
Anime Recommendation System

By Anthony Le

Context

- Anime is a Japanese Animation
- Dragon Ball Z, Pokemon
- Big fan of Anime
- myanimelist.net- like imdb for Anime

Product

- Similar to Netflix and Spotify recommendation system.
- Nice to add this feature on the website myanimelist.net
- Great for streaming services especially for anime.
- Great for products that has ton of data of their users and items.

Dataset

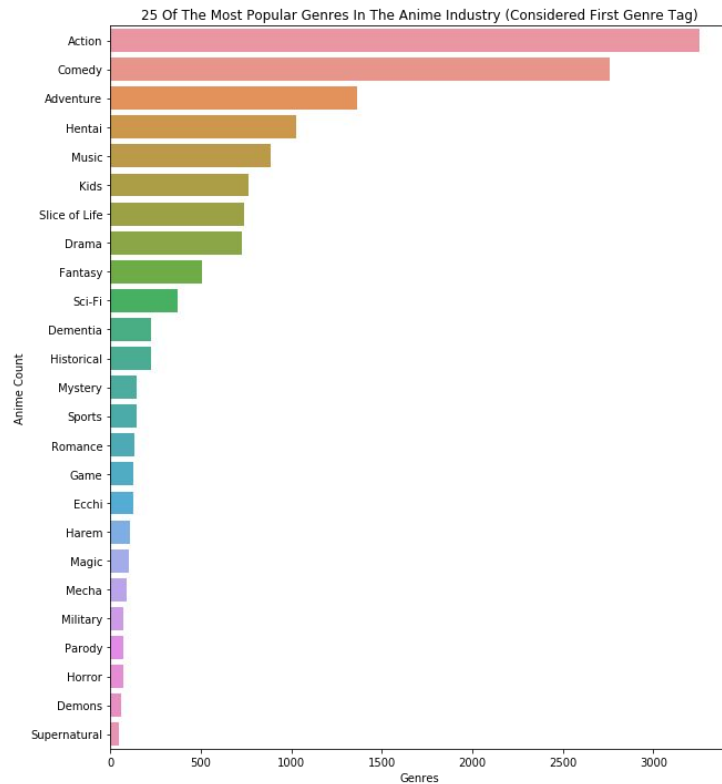
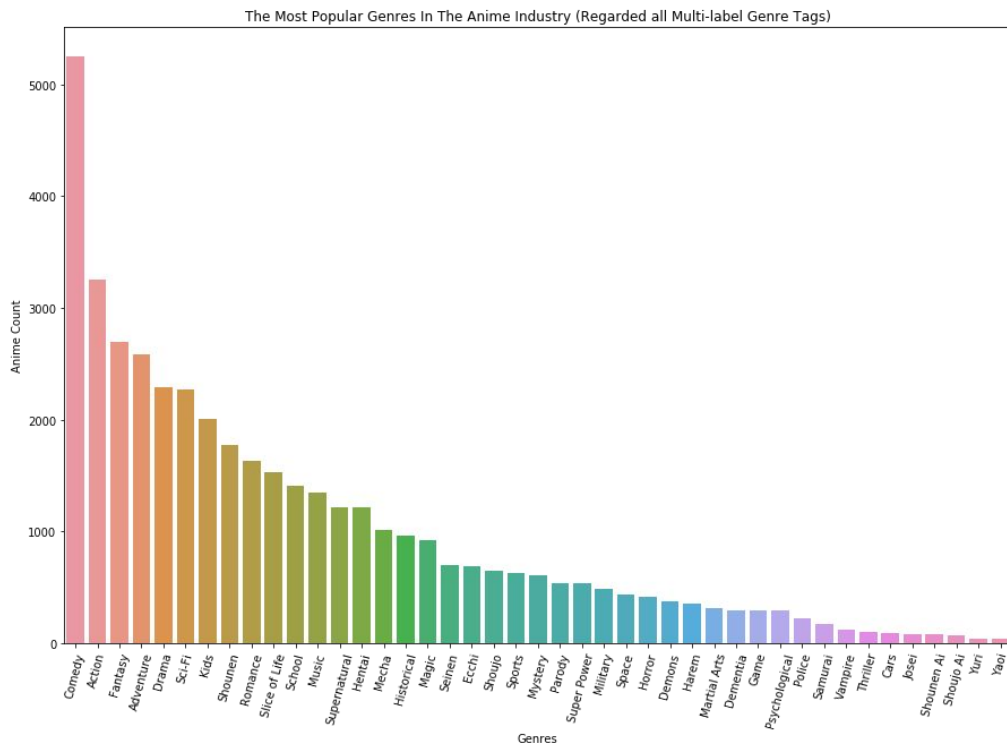
- The data collected is from big Anime Fans
- The population is not good for general fans of Anime
- Gathered from user azaoth42. (Did all the hard part collecting it)
- Source: (<https://www.kaggle.com/azathoth42/myanimelist>)
- Three datasets:
 - Users' information- date of birth, gender, etc
 - List of Anime- how many episodes, title, year it premiered, many more,
 - Scores of Anime- username, rating, (31 million records of it)

