Board Games Recommender

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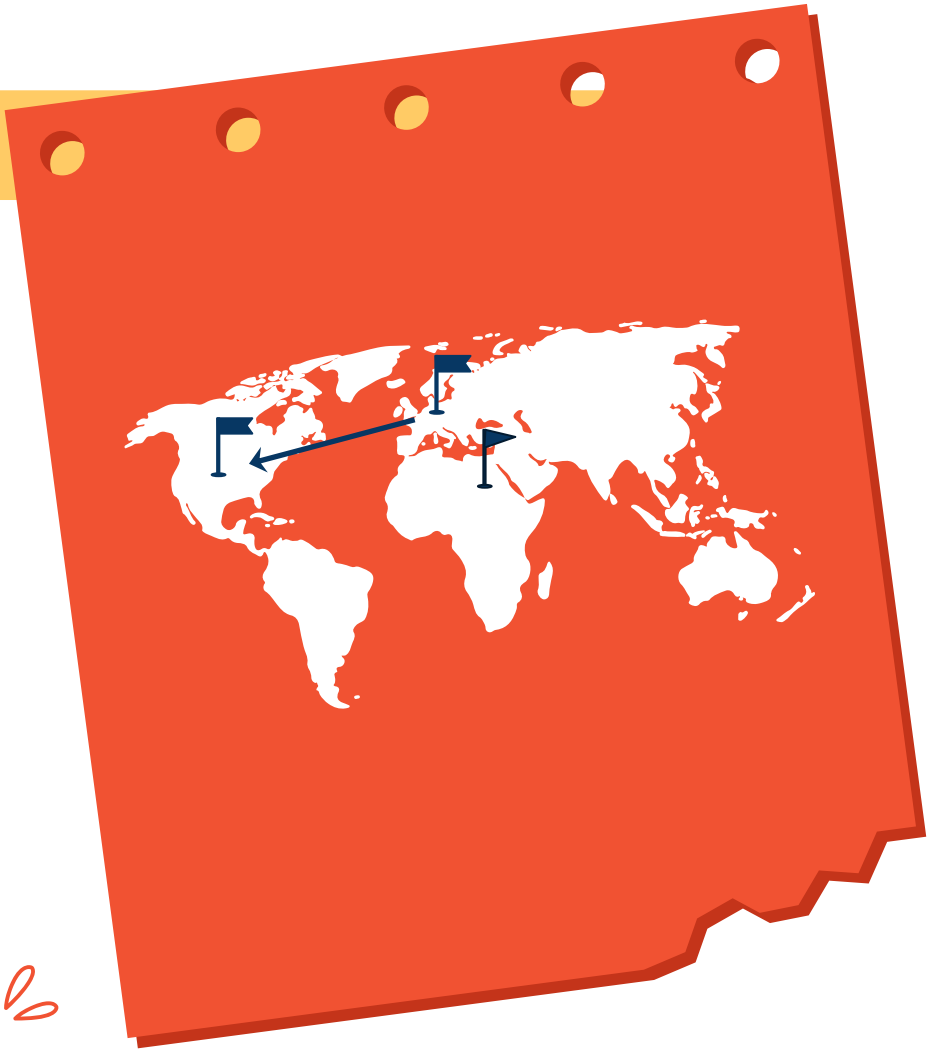
Evolution of Board Games

