

Movie Recommender *App*



Built upon Deep Neural Networks & Flask

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Why Movie Recommender?

- ★ Increasing entertainment market
- ★ Personalization on movie recommendation
- ★ Better engage customers on movie/tv product



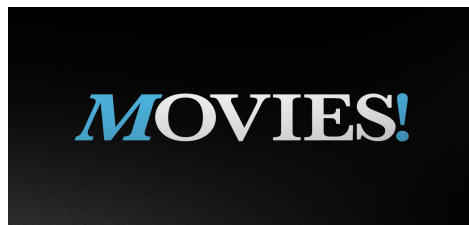
Data Source & Properties

- ★ Amazon Movies/TV reviews from [UCSD](#)
- ★ Json.gz file with 19 years data (8,765,568 reviews)
- ★ Subsample to 2018 ratings/reviews
 - reduce computational cost
- ★ Scrape review webpage link for each movie
- ★ Drop unrelated variables

Data_2018 Exploratory



N = 209,060



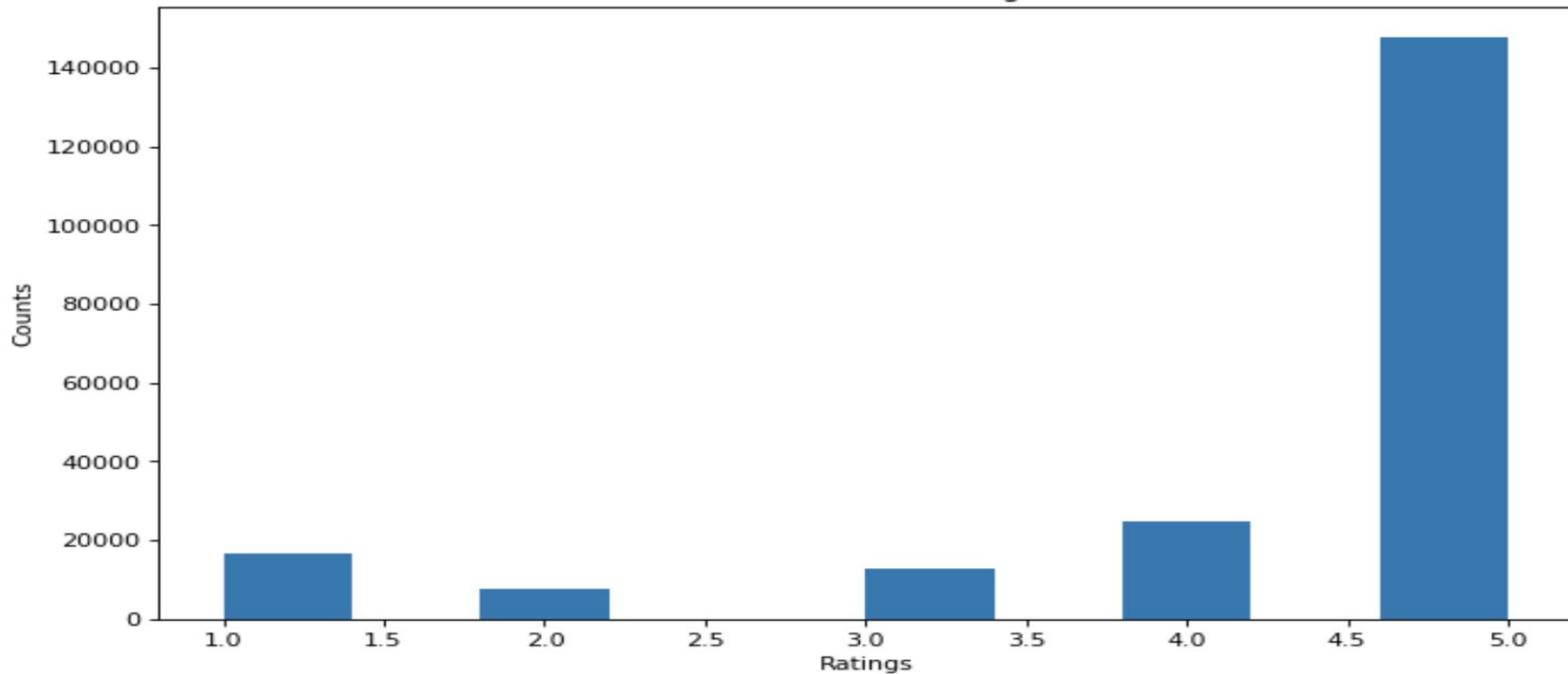
N= 38,864
Mean: 17.2
Max: 959
25% : with 1 review