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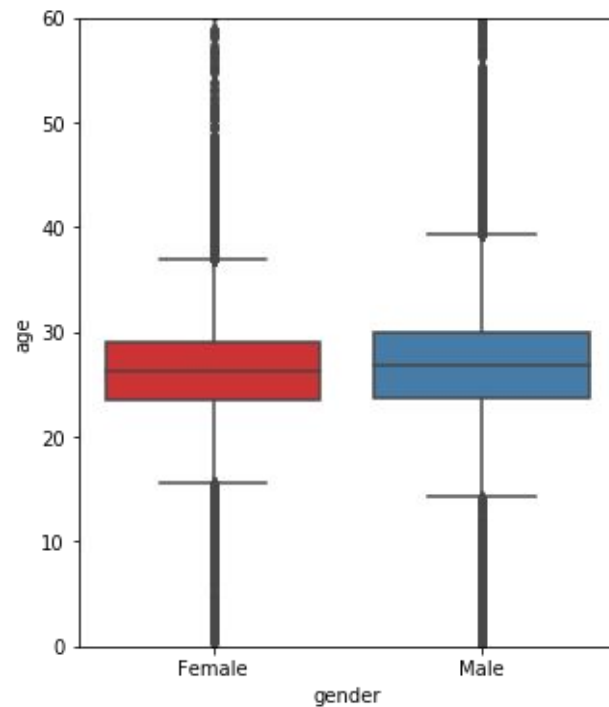
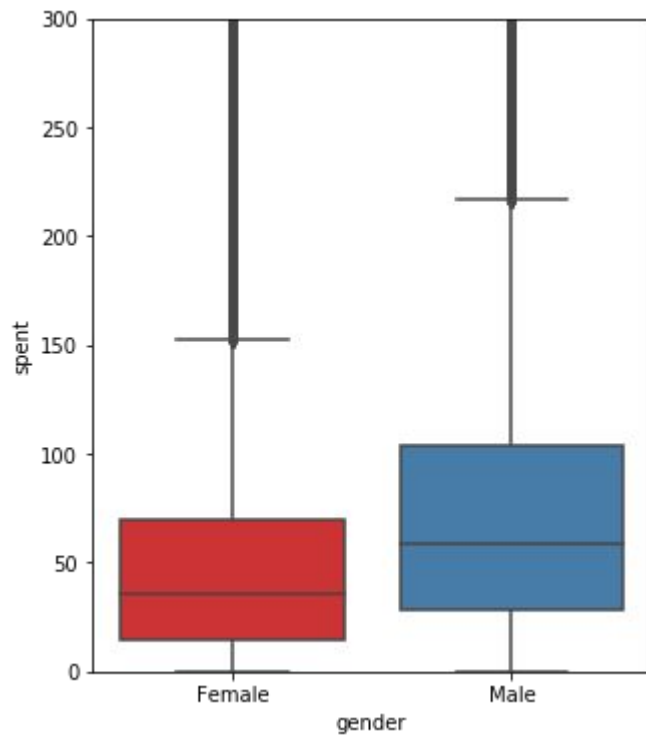
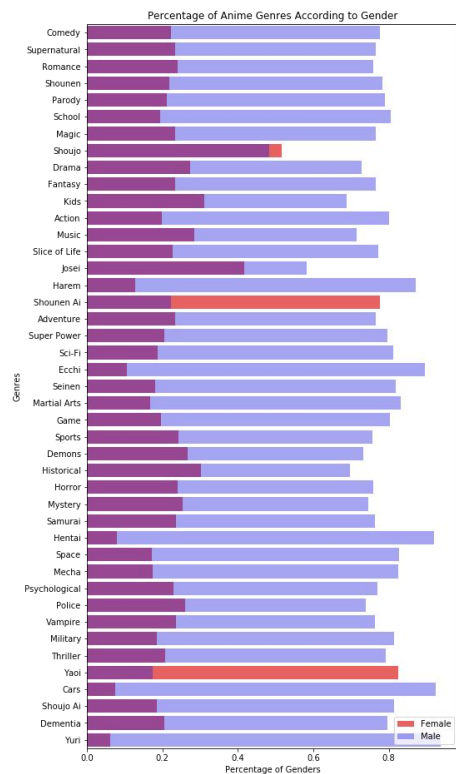
Exploring the Data