3000 BC
Egypt had ancient board games like Senet & Mehen.

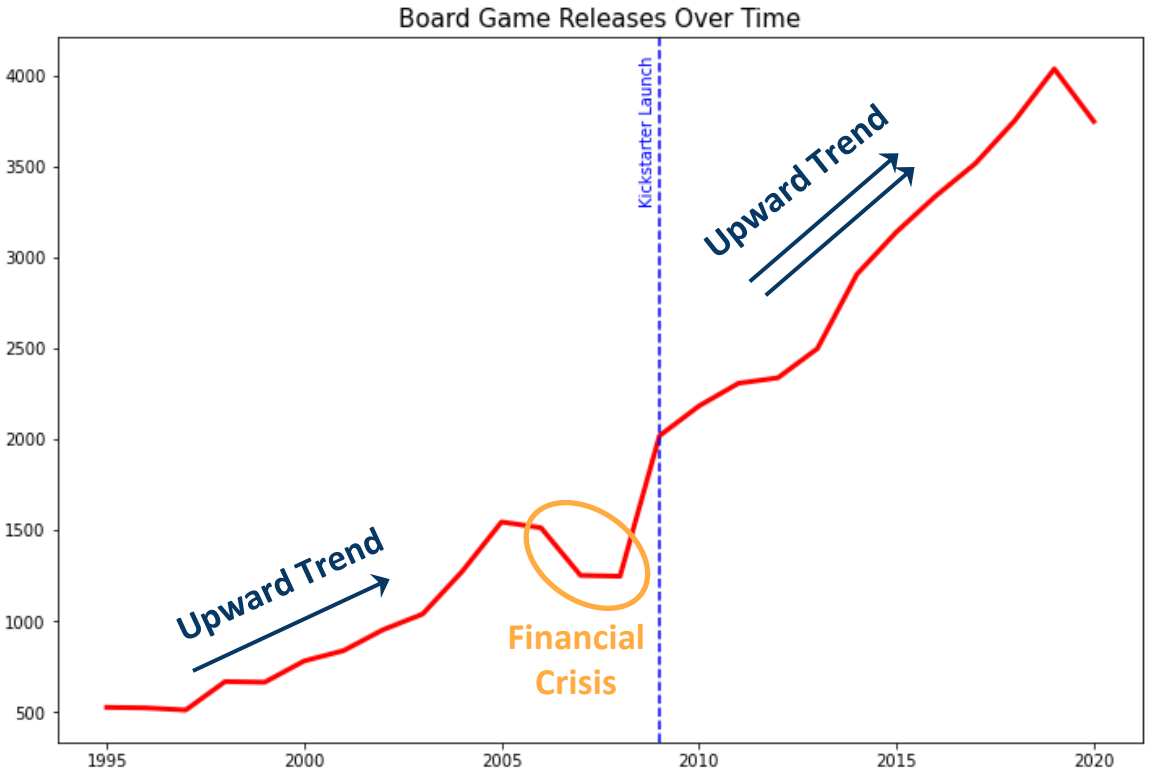
1950s
Ameritrash games in the US.
Eurogames in Germany.

1995
Eurogames like Catan gained popularity outside of Europe.

2020s
Worldwide emergence of hybrid games combining multiple genres.



