machine learning-1

2023-09-10

```
Appstore <-read.csv("C:/Users/pardh/OneDrive/Desktop/FML ASSIGNMENT-1/AppleStore.csv")
```

```
Appstore
```

```
##     X                                          track_name size_bytes currency
## 1   1                                     PAC-MAN Premium  100788224      USD
## 2   2                             Evernote - stay organized  158578688      USD
## 3   3      WeatherBug - Local Weather, Radar, Maps, Alerts  100524032      USD
## 4   4 eBay: Best App to Buy, Sell, Save! Online Shopping  128512000      USD
## 5   5                                               Bible   92774400      USD
## 6   6                                     Shanghai Mahjong   10485713      USD
## 7   7             PayPal - Send and request money safely  227795968      USD
## 8   8                             Pandora - Music & Radio  130242560      USD
## 9   9                             PCalc - The Best Calculator   49250304      USD
## 10 10                                          Ms. PAC-MAN   70023168      USD
## 11 11                             Solitaire by MobilityWare   49618944      USD
## 12 12                                    SCRABBLE Premium  227547136      USD
## 13 13             Google – Search made just for mobile  179979264      USD
## 14 14                   Bank of America - Mobile Banking  160925696      USD
## 15 15                                            FreeCell   55153664      USD
## 16 16             TripAdvisor Hotels Flights Restaurants  207907840      USD
## 17 17                                            Facebook  389879808      USD
## 18 18        Yelp - Nearby Restaurants, Shopping & Services  167407616      USD
## 19 20    Shazam - Discover music, artists, videos & lyrics  147093504      USD
## 20 21                          Crash Bandicoot Nitro Kart 3D   10735026      USD
## 21 22                                               iQuran   70707916      USD
## 22 23                                          :) Sudoku +    6169600      USD
## 23 24    Yahoo Sports - Teams, Scores, News & Highlights  130583552      USD
## 24 25                             Mileage Log | Fahrtenbuch   71203840      USD
## 25 27                             Cleartune - Chromatic Tuner   11423008      USD
## 26 28        Lifesum – Inspiring healthy lifestyle app  188017664      USD
## 27 29                                             Hangman.    4765696      USD
## 28 31        iTranslate - Language Translator & Dictionary  287933440      USD
## 29 32                                             TouchOSC    4263936      USD
## 30 33                                            RadarScope  172772352      USD
## 31 34                                              LinkedIn  273844224      USD
## 32 35                                 Period Tracker Deluxe   40216576      USD
## 33 36                                     Election 2016 Map    2386944      USD
## 34 37                             Blackjack by MobilityWare  105431040      USD
## 35 39                                          White Noise   44129280      USD
## 36 40        iHeartRadio – Free Music & Radio Stations  116443136      USD
## 37 41                                    Line Rider iRide™    1646592      USD
## 38 42                         Deliveries: a package tracker   30016512      USD
## 39 43                                         Hurricane Pro   29518848      USD
## 40 47                                          Fieldrunners   66872320      USD
## 41 48                                            Juxtaposer   45229056      USD
## 42 49 Deezer - Listen to your Favorite Music & Playlists  127470592      USD
## 43 50                                             iStellar   44241920      USD
## 44 51                                     Sonos Controller  107983872      USD
## 45 52                                            Avertinoo    8044544      USD
## 46 53                                         Google Earth   37214208      USD
## 47 54             iFart - The Original Fart Sounds App   60320768      USD
## 48 55                                             PAC-MAN  100849664      USD
## 49 57                                    FOX Sports Mobile   72748032      USD
## 50 58                                   First Words Animals   32164864      USD
##     price rating_count_tot rating_count_ver user_rating user_rating_ver
```

