



# Recommendation System

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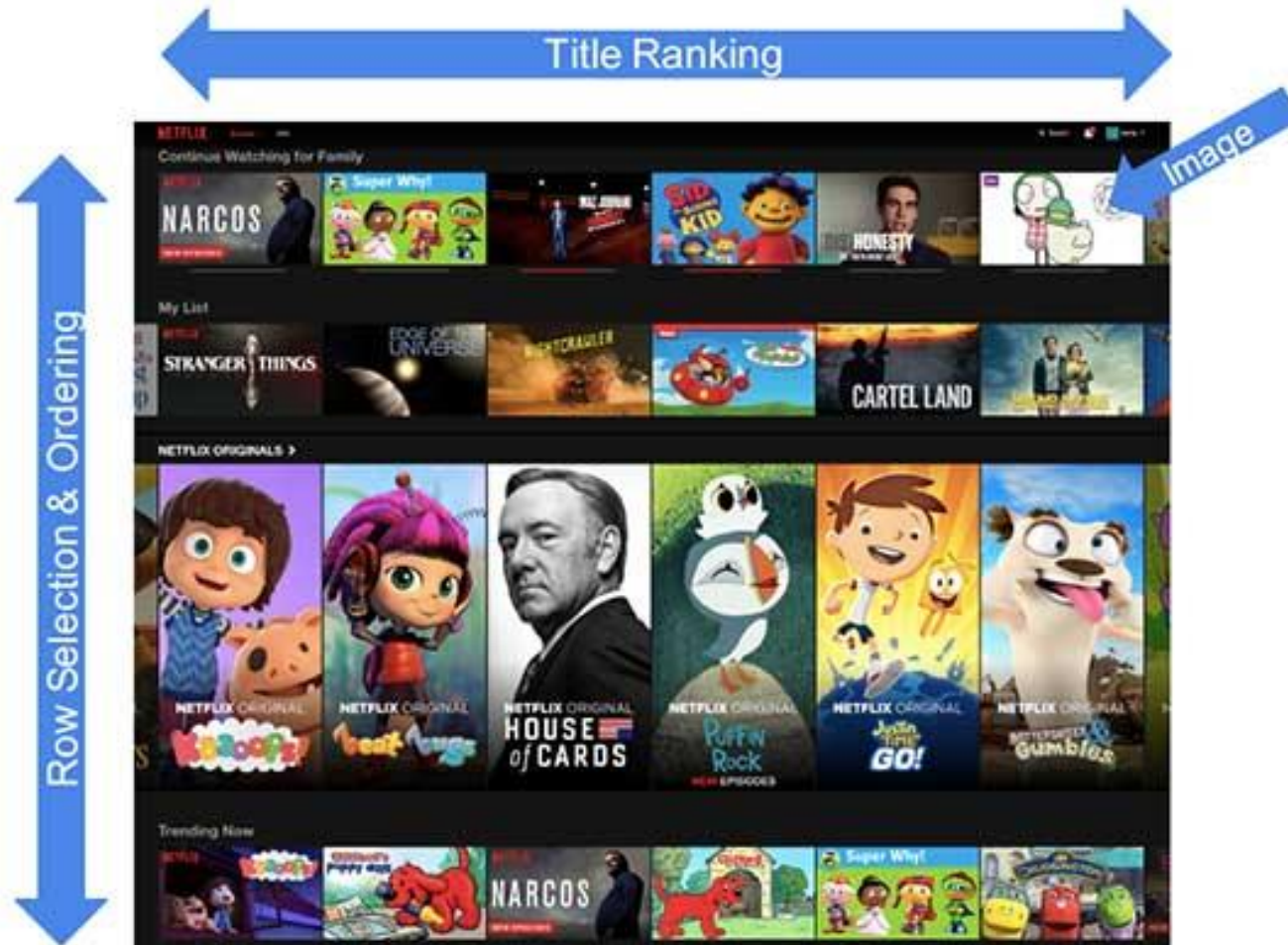
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8/8/2020