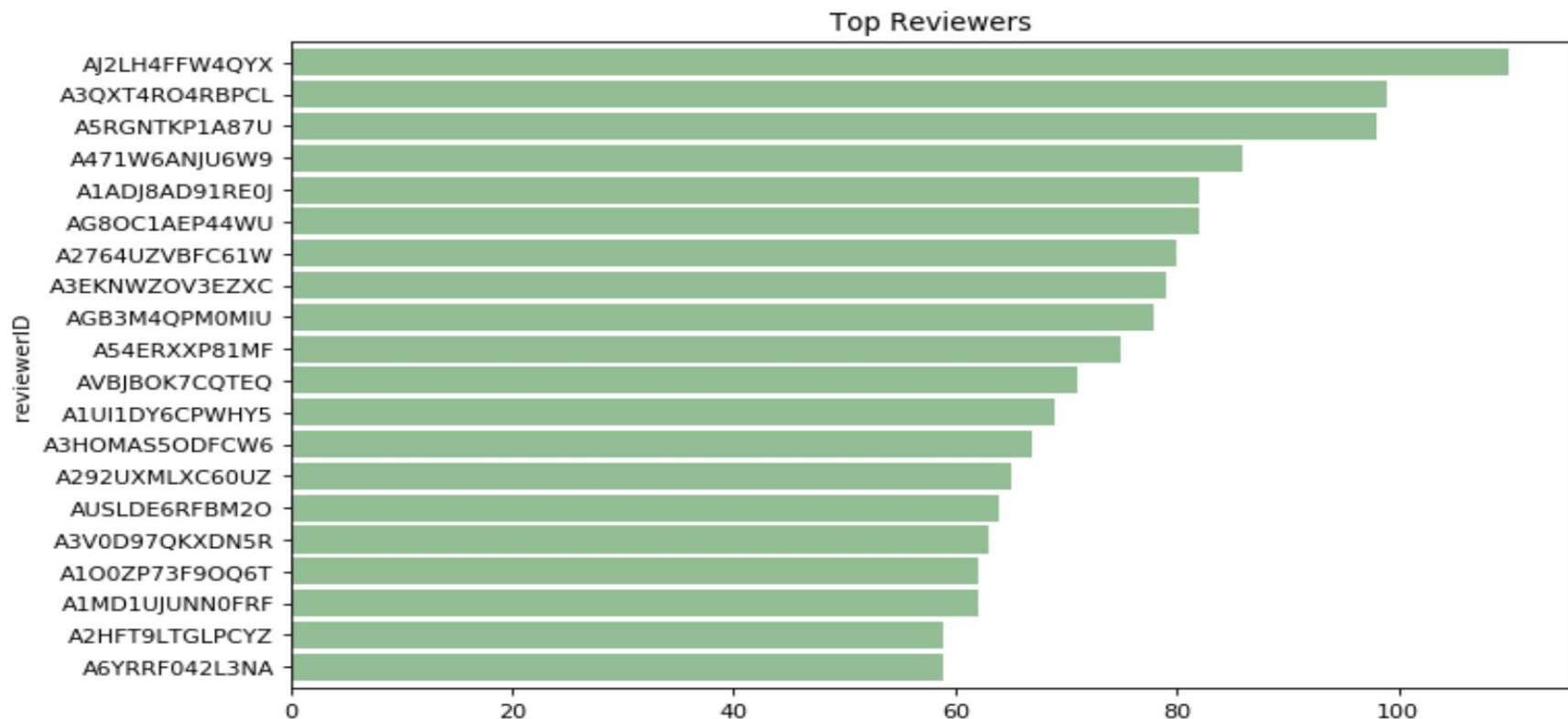
N=119,945
Mean: 1.74
Max: 110
50%: with 1 review

