PREDICTING IMDB MOVIE GROSS INCOME USING MULTIPLE LINEAR REGRESSION

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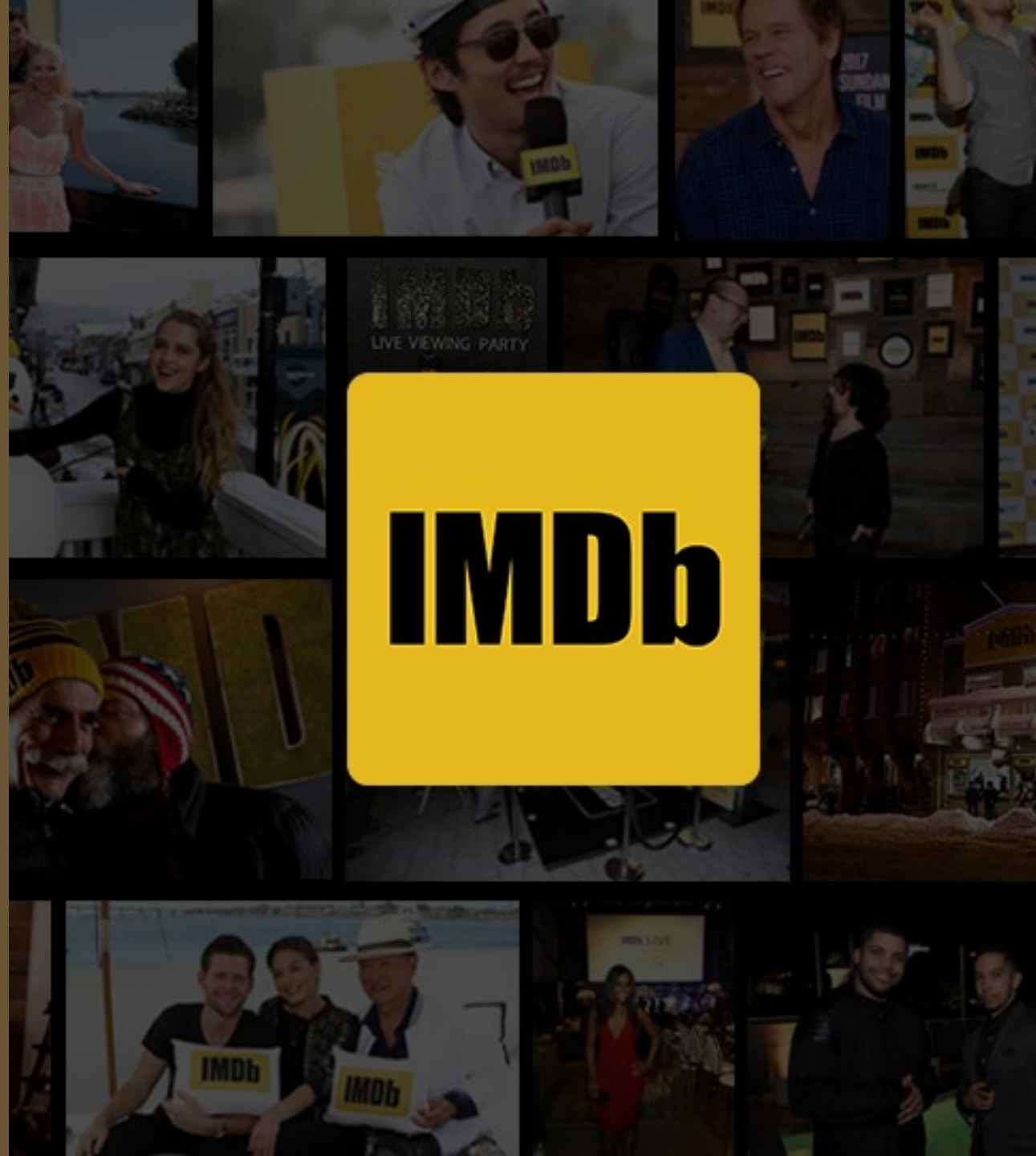
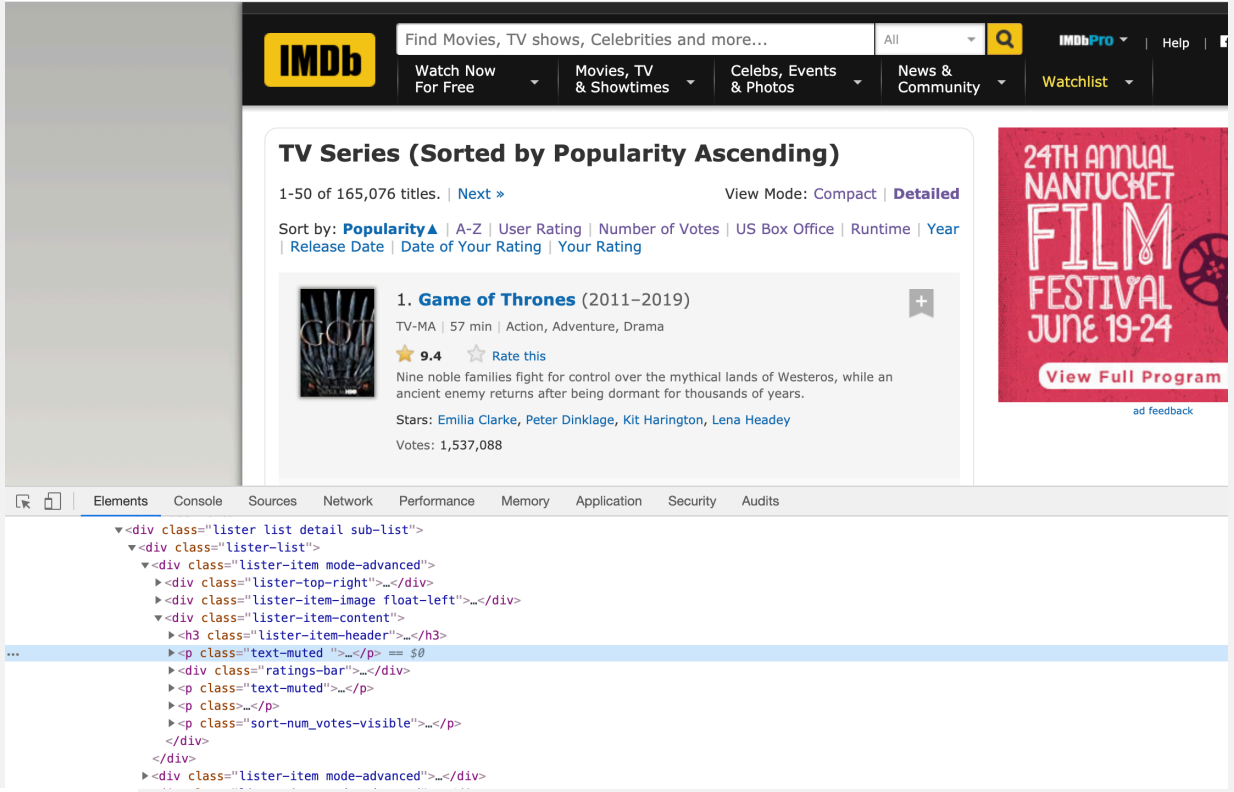


