Movie Recommendation System

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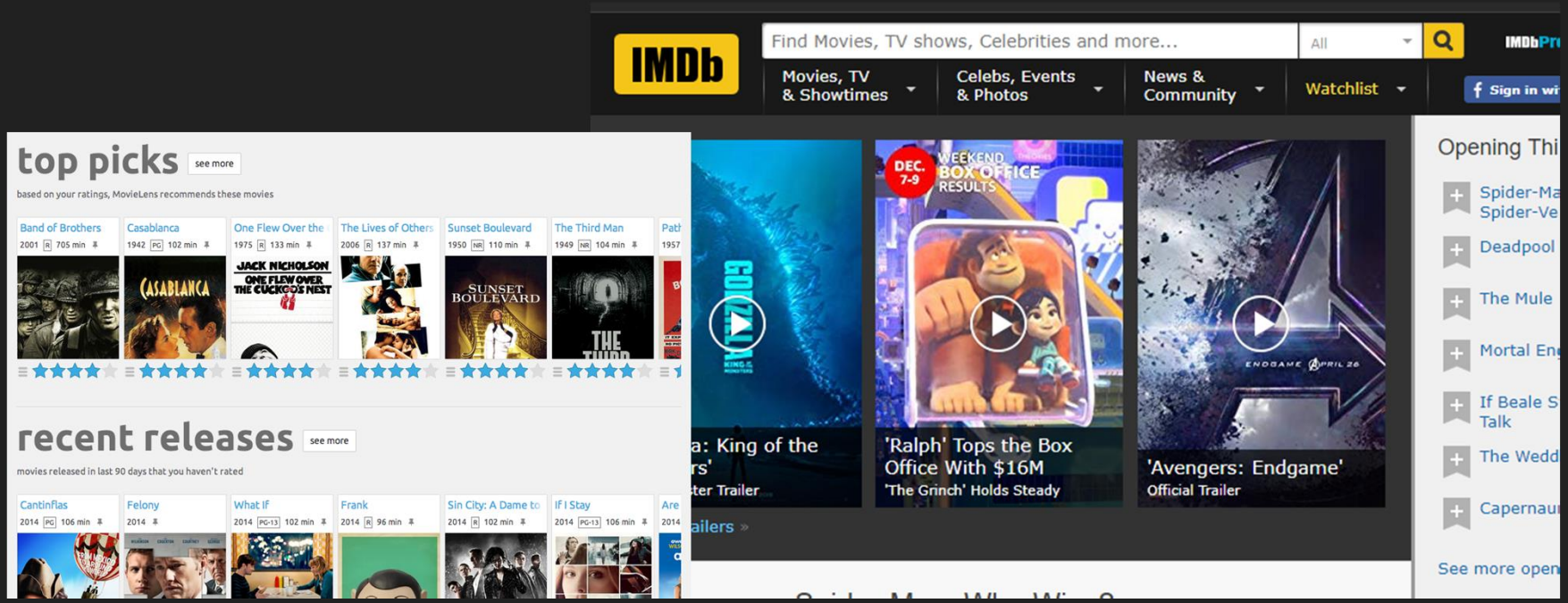
Recommender System

