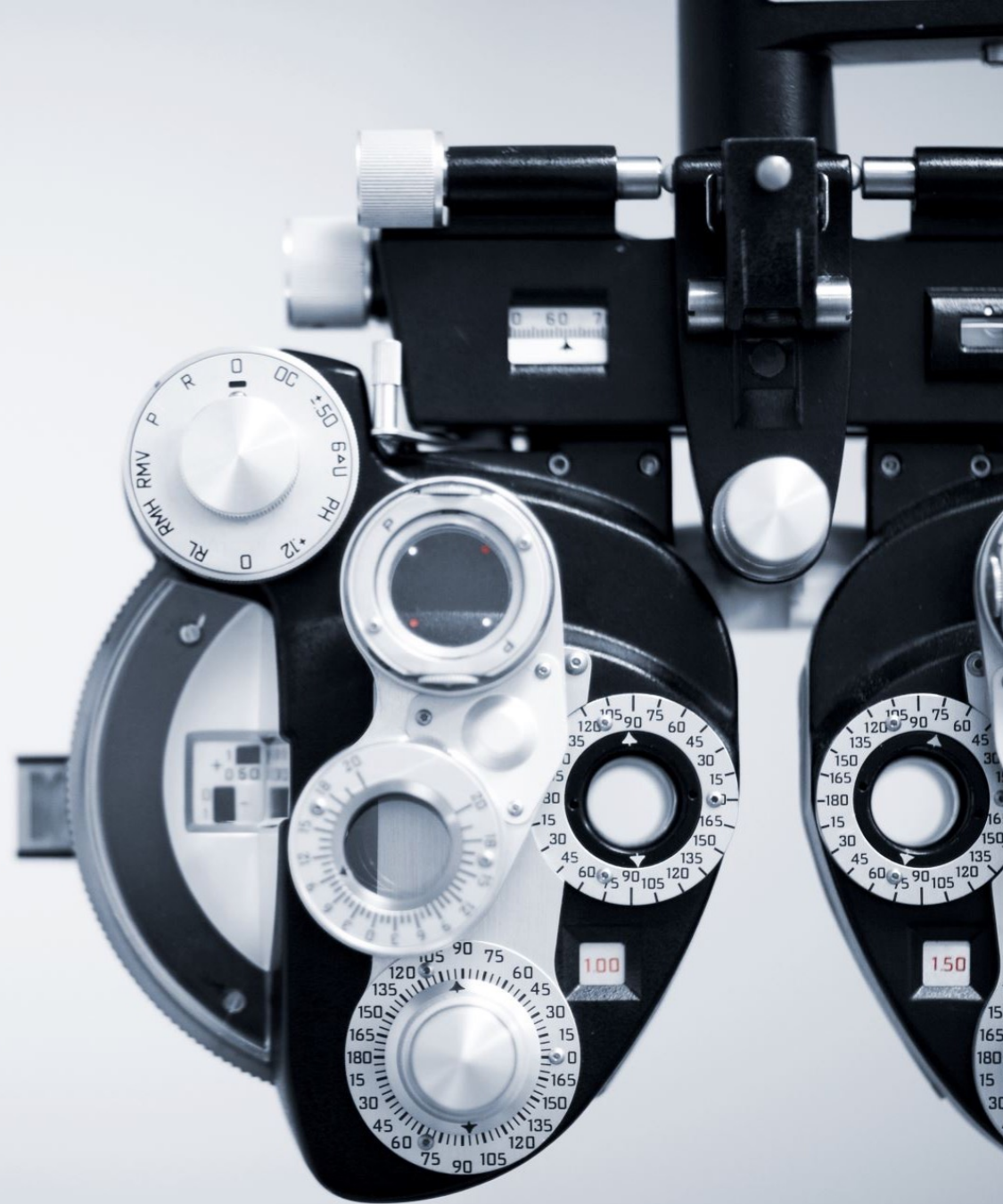# Netflix Movie Recommendation System

by Elena Burlando

Summary

Objective:

- Improve Cumulative Hit Rate to ~ 0.05

Projected Outcome:

- Test multiple recommendation systems
- Recommend 2-3 new systems

Outline

BUSINESS PROBLEM

DATA AND METHODS

RESULTS

CONCLUSIONS

BUSINESS PROBLEM

Stakeholder: Engineering team

LOW CUSTOMER ENGAGEMENT

CUMULATIVE HIT RATE IS AT 0.01

DATA & METHODS

DATA:

Over 100K ratings

9742 movies

610 users

DATA SOURCES:

MovieLens small dataset

FEATURES:

Genres, tags, date of release, links to movie details
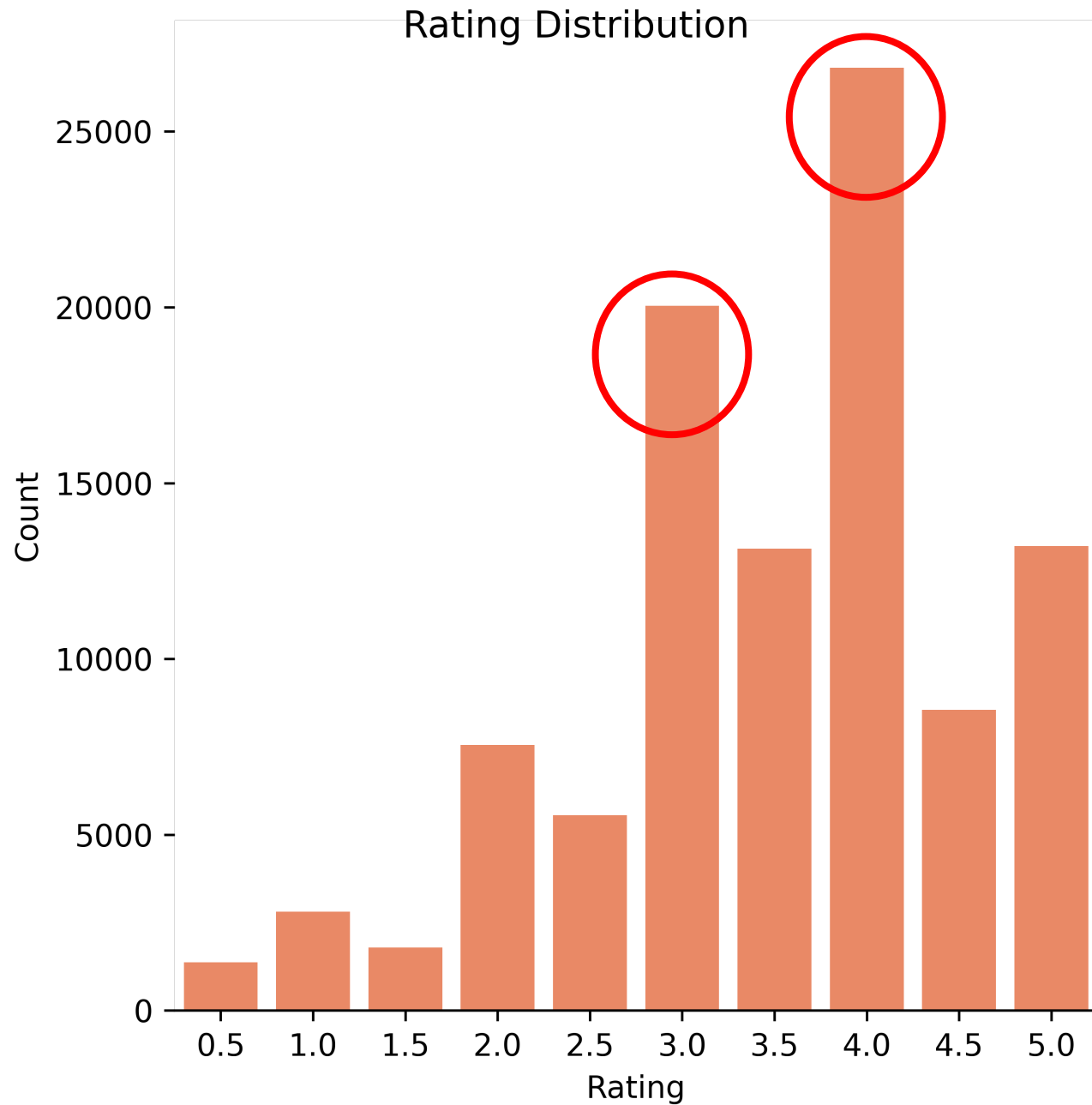
RECOMMENDATION SYSTEMS:

Popularity

Content-based (genre)
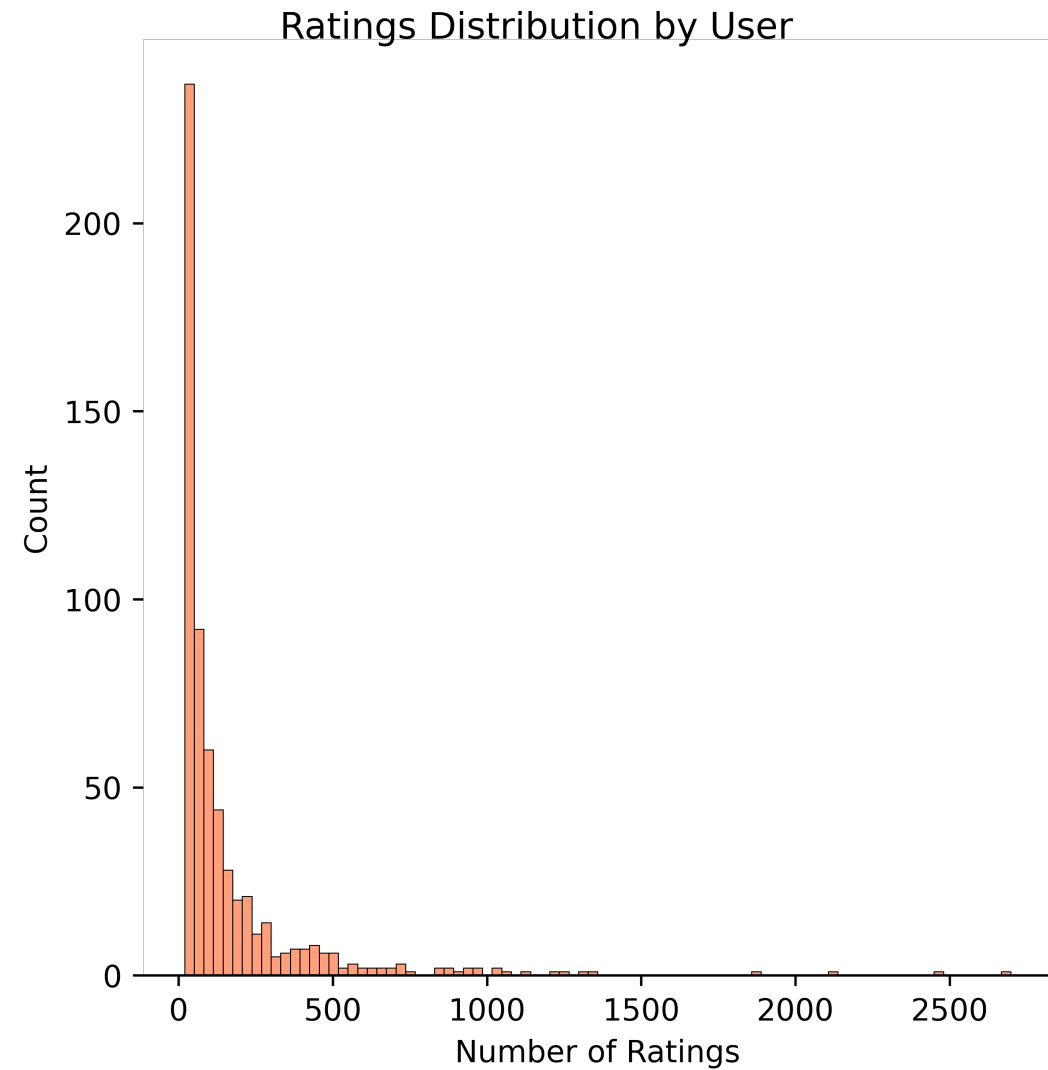
Collaborative Filtering