Data_2018 Exploratory

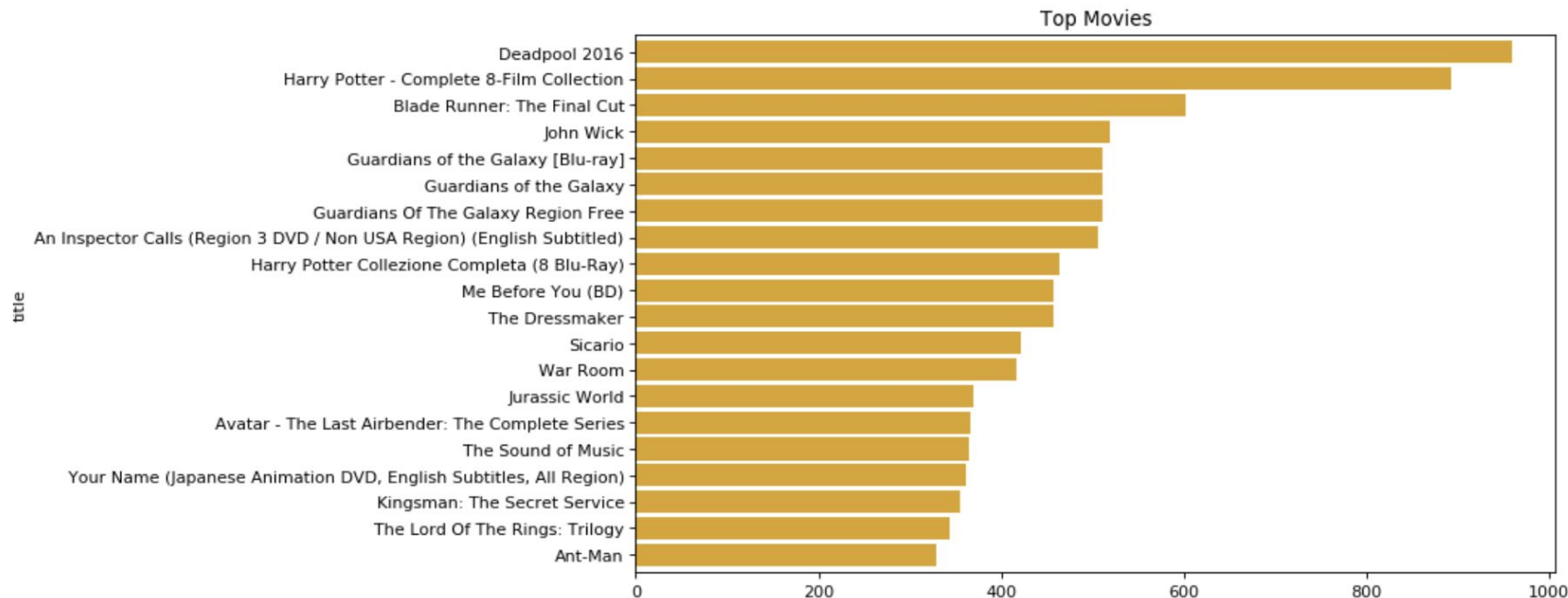
Distribution of Ratings



Data_2018 Exploratory



Data_2018 Exploratory



Collaborative Filtering Using Neural Networks

★ Collaborative filtering

- based on users' rates
- recommend user A movies that users similar to A have watched & like

★ Keras embedding:

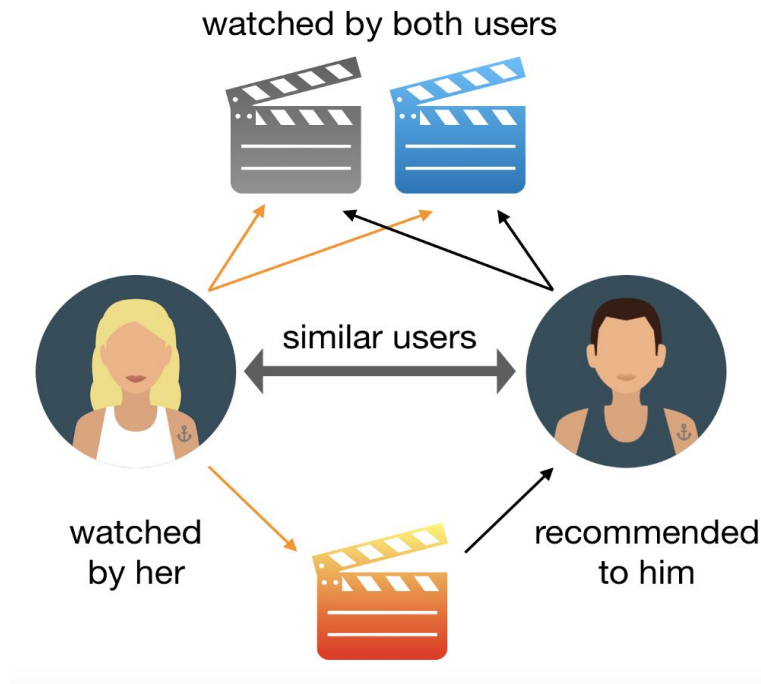
- split one matrix into two smaller matrix
 - high dimension → low dimensions