- Given an item, predicts preference of a user

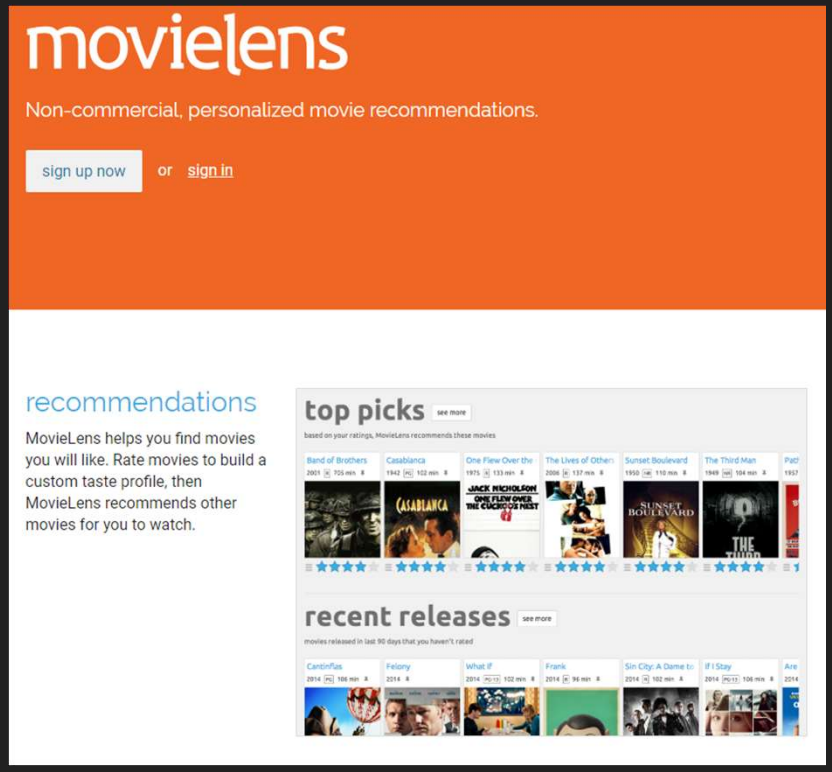


Movielens – 1M Dataset

- 1 million ratings
  from 6,000 users on 4,000 movies.