Game Releases



30 BILLION

USD by Year 2026

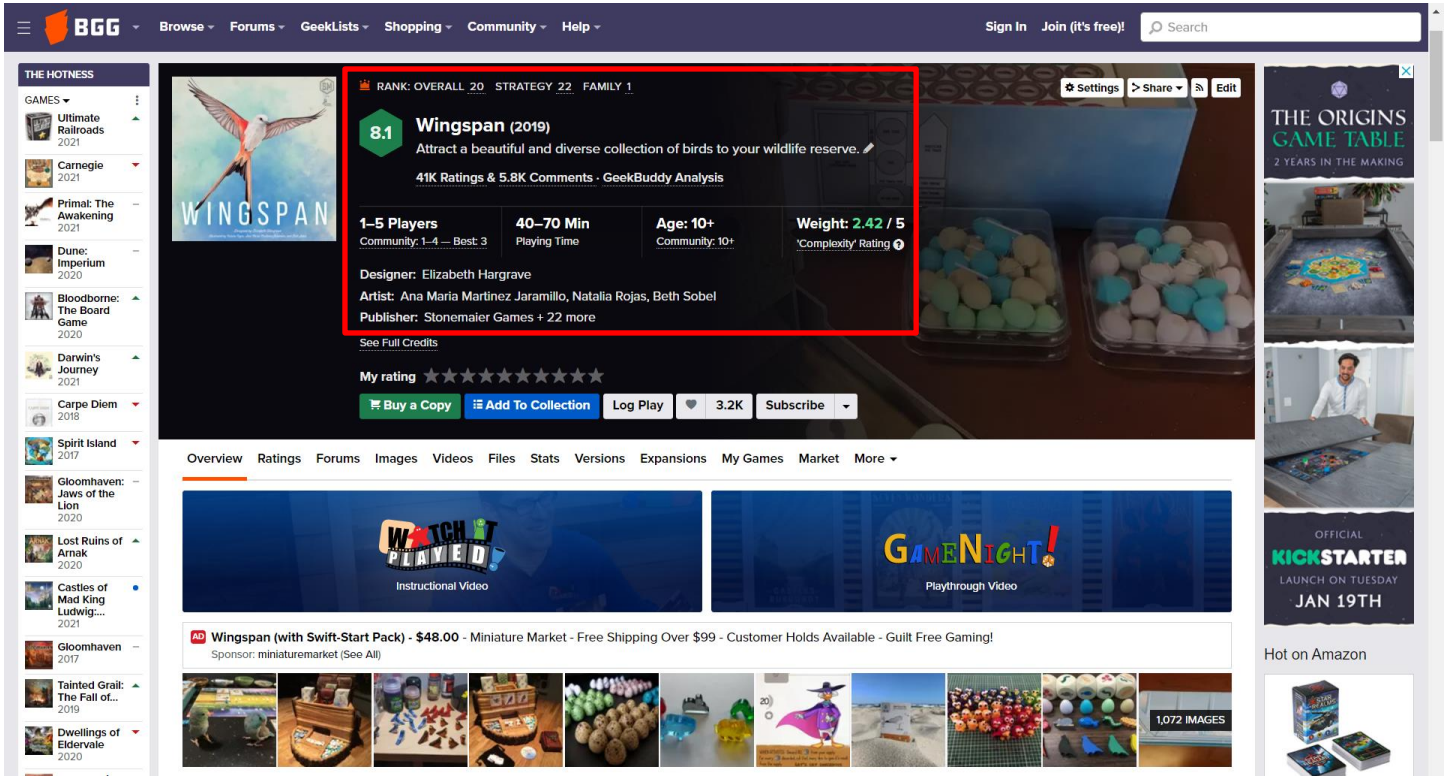
Problem Statement

Current methods that people use to seek board game recommendations, such as forums and video reviews are hardly personalized. The same “mainstream” games will always be suggested by these platforms.

As part of a data science team affiliated to BoardGameGeek (BGG), we want to build a good board game recommender.

- To reduce user churn.
- Increase time spent on website.
- Attract new users to BGG community.
- Attend to every user’s personal needs.

What Is In The Data?



