

THE ROGER-EBERT BOT

Predicting the Renowned Late Movie Critic's Rating

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Metis Bootcamp Project II

INTRODUCTION

Who is Roger Ebert?

- Legendary film critic
- Passed away in 2013 after battling with cancer for years
- Fun fact: the only film critic with a star on Hollywood Boulevard Walk of Fame

CAN WE PREDICT HOW ROGER EBERT
WOULD RATE MOVIES
IF HE WERE ALIVE TODAY?



Why is his review important?

- Balanced reviews that appreciate a movie's virtues and identify its faults
- Reviewed over 7,000 movies in 24 years of his career

Who'd find his reviews useful?

- Movie lovers, movie critics community, directors, entertainment industry

TOOLS



python™

Language

BeautifulSoup



Web-scraping



pandas



NumPy

Data manipulation



matplotlib

seaborn

Plot graphs



learn

statsmodels

Modeling & Testing

METHODOLOGY

Data Acquisition
& Cleaning

EDA,
Feature Engineering
& Selection

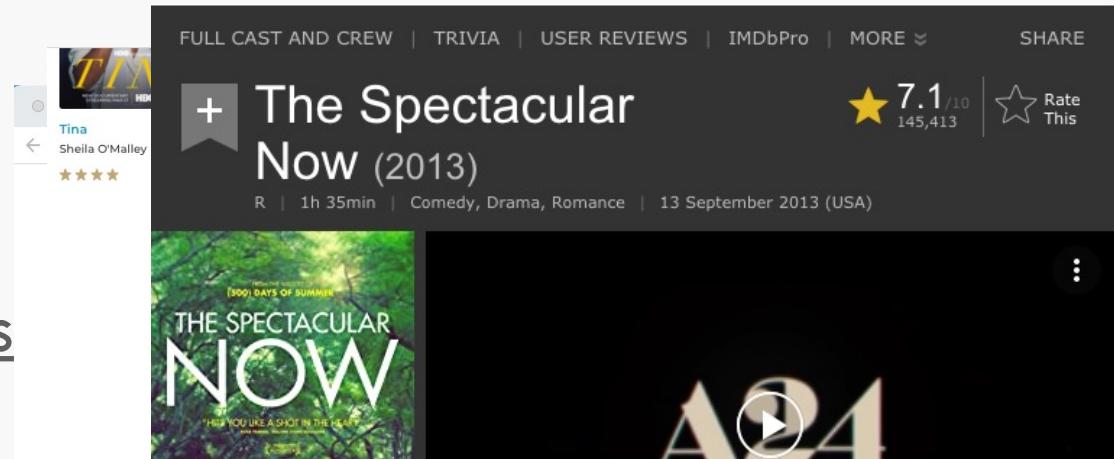
Train & Evaluate Model
(Model Selection)

PRIMARY:

- Roger Ebert Reviews Website:
<https://www.rogerebert.com/reviews>

SECONDARY:

- MovieLens movie dataset
from Kaggle (IMDb ID)
- IMDb.com
 - scrap more features



- Original data: 7847 datapoints
6 features
- Final data: 2191 datapoints,
11 features

Opening Weekend USA: \$157,115, 1 August 2013
Gross USA: \$6,854,611
Cumulative Worldwide Gross: \$6,918,591
See more on IMDbPro »

