

STAT 503 Assignment 1: Movie Ratings

SOLUTION NOTES

1 Data Description

With the upcoming academy awards and the just finished golden globes we collected data on 14 recent movies from <http://movies.yahoo.com/>. The movies are Electra, The Aviator, Ocean's Twelve, Coach Carter, Meet the Fockers, Racing Stripes, In Good Company, White Noise, Lemony Snicket, Fat Albert, The Incredibles, Alexander, Shall We Dance, Closer, Sideways. The movies were selected mostly from the top 10 list on January 14, 2005. Several movies were also suggested by class members.

We also collected ratings from 9 critics (Atlanta Journal, Boston Globe, Chicago Sun-Times, Chicago Tribune, E! Online, filmcritic, Hollywood Reporter, New York Times, Seattle Post), and the average Yahoo user rating. The list of critics were the ones that rated all 14 movies.

The main question we want to answer is:

"Which movies are consistently rated highly by both critics and reviewers?"

Other questions of interest might be:

- Are some critics more generous in their ratings than others?
- Can the critics ratings accurately predict the average user rating?
- Does the number of users rating the movie accurately predict the average user rating?
- Is there a relationship between the weekly gross of a movie and the average user rating or the average critic rating?

2 Suggested approaches

Approach	Reason	Type of questions addressed
Data Restructuring Make new variables ratings by converting letter grades to GPA's	The letter grade is an ordinal variable, and so it needs to be treated numerically for various calculations.	
Summary statistics Tabulate average critics ratings and average user ratings, and average movie ratings for each critic, calculate confidence intervals for the critics ratings	To compare the numbers for each movie, and for each critic	"What is the average critic rating for each movie?" "Does the average user rating compare similarly to the average critic rating?"
Dotplots Of the critics ratings for each movie	Examine the distribution of the ratings for each movie.	"Are some movies consistently rated higher by the critics?" "Do some movies split the critics, and draw dramatically different ratings from different critics?"
Pairwise Scatterplots Of average critics rating against average user rating, user rating against number of users	Explore the relationship between these pairs of variables	"What is the relationship between number of users and average user rating?"
Regression Of average critics rating against average user rating, user rating against number of users	To build a numerical model for the relationship between the pairs of variables	"Can the critics ratings accurately predict the average user rating?" "Does the number of users rating the movie accurately predict the average user rating?"

3 Actual Results

3.1 Summary Statistics

Table 1: *Summary of Movie Ratings. The top rated movie is The Incredibles. The lowest rated movie is White Noise. Coach Carter is a movie which is rated comparatively lower by critics than by users. Alexander is rated low by the critics but even lower by the users. Bonferroni-adjusted confidence intervals for the average critic ratings for each movie are provided to compare the significance of the differences. Most of the differences in the average movies ratings by critics are not considered to differ significantly. The one exception is Electra is considered significantly lower rated than The Incredibles.*

Movie	User		Critic				
	Average	Letter	Average	Letter	SD	Lower CI	Upper CI
The Incredibles	3.67	A-	3.48	A-	0.69	2.56	4.40
The Aviator	3.00	B	3.19	B	0.67	2.30	4.08
In Good Company	3.00	B	2.96	B	0.68	2.06	3.86
Closer	2.67	B-	2.93	B	0.91	1.72	4.14
Coach Carter	3.67	A-	2.89	B	0.24	2.58	3.20
Meet the Fockers	3.00	B	2.89	B	0.24	2.58	3.20
Lemony Snicket	3.00	B	2.78	B-	0.67	1.89	3.67
Ocean's Twelve	2.67	B-	2.56	B-	0.44	1.97	3.14
Shall We Dance	2.67	B-	2.44	C+	0.90	1.25	3.64
Racing Stripes	2.33	C+	2.33	C+	0.37	1.84	2.83
Alexander	1.67	C-	2.00	C	0.85	0.87	3.13
Fat Albert	2.67	B-	1.93	C	0.57	1.17	2.69
Electra	2.67	B-	1.74	C-	0.47	1.12	2.36
White Noise	2.33	C+	1.70	C-	0.81	0.63	2.78

3.2 Dotplots

3.3 Scatterplots

3.4 Regression

We first fitted a multiple linear model of average user rating against all the critics ratings. This model did not explain a significant amount of the variation in users ratings, and no coefficients were significant.