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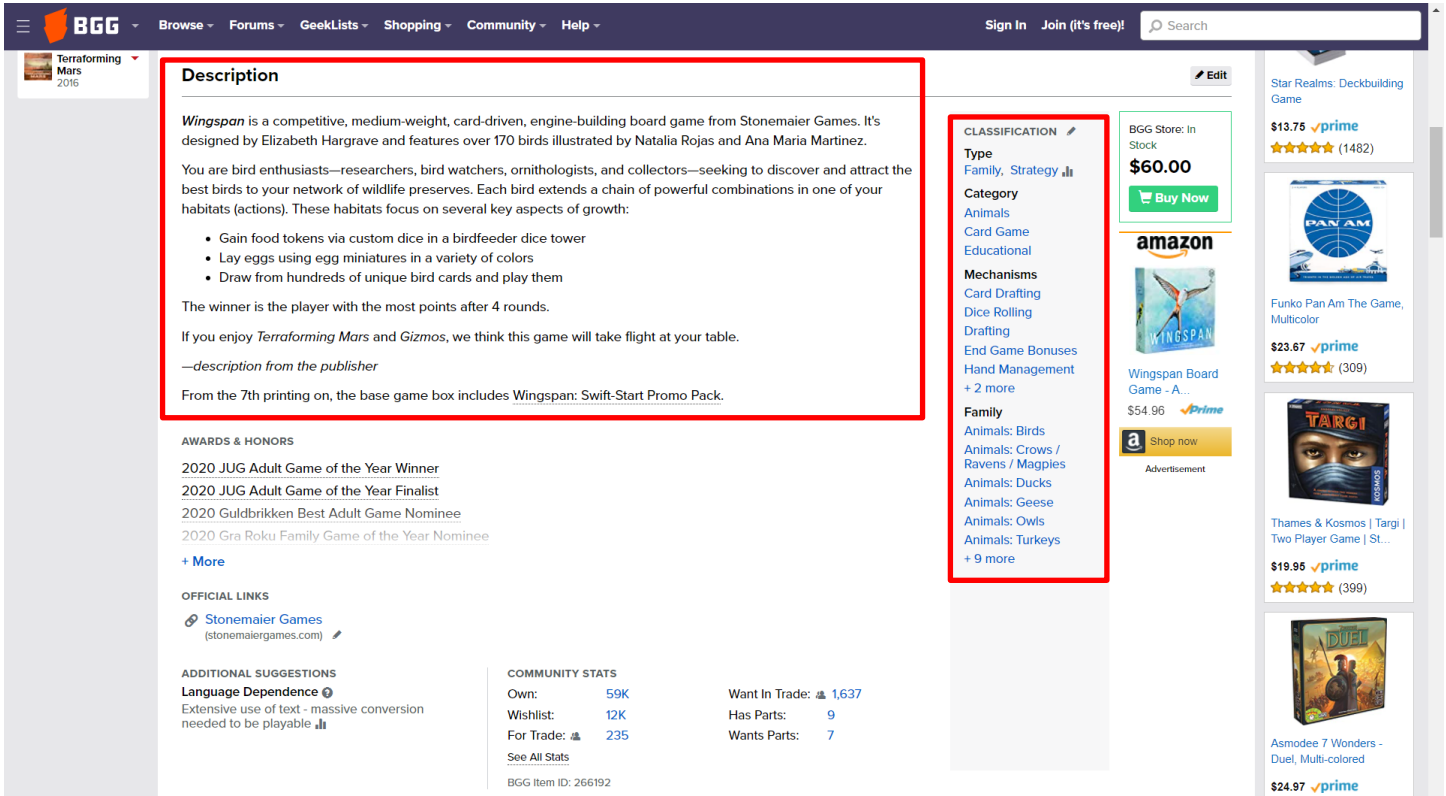
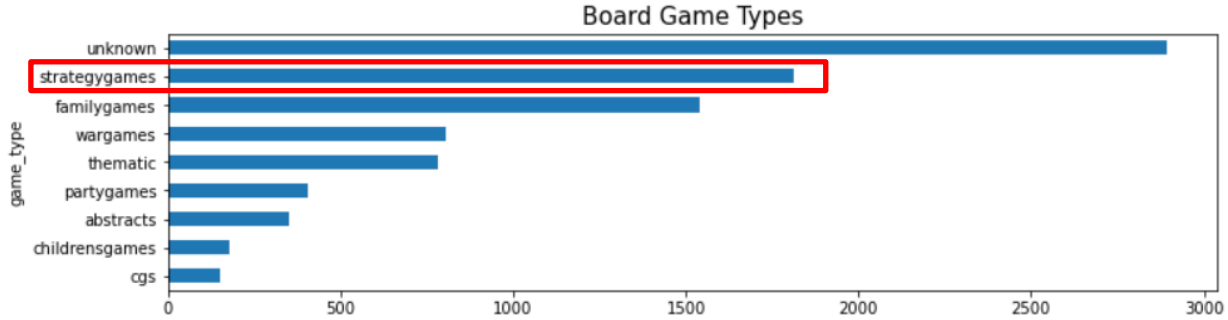


