.2
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:plyr':
##
##     arrange, count, desc, failwith, id, mutate, rename, summarise,
##     summarize
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------------------------------------------- tidyverse 1.2.1
--
```

```
## v tibble  2.0.1     v purrr   0.2.5
## v tidyr   0.8.2     v stringr 1.4.0
## v readr   1.3.1     v forcats 0.3.0
```

```
## Warning: package 'tibble' was built under R version 3.5.2
```

```
## Warning: package 'tidyr' was built under R version 3.5.2
```

```
## Warning: package 'readr' was built under R version 3.5.2
```

```
## Warning: package 'stringr' was built under R version 3.5.2
```

```
## Warning: package 'forcats' was built under R version 3.5.2
```

```
## -- Conflicts ---------------------------------------------------------------------------- tidyverse_conflicts()
--
## x dplyr::arrange()   masks plotly::arrange(), plyr::arrange()
## x purrr::compact()   masks plyr::compact()
## x dplyr::count()     masks plyr::count()
## x dplyr::failwith()  masks plyr::failwith()
## x dplyr::filter()    masks plotly::filter(), stats::filter()
## x dplyr::id()        masks plyr::id()
## x dplyr::lag()       masks stats::lag()
## x dplyr::mutate()    masks plotly::mutate(), plyr::mutate()
## x dplyr::rename()    masks plotly::rename(), plyr::rename()
## x dplyr::summarise() masks plotly::summarise(), plyr::summarise()
## x dplyr::summarize() masks plyr::summarize()
```

```
library(lubridate)
```

```
## Warning: package 'lubridate' was built under R version 3.5.2
```

```
##
## Attaching package: 'lubridate'
```

```
## The following object is masked from 'package:plyr':
##
##     here
```

```
## The following object is masked from 'package:base':
##
##     date
```

```
library(caTools)
library(ggplot2)
library(ggthemes)
```

```
## Warning: package 'ggthemes' was built under R version 3.5.2
```

```
library(reshape2)
```

```
##
## Attaching package: 'reshape2'
```

```
## The following object is masked from 'package:tidyr':
##
##     smiths
```

```
library(data.table)
```

```
##
## Attaching package: 'data.table'
```

```
## The following objects are masked from 'package:reshape2':
##
##     dcast, melt
```

```
## The following objects are masked from 'package:lubridate':
##
##     hour, isoweek, mday, minute, month, quarter, second, wday,
##     week, yday, year
```

```
## The following object is masked from 'package:purrr':
##
##     transpose
```

```
## The following objects are masked from 'package:dplyr':
##
##     between, first, last
```

```
library(tidyr)
library(corrgram)
```

```
## Warning: package 'corrgram' was built under R version 3.5.2
```

```
##
## Attaching package: 'corrgram'
```

```
## The following object is masked from 'package:plyr':
##
##     baseball
```

```
library(corrplot)
```

```
## Warning: package 'corrplot' was built under R version 3.5.2
```

```
## corrplot 0.84 loaded
```

```
library(formattable)
```

```
## Warning: package 'formattable' was built under R version 3.5.2
```

```
##
## Attaching package: 'formattable'
```

```
## The following object is masked from 'package:plotly':
##
##     style
```

```
library(cowplot)
```

```
## Warning: package 'cowplot' was built under R version 3.5.2
```

```
##
## Attaching package: 'cowplot'
```

```
## The following object is masked from 'package:ggthemes':
##
##     theme_map
```

```
## The following object is masked from 'package:ggplot2':
##
##     ggsave
```

```
library(ggpubr)
```

```
## Warning: package 'ggpubr' was built under R version 3.5.2
```

```
## Loading required package: magrittr
```

```
##
## Attaching package: 'magrittr'
```

```
## The following object is masked from 'package:purrr':
##
##     set_names
```

```
## The following object is masked from 'package:tidyr':
##
##     extract
```