ml-1m.zip

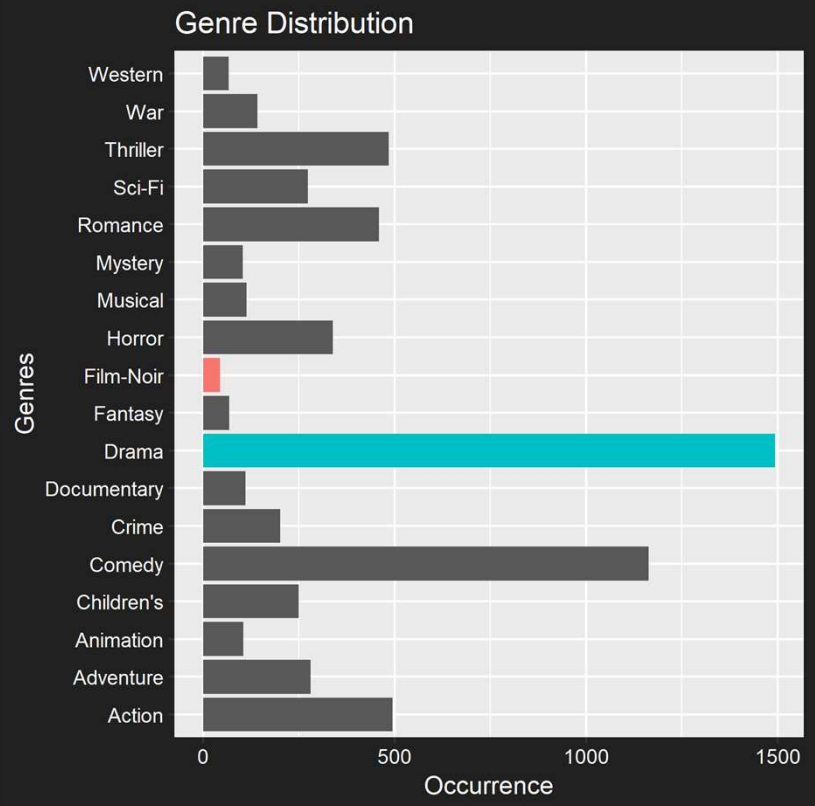
- movies.dat
- ratings.dat



movies.dat

3,883 observations, 3 attributes

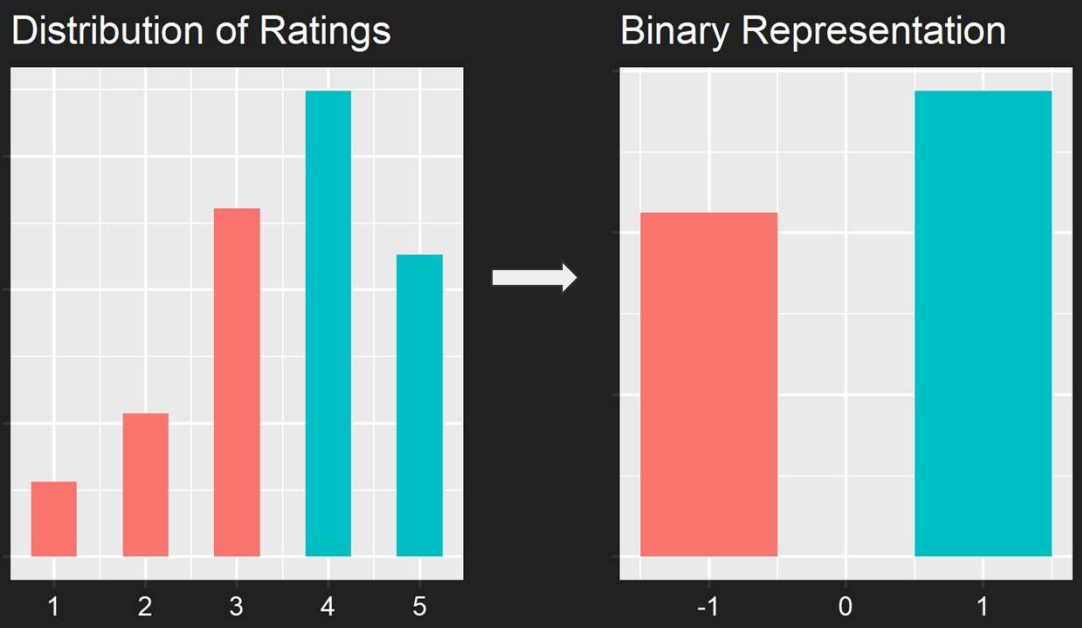
- movieId
- title
- genres



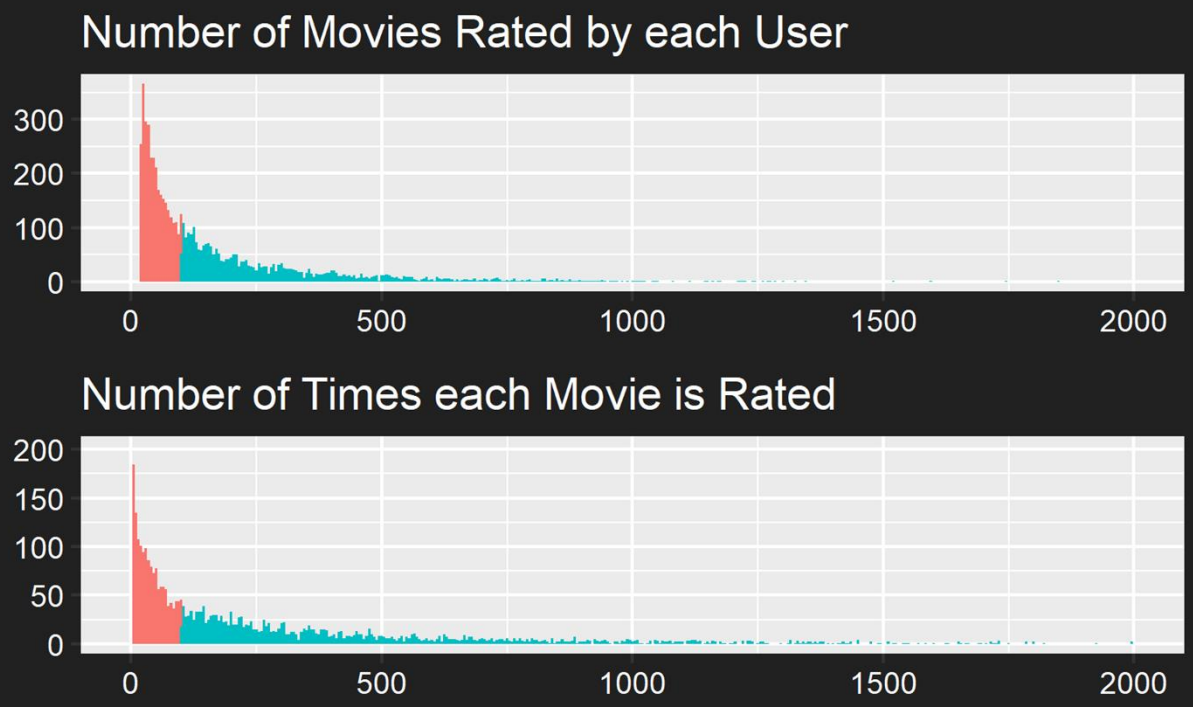
ratings.dat

1,000,209 observations, 3 attributes