# Recommendation Engine

## Everything is a Recommendation



Recommendations are driven by machine learning algorithms

**Over 80%** of what members watch comes from our recommendations

# Recommendation Engine

Home

Fawn Qiu: Easy DIY projects for kid engineers

TED TV

7:03 • Jul 2016

RECOMMENDED BY YOUR APPS



**Prime** RECOMMENDED MOVIES



**Prime** RECENTLY ADDED TV



## Types of recommendation Engine

### Collaborative Recommendation System

- User based/Memory Based System
- Item Based

### Content Based Recommendation System

### Popularity Based Recommendation System



## Overview about RS

## Collaborative Recommendation System



User based/Memory Based System



Similar User



## Overview about RS

### Collaborative Recommendation System




User based/Memory Based System

### User-Based Collaborative Filtering



# Collaborative Recommendation System



## User based/Memory Based System

Little Deeper How this  
overview works

Little Deeper How this  
overview works

Collaborative Recommendation System



User based/Memory Based System

## Dataset

	user_id	movie_id	rating	unix_timestamp
0	196	242	3	881250949
1	186	302	3	891717742
2	22	377	1	878887116
3	244	51	2	880606923
4	166	346	1	886397596
...	...	...	...	...
99995	880	476	3	880175444
99996	716	204	5	879795543
99997	276	1090	1	874795795
99998	13	225	2	882399156
99999	12	203	3	879959583

100000 rows × 4 columns



## Little Deeper How this overview works

# Collaborative Recommendation System

## User based/Memory Based System

# Pivot Table

[illegible]

Little Deeper How this  
overview works

Collaborative Recommendation System



User based/Memory Based System

Similarity Table(Cosine)

	0	1	2	3	4	5	6	7	8	9	...	933	934	935	936	
0	2.220446e-15	0.833069	0.952540	0.935642	6.215248e-01	0.569761	0.559633	0.680928	0.921862	0.623456	...	0.630473	0.880518	0.725124	0.810295	0.801
1	8.330690e-01	0.000000	0.889409	0.821879	9.270210e-01	0.754157	0.892672	0.896656	0.838952	0.840138	...	0.843014	0.692058	0.641211	0.575954	0.68
2	9.525405e-01	0.889409	0.000000	0.655849	9.787555e-01	0.927585	0.933863	0.916940	0.938960	0.934849	...	0.968125	0.957247	0.836171	0.930962	0.879
3	9.356422e-01	0.821879	0.655849	0.000000	9.681958e-01	0.931956	0.908770	0.811940	0.898716	0.939141	...	0.947893	0.963216	0.866885	0.806529	0.853
4	6.215248e-01	0.927021	0.978755	0.968196	1.110223e-16	0.762714	0.626400	0.751070	0.943153	0.798573	...	0.661206	0.919420	0.905076	0.920221	0.85
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
938	8.819047e-01	0.771417	0.973729	0.969862	9.285415e-01	0.888148	0.892973	0.904102	0.960148	0.928540	...	0.933961	0.568846	0.741979	0.773551	0.567
939	6.859280e-01	0.773210	0.838110	0.803142	7.600453e-01	0.647551	0.670075	0.753117	0.879505	0.657039	...	0.672847	0.892976	0.812464	0.818683	0.82
940	8.513831e-01	0.838515	0.898757	0.847959	8.604049e-01	0.855554	0.940007	0.853855	0.856755	0.909695	...	0.953048	0.796699	0.711682	0.765789	0.689
941	8.204921e-01	0.827732	0.866584	0.829914	8.475026e-01	0.682672	0.717997	0.824678	0.907503	0.787670	...	0.773560	0.926487	0.910412	0.870446	0.901
942	6.018253e-01	0.894202	0.973444	0.941248	6.860592e-01	0.723958	0.605636	0.700191	0.924383	0.778140	...	0.736209	0.789237	0.856747	0.922207	0.79

943 rows × 943 columns

Little Deeper How this  
overview works

Collaborative Recommendation System



User based/Memory Based System

## Prediction Table

movie_id	1	2	3	4	5	6	7	8	9	10	...
user_id											
1	5.0	3.0	4.0	3.0	3.0	5.0	4.0	1.0	5.0	3.0	...
2	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	...
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...
5	4.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...
...	...	...	...	...	...	...	...	...	...	...	...
939	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	...
940	0.0	0.0	0.0	2.0	0.0	0.0	4.0	5.0	3.0	0.0	...
941	5.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	...
942	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...

	Star Wars	Hoop Dreams	Contact	Titanic
Joe	5	2	5	4
John	2	5		3
Al	2	2	4	2
Nathan	5	1	5	?

Joe [5,2,5]  
John [2,5,2.5]  
Al [2,2,4]  
Nathan [5,1,5]



$\cos(\text{Nathan}, \text{Joe})$  0.99  
 $\cos(\text{Nathan}, \text{John})$  0.64  
 $\cos(\text{Nathan}, \text{Al})$  0.91

Little Deeper How this  
overview works

Collaborative Recommendation System



User based/Memory Based System

## Prediction Table

	Star Wars	Hoop Dreams	Contact	Titanic
Joe	5	2	5	4
John	2	5		3
Al	2	2	4	2
Nathan	5	1	5	?