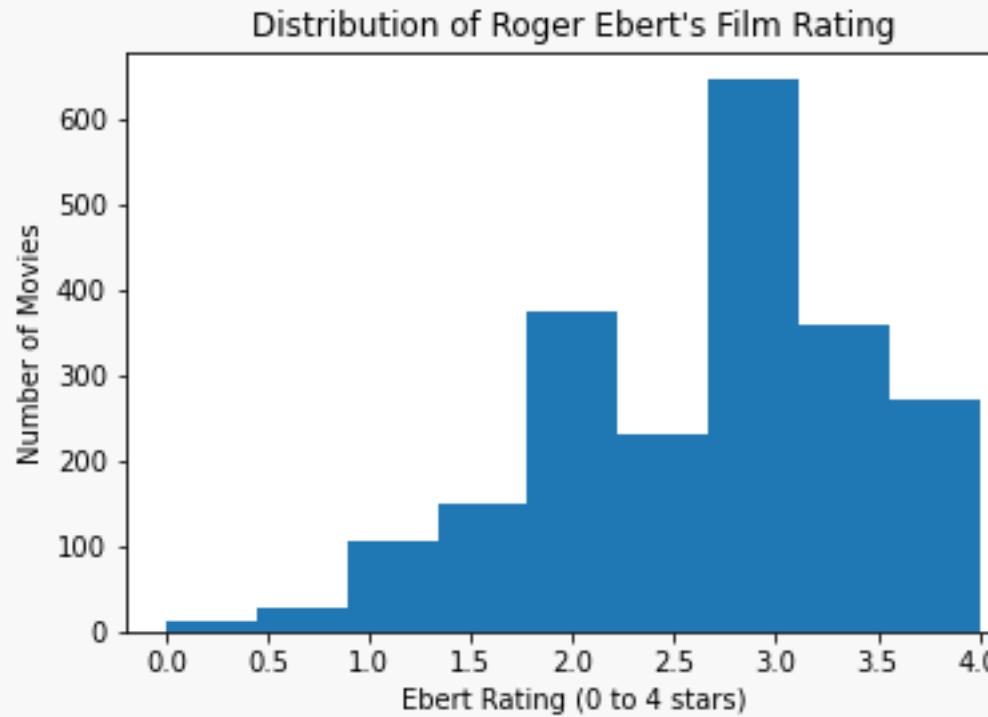
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TARGET:
Ebert Rating



Least Amount
of Ratings



Most Amount
of Ratings



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TARGET:
Ebert Rating

Year

MPAA Rating

Runtime

Genre

Sub-genre

MovieLens
Rating

IMDb Rating

Budget

Worldwide
Gross

Domestic Gross

Opening Week
Gross

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Genre
dummies

Sub-genre
dummies

MPAA Rating
dummies

Opening Gross
Proportion

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Opening Gross
Proportion

65 Features

METHODOLOGY

BASELINE MODEL

	EBERT_RATING	R-squared:
OLS	Adj. R-squared:	0.382
Least Squares	F-statistic:	0.379

Date: Tue, 13 Apr 2021 Prob (F-statistic): 2.37e-220

Time: 11:59:05 Log-Likelihood: -2307.0

No. Observations: 2189 AIC: 4634.

Df Residuals: 2179 BIC: 4691.

