Movie Recommender System

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What is a recommender system?

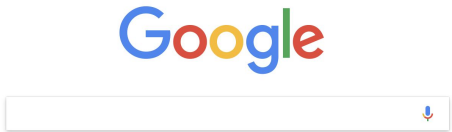
A system that is able to provide or suggest items to the end users

… long live the Age of Recommendation!

“We are leaving the age of information and entering the age of recommendation”

-- Chris Anderson in “The Long Tail”

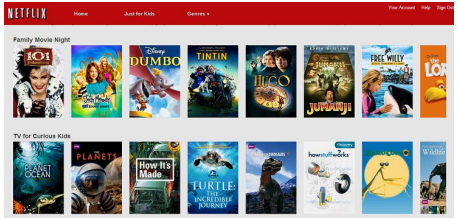
Almost every major tech company has applied recommender system in some form or the other…



Amazon: 35% sales from recommendations

Netflix: 2/3 of the movies watched are recommended

A Movie Recommender System



Dataset:

MovieLens 1M anonymous ratings of approximately 3,900 movies made by 6,040 MovieLens users who joined MovieLens in 2000.

Goal: Build a movie recommender system

- For new user, recommend new similar movies by searching movie titles
- For existing user, predict their ratings for the unseen movies and give recommendations

Movie features

	MovieID	Title	Genres
0	1	Toy Story (1995)	Animation|Children's|Comedy
1	2	Jumanji (1995)	Adventure|Children's|Fantasy
2	3	Grumpier Old Men (1995)	Comedy|Romance
3	4	Waiting to Exhale (1995)	Comedy|Drama
4	5	Father of the Bride Part II (1995)	Comedy