	Star Wars	Hoop Dreams	Contact	Titanic
Joe	5	2	5	4
John	2	5		3
Al	2	2	4	2
Nathan	5	1	5	?

0.99  
0.64  
0.91

Joe [5,2,5]  
John [2,5,2,3]  
Al [2,2,4]  
Nathan [5,1,5]



$\cos(\text{Nathan}, \text{Joe})$  0.99  
 $\cos(\text{Nathan}, \text{John})$  0.64  
 $\cos(\text{Nathan}, \text{Al})$  0.91

$\cos(\text{Nathan}, \text{Joe})$  0.99  
 $\cos(\text{Nathan}, \text{John})$  0.64  
 $\cos(\text{Nathan}, \text{Al})$  0.91

$$\frac{(0.99 \cdot 4 + 0.64 \cdot 3 + 0.91 \cdot 2)}{(0.99 + 0.64 + 0.91)}$$

$$? = 3.03$$

Little Deeper How this  
overview works

Collaborative Recommendation System



User based/Memory Based System

## Prediction Table

	0	1	2	3	4	5	6	7	8	9	...	1672	1673	1674	1675
0	2.065326	0.734303	0.629924	1.010669	0.640686	0.476150	1.784569	1.163032	1.513350	0.704478	...	0.394041	0.394434	0.393981	0.392972
1	1.763088	0.384040	0.196179	0.731538	0.225643	0.003892	1.493597	0.876153	1.108467	0.261991	...	-0.086942	-0.085491	-0.087137	-0.088158
2	1.795904	0.329047	0.158829	0.684154	0.173277	-0.035621	1.488230	0.835769	1.135426	0.236383	...	-0.134795	-0.133537	-0.135543	-0.136438
3	1.729951	0.293913	0.127741	0.644932	0.142143	-0.062261	1.437010	0.796249	1.096663	0.211789	...	-0.161413	-0.160220	-0.161542	-0.162586
4	1.796651	0.454474	0.354422	0.763130	0.359539	0.195987	1.547370	0.908904	1.292027	0.437954	...	0.101762	0.102405	0.101923	0.100839
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
938	1.676950	0.346339	0.177518	0.689906	0.199740	0.003297	1.429565	0.830905	1.070986	0.262183	...	-0.092434	-0.091197	-0.092851	-0.093801
939	1.822346	0.419125	0.286430	0.715605	0.294442	0.106633	1.514591	0.853050	1.195304	0.359260	...	0.014060	0.014688	0.014123	0.013060
940	1.591515	0.275269	0.102195	0.624383	0.133762	-0.069553	1.320734	0.765529	1.035088	0.192697	...	-0.166179	-0.164981	-0.166278	-0.167392
941	1.810363	0.404799	0.275450	0.726616	0.281316	0.087068	1.550310	0.850057	1.205745	0.342987	...	-0.008362	-0.007757	-0.008225	-0.009218
942	1.838431	0.479648	0.384963	0.780521	0.388442	0.240998	1.564232	0.946704	1.289865	0.487383	...	0.147027	0.148208	0.147193	0.146199

943 rows × 1682 columns



Little Deeper How this  
overview works

Collaborative Recommendation System



User based/Memory Based System

## Prediction Table

	0	1	2	3	4	5	6	7	8	9	...	1672	1673	1674	1675
0	2.065326	0.734303	0.629924	1.010669	0.640686	0.476150	1.784569	1.163032	1.513350	0.704478	...	0.394041	0.394434	0.393981	0.392972
1	1.763088	0.384040	0.196179	0.731538	0.225643	0.003892	1.493597	0.876153	1.108467	0.261991	...	-0.086942	-0.085491	-0.087137	-0.088158
2	1.795904	0.329047	0.158829	0.684154	0.173277	-0.035621	1.488230	0.835769	1.135426	0.236383	...	-0.134795	-0.133537	-0.135543	-0.136438
3	1.729951	0.293913	0.127741	0.644932	0.142143	-0.062261	1.437010	0.796249	1.096663	0.211789	...	-0.161413	-0.160220	-0.161542	-0.162586
4	1.796651	0.454474	0.354422	0.763130	0.359539	0.195987	1.547370	0.908904	1.292027	0.437954	...	0.101762	0.102405	0.101923	0.100839
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
938	1.676950	0.346339	0.177518	0.689906	0.199740	0.003297	1.429565	0.830905	1.070986	0.262183	...	-0.092434	-0.091197	-0.092851	-0.093801
939	1.822346	0.419125	0.286430	0.715605	0.294442	0.106633	1.514591	0.853050	1.195304	0.359260	...	0.014060	0.014688	0.014123	0.013060
940	1.591515	0.275269	0.102195	0.624383	0.133762	-0.069553	1.320734	0.765529	1.035088	0.192697	...	-0.166179	-0.164981	-0.166278	-0.167392
941	1.810363	0.404799	0.275450	0.726616	0.281316	0.087068	1.550310	0.850057	1.205745	0.342987	...	-0.008362	-0.007757	-0.008225	-0.009218
942	1.838431	0.479648	0.384963	0.780521	0.388442	0.240998	1.564232	0.946704	1.289865	0.487383	...	0.147027	0.148208	0.147193	0.146199

