Anime Recommendation System

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Introduction

- In today's world Content for Entertainment is bountiful and access to such content has never been higher, through streaming services and the internet. This creates a situation where the consumer has greater control over what is published and a major tool available to the consumer is reviewing their content.
- Users can have a better experience when recommendation systems are built on their reviews. In this project, we are building a recommendation system for Japanese Animated movies and TV shows, also known as Anime.

Dataset

- This data set contains information on user preference data from 73,516 users on 12,294 anime.
- It consists of 3 CSV files, namely- Anime, Ratings and Anime with Synopsis.

Anime.csv

1. Anime_id - myanimelist.net's unique id identifying an anime.
2. Name - full name of anime.
3. Genre - comma separated list of genres for this anime.
4. Type - movie, TV, OVA, etc.
5. Episodes - how many episodes in this show. (1 if movie).
6. Rating - average rating out of 10 for this anime.
7. Members - number of community members that are in this anime's "group"

Rating.csv

1. User_id - non identifiable randomly generated user id.
2. Anime_id - the anime that this user has rated.
3. Rating - rating out of 10 this user has assigned (-1 if the user watched it but didn't assign a rating).

Synopsis.csv

1. MAL_ID – My_Anime_list ID of the anime.
2. Name- full name of the anime.
3. Score - average score of the anime given from all users in My_Anime_list database.
4. Genders- comma separated list of genres for this anime.
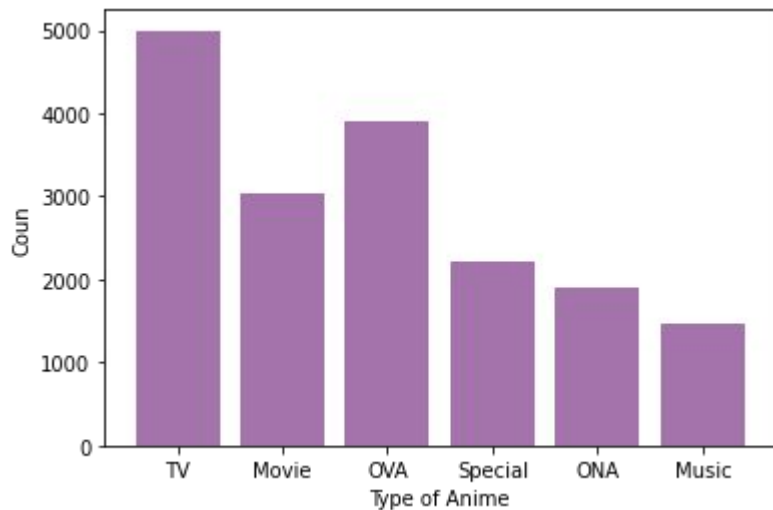5. Synopsis- string with the synopsis of the anime.