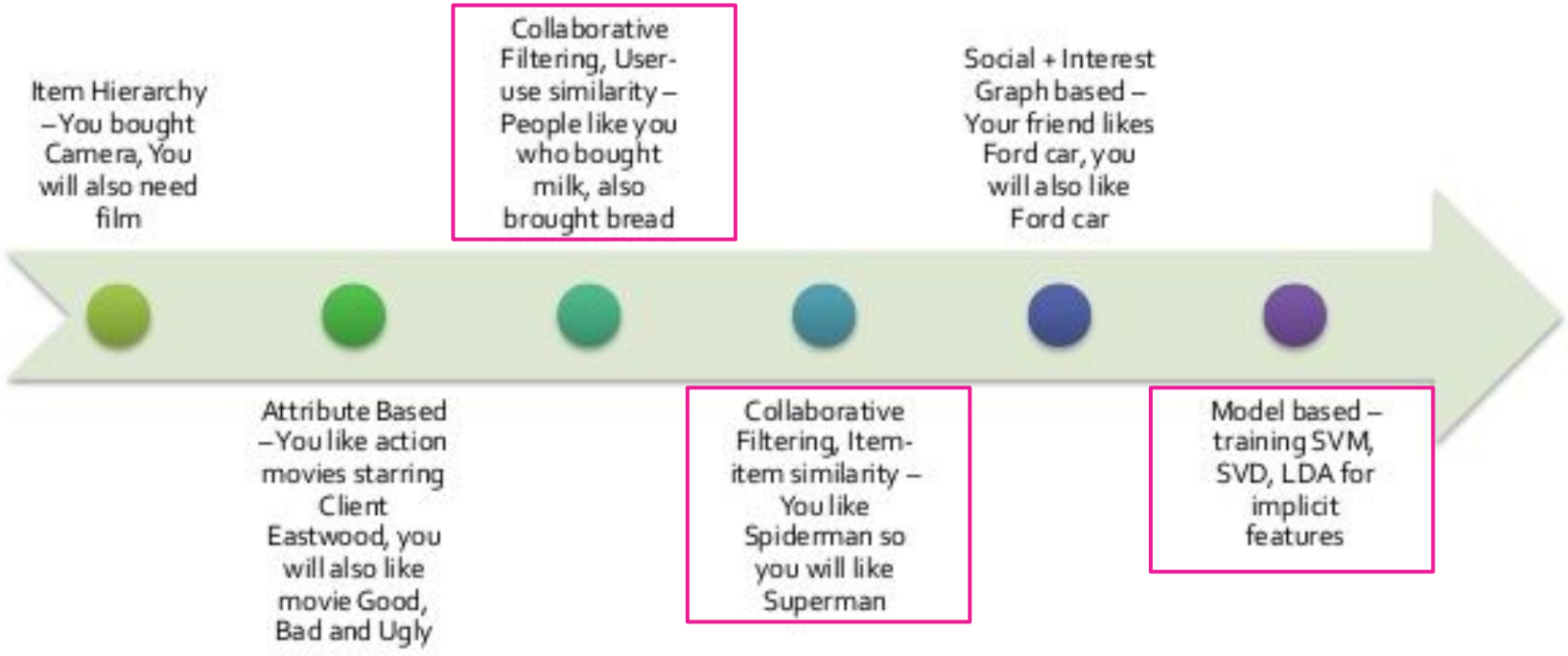
User features

	UserID	Gender	Age	JobID
0	1	F	1	10
1	2	M	56	16
2	3	M	25	15
3	4	M	45	7
4	5	M	25	20

Existing movie ratings

	UserID	MovieID	Rating
0	1	1193	5
1	1	661	3
2	1	914	3
3	1	3408	4
4	1	2355	5

Evolution of recommender system...



Collaborative / content-based recommender system

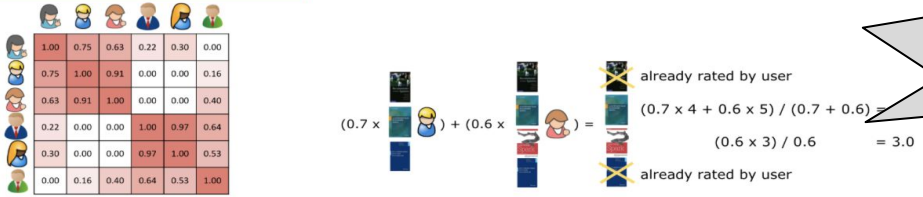
Predict ratings based on ratings from / of similar users or movies

	UserID	MovieID	Rating
0	1	1193	5
1	1	661	3
2	1	914	3
3	1	3408	4
4	1	2355	5

INPUT

Introduction to Recommender Systems
Machine learning Paradigms
Social Network-based Recommender Systems
Learning Spark
Recommender Systems Handbook
Recommender Systems and the Social Web

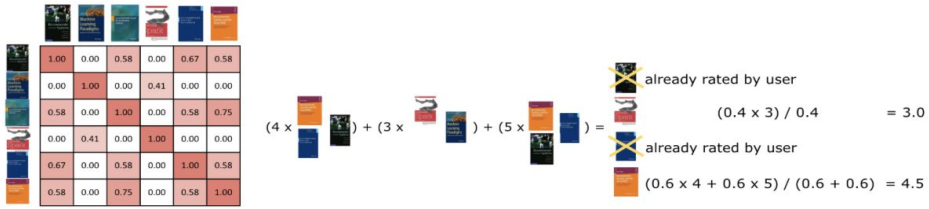
USER-BASED COLLABORATIVE FILTERING



How about other features?

ITEM-BASED COLLABORATIVE FILTERING

CONTENT-BASED FILTERING



OUTPUTS

Model-based recommender system (Neural Network)