```
   ## 1    3.99        21292        26     4.0       4.5
   ## 2    0.00       161065        26     4.0       3.5
   ## 3    0.00       188583      2822     3.5       4.5
   ## 4    0.00       262241       649     4.0       4.5
   ## 5    0.00       985920      5320     4.5       5.0
   ## 6    0.99         8253      5516     4.0       4.0
   ## 7    0.00       119487       879     4.0       4.5
   ## 8    0.00      1126879      3594     4.0       4.5
   ## 9    9.99         1117         4     4.5       5.0
   ## 10   3.99         7885        40     4.0       4.0
   ## 11   4.99        76720      4017     4.5       4.5
   ## 12   7.99       105776       166     3.5       2.5
   ## 13   0.00       479440       203     3.5       4.0
   ## 14   0.00       119773      2336     3.5       4.5
   ## 15   4.99         6340       668     4.5       4.5
   ## 16   0.00        56194        87     4.0       3.5
   ## 17   0.00      2974676       212     3.5       3.5
   ## 18   0.00       223885      3726     4.0       4.5
   ## 19   0.00       402925       136     4.0       4.5
   ## 20   2.99        31456      4178     4.0       3.5
   ## 21   1.99         2929       966     4.5       4.5
   ## 22   2.99        11447       781     5.0       5.0
   ## 23   0.00       137951       131     4.0       4.5
   ## 24   5.99            8         0     4.5       0.0
   ## 25   3.99         3241       297     4.0       4.0
   ## 26   0.00         5795        12     3.5       4.0
   ## 27   0.00        42316       248     3.0       3.5
   ## 28   0.00       123215        25     3.5       5.0
   ## 29   4.99          782         7     4.0       3.5
   ## 30   9.99         3449        23     4.0       4.5
   ## 31   0.00        71856        62     3.5       4.5
   ## 32   1.99        13350       489     4.5       5.0
   ## 33   0.99          137         0     3.0       0.0
   ## 34   0.00       180087      1101     3.5       4.5
   ## 35   0.99        33426       299     4.0       5.0
   ## 36   0.00       293228       110     4.0       3.0
   ## 37   1.99        21609        69     3.5       2.5
   ## 38   4.99         4684        10     4.0       4.0
   ## 39   2.99         2104         0     4.5       0.0
   ## 40   2.99        41633         6     4.0       3.0
   ## 41   2.99         3610         7     4.5       5.0
   ## 42   0.00         4677        12     3.0       4.0
   ## 43   3.99           30         0     3.5       0.0
   ## 44   0.00        48905      2691     4.5       4.5
   ## 45   4.99           32         0     3.0       0.0
   ## 46   0.00       446185      1359     3.5       3.5
   ## 47   1.99        21825        10     3.0       4.0
   ## 48   0.00       508808        99     3.0       4.5
   ## 49   0.00        57500       103     3.0       4.0
   ## 50   1.99         2576         4     4.0       5.0
   ##           ver cont_rating     prime_genre sup_devices.num ipadSc_urls.num
   ## 1       6.3.5          4+           Games              38               5
```

```
## 2       8.2.2      4+        Productivity           37          5
## 3       5.0.0      4+          Weather              37          5
## 4       5.10.0    12+          Shopping             37          5
## 5       7.5.1      4+         Reference             37          5
## 6         1.8      4+            Games              47          5
## 7       6.12.0     4+           Finance             37          0
## 8       8.4.1     12+            Music              37          4
## 9       3.6.6      4+          Utilities            37          5
## 10      4.0.4      4+            Games              38          0
## 11      4.10.1     4+            Games              38          4
## 12      5.19.0     4+            Games              37          0
## 13         27     17+          Utilities            37          4
## 14      7.3.8      4+           Finance             37          0
## 15      4.0.3      4+            Games              38          5
## 16       21.1      4+           Travel              37          1
## 17         95      4+ Social Networking             37          1
## 18     11.15.0    