Matrix Factorization (SDV, SVD++)
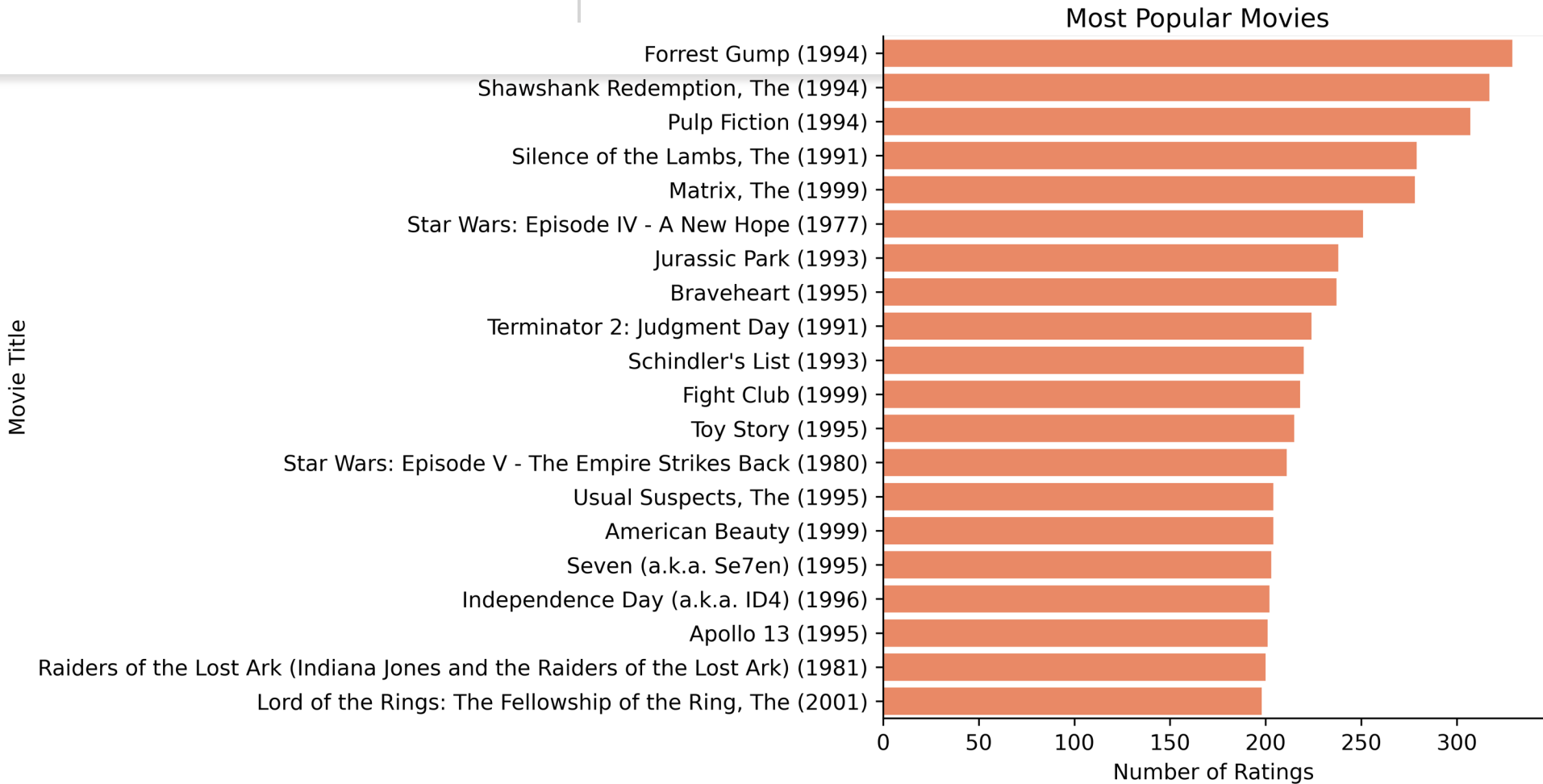
Rating Distribution

- Rating scale is 0-5.

- Rating distribution is skewed left indicating that customers tend to leave positive ratings.

- The largest # of rating given is 4.0 followed by 3.0, 3.5 and 5.

- Ratings distribution by user is skewed right indicating that majority of users have left 20+ reviews.

- Few users left 100+ reviews.

Ratings Distribution by User

POPULARITY BASED RECOMMENDATIONS

- Top 20 most rated movies based on the number of ratings.

Most Popular Movies

Untuned SVD

- RMSE = 0.88
- cHR = 0.043

```
We recommend:
Guess Who's Coming to Dinner (1967) 4.745014407216442
Three Billboards Outside Ebbing, Missouri (2017) 4.720015191777461
Paths of Glory (1957) 4.6446103691319545
Streetcar Named Desire, A (1951) 4.61991819185824
Godfather, The (1972) 4.612015465383254
Secrets & Lies (1996) 4.606239144936886
Adam's Rib (1949) 4.584542526932856
Trial, The (ProcÃ¨s, Le) (1962) 4.582209866985488
Neon Genesis Evangelion: The End of Evangelion (Shin seiki Evangelion GekijÃ´-ban: Air/Magokoro wo, kimi ni) (1997)
4.577752288908924
Five Easy Pieces (1970) 4.56212527326592
```