- userId
- movieId
- ratings

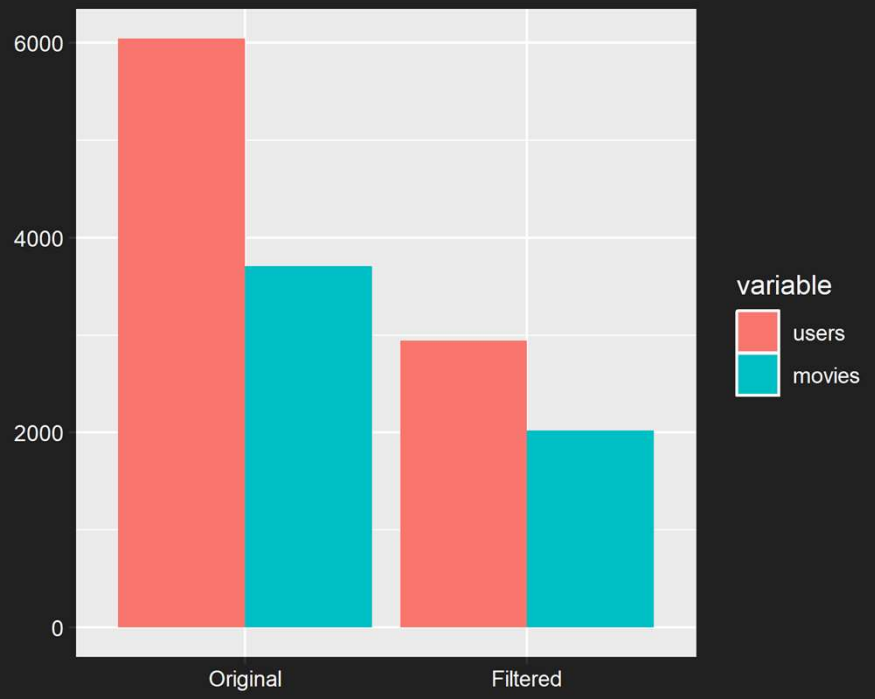


Issue: Sparsity of Ratings



Secondary Filtered Dataset

- Original Dataset
  - 1,000,209 Observations
  - 4.47% Dense
- Filtered Dataset (n ≥ 100)
  - 795,382 Observations
  - 13.38% Dense