Solution

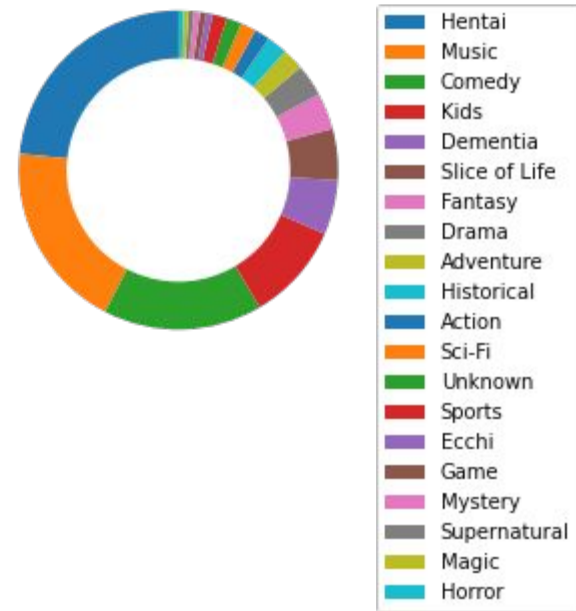## Recommendation algorithms used

- **Content Based Filtering**

- **Collaborative Filtering**

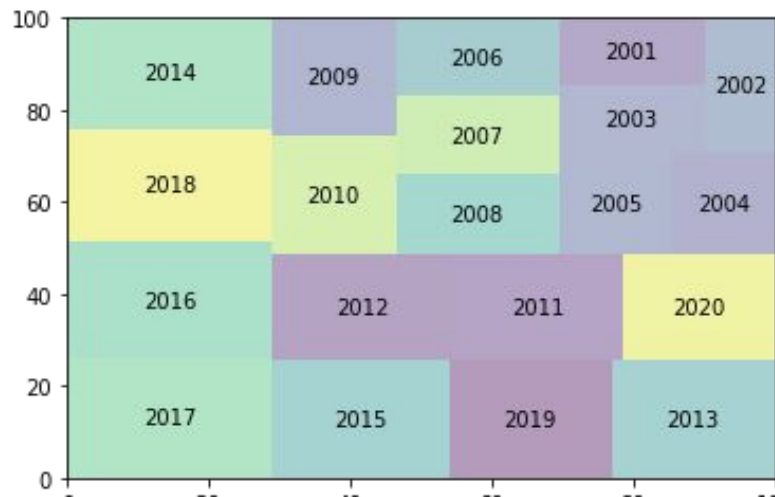- **Hybrid Filtering**

Clustering Algorithms used:

- **K-Means Clustering**

- **Mini-Batch K means Clustering**

- **Agglomerative Hierarchical Clustering**

Distribution based on Genre

Content distribution

Distribution based on
content release count

Results from Clustering

MODEL	Silhouette Score	Calinski-Harabasz	Davies-Bouldin Index	Rand Index	Adjusted Rand Index
KMeans	0.82	21136.17	0.57	1	1
KMeans with mini batch	0.44	6026.62	0.82	1	1
Hierarchical Agglomerative	0.78	18479.09	0.622	1	1