12+           Travel              37          5
## 19     11.0.3     12+            Music              37          3
## 20       1.0.0     4+            Games              47          0
## 21         3.3     4+         Reference             43          0
## 22       5.2.6     4+            Games              40          5
## 23         6.9     4+           Sports              37          2
## 24       9.0.5     4+          Business             37          5
## 25       2.1.3     4+            Music              43          2
## 26       8.4.1     4+   Health & Fitness            37          5
## 27       2.0.6     9+            Games              38          0
## 28      10.5.4     4+        Productivity           37          5
## 29       1.9.8     4+            Music              43          1
## 30       3.4.1     4+          Weather              37          5
## 31      9.1.32     4+ Social Networking             37          2
## 32         9.6    12+   Health & Fitness            38          0
## 33           5     4+       Entertainment           37          1
## 34       5.5.3    12+            Games              37          5
## 35         7.2     4+   Health & Fitness            37          5
## 36       8.0.0    12+            Music              37          5
## 37         2.4     9+       Entertainment           40          0
## 38       8.0.3     4+          Utilities            37          4
## 39         5.2    17+          Weather              37          0
## 40 1.7.177604     9+            Games              37          0
## 41       3.8.2     4+       Photo & Video           37          5
## 42      6.19.0    12+            Music              37          5
## 43       2.9.0     4+         Navigation            37          0
## 44         7.2     4+            Music              37          4
## 45       3.9.2     4+         Navigation            38          5
## 46       7.1.6     4+           Travel              43          5
## 47       4.0.8     9+       Entertainment           37          5
## 48       6.3.5     4+            Games              38          5
## 49      3.5.13     4+           Sports              37          0
## 50           7     4+            Games              38          5
```

```
summary(Appstore)
```

```
##        X              track_name           size_bytes            currency
##  Min.   : 1.00   Length:50          Min.   :  1646592   Length:50
##  1st Qu.:13.25   Class :character   1st Qu.: 37964800   Class :character
##  Median :27.50   Mode  :character   Median : 71975936   Mode  :character
##  Mean   :28.14                      Mean   : 99196751
##  3rd Qu.:41.75                      3rd Qu.:142966016
##  Max.   :58.00                      Max.   :389879808
##      price        rating_count_tot  rating_count_ver   user_rating
##  Min.   :0.000   Min.   :      8   Min.   :   0.0   Min.   :3.00
##  1st Qu.:0.000   1st Qu.:   4679   1st Qu.:  12.0   1st Qu.:3.50
##  Median :0.990   Median :  37530   Median : 120.5   Median :4.00
##  Mean   :2.055   Mean   : 188946   Mean   : 870.5   Mean   :3.86
##  3rd Qu.:3.740   3rd Qu.: 155287   3rd Qu.: 854.5   3rd Qu.:4.00
##  Max.   :9.990   Max.   :2974676   Max.   :5516.0   Max.   :5.00
##  user_rating_ver      ver              cont_rating        prime_genre
##  Min.   :0.00    Length:50          Length:50          Length:50
##  1st Qu.:3.50    Class :character   Class :character   Class :character
##  Median :4.25    Mode  :character   Mode  :character   Mode  :character
##  Mean   :3.76
##  3rd Qu.:4.50
##  Max.   :5.00
##  sup_devices.num ipadSc_urls.num
##  Min.   :37.00   Min.   :0.00
##  1st Qu.:37.00   1st Qu.:0.25
##  Median :37.00   Median :4.00
##  Mean   :38.18   Mean   :3.06
##  3rd Qu.:38.00   3rd Qu.:5.00
##  Max.   :47.00   Max.   :5.00
```

```
mean(Appstore$user_rating_ver)
```

```
## [1] 3.76
```

```
median(Appstore$user_rating_ver)
```

```
## [1] 4.25
```

```
min(Appstore$user_rating_ver)
```

```
## [1] 0
```

```
max(Appstore$user_rating_ver)
```

```
## [1] 5
```

```
sum(Appstore$user_rating_ver)
```

```
## [1] 188
```

```
sd(Appstore$user_rating_ver)
```

```
## [1] 1.411469
```

```
var(Appstore$user_rating_ver)
```

```
## [1] 1.992245
```

```
str(Appstore$prime_genre)
```