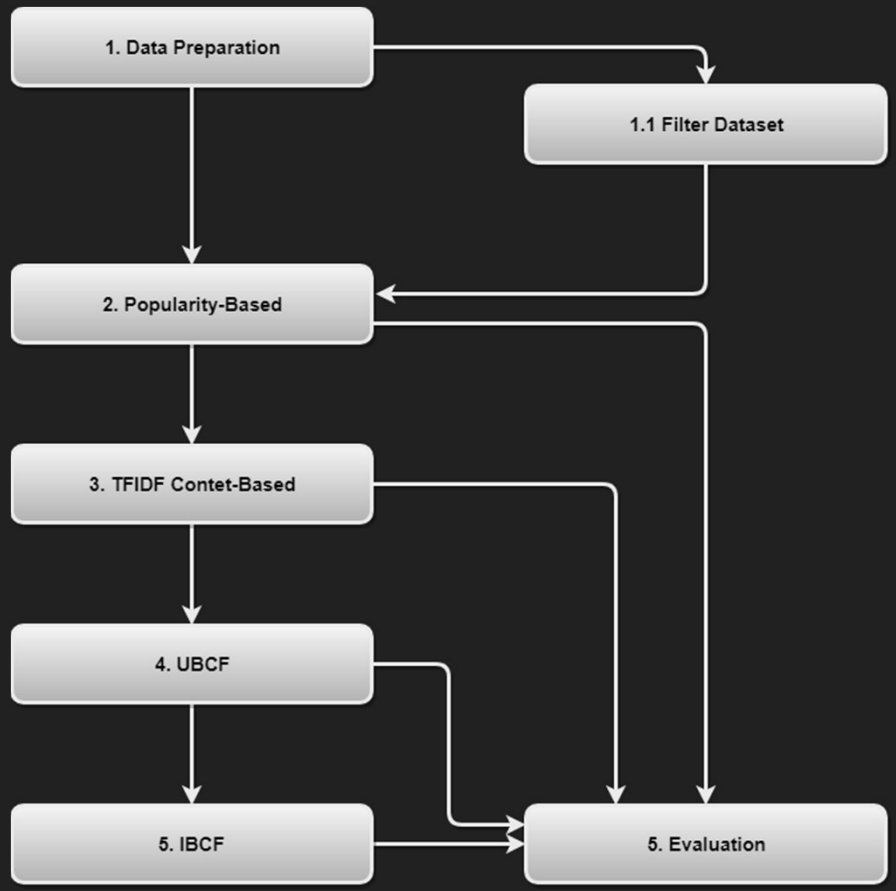
Validation

- 60% Train Set
- 40% Test Set

	movies						
users	1	2	3	4	5		m
1	1	-1	0	0	1		0
2	-1	0	-1	1	0	…	0
3	0	0	1	1	0		0
4	0	0	1	-1	0		1
5	0	1	0	0	1		0
			…				…
n	1	0	0	0	1	…	-1

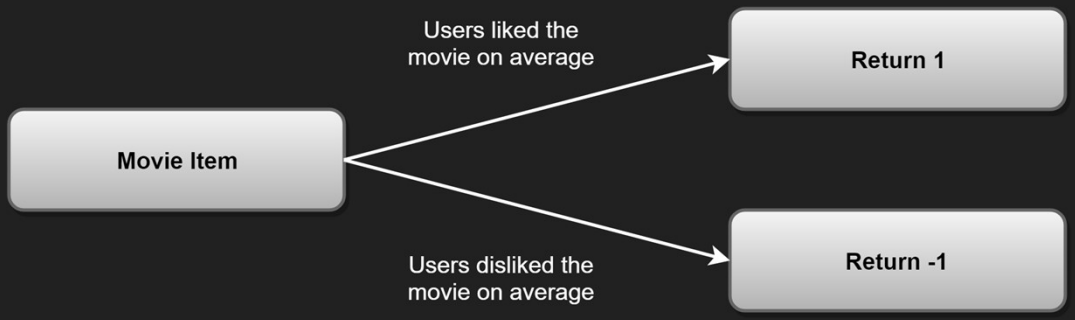
	movies						
users	1	2	3	4	5		m
1	1	-1	0	0	1		0
2	?	0	-1	1	0	…	0
3	0	0	1	1	0		0
4	0	0	?	-1	0		1
5	0	?	0	0	1		0
			…				…
n	1	0	0	0	?	…	-1