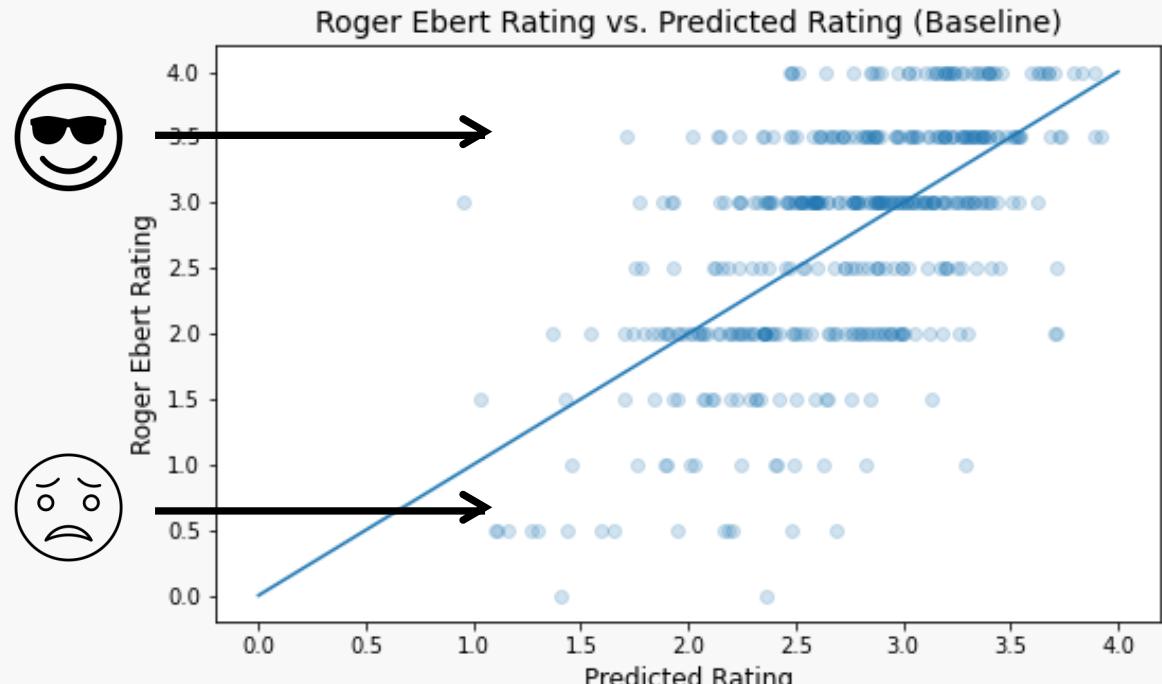
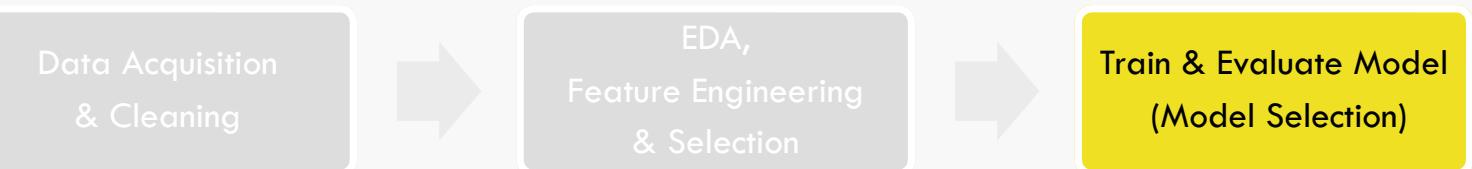
Df Model: 9

Covariance Type: nonrobust

	coef	std err	P> t	0.025	0.975
const	-0.3164	0.159	-1.99	0.046	0.627
MOVIELENS_RATING	0.6912	0.082	8.46	0.000	0.531
IMDB_RATING	0.1379	0.044	3.16	0.002	0.052
RUNTIME	0.0024	0.001	2.86	0.004	0.001
MPAA_R	-0.1555	0.066	-2.35	0.019	0.285
OPEN_PROPORTION	-0.7848	0.125	-6.27	0.000	1.030
GENRE_Comedy	-0.2646	0.066	-4.01	0.000	0.394
MPAA_PG-13	-0.2265	0.068	-3.33	0.001	0.360
GENRE_Science Fiction	-0.1522	0.051	-2.97	0.003	0.252
MPAA_PG	-0.1505	0.072	-2.09	0.036	0.291

Omnibus:	93.423	Durbin-Watson:	2.046
Prob(Omnibus):	0.000	Jarque-Bera (JB):	104.986
Skew:	-0.513	Prob(JB):	1.59e-23
Kurtosis:	3.314	Cond. No.	1.34e+03

9 features with
p-values <0.05



CAN I IMPROVE MY MODEL?