```
##  chr [1:50] "Games" "Productivity" "Weather" "Shopping" "Reference" "Games" ...
```

```
# 3 Descriptive Statistics for the selection of quantitative and categorical variables

table(Appstore$track_name)
```

```
##
##                                                  :) Sudoku +
##                                                            1
##                                                    Avertinoo
##                                                            1
##                          Bank of America - Mobile Banking
##                                                            1
##                                                        Bible
##                                                            1
##                                   Blackjack by MobilityWare
##                                                            1
##                                 Cleartune - Chromatic Tuner
##                                                            1
##                               Crash Bandicoot Nitro Kart 3D
##                                                            1
## Deezer - Listen to your Favorite Music & Playlists
##                                                            1
##                               Deliveries: a package tracker
##                                                            1
## eBay: Best App to Buy, Sell, Save! Online Shopping
##                                                            1
##                                              Election 2016 Map
##                                                            1
##                                     Evernote - stay organized
##                                                            1
##                                                     Facebook
##                                                            1
##                                                  Fieldrunners
##                                                            1
##                                          First Words Animals
##                                                            1
##                                             FOX Sports Mobile
##                                                            1
##                                                     FreeCell
##                                                            1
##                          Google – Search made just for mobile
##                                                            1
##                                                 Google Earth
##                                                            1
##                                                    Hangman.
##                                                            1
##                                                Hurricane Pro
##                                                            1
##                           iFart - The Original Fart Sounds App
##                                                            1
##                    iHeartRadio – Free Music & Radio Stations
##                                                            1
##                                                       iQuran
##                                                            1
##                                                      iStellar
##                                                            1
##           iTranslate - Language Translator & Dictionary
```

```
##                                                           1
##                                                   Juxtaposer
##                                                           1
##             Lifesum – Inspiring healthy lifestyle app
##                                                           1
##                                            Line Rider iRide™
##                                                           1
##                                                    LinkedIn
##                                                           1
##                              Mileage Log | Fahrtenbuch