Approach


1. Data Preparation
1.1 Filter Dataset
2. Popularity-Based
3. TFIDF Contet-Based
4. UBCF
5. IBCF
5. Evaluation

Popularity-Based

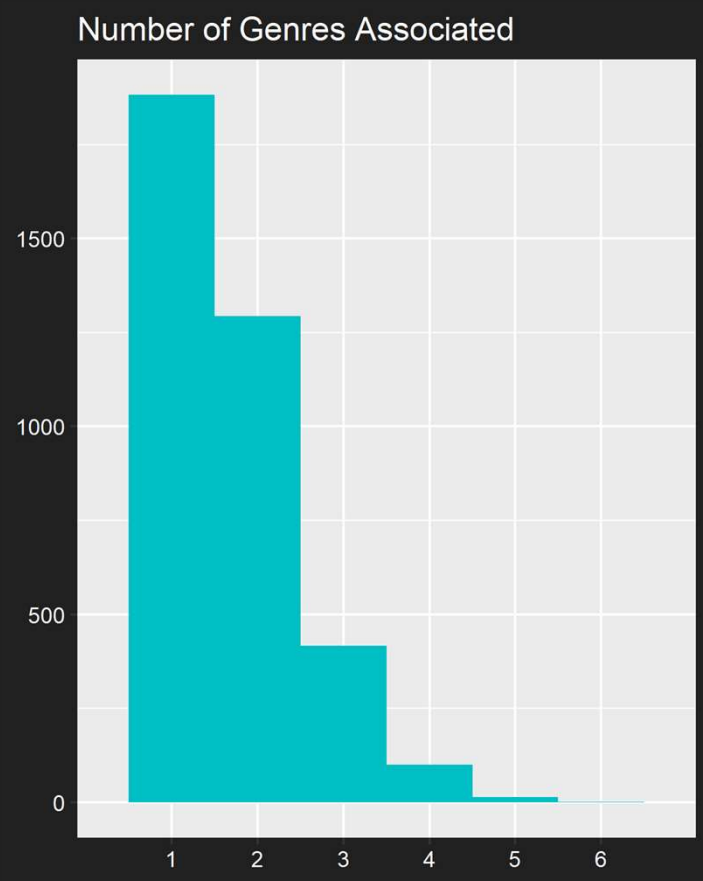
- Average rating given a movie
- Used as a benchmark model



Genre-Based Filtering

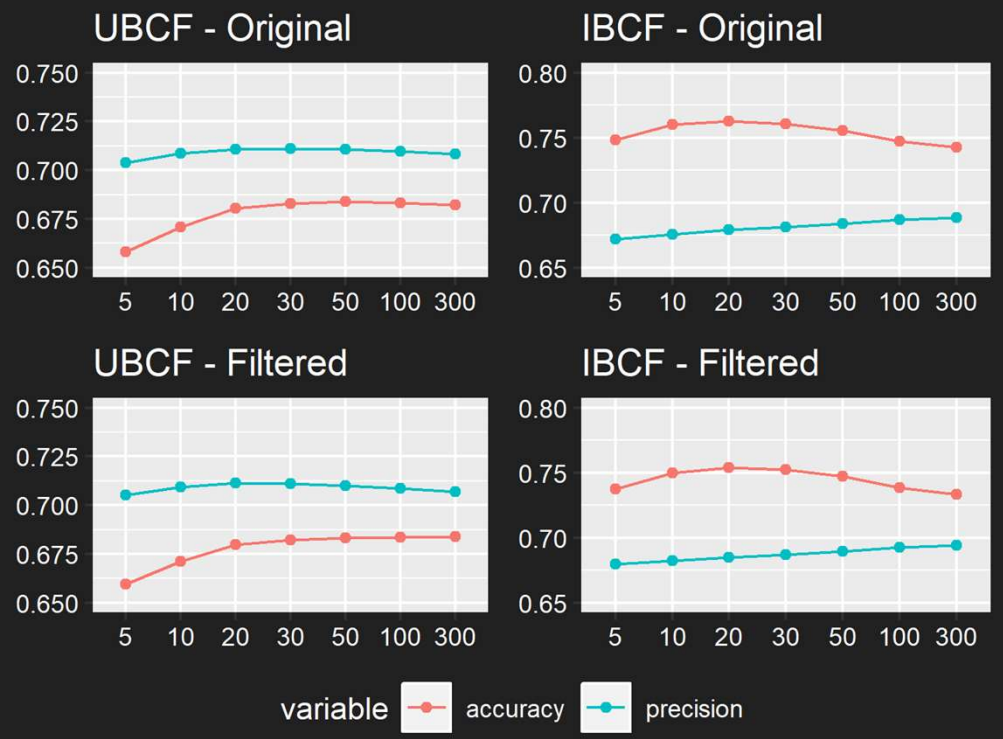
- Each movie has 1 to 6 genres
- Genres distributed unevenly