- Genres
- Gender
- Location
- Popularity and rankings
- Sources
- Season

Genres

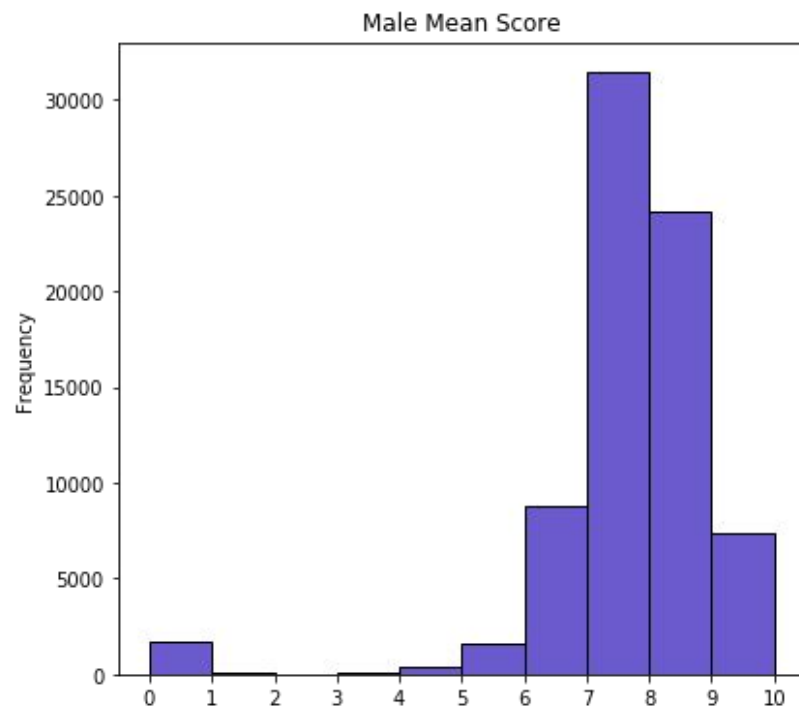
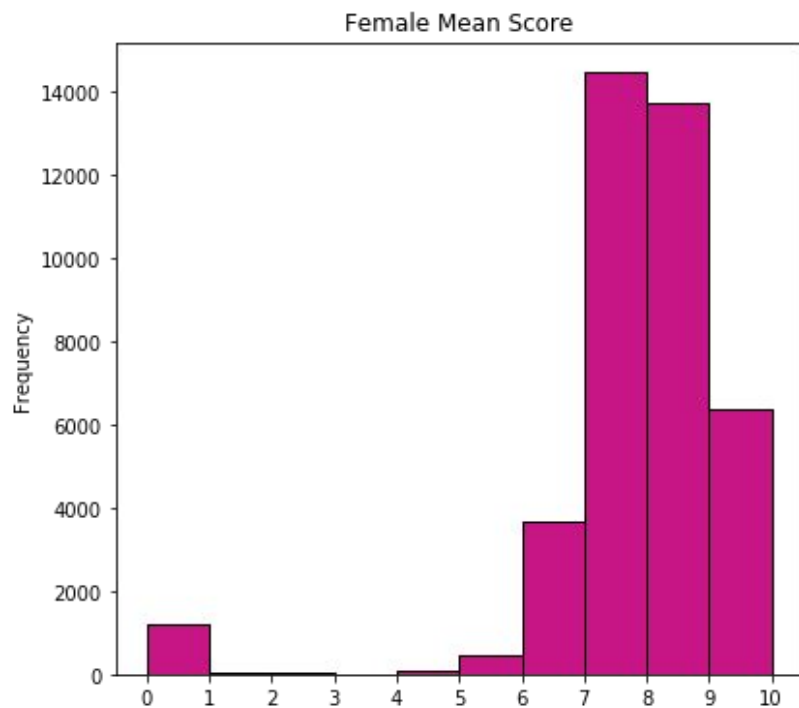