```
##
## Attaching package: 'ggpubr'
```

```
## The following object is masked from 'package:cowplot':
##
##     get_legend
```

```
## The following object is masked from 'package:plyr':
##
##     mutate
```

```
library(plot3D)
```

```
## Warning: package 'plot3D' was built under R version 3.5.2
```

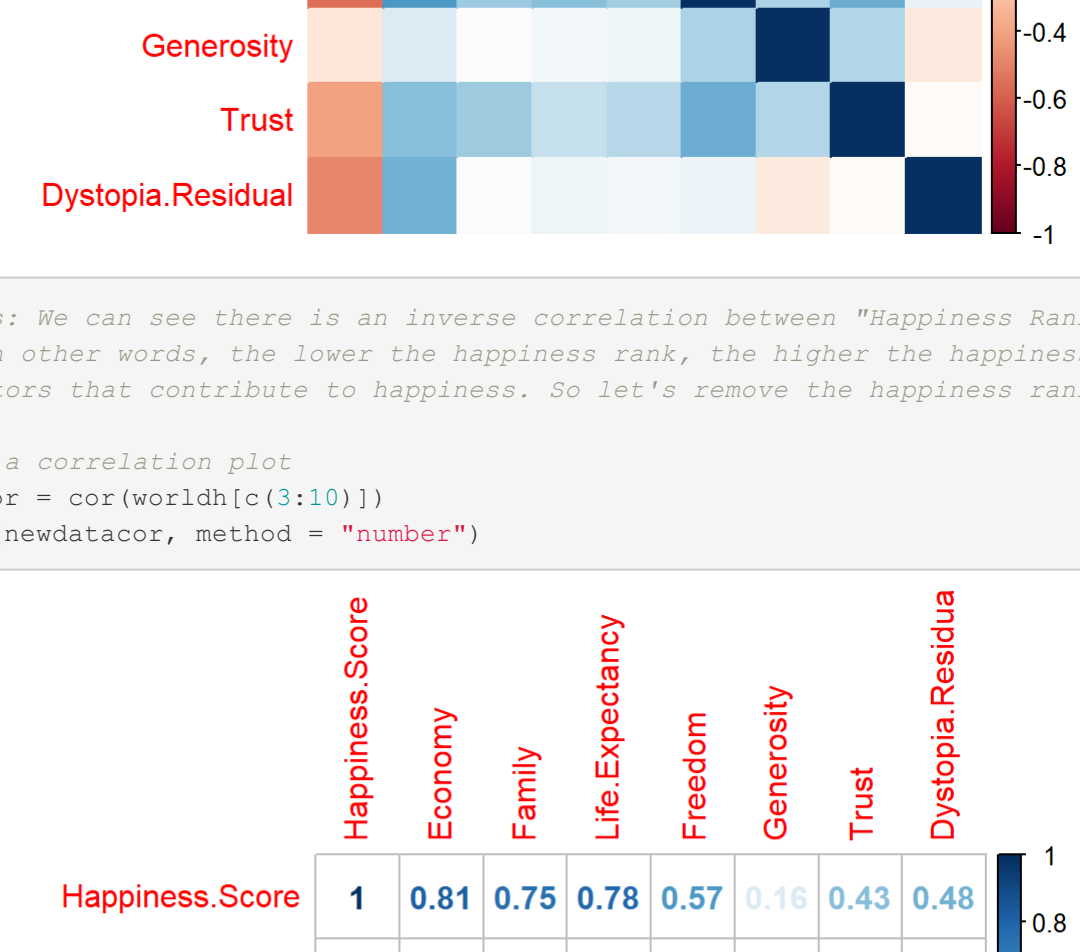
```
#View the data
View(worldh)
#Displays the first few rows of the dataset
head(worldh)
```