943 rows × 1682 columns



Little Deeper How this  
overview works



Select the User\_Input



**UserID=34**

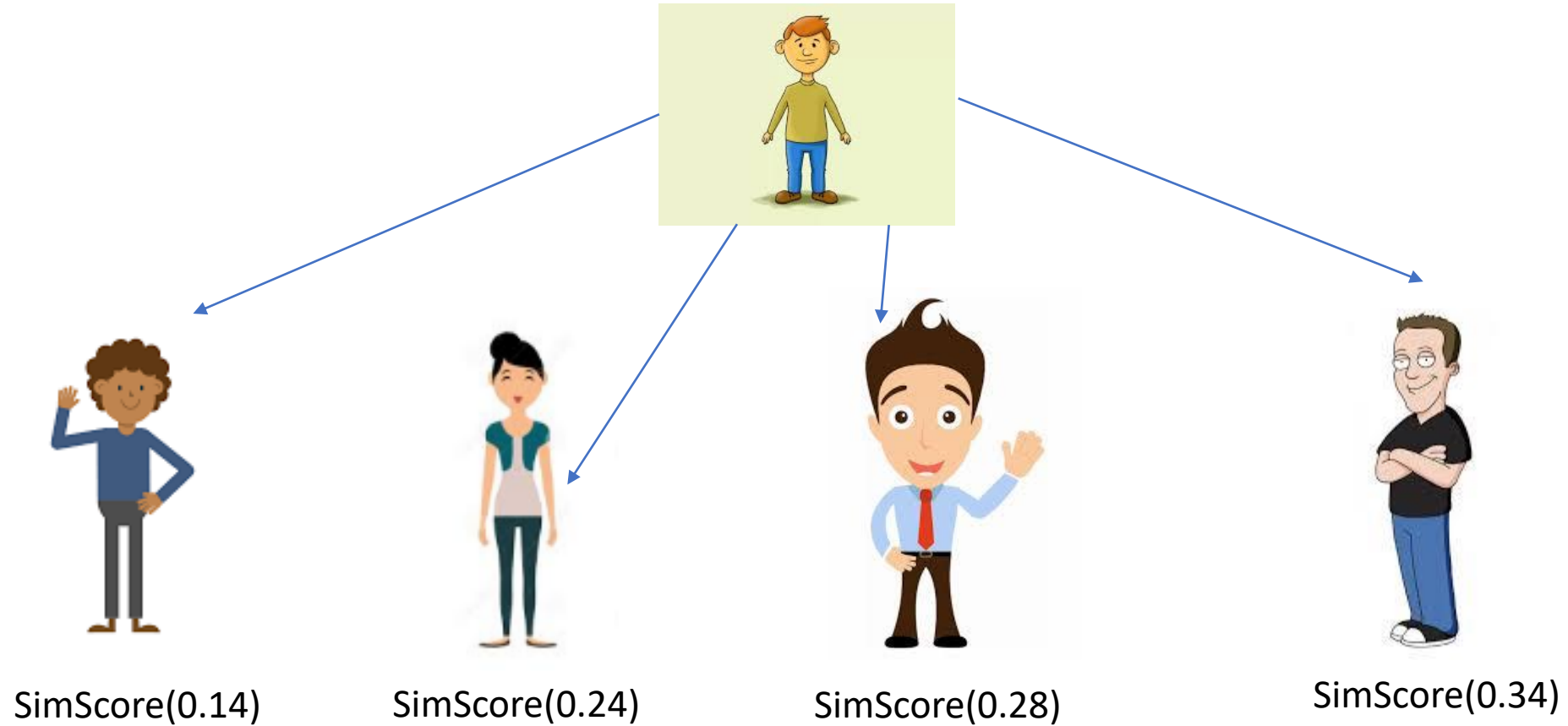
Little Deeper How this  
overview works

Collaborative Recommendation System



User based/Memory Based System

**Similar users Based on Similarity Table**



Little Deeper How this  
overview works

Collaborative Recommendation System



User based/Memory Based System

Similar users movie Id



34  
45  
89  
673  
876  
893



34  
56  
67  
78  
89  
93



67  
83  
56  
83  
86  
90



67  
83  
53  
87  
86  
90

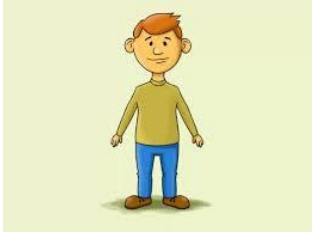
Little Deeper How this  
overview works

Collaborative Recommendation System



User based/Memory Based System

User\_Input movie Id



Movie\_Id

34  
45  
67  
93  
57  
83  
98  
89  
100



Movie\_Id

34  
45  
89  
673  
876  
893



Movie\_Id

34  
56  
67  
78  
89  
93



Movie\_Id

67  
83  
56  
83  
86  
90



Movie\_Id

67  
83  
53  
87  
86  
90

Little Deeper How this  
overview works

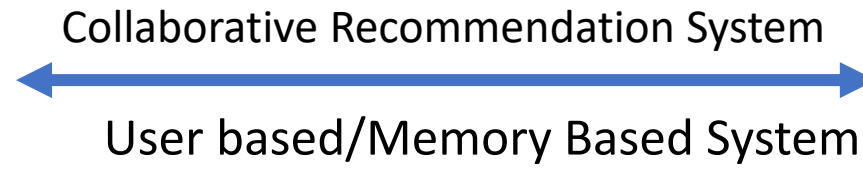