Untuned SVD++

- RMSE = 0.87
- cHR = 0.043

```
We recommend:
Streetcar Named Desire, A (1951) 4.548908044586783
12 Angry Men (1957) 4.5399802872258395
Ran (1985) 4.515392734559682
Three Billboards Outside Ebbing, Missouri (2017) 4.514355757991221
Grand Day Out with Wallace and Gromit, A (1989) 4.50861699618624
Departed, The (2006) 4.501026716157305
High Noon (1952) 4.4935906701537105
Seventh Seal, The (Sjunde inseglet, Det) (1957) 4.475112667114752
Secrets & Lies (1996) 4.46415371255078
Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb (1964) 4.4632009805588275
```
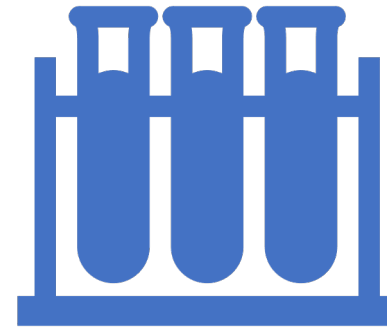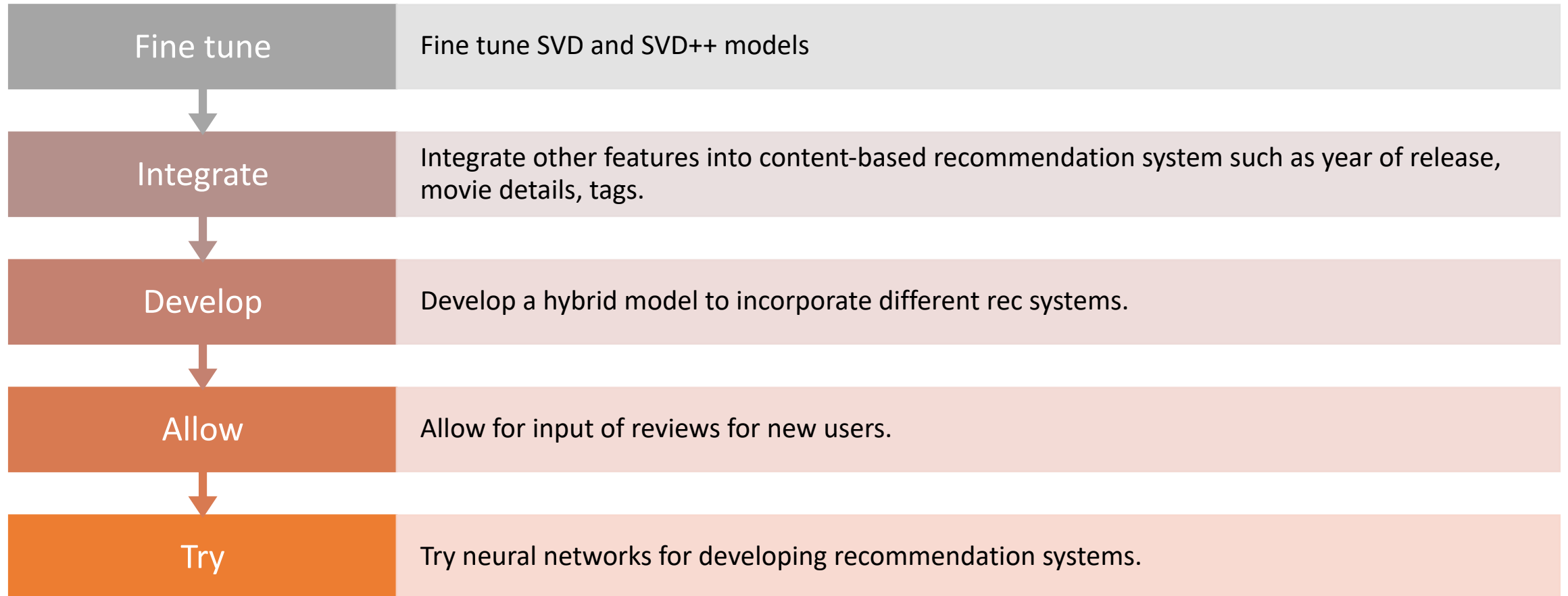
BUSINESS RECOMMENDATIONS

Implement Popularity-based
recommendation system for new users.

A/B test SVD and SVD++
recommendation models on website.

NEXT STEPS

Fine tune	Fine tune SVD and SVD++ models
Integrate	Integrate other features into content-based recommendation system such as year of release, movie details, tags.
Develop	Develop a hybrid model to incorporate different rec systems.
Allow	Allow for input of reviews for new users.
Try	Try neural networks for developing recommendation systems.

Thank you!

Link to Notebook