```
##       Country Happiness.Rank Happiness.Score Whisker.high Whisker.low
## 1      Norway              1           7.537     7.594445    7.479556
## 2     Denmark              2           7.522     7.581728    7.462272
## 3     Iceland              3           7.504     7.622030    7.385970
## 4 Switzerland              4           7.494     7.561772    7.426227
## 5     Finland              5           7.469     7.527542    7.410458
## 6 Netherlands              6           7.377     7.427426    7.326574
##   Economy..GDP.per.Capita.   Family Health..Life.Expectancy.   Freedom
## 1                 1.616463 1.533524                0.7966665 0.6354226
## 2                 1.482383 1.551122                0.7925655 0.6260067
## 3                 1.480633 1.610574                0.8335521 0.6271626
## 4                 1.564980 1.516912                0.8581313 0.6200706
## 5                 1.443572 1.540247                0.8091577 0.6179509
## 6                 1.503945 1.428939                0.8106961 0.5853845
##   Generosity Trust..Government.Corruption. Dystopia.Residual
## 1  0.3620122                     0.3159638          2.277027
## 2  0.3552805                     0.4007701          2.313707
## 3  0.4755402                     0.1535266          2.322715
## 4  0.2905493                     0.3670073          2.276716
## 5  0.2454828                     0.3826115          2.430182
## 6  0.4704898                     0.2826618          2.294804
```

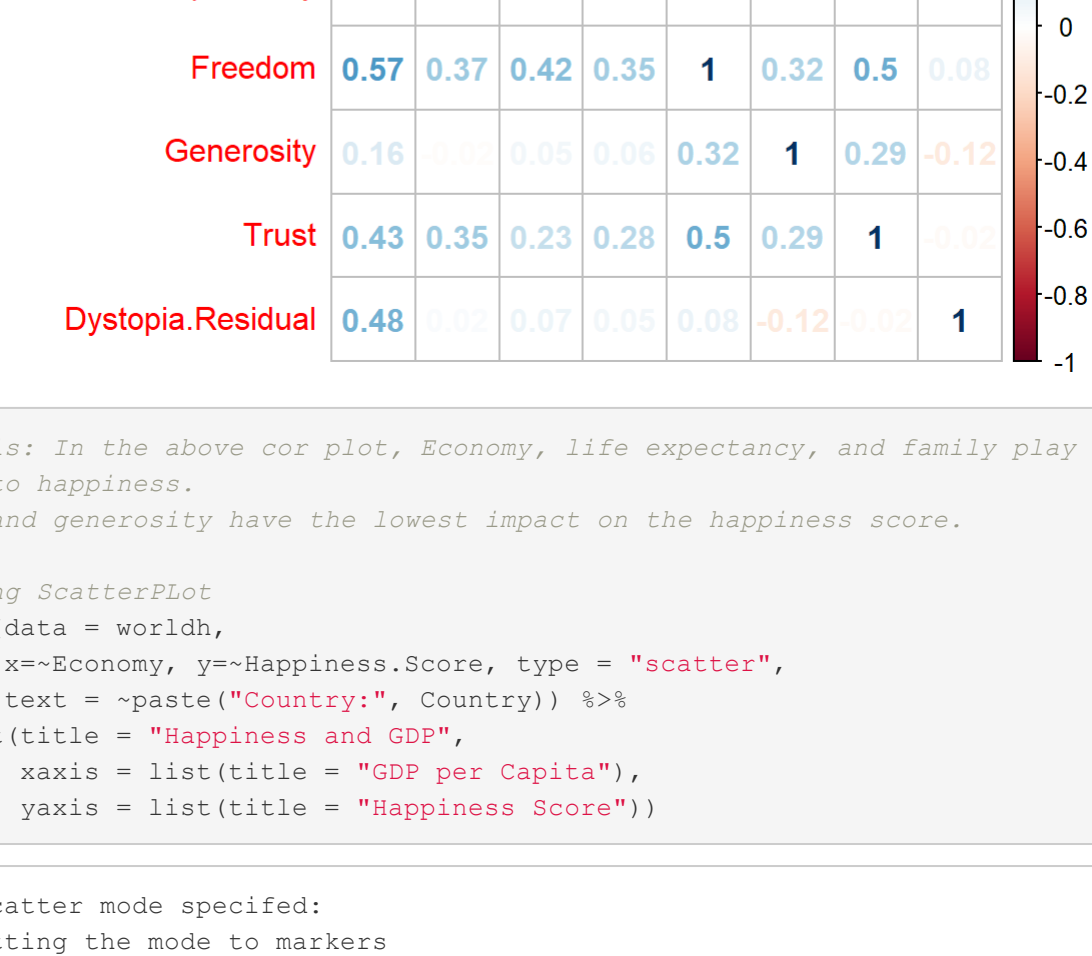
```
#Display the structure of the attributes
str(worldh)
```