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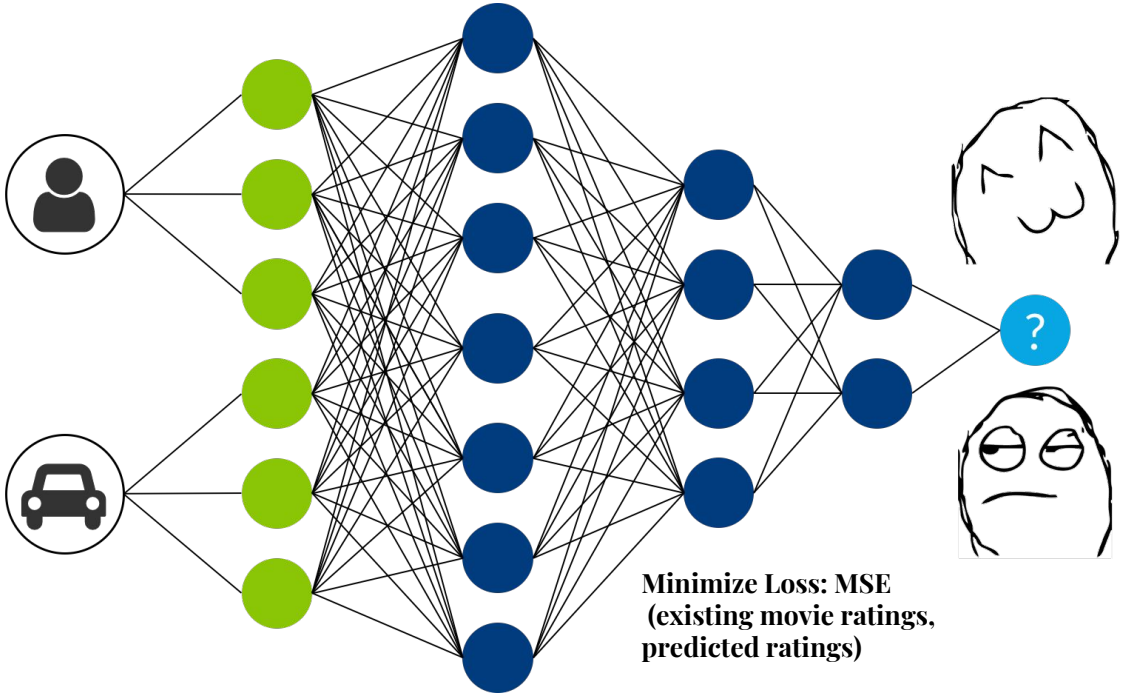

Minimize Loss: MSE
(existing movie ratings, predicted ratings)

Predicted ratings

	UserID	MovieID	Rating
0	1	1193	5
1	1	661	3
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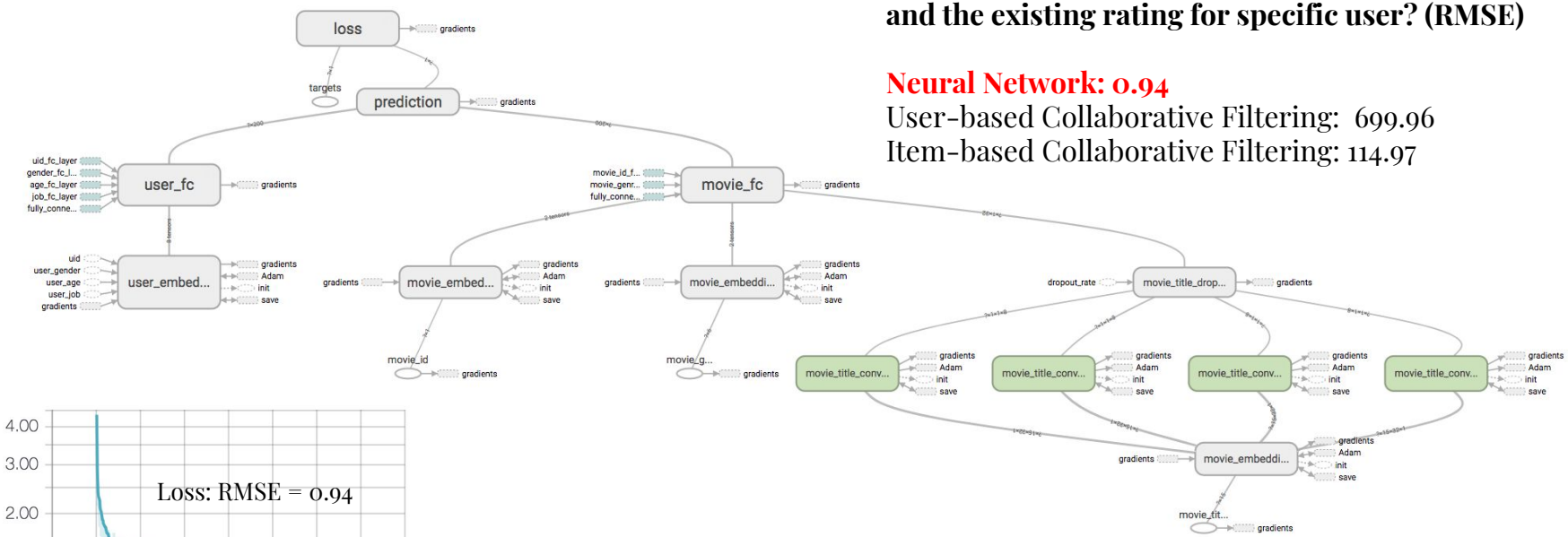
3	1	3408	4
4	1	2355	5