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Train & Evaluate Model
(Model Selection)

Cross Validation on Each Model (Baseline)

Model Type	R ² (Validation)	RSME	MAE
Simple Linear Regression	0.368 +- 0.010	0.682	0.561
Ridge	0.368 +- 0.010	0.682	0.561
LASSO	0.368 +- 0.009	0.684	0.563
Polynomial	0.346 +- 0.017	0.691	0.570

- R-squared values are **close and low** between models and between train and validation sets (except for Polynomial)
- Suggests that the models may be **underfitting**

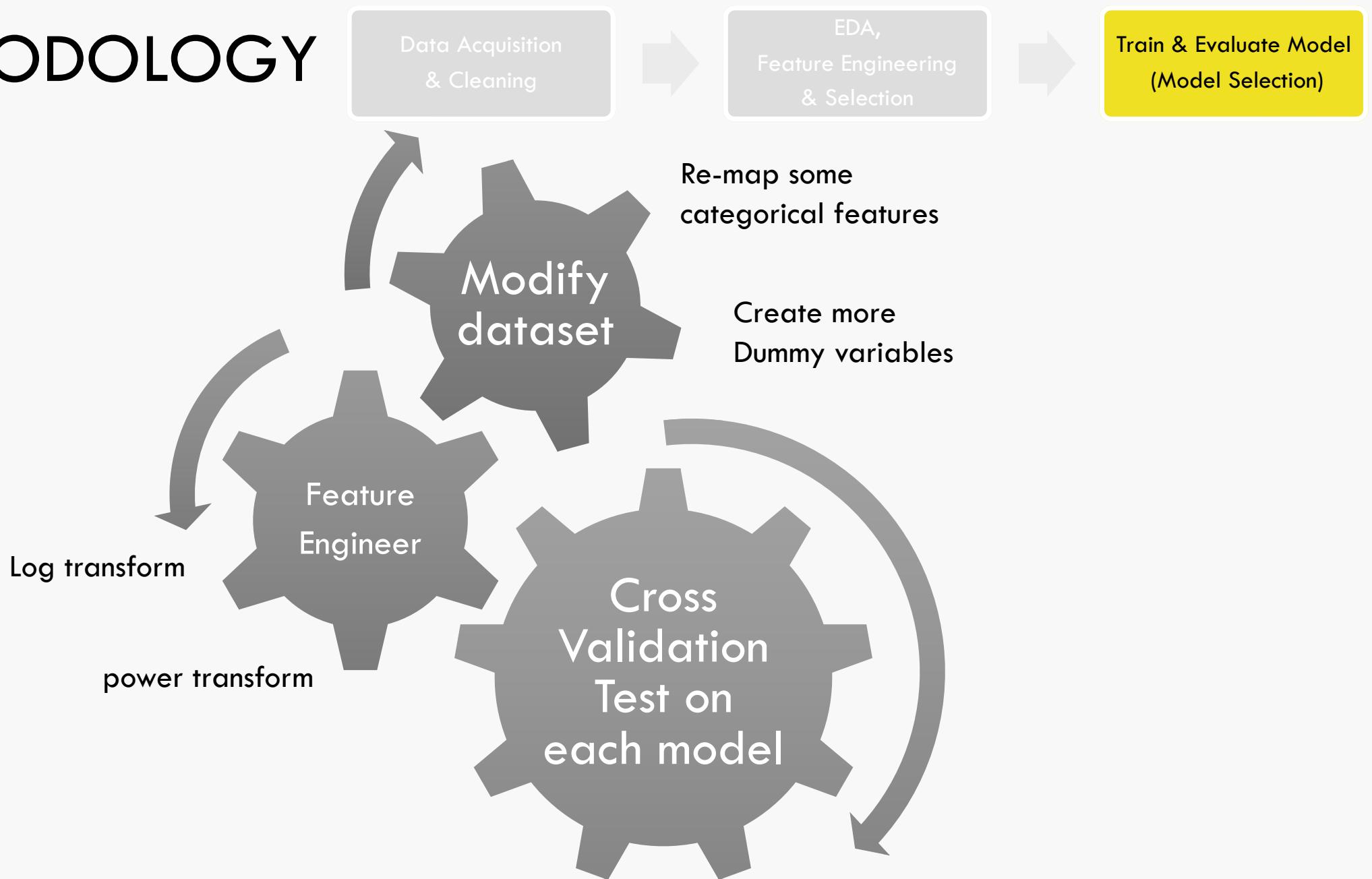
Cross Validation on Each Model (Baseline)

Model Type	R ² (Validation)	R ² (Train)
Simple Linear Regression	0.368 +- 0.010	0.384 +- 0.002
Ridge	0.368 +- 0.010	0.384 +- 0.002
LASSO	0.368 +- 0.009	0.384 +- 0.002
Polynomial	0.346 +- 0.017	0.408 +- 0.003

What Next?