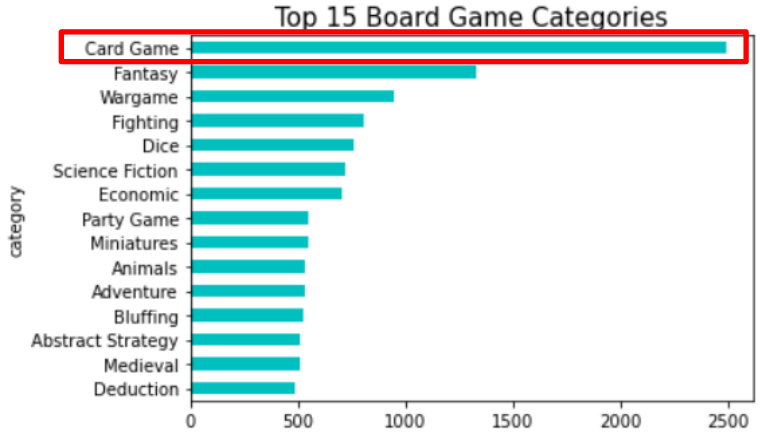
Data Dictionary

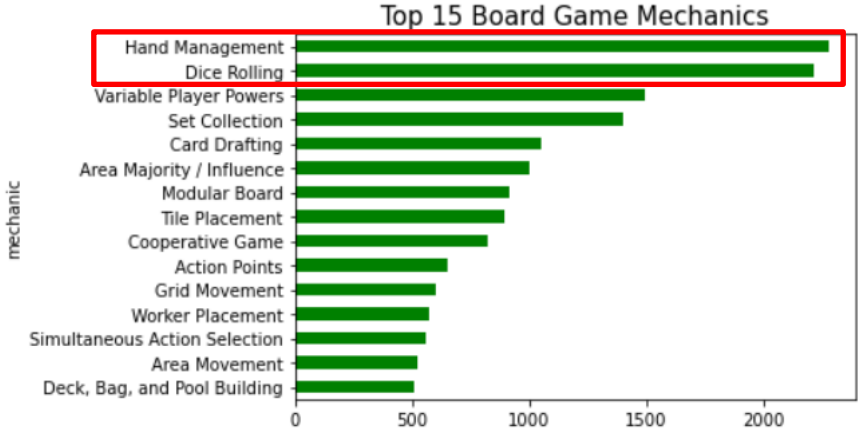
Feature	Description
bgg_id	Board game's ID on BoardGameGeek database.
name	Board game's name in English.
year	Board game's year of release.
game_type	Board game's associated game types (e.g. strategy game, thematic, etc.).
designer	Designer(s) of the board game.
artist	Artist(s) of the board game and its components.
publisher	Publisher(s) of the board game.
min_players	Minimum number of players for the board game by design.
max_players	Maximum number of players for the board game by design.
min_players_rec	Minimum number of players for the board game as recommended by the BGG community.
max_players_rec	Maximum number of players for the board game as recommended by the BGG community.
min_players_best	Best number of players minimally for the board game as suggested by the BGG community.
max_players_best	Best maximum number of players for the board game as suggested by the BGG community.
min_age	Minimum age for players to play the board game by design.
min_age_rec	Minimum age for players to play the board game as recommended by the BGG community.
min_time	Minimum time required for a single play-through of the board game as stated by the designer.
max_time	Maximum time required for a single play-through of the board game as stated by the designer.
category	Board game's associated categories (e.g. Adventure, Exploration, Fantasy, etc.).