Collaborative Recommendation System  
← User based/Memory Based System →

Filtered Movieid from similar user  
based on User\_input



50  
78  
87  
90  
673  
876  
893

Little Deeper How this  
overview works



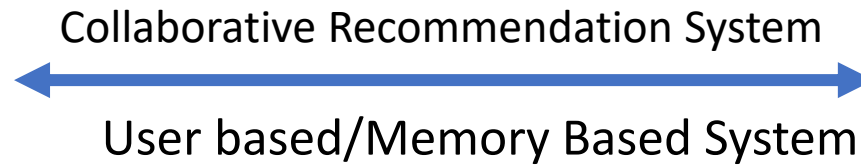
Filtered Movie List based on the  
User Prediction Table(highest)



Movie_Id	Prediction Value
50	0.99
78	0.89
87	0.75
90	0.74
673	0.45
876	0.37
893	0.25



Little Deeper How this  
overview works

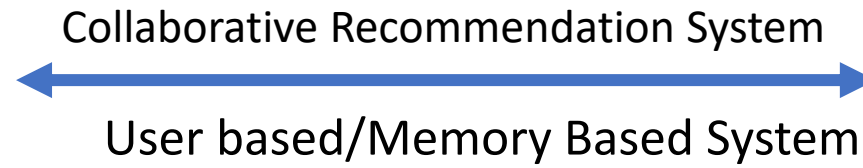


**Highest Rated Movie\_id**



Movie_Id	Prediction Value	Threshold=0.7 Sorted Movie_List
50	0.99	50
78	0.89	78
87	0.75	87
90	0.74	90
673	0.45	
876	0.37	
893	0.25	

Little Deeper How this  
overview works



Retrieve the Movie Title using  
Highest rated movieid

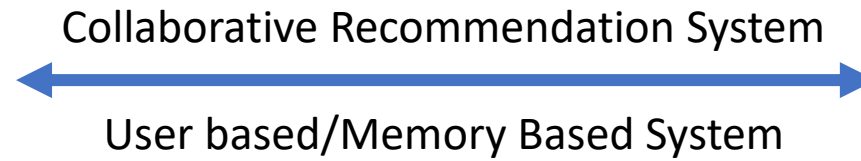


Threshold=0.7  
Sorted Movie\_List

50  
78  
87  
90

Movie Title

InterSteller  
Inception  
Gravity  
Imitation Game



## STEPS FOR USER BASED RECOMMENDATION SYSTEM

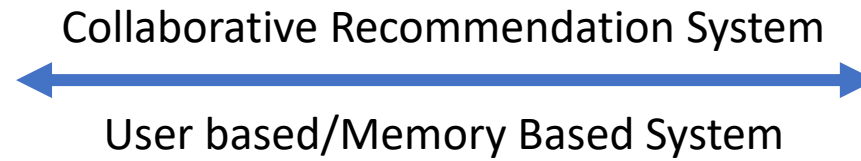
Step1: Create Pivot Table , values as rating