- TF-IDF values of genres used to create user-profile

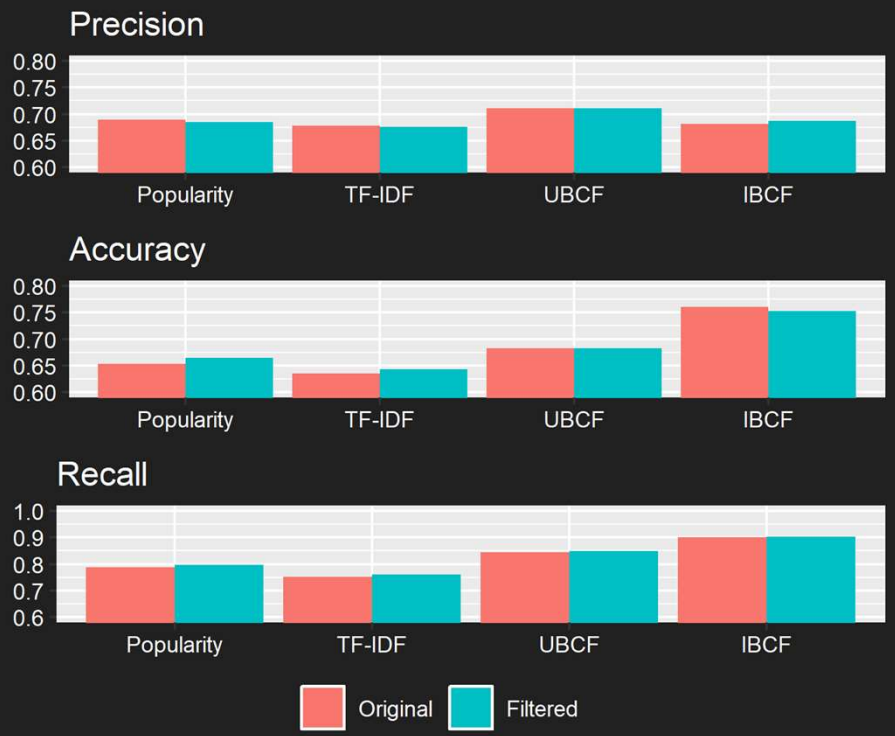


Collaborative Filtering

- Cosine Similarity
- Number of Neighbors
  - K = 30



Effect of Filtering Dataset was Not Significant



- ⬆ Higher Density
- ⬇ Smaller Dataset

Evaluation

- Primary Metric
  - Precision
- Secondary Metric
  - Accuracy
  - Recall

Original Dataset	Precision	Accuracy	Recall
Popularity-based	68.94%	65.39%	78.77%
TFIDF	67.78%	63.48%	75.12%
UBCF (k = 30)	**71.11%**	68.28%	84.44%
IBCF (k = 30)	68.10%	**76.08%**	**90.11%**

Filtered Dataset	Precision	Accuracy	Recall
Popularity-based	68.78%	66.03%	79.44%
TFIDF	67.79%	63.75%	75.62%
UBCF (k = 30)	**71.28%**	67.84%	84.46%
IBCF (k = 30)	68.90%	**75.01%**	**90.26%**

Importance of Recommender Systems

- Amount of data available online is always increasing
- Broad scope of application

Pandora helps users discover new podcasts on the platform

TECH NEWS

Tuesday, 11 Dec 2018

11:00 AM MYT

Pandora announced that the platform now has hundreds of podcasts across a wide range of genres bringing users over 100,000 episodes to listen to. — AFP

After working on the Podcast Genome Project for the last year, Pandora is officially introducing podcasts and highly personalised podcast recommendations to the music streaming service.

Pandora announced that the platform now has hundreds of podcasts across a wide

November 2, 2018

Movie Recommendations with Spark Collaborative Filtering

Rosaria Silipo

Collaborative filtering (CF)[1] based on the alternating least squares (ALS) technique[2] is another algorithm used to generate recommendations. It produces automatic predictions (filtering) about the interests of a user by collecting preferences from many other users (collaborating). The underlying assumption of the collaborative filtering approach is that if a person A has the same opinion as a person B on an issue, A is more likely to have B's opinion on a different issue than a randomly chosen person. This algorithm gained a lot of traction in the data science community after it was used by the team winner of the Netflix Prize.