Gender

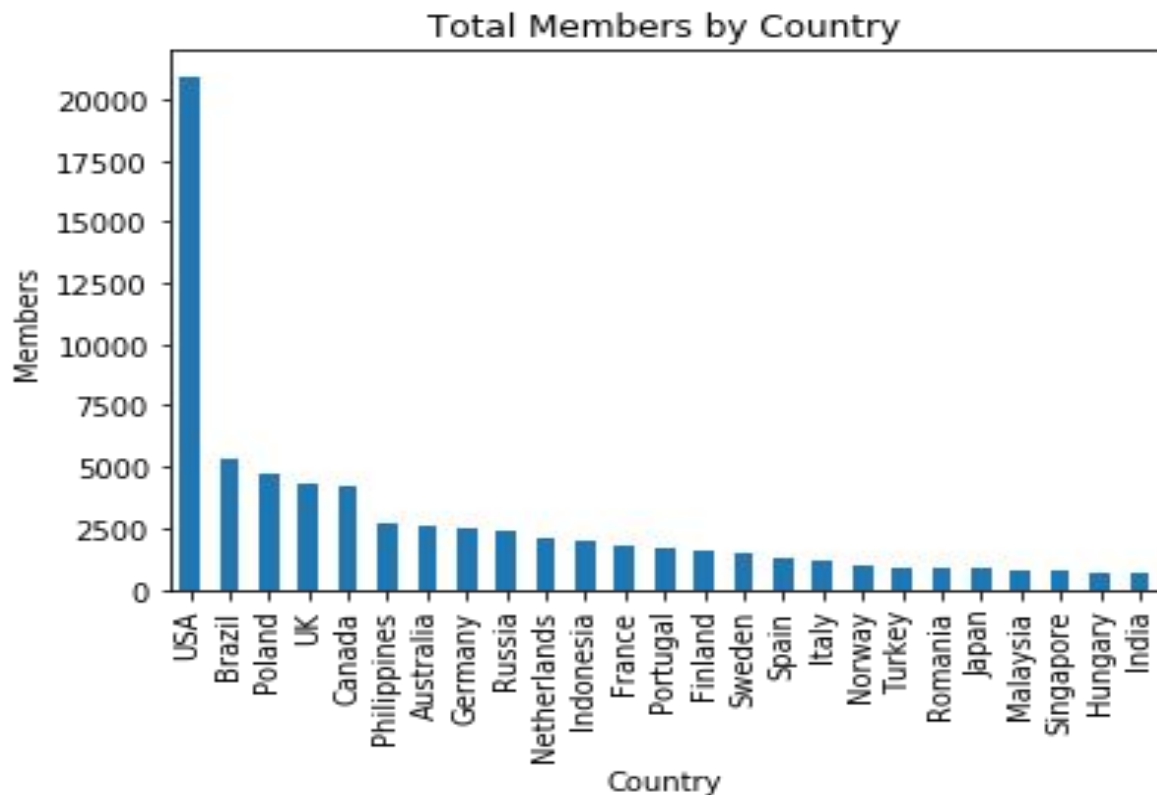


Gender(Cont)