Step2: Create similarity table between Users using Pivot → Cosine Decision

Step3: Predict the non filled rating for the users using formula\*(This helps to find the not watched film )

Step4: Select the user\_input

Step5: For the user\_input select the similar user using similarity Table(Minimum Distance is the similar)



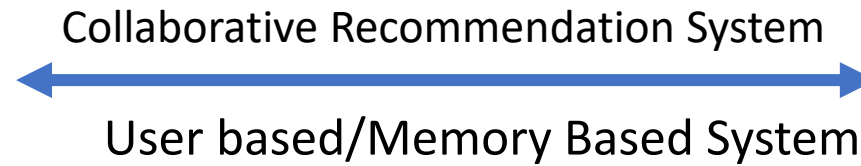
## STEPS FOR USER BASED RECOMMENDATION SYSTEM

Step6: Create a list of movie id for similar user

Step7: Create a list of movie id for user\_input

Step8: Filter the movieid of user\_input which is not present in similar user

Step9: Filtered movieid have to check with Prediction table(step3 Answer) because of filtered movieid list are the recommended list



## STEPS FOR USER BASED RECOMMENDATION SYSTEM

Step10: But we have to select only the highest rated movie of the filtered list.

Step11: With help of threshold value we can select the highest rated movie(Completely using predicted table )

Step12: Now we have only the highest rated movieid list of important user.

Step13: Now load the movie tile table

Step14: Using movie title table we can retrieve the highest rated movie list of the user\_input(Final Recommendation Title.)

```
In [156]: #def userbased(input_user,user_similarity,user_predictions,similar_user_count,similar_user_movieid_count,thres):  
Recommended_movie=userbased(5,user_similarity,user_pred,2,0.8)
```

```
['Twelve Monkeys (1995)']  
['Richard III (1995)']  
['Postino, Il (1994)']  
['Cold Comfort Farm (1995)']  
['Lone Star (1996)']  
['Swingers (1996)']  
['When the Cats Away (Chacun cherche son chat) (1996)']  
['Chasing Amy (1997)']  
['Heat (1995)']  
['Sense and Sensibility (1995)']  
['Secrets & Lies (1996)']  
['Donnie Brasco (1997)']  
['Ulee's Gold (1997)']  
['Mother (1996)']  
['Cop Land (1997)']  
The common Movie in Recom & User: []
```

```
In [153]: len(Recommended_movie)
```

```
Out[153]: 12
```



Collaborative Recommendation System



Item Based Recommendation

## Item Based Recommendation



Similar item



Recommended

Recommended



## Item Based Recommendation

## Dataset

	user_id	movie_id	rating	unix_timestamp
0	196	242	3	881250949
1	186	302	3	891717742
2	22	377	1	878887116
3	244	51	2	880606923
4	166	346	1	886397596
...	...	...	...	...
99995	880	476	3	880175444
99996	716	204	5	879795543
99997	276	1090	1	874795795
99998	13	225	2	882399156
99999	12	203	3	879959583

100000 rows × 4 columns



# Collaborative Recommendation System



## Item Based Recommendation

Similarity Table(Cosine)

	0	1	2	3	4	5	6	7	8	9	...	1672	1673	1674	1675	1676
0	0.000000	5.976178e-01	0.669755	0.545062	0.713286	0.883656	0.379021	0.518886	0.503712	0.726065	...	0.964613	1.0	1.000000	1.000000	0.964613
1	0.597618	1.110223e-16	0.726931	0.497429	0.681164	0.916437	0.616597	0.662998	0.744748	0.828918	...	1.000000	1.0	1.000000	1.000000	1.000000
2	0.669755	7.269308e-01	0.000000	0.675134	0.787043	0.893278	0.627079	0.799206	0.726331	0.841896	...	1.000000	1.0	1.000000	1.000000	0.967700
3	0.545062	4.974292e-01	0.675134	0.000000	0.665761	0.909692	0.510717	0.509764	0.580956	0.747439	...	1.000000	1.0	0.905978	0.905978	0.962300
4	0.713286	6.811638e-01	0.787043	0.665761	0.000000	0.962701	0.665231	0.740839	0.727552	0.944547	...	1.000000	1.0	1.000000	1.000000	1.000000
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1677	1.000000	1.000000e+00	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	...	1.000000	1.0	1.000000	1.000000	1.000000
1678	1.000000	1.000000e+00	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	...	1.000000	1.0	1.000000	1.000000	1.000000
1679	1.000000	1.000000e+00	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	...	1.000000	1.0	1.000000	1.000000	1.000000
1680	0.952817	9.217006e-01	1.000000	0.943587	1.000000	1.000000	0.948502	0.917967	0.942640	1.000000	...	1.000000	1.0	1.000000	1.000000	1.000000
1681	0.952817	9.217006e-01	0.903125	0.924782	0.905789	1.000000	0.948502	1.000000	0.928300	1.000000	...	1.000000	1.0	1.000000	1.000000	1.000000