★ Neural networks:

- efficiently learn the underlying explanatory factors and useful representations

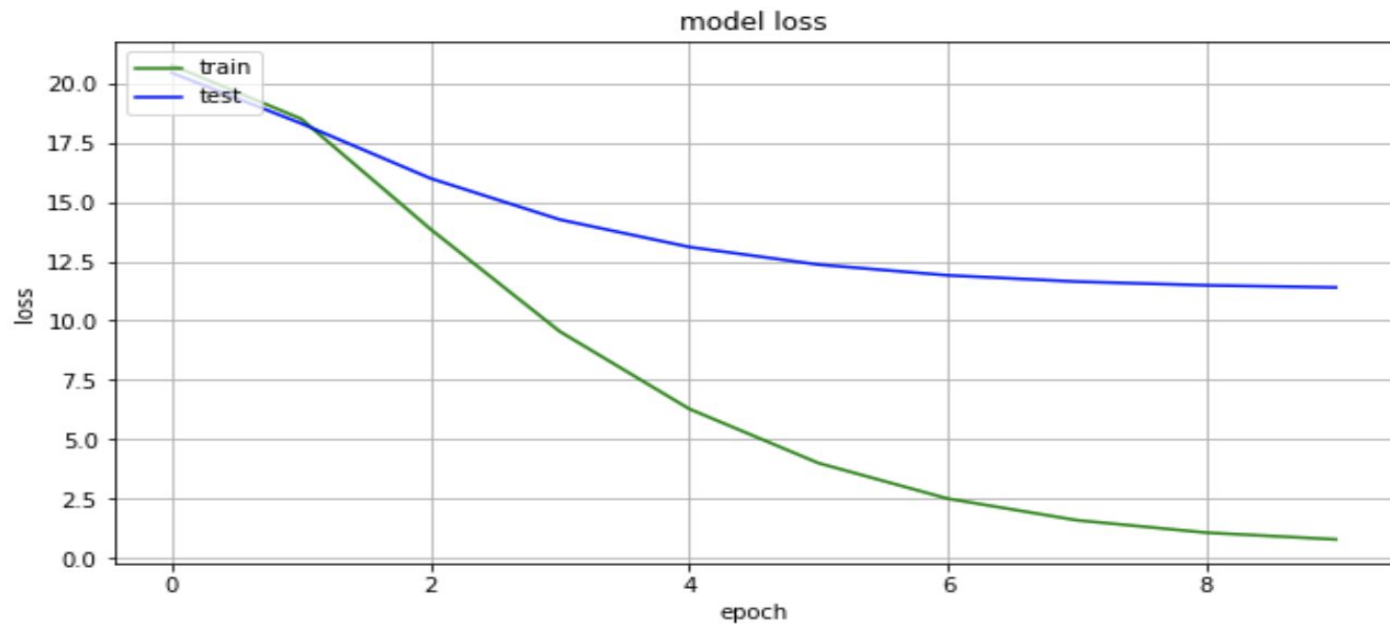
★ Evaluation metrics:

- Mean Absolute Error (MAE)



Base Model (input \rightarrow output)