So we fitted separate models for each critic, using a stepwise regression approach. Table 3.4 summarizes the results:

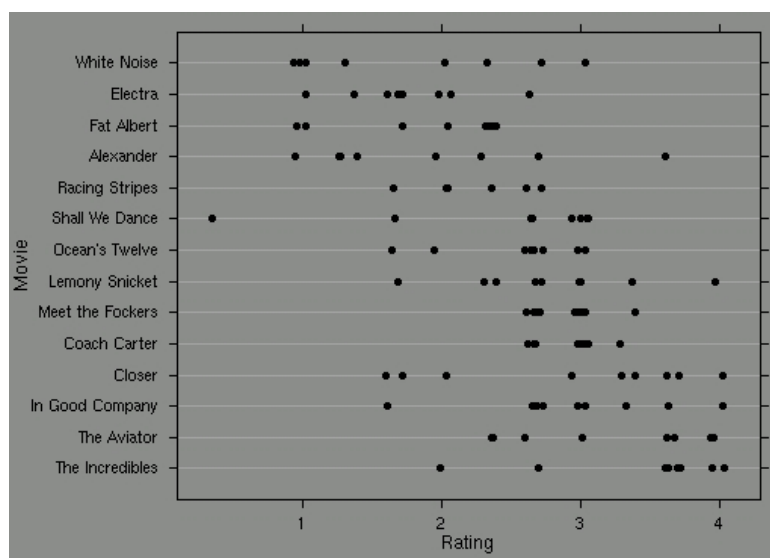


Figure 1: Ratings given by 9 critics to 14 movies.