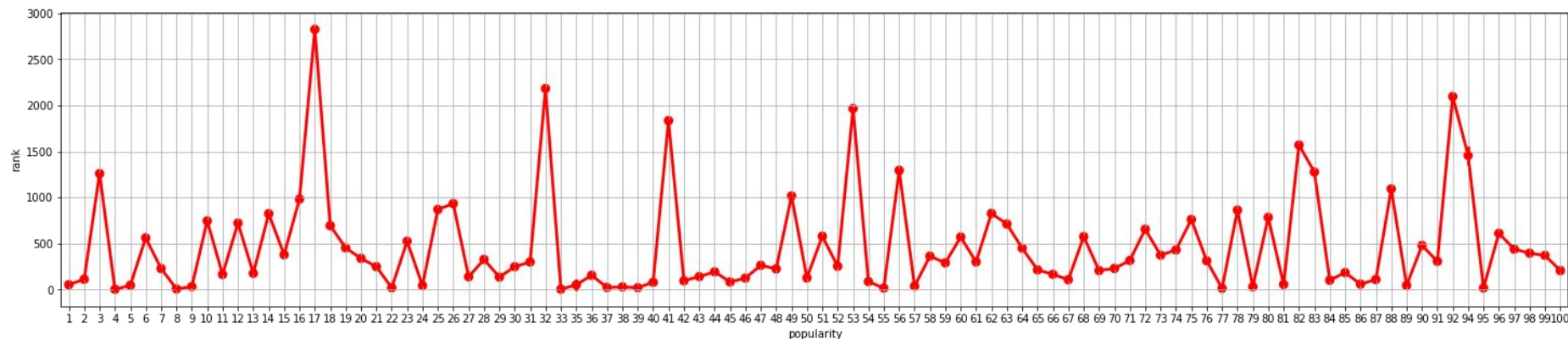
Anime Rating by Gender



Location

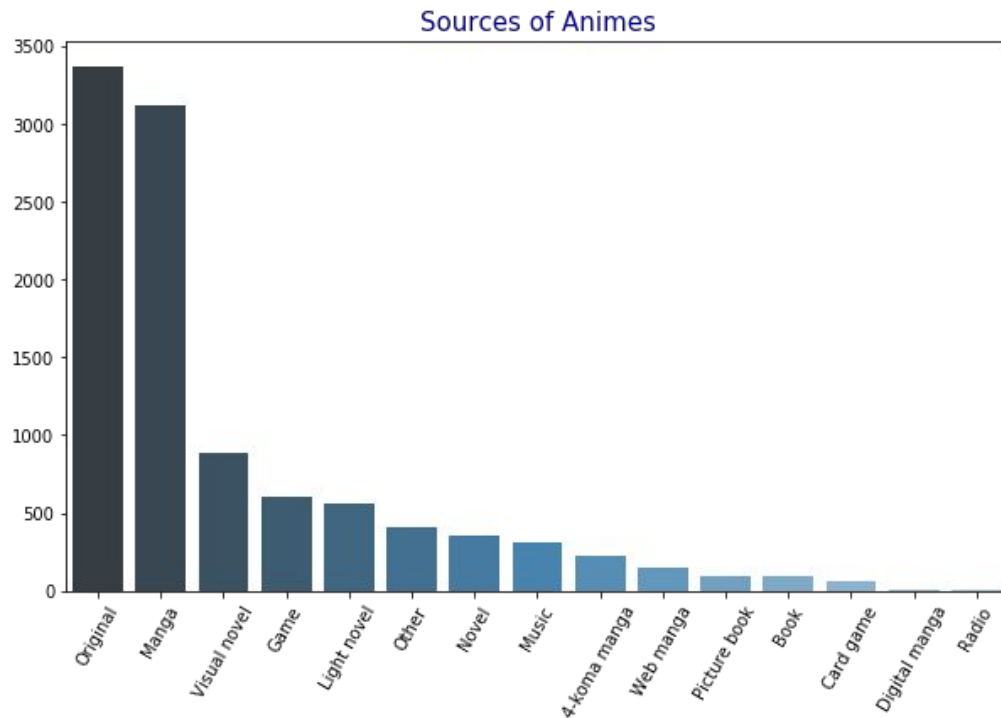


Popularity and Ranking



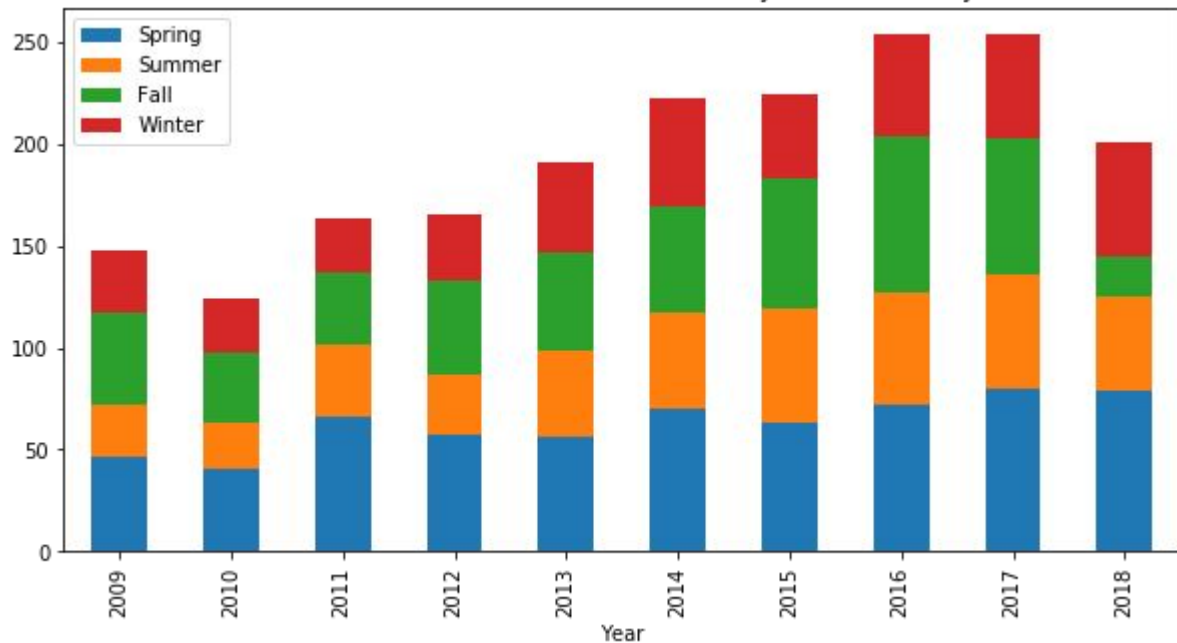
	title	popularity	rank
4825	Highschool of the Dead	32	2184.0

Sources

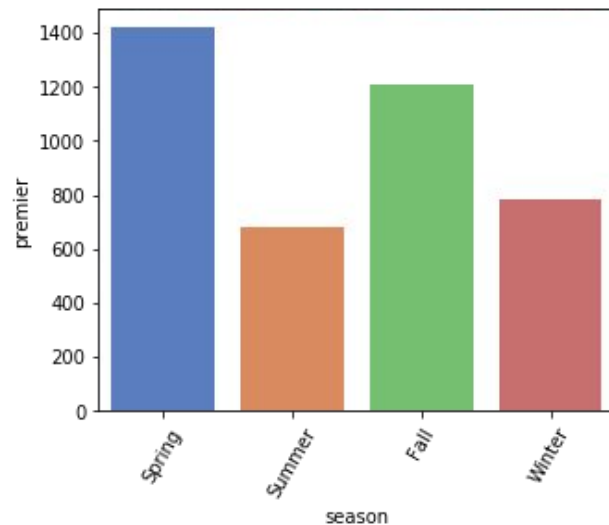


Season

Animes Released on the Premiere Seasons by Years (Last 10 year)



Animes Released on the Premiere Seasons



Setting up the Models

- Used one percent of the data due limitation
- Used a surprise library from python to find the best algorithm
- Used RSME and precision for metrics.

