Movie Rating and Financial Performance

Movies are a type of visual art used to convey stories, ideas, perceptions and feelings. Creating movies is a big business, and production companies spend millions of dollars towards movie budgets. However, not all films with high budgets always do as well in terms of gross earnings. This lowers profitability. The goal of this project is to understand what type of movies generate higher gross earnings, if higher budgeted films mainly result in higher gross earnings, and predict gross earnings given the budget of the film.

This dataset is adapted from https://data.world/jamesgaskin/movies. It has 11 columns. This analysis uses the MPAA Ratings (Motion Picture Association film rating system), budget of the film (in USD), gross earnings of the film (in USD), and genre of the film. For the analysis of this project, the film ratings column was discarded from use because the number of people voting for each film were not the same, and would therefore result in a biased analysis in terms of which films did better. The average film runtime is 117.7 minutes. The mean budget for all films is $83,922,275, and the mean gross earnings is $382,186,608.

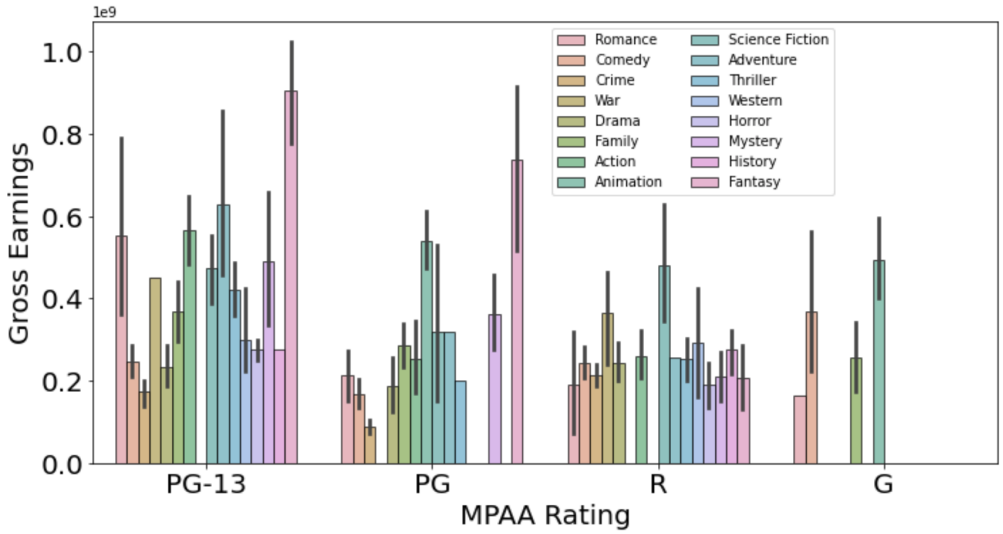
The first figure analyzes what type of film, in terms of genre, given its MPAA rating, produces better gross earnings, and is hence more popular. The clustered bar plots signify what genre of film it is, for that particular type of MPAA rating (x axis). The y-axis represents gross earnings upto $1 billion. We notice that there are way more PG-13 movies as compared to the other categories. Fantasy films are more popular as compared to other genres as they produce the highest gross earnings. Overall, PG-13 films have higher gross earnings across all genres of films.

Oftentimes, there are films with large budgets that don't do as well and face loss in profitability after the films release. The second figure uses unsupervised machine learning. KMeans clustering is used to find clusters of movies depending on how much they spend on and earn from a film. This figure observes 6 such clusters. We find that low budget movies usually tend to have lower gross earnings as well as higher gross earnings. However, when it comes to some high budget films, we notice differences in earnings from the clusters formed. We find that higher budget films do relatively better than lower budget films. However, there are fewer films that have higher budgets.
The third depicts a regression analysis between gross earnings and budget of the film. Ratings were used initially to improve the prediction but the results were uneven due to the difference in number of reviewers. The red line depicts the line of fit. The slope obtained for the line of fit is 0.12584 and the intercept obtained is 34862841.23. Given a budget on the fit line , we can obtain the corresponding gross earnings value of the film. Therefore, for example, from the fit line, a budget of $402,895,559.62 would obtain a gross earning of $2,924,538,088.

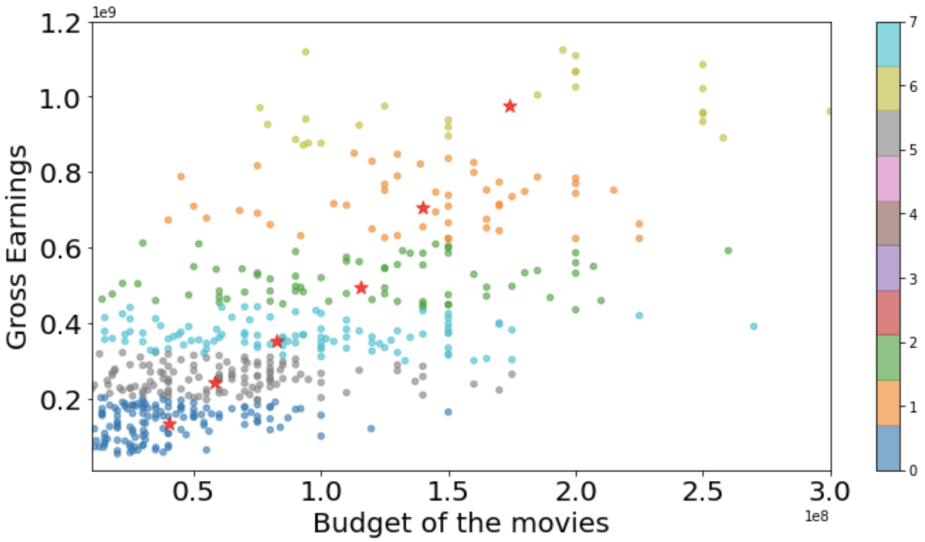
To conclude, this analysis shows us that investing and having higher budgets for PG-13 films of the genre Fantasy would be most profitable. Romance, action and thriller films are also amongst the popular genres and are more profitable films across all MPAA

ratings. There are certain high budgeted films that do not do as well and have relatively lower earnings. In contrast, several low budget films do just as good, if not better than high budget films. However, most high budget films tend to have high gross earnings.

1. Gross Earnings according to MPAA Rating and Genre of Movies



2. Gross Earnings and Movie Budget Clusters



3. Linear Regression on Gross Earnings and Movie Budget