##                                                           1
##                                               Ms. PAC-MAN
##                                                           1
##                                                   PAC-MAN
##                                                           1
##                                            PAC-MAN Premium
##                                                           1
##                                    Pandora - Music & Radio
##                                                           1
##                  PayPal - Send and request money safely
##                                                           1
##                            PCalc - The Best Calculator
##                                                           1
##                                    Period Tracker Deluxe
##                                                           1
##                                                  RadarScope
##                                                           1
##                                           SCRABBLE Premium
##                                                           1
##                                           Shanghai Mahjong
##                                                           1
##        Shazam - Discover music, artists, videos & lyrics
##                                                           1
##                                 Solitaire by MobilityWare
##                                                           1
##                                          Sonos Controller
##                                                           1
##                                                    TouchOSC
##                                                           1
##                   TripAdvisor Hotels Flights Restaurants
##                                                           1
##         WeatherBug - Local Weather, Radar, Maps, Alerts
##                                                           1
##                                                 White Noise
##                                                           1
##         Yahoo Sports - Teams, Scores, News & Highlights
##                                                           1
##           Yelp - Nearby Restaurants, Shopping & Services
##                                                           1
```

```
str(Appstore$track_name)
```

```
##  chr [1:50] "PAC-MAN Premium" "Evernote - stay organized" ...
```

```
# 4 Transforming the Variables

log(Appstore$rating_count_ver)
```

```
##  [1] 3.258097 3.258097 7.945201 6.475433 8.579229 8.615408 6.778785 8.187021
##  [9] 1.386294 3.688879 8.298291 5.111988 5.313206 7.756195 6.504288 4.465908
## [17] 5.356586 8.223091 4.912655 8.337588 6.873164 6.660575 4.875197      -Inf
## [25] 5.693732 2.484907 5.513429 3.218876 1.945910 3.135494 4.127134 6.192362
## [33]      -Inf 7.003974 5.700444 4.700480 4.234107 2.302585      -Inf 1.791759
## [41] 1.945910 2.484907      -Inf 7.897668      -Inf 7.214504 2.302585 4.595120
## [49] 4.634729 1.386294
```

```
t <- Appstore$user_rating_ver-mean(Appstore$user_rating)/sd(Appstore$user_rating_ver)

t
```
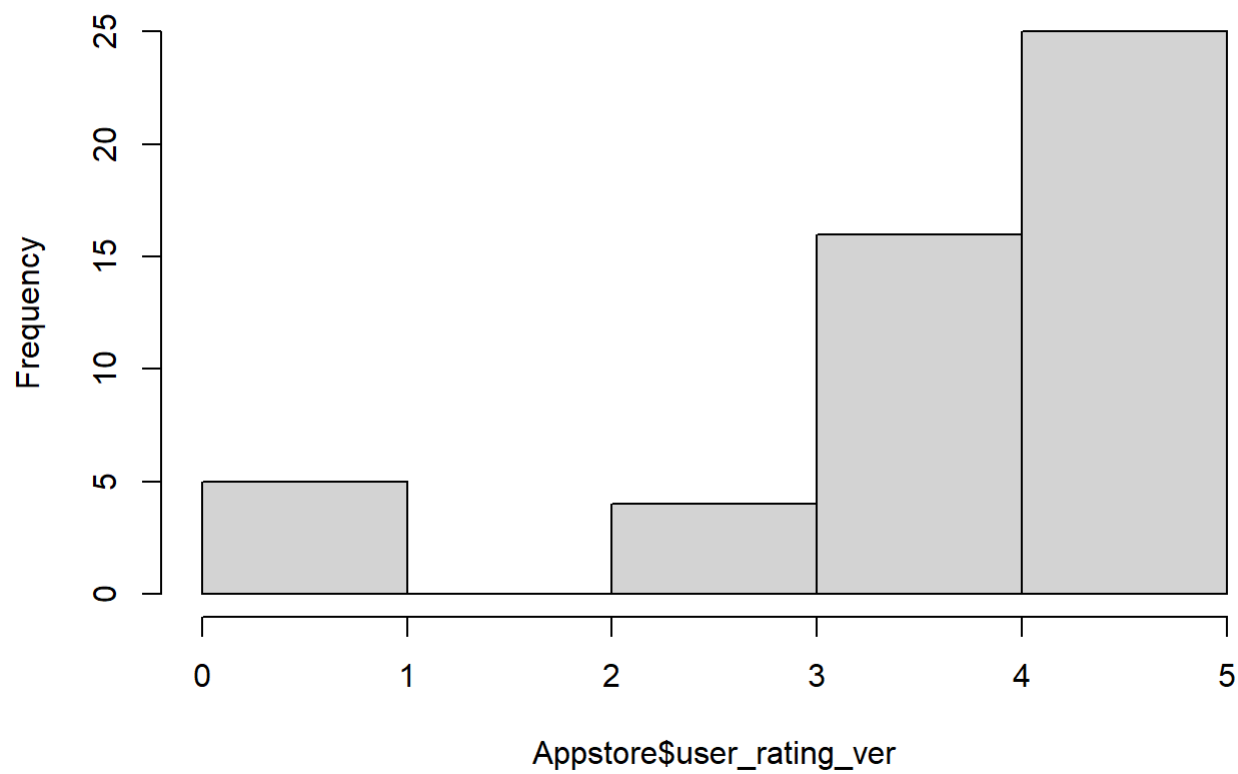
```
##  [1]  1.7652606  0.7652606  1.7652606  1.7652606  2.2652606  1.2652606
##  [7]  1.7652606  1.7652606  2.2652606  1.2652606  1.7652606 -0.2347394
## [13]  1.2652606  1.7652606  1.7652606  0.7652606  0.7652606  1.7652606
## [19]  1.7652606  0.7652606  1.7652606  2.2652606  1.7652606 -2.7347394
## [25]  1.2652606  1.2652606  0.7652606  2.2652606  0.7652606  1.7652606
## [31]  1.7652606  2.2652606 -2.7347394  1.7652606  2.2652606  0.2652606
## [37] -0.2347394  1.2652606 -2.7347394  0.2652606  2.2652606  1.2652606
## [43] -2.7347394  1.7652606 -2.7347394  0.7652606  1.2652606  1.7652606
## [49]  1.2652606  2.2652606
```

```
# 5 Plotting one variable

hist(Appstore$user_rating_ver,main = "Histogram for Ratings")
```

Histogram for Ratings


```
# 6 Scatterplot

plot(Appstore$user_rating_ver,Appstore$rating_count_tot, main = "Scatterplot")
```

Scatterplot