Algorithm

	Algorithm	RMSE	Precision@10	Time to run (in seconds)	RMSE^-1
1	NMF	2.173690	0.945554	11.628531	0.460047
7	BaselineOnly	1.275284	0.934954	0.967903	0.784139
0	SlopeOne	1.289960	0.934891	33.033484	0.775218
3	KNNBaseline	1.256897	0.933942	8.944150	0.795610
5	KNNWithMeans	1.283675	0.932722	7.539180	0.779013
6	KNNWithZScore	1.278143	0.931296	8.102930	0.782385
4	KNNBasic	1.408282	0.926211	6.981651	0.710085
8	CoClustering	1.318944	0.923988	4.149548	0.758183
2	NormalPredictor	2.309258	0.829248	0.662350	0.433040

Baseline Only

- It was the best algorithm to pick from
- Second highest precision score(off by .09 compared to the highest)
- Has the lowest RMSE.
- Item-based recommendation system.
- Simplest and fastest algorithm
- " For example, suppose that we want a baseline estimate for the rating of the movie Titanic by user Joe. Now, say that the average rating over all movies, μ , is 3.7 stars. Furthermore, Titanic is better than an average movie, so it tends to be rated 0.5 stars above the average. On the other hand, Joe is a critical user, who tends to rate 0.3 stars lower than the average. Thus, the baseline estimate for Titanic's rating by Joe would be 3.9 stars by calculating $3.7 - 0.3 + 0.5$. "

KNN

- Use for item-item recommendation
- assumes that similar things exist in close proximity. In other words, similar things are near to each other
- Simple to make
- Commonly use for recommendation systems.

ALS

- Use pyspark set up the model.
- Alternating Least Squares
- Factor in less-known anime
- Matrix Decomposition

Results

```
] get_item_recommendations('One Piece', k=30)
```



	Anime_ID	title	genre	score	premiered
0	11061	Hunter x Hunter (2011)	Action, Adventure, Super Power, Shounen	9.11	Fall 2011
1	15	Eyeshield 21	Action, Sports, Comedy, Shounen	8.05	Spring 2005
2	6702	Fairy Tail	Action, Adventure, Comedy, Magic, Fantasy, Sho...	8.08	Fall 2009
3	16498	Shingeki no Kyojin	Action, Military, Mystery, Super Power, Drama,...	8.49	Spring 2013
4	1604	Katekyo Hitman Reborn!	Action, Comedy, Shounen, Super Power	8.31	Fall 2006
5	235	Detective Conan	Adventure, Mystery, Comedy, Police, Shounen	8.25	Winter 1996
6	18115	Magi: The Kingdom of Magic	Action, Adventure, Magic, Fantasy, Shounen	8.44	Fall 2013
7	9253	Steins;Gate	Thriller, Sci-Fi	9.14	Spring 2011
8	170	Slam Dunk	Comedy, Sports, Drama, School, Shounen	8.55	Fall 1993
9	469	Karin	Comedy, Romance, Vampire, School, Shounen	7.28	Fall 2005

➡ Recommendations for user 3924291:

	anime_id	title	genre	prediction	premiered
0	35478	Neko no Robu	Comedy, Slice of Life	9.476129	Spring 2017
1	32281	Kimi no Na wa.	Supernatural, Drama, Romance, School	9.002776	None
2	28977	Gintama°	Action, Comedy, Historical, Parody, Samurai, S...	9.162655	Spring 2015
3	15417	Gintama'; Enchousen	Action, Comedy, Historical, Parody, Samurai, S...	8.993153	Fall 2012
4	30484	Steins;Gate 0	Sci-Fi, Thriller	9.004238	Spring 2018
5	28851	Koe no Katachi	Drama, School, Shounen	8.849479	None
6	9969	Gintama';	Action, Sci-Fi, Comedy, Historical, Parody, Sa...	9.060499	Spring 2011
7	34096	Gintama.	Action, Comedy, Historical, Parody, Samurai, S...	8.962780	Winter 2017
8	263	Hajime no Ippo	Comedy, Sports, Drama, Shounen	8.846721	Fall 2000
9	15335	Gintama Movie 2: Kanketsu-hen - Yorozuya yo Ei...	Action, Sci-Fi, Comedy, Historical, Parody, Sa...	8.966371	None