```
## 'data.frame':    155 obs. of  12 variables:
##  $ Country                      : Factor w/ 155 levels "Afghanistan",..: 105 38 58 133 45 99 26 100 132 7
...
##  $ Happiness.Rank               : int  1 2 3 4 5 6 7 8 9 10 ...
##  $ Happiness.Score              : num  7.54 7.52 7.5 7.49 7.47 ...
##  $ Whisker.high                 : num  7.59 7.58 7.62 7.56 7.53 ...
##  $ Whisker.low                  : num  7.48 7.46 7.39 7.43 7.41 ...
##  $ Economy..GDP.per.Capita.     : num  1.62 1.48 1.48 1.56 1.44 ...
##  $ Family                       : num  1.53 1.55 1.61 1.52 1.54 ...
##  $ Health..Life.Expectancy.     : num  0.797 0.793 0.834 0.858 0.809 ...
##  $ Freedom                      : num  0.635 0.626 0.627 0.62 0.618 ...
##  $ Generosity                   : num  0.362 0.355 0.476 0.291 0.245 ...
##  $ Trust..Government.Corruption.: num  0.316 0.401 0.154 0.367 0.383 ...
##  $ Dystopia.Residual            : num  2.28 2.31 2.32 2.28 2.43 ...
```

```
# Changing the name of columns
colnames (worldh) <- c("Country", "Happiness.Rank", "Happiness.Score",
                       "Whisker.High", "Whisker.Low", "Economy", "Family",
                       "Life.Expectancy", "Freedom", "Generosity",
                       "Trust", "Dystopia.Residual")

