

RaidRec - Group Recommendation

Based on MovieLens Dataset

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Schedule

- Introduction
- Usage Scenario
- Motivation
- Aggregation Techniques
- Environment
- Results
- References

Introduction

“Given groups of users of a recommender system, one wants to recommend top-k items to a group that maximize the satisfaction of the group members, according to a chosen semantics of group satisfaction.”[cs.IR, 2015]



Usage Scenario

Five friends would like to watch a movie together. We already have some information about them, they have rated some movies previously. Which movie would we recommend to them now?



Motivation

Assuming that we know perfectly what is good for individual users, the issue arises on how to combine individual preferences to recommend to the whole group?



Aggregation Techniques

- Average
- Multiplicative
- Borda Count
- Least Misery
- Most Pleasure
- Average without Misery
- Fairness



Aggregation Techniques

- **Average** - Averages individual ratings ($A+B+C/3$)
- **Multiplicative** - Multiplies individual ratings ($A*B*C$)
- **Borda Count**
- **Least Misery** - Takes the minimum of individual ratings
- **Most Pleasure** - Takes the maximum of individual ratings
- **Average without Misery** - Averages individual ratings, after excluding items with individual ratings below a certain threshold (say 2).
- **Fairness**



Environment

- A model based on item content recommendation
- <https://github.com/amandachagas/raidrec>



Results

```
= = = = FIXED GROUP = = = =  
User ids: [15, 30, 73, 77, 78]
```

```
...Individual rates in the fixed group...
```

Movie Name	Rate by users				
Titanic	1.5	4.0	0.5	2.0	4.0
Braveheart	3.0	5.0	4.0	3.5	1.5
Jurassic Park	3.0	4.0	4.0	3.0	3.5
Lion King, The	4.0	3.0	5.0	3.0	3.5
Star Wars: Episode IV - A New Hope	5.0	4.0	4.5	4.0	5.0

```
>>>>Fixed Group Rates after strategies are applied<<<<<
```

Strategy	Rates				
multiplicative	0.038	0.504	0.806	1.008	2.880
average_without_misery	0.500	1.500	3.500	3.700	4.500
average	2.400	3.400	3.500	3.700	4.500
least_misery	0.500	1.500	3.000	3.000	4.000
most_pleasure	4.000	5.000	4.000	5.000	5.000



Results - Average

```
<----->
<---- Recommending based on the "average" with the fixed groups ---->
<----->
[2.4, 3.4, 3.5, 3.7, 4.5]
```

userId	movieId	score	rank	title	genres	year
98765	442	0.735405886173	1	Demolition Man	[Action, Adventure, Sci-Fi]	1993
98765	465	0.716385650635	2	Heaven & Earth	[Action, Drama, War]	1993
98765	3635	0.500000023842	3	Spy Who Loved Me, The	[Action, Adventure, Thriller]	1977
98765	316	0.494393026829	4	Stargate	[Action, Adventure, Sci-Fi]	1994
98765	1196	0.488954520226	5	Star Wars: Episode V - The...	[Action, Adventure, Sci-Fi]	1980
98765	1210	0.479262197018	6	Star Wars: Episode VI - Re...	[Action, Adventure, Sci-Fi]	1983
98765	2628	0.475454640388	7	Star Wars: Episode I - The...	[Action, Adventure, Sci-Fi]	1999
98765	4947	0.473205077648	8	Gauntlet, The	[Action]	1977
98765	135569	0.46782643795	9	Star Trek 3	[Action, Adventure, Sci-Fi]	2016
98765	4638	0.466666674614	10	Jurassic Park III	[Action, Adventure, Sci-Fi...]	2001

Results - Multiplicative

```
<----->
<---- Recommending based on the "multiplicative" with the fixed groups ---->
<----->
[0.0384, 0.504, 0.8064, 1.008, 2.88]
```

userId	movieId	score	rank	title	genres	year
98765	3635	0.320000004768	1	Spy Who Loved Me, The	[Action, Adventure, Thriller]	1977
98765	316	0.316411530972	2	Stargate	[Action, Adventure, Sci-Fi]	1994
98765	1196	0.312930893898	3	Star Wars: Episode V - The...	[Action, Adventure, Sci-Fi]	1980
98765	1210	0.306727802753	4	Star Wars: Episode VI - Re...	[Action, Adventure, Sci-Fi]	1983
98765	2628	0.304290962219	5	Star Wars: Episode I - The...	[Action, Adventure, Sci-Fi]	1999
98765	4947	0.302851247787	6	Gauntlet, The	[Action]	1977
98765	135569	0.299408912659	7	Star Trek 3	[Action, Adventure, Sci-Fi]	2016
98765	33493	0.29443359375	8	Star Wars: Episode III - R...	[Action, Adventure, Sci-Fi]	2005
98765	442	0.29231749773	9	Demolition Man	[Action, Adventure, Sci-Fi]	1993
98765	72998	0.280630779266	10	Avatar	[Action, Adventure, Sci-Fi...]	2009