Cluster visualization
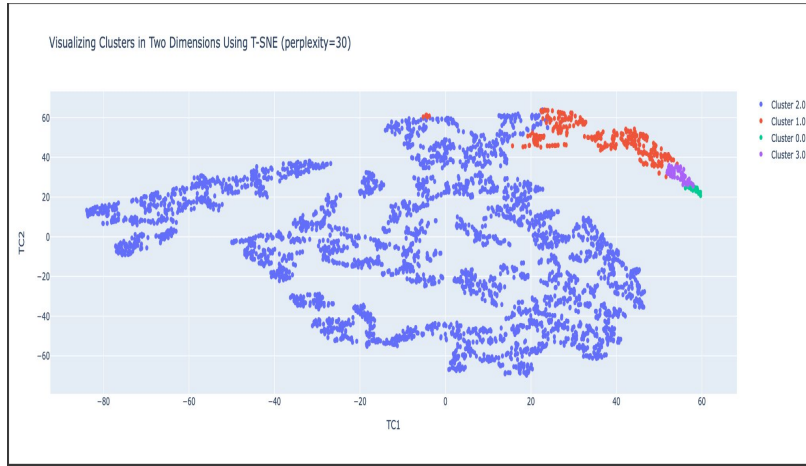
Kmeans

Agglomerative
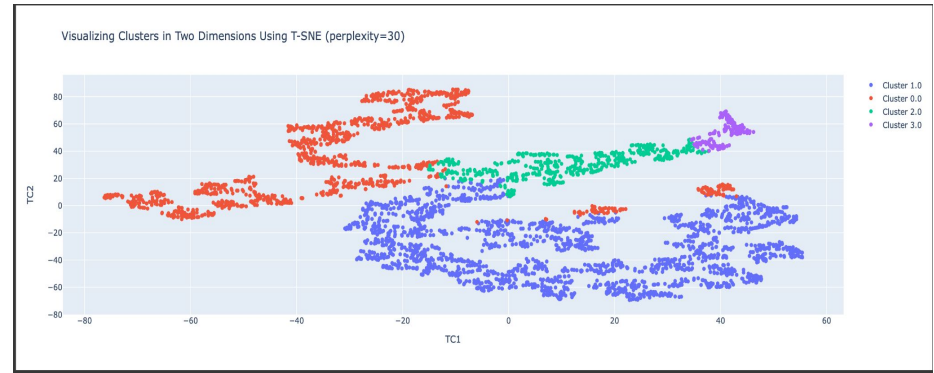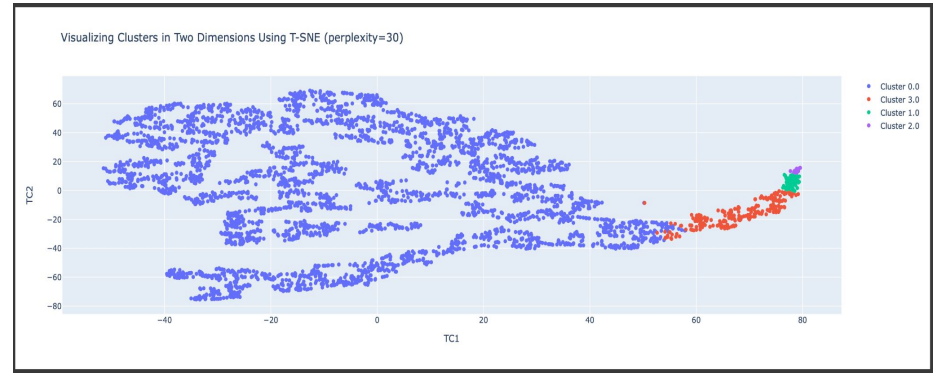
Mini batch - Kmeans

Content based Recommendation- 'Naruto'

	MAL_ID	Name	Score	Genres	English name	Japanese name	Type	Episodes	Aired	Premiered	...	Score-10	Score-9	Score-8	S
1574	1735	Naruto: Shippuuden	8.16	Action, Adventure, Comedy, Super Power, Martia...	Naruto:Shippuden	ナルト- 疾風伝	TV	500	Feb 15, 2007 to Mar 23, 2017	Winter 2007	...	249262.0	213677.0	239113.0	17!
12802	35072	Boruto: Jump Festa 2016 Special	6.22	Action, Adventure, Comedy, Super Power, Martia...	Unknown	BORUTOジャンプフェスタ 2016	Special	1	Nov 27, 2016	Unknown	...	331.0	175.0	386.0	
245	269	Bleach	7.80	Action, Adventure, Comedy, Super Power, Supern...	Bleach	BLEACH - ブリーチ -	TV	366	Oct 5, 2004 to Mar 27, 2012	Fall 2004	...	116063.0	136177.0	192980.0	17
12492	34566	Boruto: Naruto Next Generations	5.81	Action, Adventure, Super Power, Martial Arts, ...	Boruto:Naruto Next Generations	BORUTO - NARUTO NEXT GENERATIONS-	TV	Unknown	Apr 5, 2017 to ?	Spring 2017	...	13925.0	12533.0	26748.0	4i
5304	8246	Naruto: Shippuuden Movie 4 - The Lost Tower	7.42	Action, Comedy, Martial Arts, Shounen, Super P...	Unknown	劇場版 NARUTO-ナルト-疾風伝 ザ・ロストタワー	Movie	1	Jul 31, 2010	Unknown	...	11387.0	13079.0	24809.0	2i
9862	28755	Boruto: Naruto the Movie	7.50	Action, Comedy, Martial Arts, Shounen, Super P...	Boruto:Naruto the Movie	BORUTO - NARUTO THE MOVIE-	Movie	1	Aug 7, 2015	Unknown	...	21653.0	30165.0	56070.0	5!
4553	6325	Naruto: Shippuuden Movie 3 - Hi no Ishi wo Tsu...	7.35	Action, Comedy, Martial Arts, Shounen, Super P...	Unknown	ナルト- 疾風伝 火の意志を継ぐ者	Movie	1	Aug 1, 2009	Unknown	...	8769.0	10021.0	20222.0	2i
6055	10075	Naruto x UT	7.40	Action, Comedy, Super Power, Martial Arts, Sho...	Unknown	NARUTO×UT	OVA	1	Jan 1, 2011	Unknown	...	3218.0	2549.0	4010.0	