# Deleting unnecessary columns (Whisker.high and Whisker.low)
worldh <- worldh[, -c(4,5)]

# Finding the correlation between numerical columns
Num.cols <- sapply(worldh, is.numeric)
Cor.data <- cor(worldh[, Num.cols])
corrplot(Cor.data, method = 'color')
```

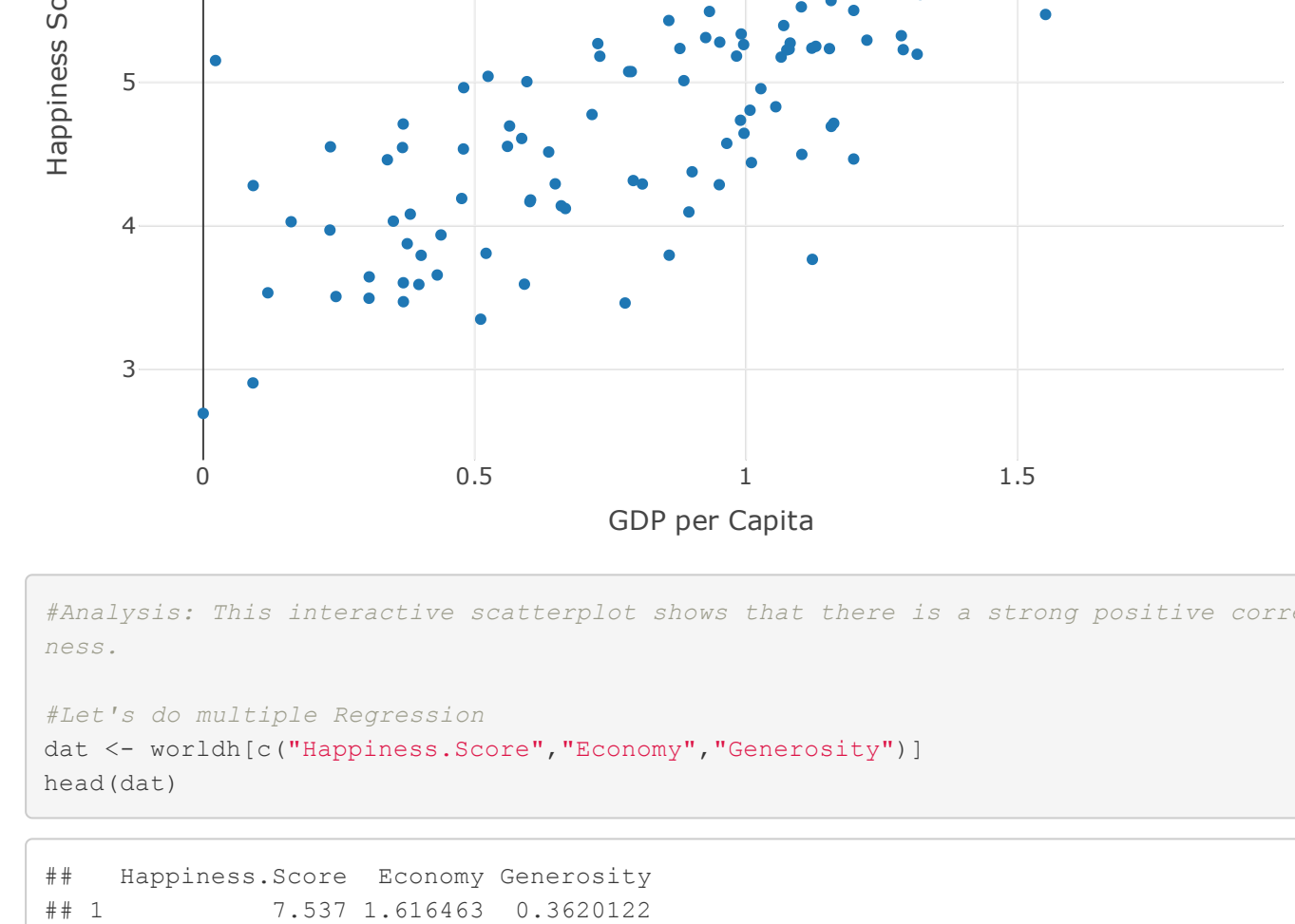



```
#Analysis: We can see there is an inverse correlation between "Happiness Rank" and all the other numerical vari
ables. In other words, the lower the happiness rank, the higher the happiness score, and the higher the other s
even factors that contribute to happiness. So let's remove the happiness rank, and see the correlation again.

# Create a correlation plot
newdatacor = cor(worldh[c(3:10)])
corrplot(newdatacor, method = "number")
```




```
#Analysis: In the above cor plot, Economy, life expectancy, and family play the most significant role in contri
buting to happiness.
#Trust and generosity have the lowest impact on the happiness score.