Model Implementation and Evaluation (TensorFlow)



How different between the movie rating we predict and the existing rating for specific user? (RMSE)

Neural Network: 0.94

User-based Collaborative Filtering: 699.96

Item-based Collaborative Filtering: 114.97

Showcase: New Users

Recommend similar new movies by searching movie titles

```
The movie you searched:

Movie ID:  1210
Movie Title:  Star Wars: Episode VI - Return of the Jedi (1983)
Movie Genres:  Action|Adventure|Romance|Sci-Fi|War
Average Rating:  4.0

Here are five movies you may like:

Movie ID:  2662
Movie Title:  War of the Worlds, The (1953)
Movie Genres:  Action|Sci-Fi|War
Average Rating:  3.9
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Movie ID:  1372
Movie Title:  Star Trek VI: The Undiscovered Country (1991)
Movie Genres:  Action|Adventure|Sci-Fi
Average Rating:  3.4
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Movie ID:  3701
Movie Title:  Alien Nation (1988)
Movie Genres:  Crime|Drama|Sci-Fi
Average Rating:  3.2
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Movie ID:  3362
Movie Title:  Dog Day Afternoon (1975)
Movie Genres:  Comedy|Crime|Drama
Average Rating:  4.0
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Movie ID:  969
Movie Title:  African Queen, The (1951)
Movie Genres:  Action|Adventure|Romance|War
Average Rating:  4.3
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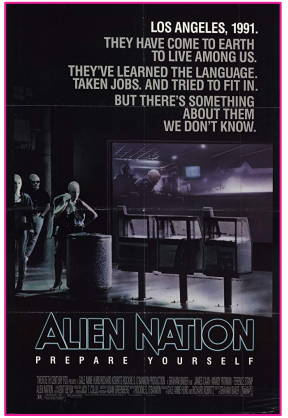

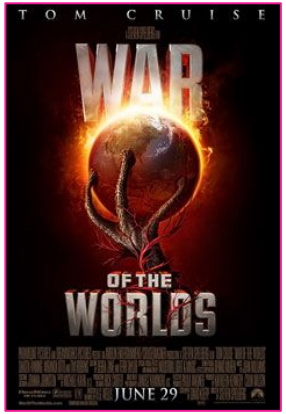

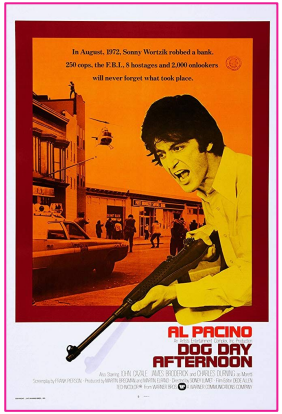

Showcase: Existing Users

Recommend new movies you may like based on your profile (user info / movie ratings)

```
Here is your profile:

User ID:  4
User Gender:  M
User Age:  45
Average Rating:  4.2

Here are five movies you may like:

Movie ID:  750
Movie Title:  Dr. Strangelove or: How I Learned t
Movie Genres:  Sci-Fi|War
Average Rating:  4.4
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Movie ID:  913
Movie Title:  Maltese Falcon, The (1941)
Movie Genres:  Film-Noir|Mystery
Average Rating:  4.4
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Movie ID:  3435
Movie Title:  Double Indemnity (1944)
Movie Genres:  Crime|Film-Noir
Average Rating:  4.4
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Movie ID:  1207
Movie Title:  To Kill a Mockingbird (1962)
Movie Genres:  Drama
Average Rating:  4.4
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Movie ID:  1284
Movie Title:  Big Sleep, The (1946)
Movie Genres:  Film-Noir|Mystery
Average Rating:  4.3
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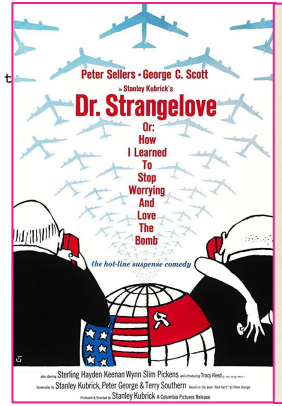
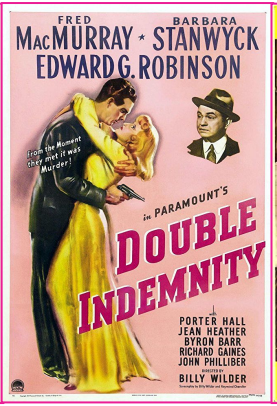
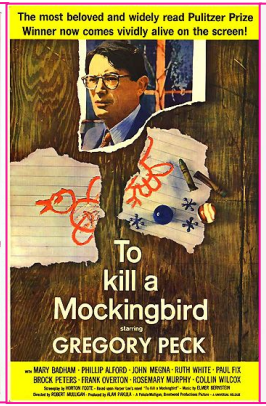
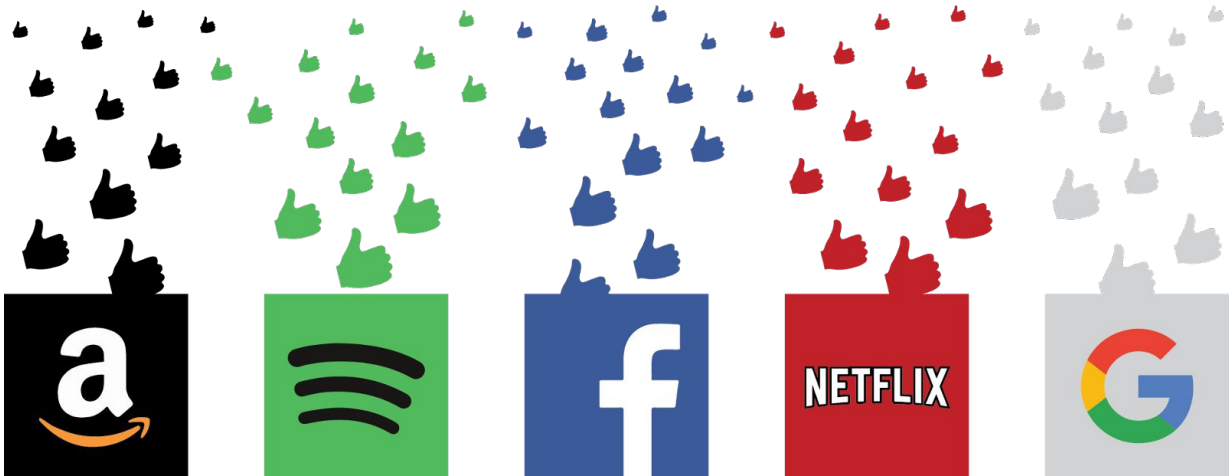






Next Step

1. Train the model on a bigger dataset, add more movies
2. Explore other models (e.g. SVD) and compare the score
3. Build an user interface for better interactions



Thanks for Watching!