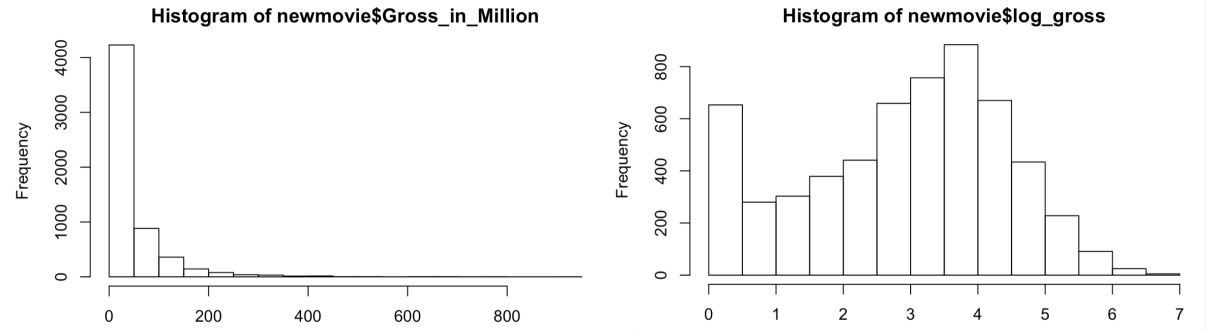
WEB SCRAPING

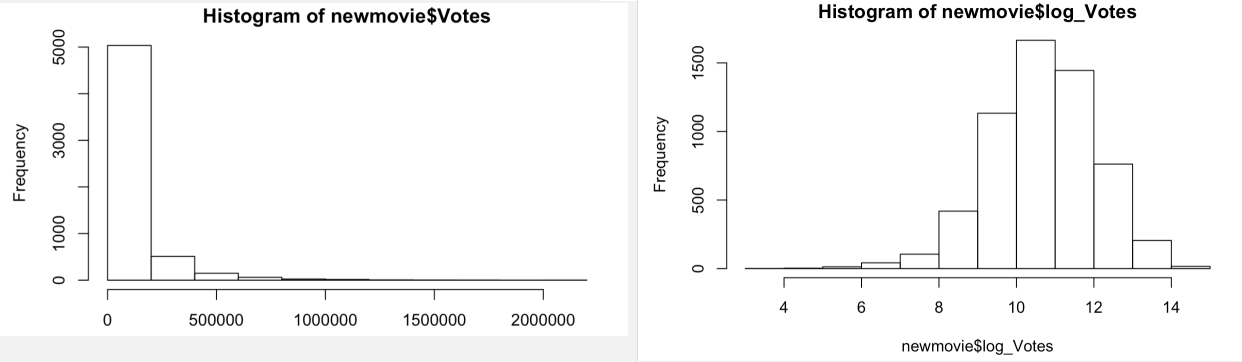


	Name	Year	Level	Duration	Genre	Score	Director	Votes	Gross_in_Million
0	Aladdin	2019	PG	128 min	Adventure Comedy Family	7.4	Guy Ritchie	44991	142.697174
1	Godzilla: King of the Monsters	2019	PG-13	131 min	Action Adventure Fantasy	6.9	Michael Dougherty	21581	
2	Rocketman	2019	R	121 min	Biography Drama Music	7.7	Dexter Fletcher	13985	
3	Avengers: Endgame	2019	PG-13	181 min	Action Adventure Sci-Fi	8.8	Anthony Russo	430042	807.688784
4	John Wick: Chapter 3 - Parabellum	2019	R	131 min	Action Crime Thriller	8.0	Chad Stahelski	70336	114.652812
5	Booksmart	2019	R	102 min	Comedy	7.5	Olivia Wilde	13480	11.038184
6	Once Upon a Time ... in Hollywood	2019	NaN	159 min	Comedy Drama	9.8	Quentin Tarantino	5034	
7	Terminator: Dark Fate	2019	NaN		Action Adventure Sci-Fi		Tim Miller		
8	The Perfection	2018	TV-MA	90 min	Drama Horror Thriller	6.2	Richard Shepard	10362	
9	Brightburn	2019	R	90 min	Horror Sci-Fi	6.5	David Yarovesky	10610	11.897552
10	Rim of the World	2019	TV-14	98 min	Action Adventure Comedy	5.1	McG	8275	
11	Captain Marvel	2019	PG-13	123 min	Action Adventure Sci-Fi	7.1	Anna Boden	286653	426.011433
12	Ma	2019	R	99 min	Horror Thriller	6.1	Tate Taylor	2530	
13	Rambo: Last Blood	2019	NaN		Action Adventure Thriller		Adrian Grunberg		
14	The Goldfinch	2019	R		Drama		John Crowley		
15	Us	2019	R	116 min	Horror Mystery Thriller	7.2	Jordan Peele	96627	174.89178