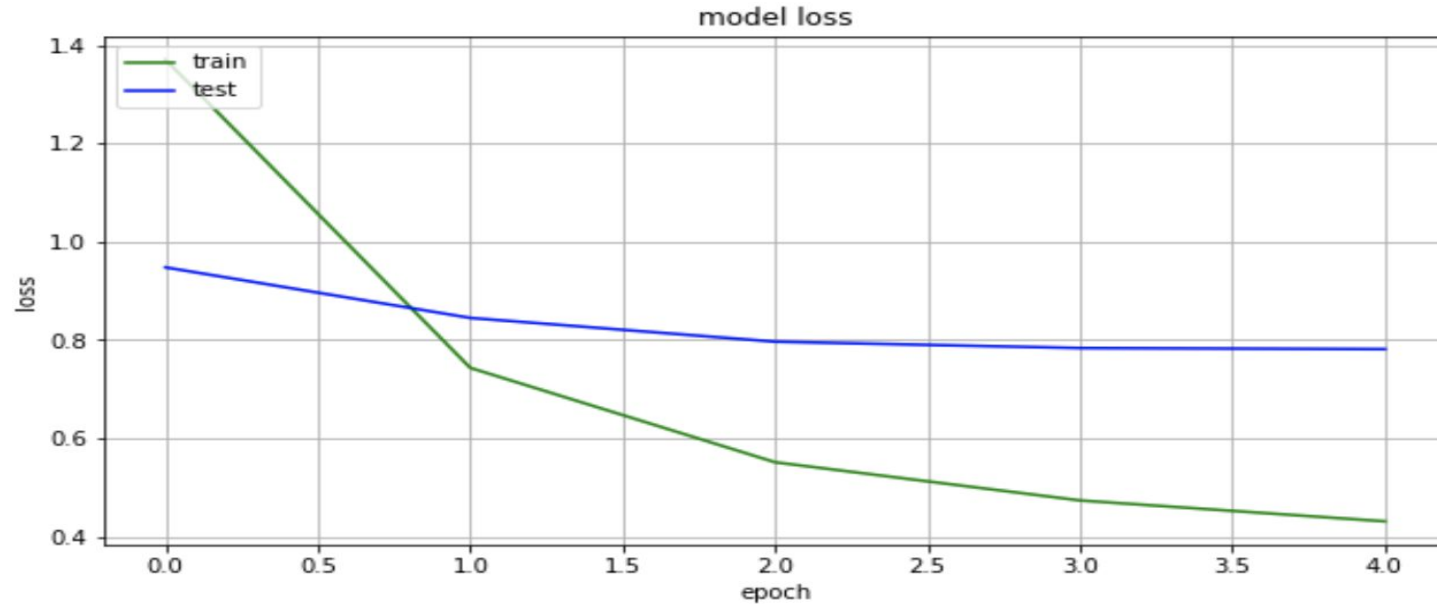
★ MAE = 2.4



Loss function: Mean squared error

Final Model (input \Rightarrow hidden layers/dropout \Rightarrow output)

★ MAE = 0.43



Loss function: Mean squared error

Cross Validation on Final Model

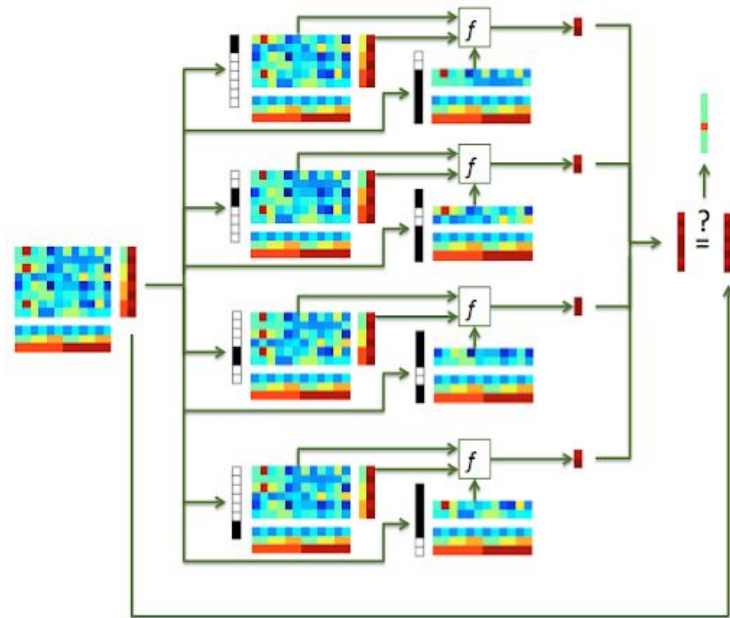
Metrics: Mean Absolute Error (MAE)

StratifiedKFold, n_splits=5

- ★ Split 1: 0.41
- ★ Split 2: 0.40
- ★ Split 3: 0.38
- ★ Split 4: 0.37
- ★ Split 5: 0.38

Average of MAE: 0.39

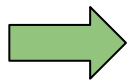
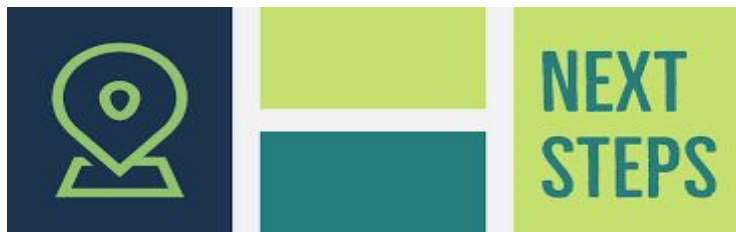
Standard Deviation of MAE: 0.0124



Make Recommendation



GO!!!



1. Cluster users & weight on rates
2. Build a recommendation system based on sentiment analysis on review texts
3. Compare two models & the combination of the two
4. Visualize keras embedding
5. Improve deployment

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