- **Increase Complexity** by
 - Adding more features to the dataset
 - Feature Engineering

METHODOLOGY



METHODOLOGY



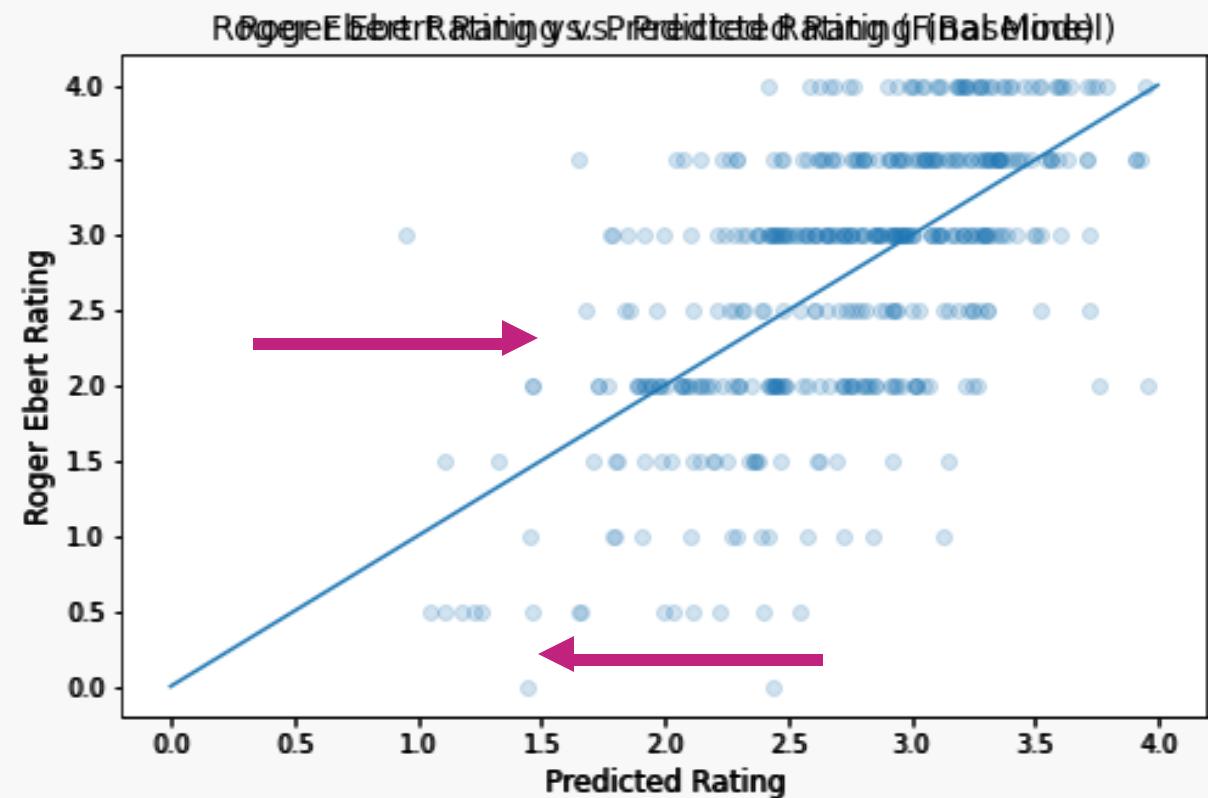
Cross Validation Test on Each Model (Final)