- USING THE LIBRARY BEAUTIFULSOUP TO INSPECT WEBPAGE AND EXTRACT RELATED DATA CONCERNING EACH MOVIE

Log transformation: gross_in_million and votes



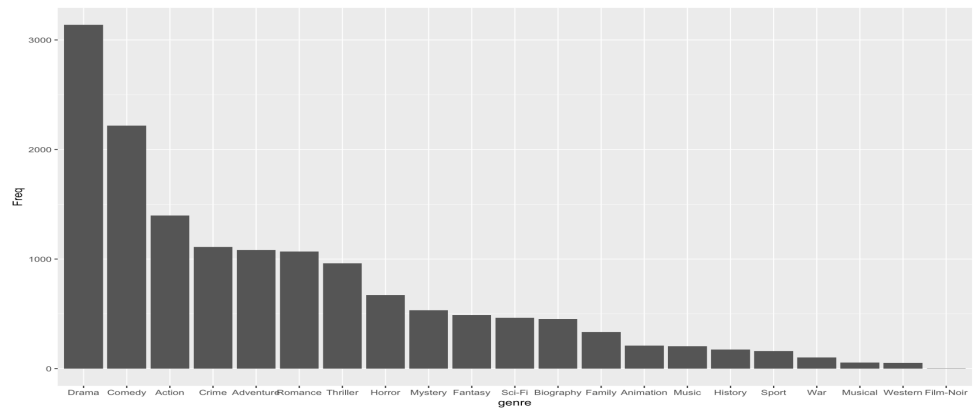


Change numerical variable "runtime" and "Year" to categorical variable

```
table(newmovie$final_Duration)

Long Normal  Short
1222   2430   2157
```

Reclassify and sort the frequency of genre:
Top 3: Drama, Comedy and Action




```
> table(newmovie$new_Year)

before2000  first_ten second_ten
      2125       1865       1819
```

FINAL MODEL AND CROSS VALIDATION

```
Call:
lm(formula = log_gross ~ new_Year + Level + final_Duration +
    Score + log_Votes + Animation + Comedy + Drama + Sport, data = test)

Residuals:
    Min      1Q  Median      3Q     Max
-3.4551 -0.4522  0.1284  0.5933  2.2949

Coefficients:
                     Estimate Std. Error t value Pr(>|t|)
(Intercept)          -0.74908    0.47222  -1.586  0.11332
new_Yearfirst_ten    -0.14723    0.11624  -1.267  0.20590
new_Yearsecond_ten    0.14097    0.10660   1.322  0.18668
LevelPG-13           -0.49155    0.14848  -3.311  0.00100 **
LevelR               -1.08863    0.14020  -7.765 4.87e-14 ***
final_DurationNormal -0.52736    0.10121  -5.211 2.79e-07 ***
final_DurationShort  -0.64907    0.12606  -5.149 3.81e-07 ***
Score                -0.32906    0.05800  -5.673 2.41e-08 ***
log_Votes             0.67671    0.04184  16.173  < 2e-16 ***
Animation             0.15732    0.25273   0.622  0.53391
Comedy                0.20744    0.09840   2.108  0.03553 *
Drama                -0.28625    0.09847  -2.907  0.00382 **
Sport                 0.11147    0.25163   0.443  0.65797
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.9081 on 487 degrees of freedom
Multiple R-squared:  0.5629,    Adjusted R-squared:  0.5522
F-statistic: 52.27 on 12 and 487 DF,  p-value: < 2.2e-16
```

Linear model on **test** data set
R^squared: 0.5629

Linear model on **training** data set
R^squared: 0.6461

```
summary(mbic)

##
## Call:
## lm(formula = log_gross ~ new_Year + Level + final_Duration +
##     Score + log_Votes + Animation + Drama, data = datanml)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.46763 -0.44222  0.08769  0.50939  2.18998
##
## Coefficients:
##                      Estimate Std. Error t value Pr(>|t|)
## (Intercept)          -1.79353    0.26020  -6.893 8.24e-12 ***
## new_Yearfirst_ten    -0.23326    0.05762  -4.048 5.44e-05 ***
## new_Yearsecond_ten   -0.18214    0.05506  -3.308 0.000964 ***
## LevelPG-13           -0.25615    0.07151  -3.582 0.000352 ***
## LevelR               -0.93855    0.06767 -13.870  < 2e-16 ***
## final_DurationNormal -0.29996    0.05091  -5.893 4.75e-09 ***
## final_DurationShort  -0.41889    0.06264  -6.688 3.27e-11 ***
## Score                -0.30418    0.03136  -9.699  < 2e-16 ***
## log_Votes             0.74709    0.02192  34.079  < 2e-16 ***
```

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```
## Animation             0.59917    0.13159   4.553 5.74e-06 ***
## Drama                -0.30303    0.04803  -6.309 3.76e-10 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7763 on 1403 degrees of freedom
## Multiple R-squared:  0.6461, Adjusted R-squared:  0.6435
## F-statistic: 256.1 on 10 and 1403 DF,  p-value: < 2.2e-16
```

SHINYAPP DEPLOYMENT