➡

	uid	est		title	genre	premiered
0	adam1x6	9.138323		Ginga Eiyuu Densetsu	Military, Sci-Fi, Space, Drama	NaN
1	adam1x6	9.104904	Owarimonogatari 2nd Season		Comedy, Mystery, Supernatural, Vampire	Summer 2017
2	adam1x6	9.100998		Gintama';	Action, Sci-Fi, Comedy, Historical, Parody, Sa...	Spring 2011
3	adam1x6	9.075769		Made in Abyss	Sci-Fi, Adventure, Mystery, Drama, Fantasy	Summer 2017
4	adam1x6	9.059361		Kimi no Na wa.	Supernatural, Drama, Romance, School	NaN
5	adam1x6	9.054259	3-gatsu no Lion 2nd Season		Drama, Game, Seinen, Slice of Life	Fall 2017
6	adam1x6	9.016938		Gintama°	Action, Comedy, Historical, Parody, Samurai, S...	Spring 2015
7	adam1x6	9.004694	Kizumonogatari III: Reiketsu-hen		Action, Mystery, Supernatural, Vampire	NaN
8	adam1x6	8.993671		Gintama'; Enchousen	Action, Comedy, Historical, Parody, Samurai, S...	Fall 2012
9	adam1x6	8.969301	Mushishi Zoku Shou 2nd Season		Adventure, Fantasy, Historical, Mystery, Seine...	Fall 2014

Recommendations for user 303577:

	anime_id	title	genre	prediction	premiered
0	35478	Neko no Robu	Comedy, Slice of Life	10.540213	Spring 2017
1	28977	Gintama°	Action, Comedy, Historical, Parody, Samurai, S...	9.528095	Spring 2015
2	3784	Evangelion: 2.0 You Can (Not) Advance	Action, Sci-Fi, Mecha	9.567251	None
3	5114	Fullmetal Alchemist: Brotherhood	Action, Military, Adventure, Comedy, Drama, Ma...	9.647413	Spring 2009
4	36732	Qin Shi Ming Yue: Tian Xing Jiu Ge	Action, Historical, Martial Arts, Fantasy	9.684301	None
5	9253	Steins;Gate	Thriller, Sci-Fi	9.560666	Spring 2011
6	33473	Tokyo Futago Athletic	Comedy, Sports	10.158769	Winter 2017
7	15417	Gintama'; Enchousen	Action, Comedy, Historical, Parody, Samurai, S...	9.536556	Fall 2012
8	35385	Yukai na Animal Bus 2nd Season	Comedy, Kids	10.179564	Summer 2017
9	9969	Gintama';	Action, Sci-Fi, Comedy, Historical, Parody, Sa...	9.654662	Spring 2011

	uid	est	title	genre	premiered
0	r0idzipoo	9.991368	Fullmetal Alchemist: Brotherhood	Action, Military, Adventure, Comedy, Drama, Ma...	Spring 2009
1	r0idzipoo	9.934125	Steins;Gate	Thriller, Sci-Fi	Spring 2011
2	r0idzipoo	9.885846	Ginga Eiyuu Densetsu	Military, Sci-Fi, Space, Drama	NaN
3	r0idzipoo	9.852426	Owarimonogatari 2nd Season	Comedy, Mystery, Supernatural, Vampire	Summer 2017
4	r0idzipoo	9.848521	Gintama';	Action, Sci-Fi, Comedy, Historical, Parody, Sa...	Spring 2011
5	r0idzipoo	9.823291	Made in Abyss	Sci-Fi, Adventure, Mystery, Drama, Fantasy	Summer 2017
6	r0idzipoo	9.806884	Kimi no Na wa.	Supernatural, Drama, Romance, School	NaN
7	r0idzipoo	9.801782	3-gatsu no Lion 2nd Season	Drama, Game, Seinen, Slice of Life	Fall 2017
8	r0idzipoo	9.764460	Gintama°	Action, Comedy, Historical, Parody, Samurai, S...	Spring 2015
9	r0idzipoo	9.752216	Kizumonogatari III: Reiketsu-hen	Action, Mystery, Supernatural, Vampire	NaN

Conclusion

- ALS is the better model
- Uses all the data
- RSME is 1.22568 compared to baseline's 1.289960
- ALS leans toward a mix of popular anime and not known anime also.
- While Baseline lean popular Anime.

Future

- Get more data(especially current data- pass 2018)
- Test this on people and ask how accurate
- Use more features for sure
- Find to way to use all data to implemented to the algorithms
- Use other algorithms.