Model Type	R ²	RSME	MAE
Simple Linear Regression	0.3708	0.707	0.560
Ridge	0.3703	0.708	0.560
LASSO	0.3711	0.707	0.559
Polynomial	-4077.74	56.97	9.703
Polynomial-Ridge	0.2611	0.767	0.604
Polynomial-LASSO	0.3454	0.722	0.574

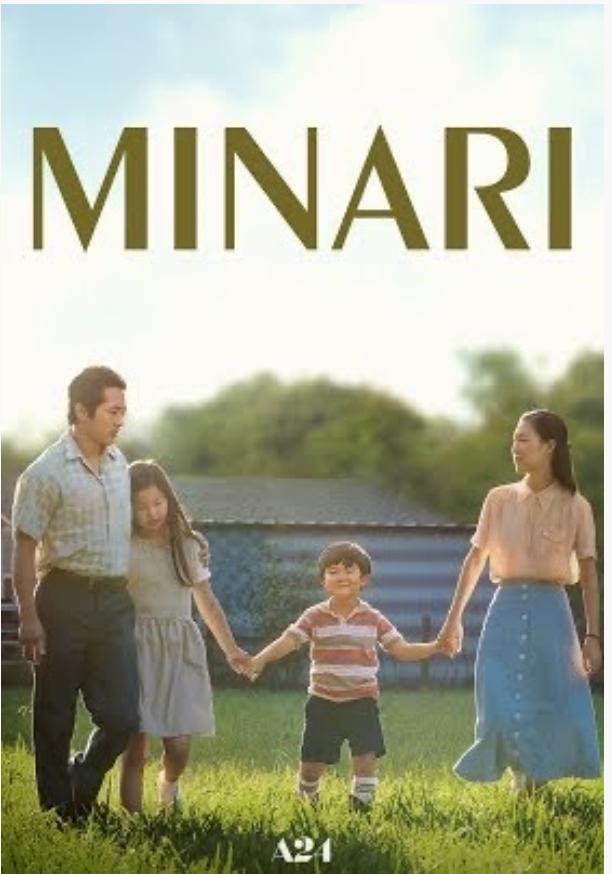
RESULTS – MODEL PERFORMANCE

	Baseline	Final Model
R ²	0.382	0.396
MAE	0.563	0.55

Prediction is off by about 0.5 star



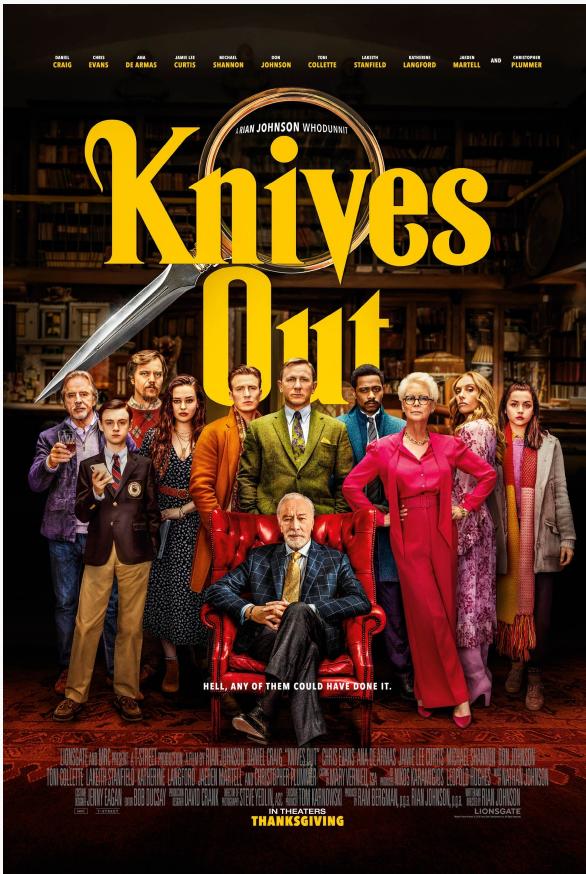
RESULTS – MODEL PREDICTION



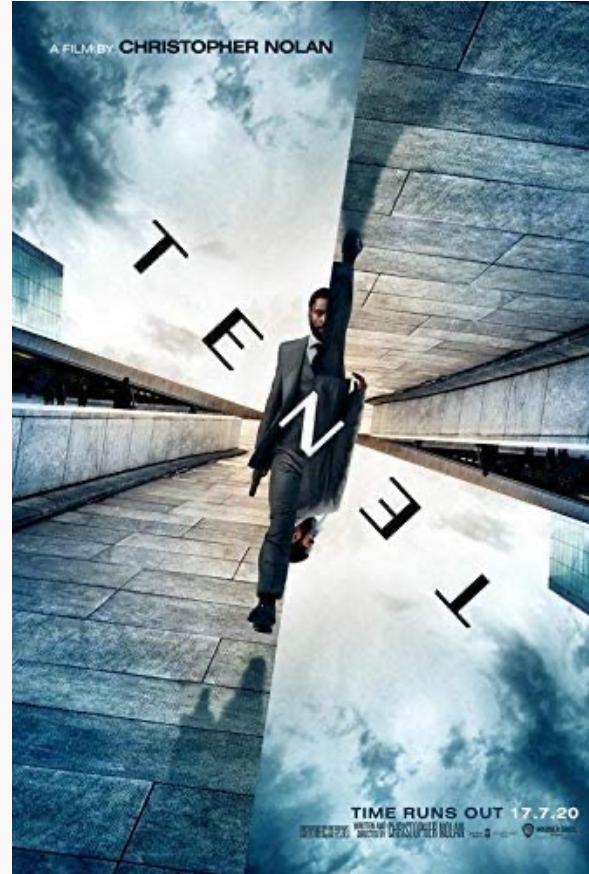
3.6



2.6



3.4



3.5



INSIGHTS

- Linear Regression may not be the best prediction model for this dataset, which is further confirmed with diagnostic plot [1]
- Predicting human behavior typically has R-squared values lower than 50%. Humans are simply harder to predict than, say, physical processes. [2]

FUTURE WORK

- Non-linear prediction model
 - *Tree-based model*
- More datapoints – filling missing values in some features and get more features
- Flask app – deploy the prediction model

A bronze statue of Steve Jobs, co-founder of Apple, is seated in a large, ornate armchair. He is wearing glasses, a light-colored button-down shirt, and a blazer. His right hand is raised in a thumbs-up gesture, while his left hand rests on the chair's armrest. The background is a blurred indoor setting with warm, glowing lights.

THANK YOU

Questions?



