Marvel is better to focus on the real cinema audiences

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Abstract

Film ratings are different from place to place. We do not know which rating agency we should believe in deciding a popular movie to watch. This paper investigates the rating difference between the agencies and which agency we should check to watch popular movies.

1 Introduction

We have seen diverse movies produced from Marvel Cinematic Universe (MCU) [Wikipedia contributors(2021b)], one of the most successful superhero film brands. Starting from Iron Man in 2008, the brand has released 23 superhero films so far, excluding the upcoming eleven films [Wikipedia contributors(2021a)]. In general, people often refer to the rates of a movie to decide to watch it. For example, they investigate the movie rate at the online-based review websites, such as Rotten Tomatoes, Metacritic. Besides, CinemaScore, the rates from the real cinema audiences, is also a good measure. In this paper, we analyze how the rate varies among the three cinema-rating places and which rating agency provides the most appropriate rate corresponding to the box office gross.

2 Methods

Correlation analysis is an appropriate technique to investigate how a variable is related to another. As a page of Wikipedia presents the movie rates created from Rotten Tomatoes, Metacritic, and CinemaScore, we analyzed the data [Wikipedia contributors(2021b)]. Rotten Tomatoes and Metacritic provide the movie rates made by critics, but the rates from CinemaScore includes the opinions by audience. In Python, we reproduced a DataFrame table from a table called "Critical and public response" on the Wikipedia page. Note that all numbers were converted as an integer ($70\% \rightarrow 70$, A+ $\rightarrow$ 4, A $\rightarrow$ 3, A- $\rightarrow$ 2, and B+ $\rightarrow$ 1). The correlation between two variables can be easily shown by plotting values from one variable in terms of the sorted values in another variable. Figure 1 is an example of the plot with Metacritic and Rotten Tomatoes variables. These variables have a high correlation because the y-values are mostly increasing in terms of the x-value. Finally, we made a confusion matrix with all pairs of the three variables.

Next, we analyzed which rating place corresponds to the worldwide box office gross. We further extracted the data of the worldwide box office gross from the "Box office performance" table on the Wikipedia page. The data is further processed to calculate the correlation with the reported three ratings.

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3 Results

There are three movie rating systems on the Wikipedia page. Among these three responses, the strongest correlation is between two critical responses. Figure 1 shows the positive correlation between Rotten Tomatoes and Metacritic. Additionally, we calculated the Pearson correlation coefficient between two critics, and it was around 0.88.

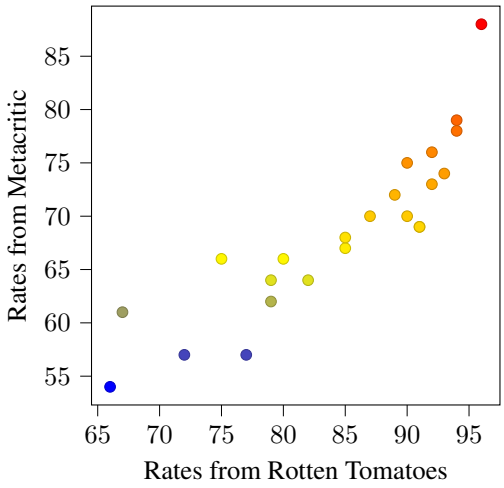

Figure 1: Rates from Metacritic in terms of the ascending order of the rates from Rotten Tomatoes

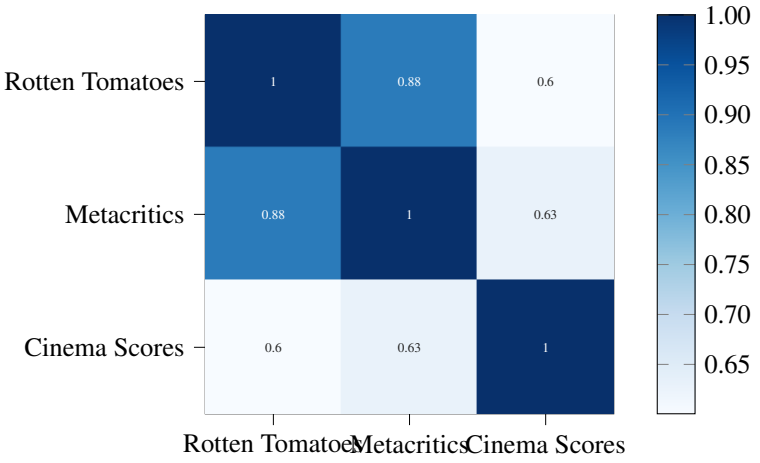

Figure 2: The confusion matrix of the three movie responses based on the calculated Pearson correlation coefficients.