Feature	Description
mechanic	Board game's associated mechanics (e.g. Chaining, Drafting, Push Your Luck, etc.).
cooperative	Whether the board game has cooperative game play (0 means non-cooperative, 1 means cooperative).
compilation	Whether the board game is a compilation of others (0 means not compilation, 1 means compilation).
compilation_of	The set of items which the board game is a compilation of.
family	The broad families which the board game falls into (e.g. Two Player Only Games, Theme: Tropical Islands, etc.).
implementation	The bgg_id of the previous board game which this one is a re-implementation of.
integration	The bgg_id of another board game which this one integrates with.
rank	Board game's overall ranking on the BGG website.
num_votes	Total number of votes on rating the board game by the BGG community.
avg_rating	Board game's average rating given by the BGG community (On a scale of 1-10, 10 being the best while 1 being the worst).
stddev_rating	Standard deviation of board game's rating given by the BGG community.
bayes_rating	Board game's average rating using the Bayesian method.
complexity	Board game's average rating for how difficult the game is to understand, by the BGG community (On a scale of 1-5, the lower the rating, the easier the game is to understand).
language_dependency	How language-dependent components (aside from the rules) are for those who do not speak the game published language (On a scale of 1-5, 5 means no necessary in-game text, 1 means unplayable in another language).
_id	Board game's associated ID with other websites (like BGA, WikiData, etc.).

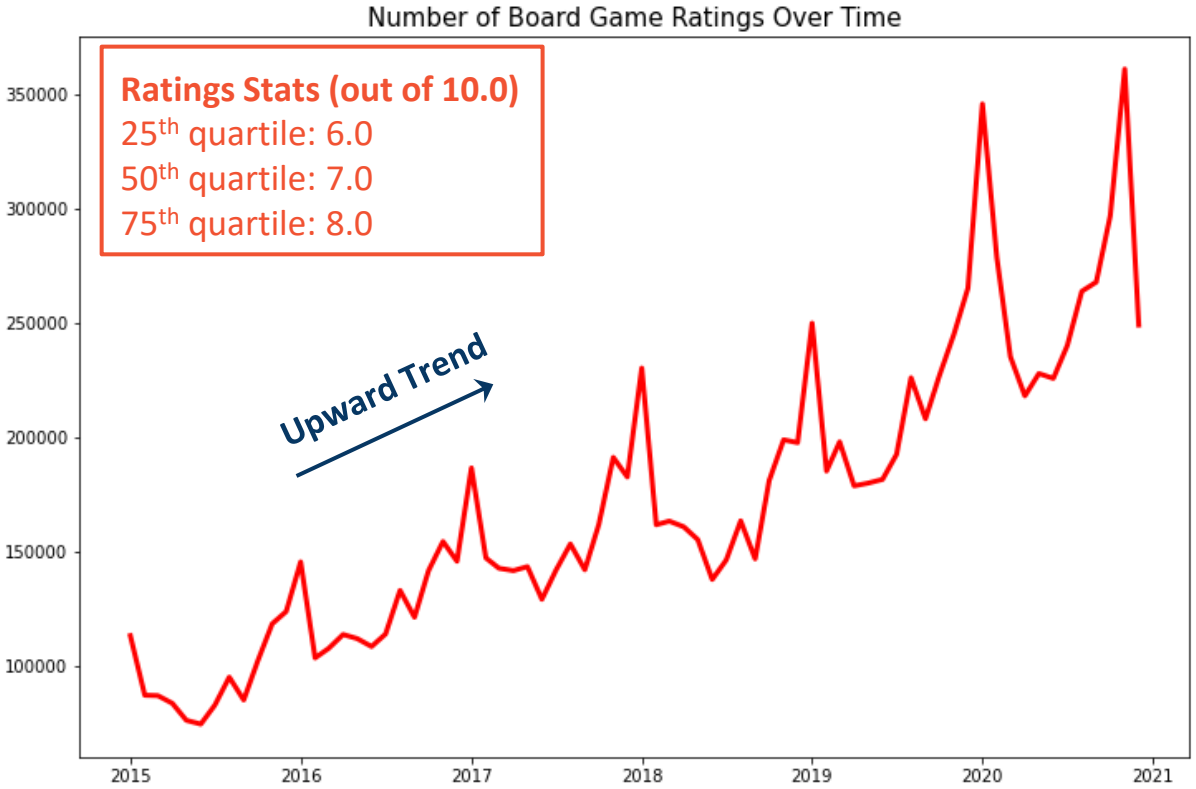
Game Classifications







User Ratings



- **General increasing trend** throughout the years.
- **Cyclical pattern**, number increases towards end of each year, decreases towards the mid-year.
- People generally more active on the website towards the end of each year.
- Common for youtubers to post year-end game reviews.