1682 rows × 1682 columns

## Item Based Recommendation

## Prediction Table

movie_id	1	2	3	4	5	6	7	8	9	10	...
user_id											
1	5.0	3.0	4.0	3.0	3.0	5.0	4.0	1.0	5.0	3.0	...
2	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	...
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...
5	4.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...
...	...	...	...	...	...	...	...	...	...	...	...
939	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	...
940	0.0	0.0	0.0	2.0	0.0	0.0	4.0	5.0	3.0	0.0	...
941	5.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	...
942	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...

	Star Wars	Hoop Dreams	Contact	Titanic
Joe	5	2	5	4
John	2	5		3
Al	2	2	4	2
Nathan	5	1	5	?

Joe [5,2,5]  
 John [2,5,2,5]  
 Al [2,2,4]  
 Nathan [5,1,5]



$\cos(\text{Nathan}, \text{Joe})$  0.99  
 $\cos(\text{Nathan}, \text{John})$  0.64  
 $\cos(\text{Nathan}, \text{Al})$  0.91



## Item Based Recommendation

## Prediction Table

	Star Wars	Hoop Dreams	Contact	Titanic
Joe	5	2	5	4
John	2	5		3
Al	2	2	4	2
Nathan	5	1	5	?

	Star Wars	Hoop Dreams	Contact	Titanic
Joe	5	2	5	4
John	2	5		3
Al	2	2	4	2
Nathan	5	1	5	?

0.99  
0.64  
0.91

Joe [5,2,5]  
John [2,5,2,3]  
Al [2,2,4]  
Nathan [5,1,5]



cos (Nathan,Joe) 0.99  
cos (Nathan,John) 0.64  
cos (Nathan,Al) 0.91

cos (Nathan,Joe) 0.99  
cos (Nathan,John) 0.64  
cos (Nathan,Al) 0.91

$$\frac{(0.99 \times 4 + 0.64 \times 3 + 0.91 \times 2)}{(0.99 + 0.64 + 0.91)}$$

$$? = 3.03$$

# Collaborative Recommendation System

## Item Based Recommendation

### Prediction Table

	0	1	2	3	4	5	6	7	8	9	...	1672	1673	1674	1675
0	2.065326	0.734303	0.629924	1.010669	0.640686	0.476150	1.784569	1.163032	1.513350	0.704478	...	0.394041	0.394434	0.393981	0.392972
1	1.763088	0.384040	0.196179	0.731538	0.225643	0.003892	1.493597	0.876153	1.108467	0.261991	...	-0.086942	-0.085491	-0.087137	-0.088158
2	1.795904	0.329047	0.158829	0.684154	0.173277	-0.035621	1.488230	0.835769	1.135426	0.236383	...	-0.134795	-0.133537	-0.135543	-0.136438
3	1.729951	0.293913	0.127741	0.644932	0.142143	-0.062261	1.437010	0.796249	1.096663	0.211789	...	-0.161413	-0.160220	-0.161542	-0.162586
4	1.796651	0.454474	0.354422	0.763130	0.359539	0.195987	1.547370	0.908904	1.292027	0.437954	...	0.101762	0.102405	0.101923	0.100839
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
938	1.676950	0.346339	0.177518	0.689906	0.199740	0.003297	1.429565	0.830905	1.070986	0.262183	...	-0.092434	-0.091197	-0.092851	-0.093801
939	1.822346	0.419125	0.286430	0.715605	0.294442	0.106633	1.514591	0.853050	1.195304	0.359260	...	0.014060	0.014688	0.014123	0.013060
940	1.591515	0.275269	0.102195	0.624383	0.133762	-0.069553	1.320734	0.765529	1.035088	0.192697	...	-0.166179	-0.164981	-0.166278	-0.167392
941	1.810363	0.404799	0.275450	0.726616	0.281316	0.087068	1.550310	0.850057	1.205745	0.342987	...	-0.008362	-0.007757	-0.008225	-0.009218
942	1.838431	0.479648	0.384963	0.780521	0.388442	0.240998	1.564232	0.946704	1.289865	0.487383	...	0.147027	0.148208	0.147193	0.146199