Collaborative recommendation for- 'Naruto'

	MAL_ID	Name	Score	Genres	English name	Japanese name	Type	Episodes	Aired	Premiered	...	Score-10	Score-9	Score-8
1393	1535	Death Note	8.63	Mystery, Police, Psychological, Supernatural, ...	Death Note	デスノート	TV	37	Oct 4, 2006 to Jun 27, 2007	Fall 2006	...	557406.0	535252.0	415890.0
7449	16498	Shingeki no Kyojin	8.48	Action, Military, Mystery, Super Power, Drama,...	Attack on Titan	進撃の巨人	TV	25	Apr 7, 2013 to Sep 29, 2013	Spring 2013	...	470882.0	514879.0	459113.0
6614	11757	Sword Art Online	7.25	Action, Game, Adventure, Romance, Fantasy	Sword Art Online	ソードアート・オンライン	TV	25	Jul 8, 2012 to Dec 23, 2012	Summer 2012	...	241049.0	236672.0	305386.0
1574	1735	Naruto: Shippuuden	8.16	Action, Adventure, Comedy, Super Power, Martia...	Naruto:Shippuden	ナルト- 疾風伝	TV	500	Feb 15, 2007 to Mar 23, 2017	Winter 2007	...	249262.0	213677.0	239113.0
3971	5114	Fullmetal Alchemist: Brotherhood	9.19	Action, Military, Adventure, Comedy, Drama, Ma...	Fullmetal Alchemist:Brotherhood	鋼の錬金術師 FULLMETAL ALCHEMIST	TV	64	Apr 5, 2009 to Jul 4, 2010	Spring 2009	...	714811.0	401507.0	199160.0
10451	30276	One Punch Man	8.57	Action, Sci-Fi, Comedy, Parody, Super Power, S...	One Punch Man	ワンパンマン	TV	12	Oct 5, 2015 to Dec 21, 2015	Fall 2015	...	360187.0	465041.0	403832.0
5975	9919	Ao no Exorcist	7.59	Action, Demons, Fantasy, Shounen, Supernatural	Blue Exorcist	青の祓魔師 (エクソシスト)	TV	25	Apr 17, 2011 to Oct 2, 2011	Spring 2011	...	80157.0	137344.0	248970.0
8646	22319	Tokyo Ghoul	7.81	Action, Mystery, Horror, Psychological,	Tokyo Ghoul	東京喰種-トーキョーグール-	TV	12	Jul 4, 2014 to Sep 19	Summer 2014	...	190342.0	250814.0	348603.0

Hybrid recommendation - for User - 6, title - 'Naruto'

	MAL_ID	Name	Genres	Score
1506	1735	Naruto: Shippuuden	Action, Adventure, Comedy, Super Power, Martia...	8.16
824	934	Higurashi no Naku Koro ni	Mystery, Dementia, Horror, Psychological, Supe...	7.95
5998	16870	The Last: Naruto the Movie	Action, Super Power, Romance, Martial Arts, Sh...	7.76
5623	13667	Naruto: Shippuuden Movie 6 - Road to Ninja	Action, Adventure, Super Power, Martial Arts, ...	7.67
7245	28755	Boruto: Naruto the Movie	Action, Comedy, Martial Arts, Shounen, Super P...	7.50
4381	8246	Naruto: Shippuuden Movie 4 - The Lost Tower	Action, Comedy, Martial Arts, Shounen, Super P...	7.42
2089	2472	Naruto: Shippuuden Movie 1	Action, Adventure, Comedy, Fantasy, Shounen	7.29
3145	4437	Naruto: Shippuuden Movie 2 - Kizuna	Action, Martial Arts, Shounen, Supernatural	7.29
403	442	Naruto Movie 1: Dai Katsugeki!! Yuki Hime Shin...	Adventure, Comedy, Historical, Supernatural, D...	7.10
826	936	Naruto Movie 2: Dai Gekitotsu! Maboroshi no Ch...	Adventure, Comedy, Drama, Fantasy, Shounen, Su...	6.88