Final Recommender System

01

User Profiling

Process user selection and develop user profile.

02

Collaborative Filtering

Locate similar BGG users in database.

03

Deep Neural Network

Recommendations based on list of similar user profiles and board game features.

04

User Criteria

Attend to user needs and provide personalization options, including diversifying games using topic model.

Stage 1: User Profiling

New User

New User Profile

	3	9	10	11	12	13	14	16	17	25	...	317519	317985	318472	318553	318977	318983	319114	319966
new_user	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

Stage 2: Collaborative Filtering

New User Profile

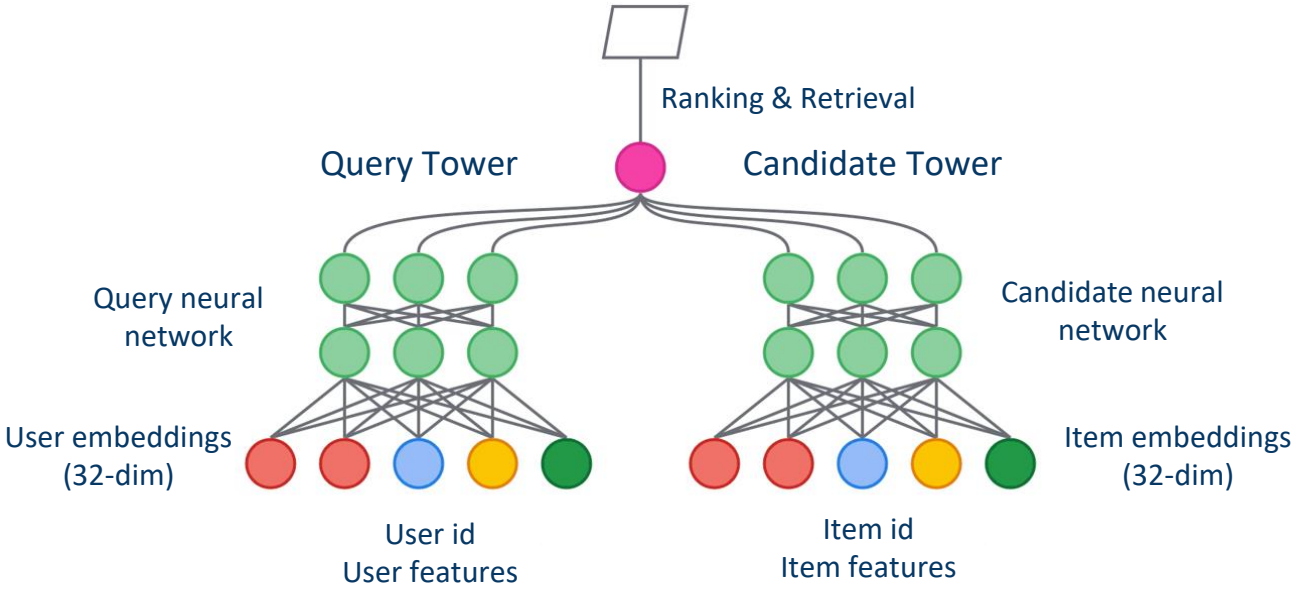
	3	9	10	11	12	13	14	16	17	25	...	317519	317985	318472	318553	318977	318983	319114	319966
new_user	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