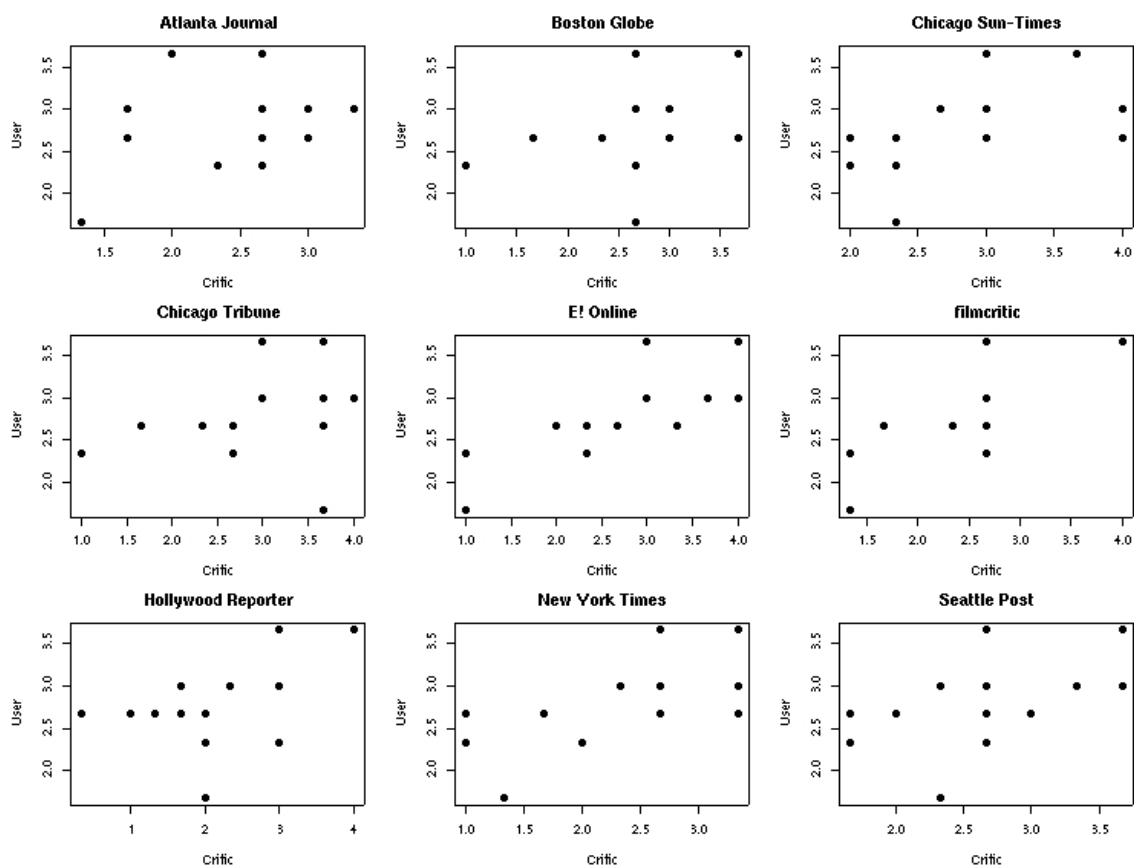


Figure 2: Scatterplots of users ratings against critics ratings, to compare their similarity.

Table 2: *Summary of Critics Ratings. Both Chicago critics rate movies higher on average, and the Hollywood Reporter and The New York Times rate movies the lowest on average. Bonferroni-adjusted confidence intervals to compare the significance of the difference in average ratings are given. The differences in the critics averages are not considered to differ significantly.*

Critic	Average	SD	Lower CI	Upper CI
Chicago Tribune	2.98	0.89	2.20	3.76
Chicago Sun-Times	2.88	0.66	2.30	3.46
E! Online	2.71	0.94	1.89	3.54
Boston Globe	2.69	0.70	2.08	3.30
Seattle Post	2.60	0.66	2.02	3.17
Atlanta Journal	2.48	0.60	1.96	3.00
filmcritic	2.33	0.73	1.70	2.97
New York Times	2.19	0.87	1.43	2.96
Hollywood Reporter	2.17	0.97	1.32	3.01

Table 3: *Summary of individual regression models for each critic. The ratings of E! Online and filmcritic most closely match the users ratings. The New York Times, Chicago Sun-Times and Seattle Post do a quite reasonable job of predicting the average user rating. The worst performance are the Chicago Tribune and the Atlanta Journal.*

Critic	Deviance	Intercept	Slope	p -value for slope
E! Online	1.37	1.63	0.43	0.001
filmcritic	1.52	1.54	0.53	0.002
New York Times	2.18	2.00	0.36	0.021
Chicago Sun-Times	2.53	1.62	0.41	0.057
Seattle Post	2.58	1.75	0.40	0.065
Hollywood Reporter	2.70	2.24	0.25	0.090
Boston Globe	2.99	2.05	0.27	0.191
Chicago Tribune	3.19	2.29	0.17	0.323
Atlanta Journal	3.21	2.20	0.24	0.343

4 Conclusions

- Only “The Incredibles” is rated highly, A-, by both users and critics. The Aviator and In Good Company are consistently rated well, but at a B.
- Although The Incredibles is rated very highly on average, two critics gave it low scores: C from The Atlanta Journal, and B- from the New York Times.
- Shall We Dance was rated reasonably well, B, by all but two critics: F from The Hollywood Reporter, and C- from E! Online.
- Coach Carter is rated poorly by critics but highly by users. Electra was rated poorly by critics, C-, but reasonably by the users, B-. Alexander is the only movie that users rated worse than critics, both rated it poorly.
- The two Chicago newspapers rate movies more highly on average than other critics. The Hollywood Reporter and The New York Times rate movies lower on average.