Figure 2 represents the confusion matrix of three different movie responses. The figure includes the calculated Pearson correlation coefficients among three of them. The larger the Pearson correlation coefficient, i.e., the more strongly correlates, the darker color appears in the matrix. The correlations between critical and public response, however, are not that significant. Therefore, we conclude that only two critical responses correlate to a high degree. However, there is a less meaningful correlation between either Rotten Tomatoes or Metacritic and CinemaScores. It means it is highly likely to have a similar response in professional critics. But even if a movie gets a positive response from critics, that does not guarantee public audiences would also give a positive response to the same film.

Next, Fig. 3 is another confusion matrix of three movie responses and each movie's profit. We tried to see which kind of movie response has the strongest correlation to the movie's profit, i.e., Worldwide box office gross from this figure. As you can see, the CinemaScore has a stronger correlation to the profit than Rotten Tomatoes or Metacritic. The Pearson correlation coefficients between CinemaScore

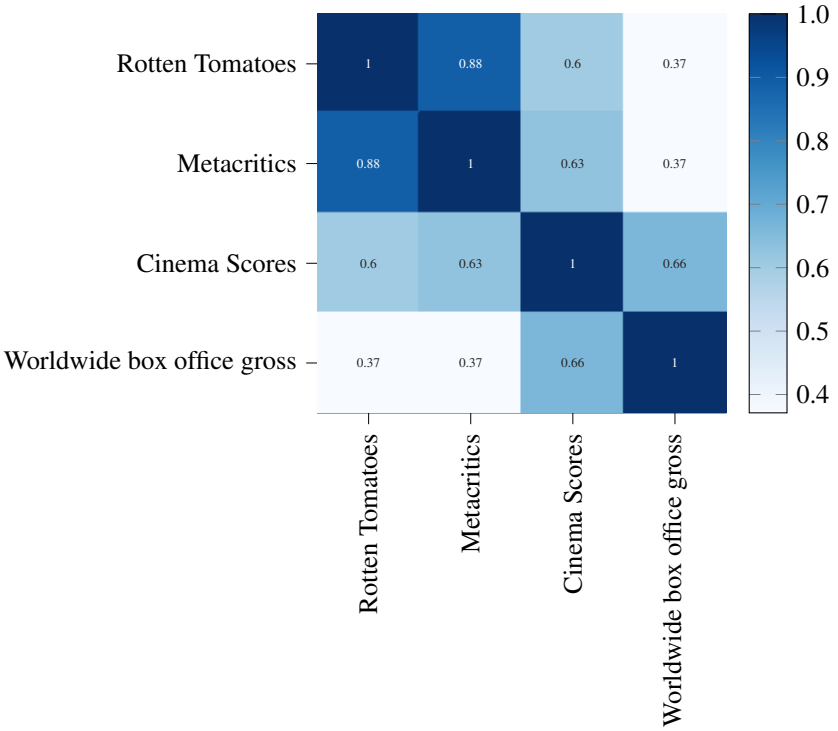

Figure 3: The confusion matrix of three movie responses and each movie's profit

and Worldwide box office gross is around 0.66. It is also not so high as we expected. Still, it is much greater than the one between Rotten Tomatoes or Metacritic and Worldwide box office gross. Therefore, we conclude that it has a higher possibility to make a good profit when the movie gets a positive response from public audiences than from professional critics.

4 Conclusion

We investigated the correlations of Marvel films' ratings created from Rotten Tomatoes, Metacritics, and CinemaScore. Based on the information from Wikipedia, we imported the released data and produced a confusion matrix showing the correlation between all pairs of the three rating agencies. It turns out that the ratings from Rotten Tomatoes and Metacritics are similar to each other. Nevertheless, we found that the rating scores from CinemaScore are reliable if we assume that popular movies (i.e., movies with high box office gross) lead to high ratings on movies.

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