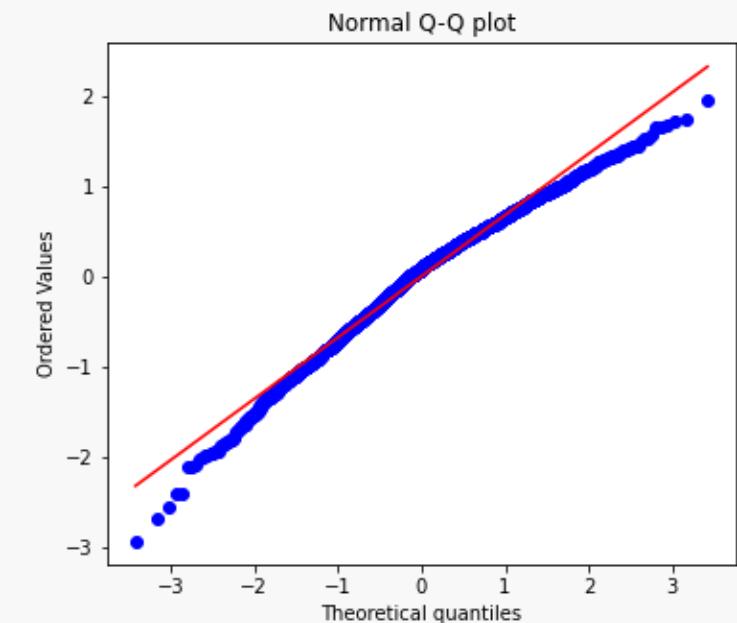
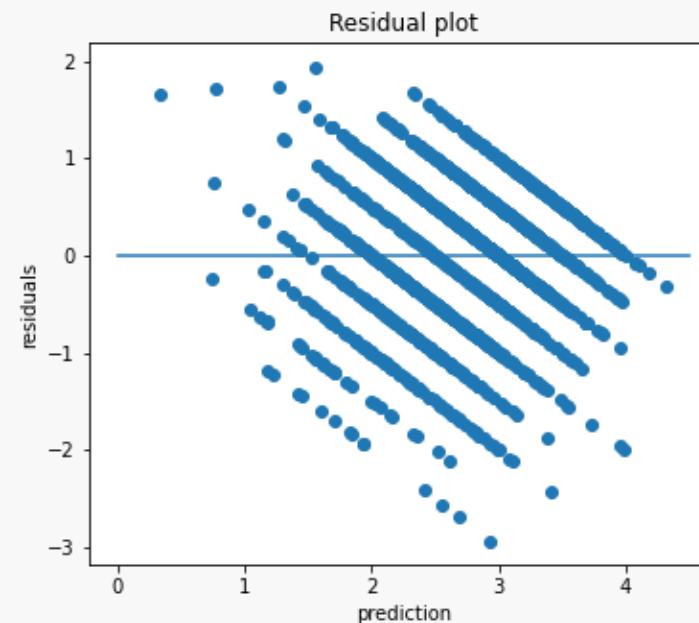
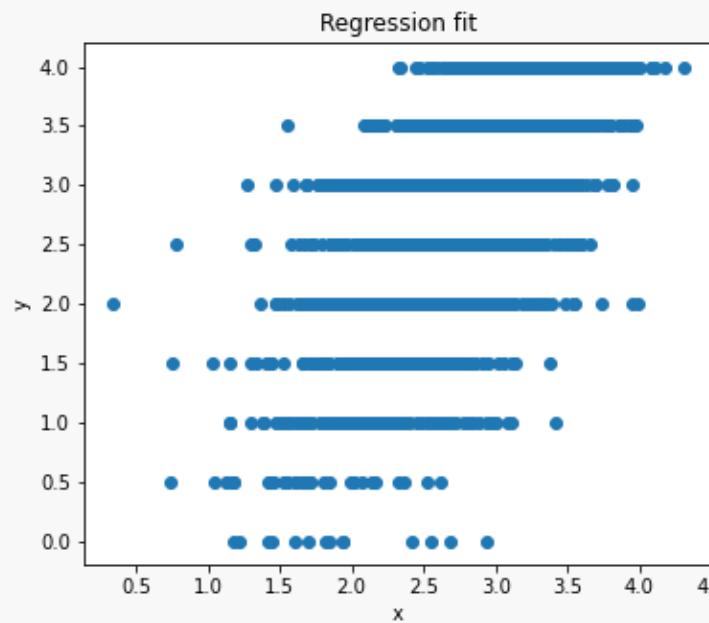
crystal-ctrl



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APPENDIX

Assumption 1: Regression is linear in parameters and correctly specified



APPENDIX: ARTICLE CITED

- How to Interpret R-squared in Regression Analysis by Jim Frost
 - <https://statisticsbyjim.com/regression/interpret-r-squared-regression>

ARE LOW R-SQUARED VALUES INHERENTLY BAD?

No! There are two major reasons why it can be just fine to have low R-squared values.

In some fields, it is entirely expected that your R-squared values will be low. For example, any field that attempts to predict human behavior, such as psychology, typically has R-squared values lower than 50%. Humans are simply harder to predict than, say, physical processes.