#Plotting ScatterPLot
plot_ly(data = worldh,
        x=~Economy, y=~Happiness.Score, type = "scatter",
        text = ~paste("Country:", Country)) %>%
  layout(title = "Happiness and GDP",
         xaxis = list(title = "GDP per Capita"),
         yaxis = list(title = "Happiness Score"))
```

```
## No scatter mode specifed:
##   Setting the mode to markers
##   Read more about this attribute -> https://plot.ly/r/reference/#scatter-mode
```

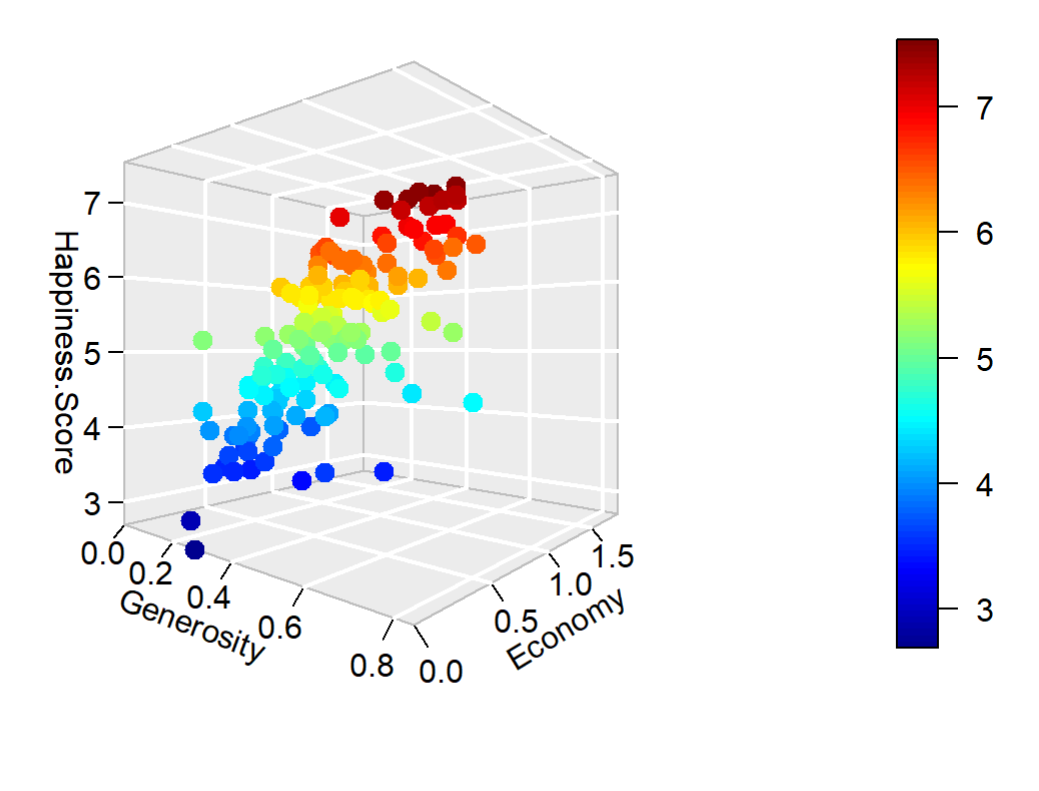



```
#Analysis: This interactive scatterplot shows that there is a strong positive correlation between GDP and Happi
ness.

#Let's do multiple Regression
dat <- worldh[c("Happiness.Score","Economy","Generosity")]
head(dat)
```

```
##   Happiness.Score  Economy Generosity
## 1           7.537 1.616463  0.3620122
## 2           7.522 1.482383  0.3552805
## 3           7.504 1.480633  0.4755402
## 4           7.494 1.564980  0.2905493
## 5           7.469 1.443572  0.2454828
## 6           7.377 1.503945  0.4704898
```

```
plot(dat)
```


```
#It seems like there is a positive correlation between economy and happiness score but this is not true between
happiness score
#and generosity.

#3D plot of same
scatter3D(dat$Generosity, dat$Economy, dat$Happiness.Score, phi = 0, bty = "g",
          pch = 20, cex = 2, ticktype = "detailed",
          main = "Happiness data", xlab = "Generosity",
          ylab ="Economy", zlab = "Happiness.Score")
```




```
#From the scatter plot we cannot determine that combination of high economy and generosity leads to greater hap
piness score.
#This is something we have to conclude after analyzing the effect of these 2 taken together.
```