943 rows × 1682 columns

# Collaborative Recommendation System

## Item Based Recommendation

### Prediction Table

	0	1	2	3	4	5	6	7	8	9	...	1672	1673	1674	1675
0	2.065326	0.734303	0.629924	1.010669	0.640686	0.476150	1.784569	1.163032	1.513350	0.704478	...	0.394041	0.394434	0.393981	0.392972
1	1.763088	0.384040	0.196179	0.731538	0.225643	0.003892	1.493597	0.876153	1.108467	0.261991	...	-0.086942	-0.085491	-0.087137	-0.088158
2	1.795904	0.329047	0.158829	0.684154	0.173277	-0.035621	1.488230	0.835769	1.135426	0.236383	...	-0.134795	-0.133537	-0.135543	-0.136438
3	1.729951	0.293913	0.127741	0.644932	0.142143	-0.062261	1.437010	0.796249	1.096663	0.211789	...	-0.161413	-0.160220	-0.161542	-0.162586
4	1.796651	0.454474	0.354422	0.763130	0.359539	0.195987	1.547370	0.908904	1.292027	0.437954	...	0.101762	0.102405	0.101923	0.100839
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
938	1.676950	0.346339	0.177518	0.689906	0.199740	0.003297	1.429565	0.830905	1.070986	0.262183	...	-0.092434	-0.091197	-0.092851	-0.093801
939	1.822346	0.419125	0.286430	0.715605	0.294442	0.106633	1.514591	0.853050	1.195304	0.359260	...	0.014060	0.014688	0.014123	0.013060
940	1.591515	0.275269	0.102195	0.624383	0.133762	-0.069553	1.320734	0.765529	1.035088	0.192697	...	-0.166179	-0.164981	-0.166278	-0.167392
941	1.810363	0.404799	0.275450	0.726616	0.281316	0.087068	1.550310	0.850057	1.205745	0.342987	...	-0.008362	-0.007757	-0.008225	-0.009218
942	1.838431	0.479648	0.384963	0.780521	0.388442	0.240998	1.564232	0.946704	1.289865	0.487383	...	0.147027	0.148208	0.147193	0.146199

943 rows × 1682 columns

Collaborative Recommendation System



## Item Based Recommendation

Input Item



Item ID=34

Collaborative Recommendation System

## Item Based Recommendation

Similar Items





## Item Based Recommendation



User-Id

34  
45  
89  
673  
876  
893



User-Id

34  
56  
67  
78  
89  
93



User-Id

67  
83  
56  
83  
86  
90

Collaborative Recommendation System



## Item Based Recommendation

User ID vs input Item

Filter the unique user id



Unique User ID

50

78

87

90

673

876

893





## Item Based Recommendation

User ID vs input Item

Filter the unique user id



Unique User ID	Predicted value
50	0.99
78	0.89
87	0.75
90	0.74
673	0.45
876	0.37
893	0.25





## Item Based Recommendation

User ID vs input Item

Filter the unique user id



Unique User ID	Predicted value	Threshold=0.7
50	0.99	Sorted
78	0.89	
87	0.75	
90	0.74	
673	0.45	
876	0.37	
893	0.25	

Collaborative Recommendation System



Item Based Recommendation



Recommended



User Id

50

78

87

90



## STEPS FOR ITEM BASED RECOMMENDATION SYSTEM

Step1: Create Pivot Table , values as rating

Step2: Create similarity table between items using Pivot →  
Cosine Decision

Step3: Predict the non filled rating for the users using  
formula\*(This helps to find the not watched film )

Step4: Select the item\_input

Step5: For the item\_input select the similar item using  
similarity Table(Minimum Distance is the similar)



## STEPS FOR USER BASED RECOMMENDATION SYSTEM

Step6: Create a list of user id for similar items

Step7: Create a list of user id for item\_input

Step8: Filter the user id of item\_input which is not present in similar user

Step9: Filtered userid have to check with Prediction table(step3 Answer) because of filtered userid list are the recommended list



## STEPS FOR USER BASED RECOMMENDATION SYSTEM

Step10: But we have to select only the highest rated movie of the filtered list user id

Step11: With help of threshold value we can select the highest rated movie(Completely using predicted table )

Step12: Now we have only the highest rated movieid list of important user.

Collaborative Recommendation System



Item Based Recommendation

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<https://forms.gle/6kR2qA9zE6mUCb1h8>