Results - Least Misery

```
<----->
<---- Recommending based on the "least_misery" with the fixed groups ---->
<----->
[0.5, 1.5, 3.0, 3.0, 4.0]
```

userId	movieId	score	rank	title	genres	year
98765	442	0.639871716499	1	Demolition Man	[Action, Adventure, Sci-Fi]	1993
98765	3635	0.4444444465637	2	Spy Who Loved Me, The	[Action, Adventure, Thriller]	1977
98765	465	0.441129791737	3	Heaven & Earth	[Action, Drama, War]	1993
98765	316	0.439460468292	4	Stargate	[Action, Adventure, Sci-Fi]	1994
98765	1196	0.434626245499	5	Star Wars: Episode V - The...	[Action, Adventure, Sci-Fi]	1980
98765	1210	0.426010847092	6	Star Wars: Episode VI - Re...	[Action, Adventure, Sci-Fi]	1983
98765	2628	0.42262635231	7	Star Wars: Episode I - The...	[Action, Adventure, Sci-Fi]	1999
98765	4947	0.420626735687	8	Gauntlet, The	[Action]	1977
98765	135569	0.415845727921	9	Star Trek 3	[Action, Adventure, Sci-Fi]	2016
98765	33493	0.408935546875	10	Star Wars: Episode III - R...	[Action, Adventure, Sci-Fi]	2005



Results - Most Pleasure

```
<----->
<--- Recommending based on the "most_pleasure" with the fixed groups --->
<----->
[4.0, 5.0, 4.0, 5.0, 5.0]
```

userId	movieId	score	rank	title	genres	year
98765	465	0.954962563515	1	Heaven & Earth	[Action, Drama, War]	1993
98765	442	0.830940067768	2	Demolition Man	[Action, Adventure, Sci-Fi]	1993
98765	26903	0.606086552143	3	Whisper of the Heart (Mimi...	[Animation, Drama, Romance]	1995
98765	2092	0.562201917171	4	Return of Jafar, The	[Adventure, Animation, Chi...	1994
98765	6	0.5556884408	5	Heat	[Action, Crime, Thriller]	1995
98765	3635	0.555555582047	6	Spy Who Loved Me, The	[Action, Adventure, Thriller]	1977
98765	665	0.555555582047	7	Underground	[Comedy, Drama, War]	1995
98765	168	0.555555582047	8	First Knight	[Action, Drama, Romance]	1995
98765	155	0.555555582047	9	Beyond Rangoon	[Adventure, Drama, War]	1995
98765	316	0.549325585365	10	Stargate	[Action, Adventure, Sci-Fi]	1994

Results - Average without Misery

```
<----->
<---- Recommending based on the "average_without_misery" with the fixed groups ---->
<----->
[0.5, 1.5, 3.5, 3.7, 4.5]
```

userId	movieId	score	rank	title	genres	year
98765	442	0.735405886173	1	Demolition Man	[Action, Adventure, Sci-Fi]	1993
98765	3635	0.500000023842	2	Spy Who Loved Me, The	[Action, Adventure, Thriller]	1977
98765	316	0.494393026829	3	Stargate	[Action, Adventure, Sci-Fi]	1994
98765	1196	0.488954520226	4	Star Wars: Episode V - The...	[Action, Adventure, Sci-Fi]	1980
98765	465	0.484085631371	5	Heaven & Earth	[Action, Drama, War]	1993
98765	1210	0.479262197018	6	Star Wars: Episode VI - Re...	[Action, Adventure, Sci-Fi]	1983
98765	2628	0.475454640388	7	Star Wars: Episode I - The...	[Action, Adventure, Sci-Fi]	1999
98765	4947	0.473205077648	8	Gauntlet, The	[Action]	1977
98765	135569	0.46782643795	9	Star Trek 3	[Action, Adventure, Sci-Fi]	2016
98765	4638	0.466666674614	10	Jurassic Park III	[Action, Adventure, Sci-Fi...]	2001

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