BGG User Profiles

bgg_id	**3**	**9**	**10**	**11**	**12**	**13**	**14**	**16**	**17**	**25**	**...**	**317519**	**317985**	**318472**	**318553**	**318977**	**318983**	**319114**	**319966**
bgg_user_name																			
...hammer	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
0492372665	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
0815spieler	NaN	NaN	NaN	NaN	NaN	8.0	NaN	NaN	NaN	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
0b1_ita	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
0xa8e	NaN	NaN	NaN	NaN	NaN	6.0	NaN	NaN	NaN	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
zyxbg	8.0	NaN	NaN	NaN	NaN	5.0	NaN	NaN	NaN	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
zzap1977	NaN	NaN	NaN	NaN	NaN	5.0	NaN	NaN	NaN	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
zzgamer11	NaN	NaN	NaN	NaN	NaN	5.0	NaN	NaN	NaN	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
zztap	NaN	NaN	NaN	NaN	NaN	7.0	NaN	NaN	NaN	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
zzzabiss	NaN	NaN	NaN	5.0	NaN	7.0	NaN	NaN	NaN	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

Similar Users

Stage 3: Deep Neural Network



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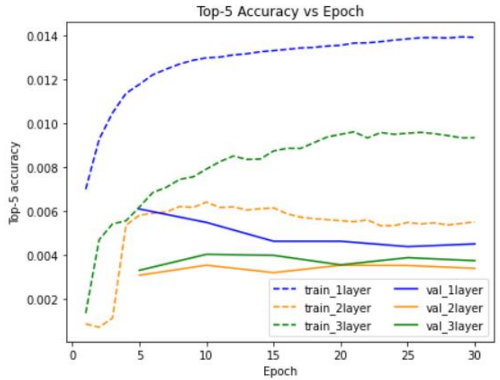
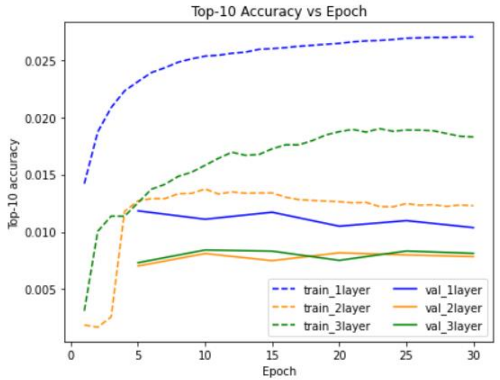
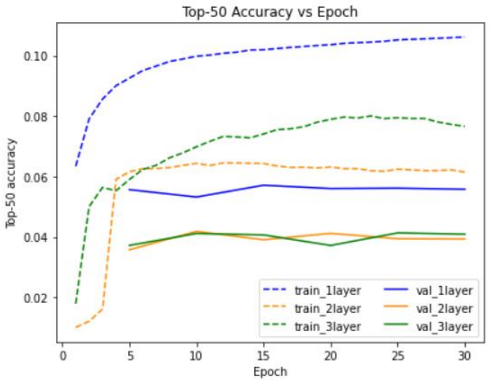
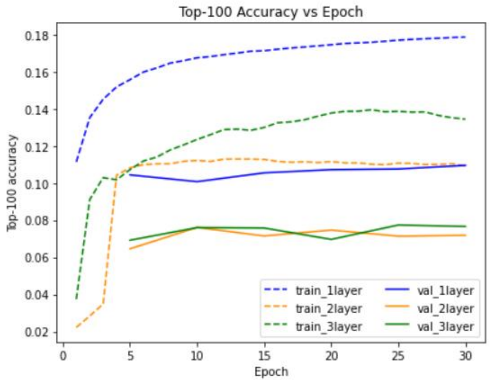
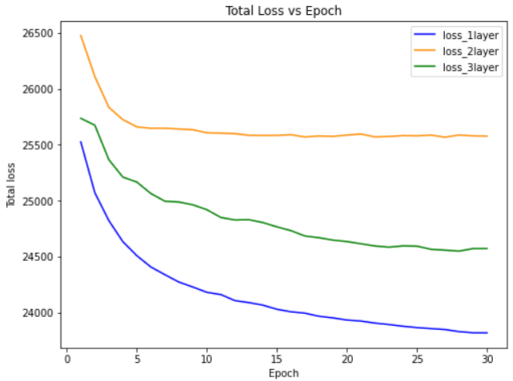




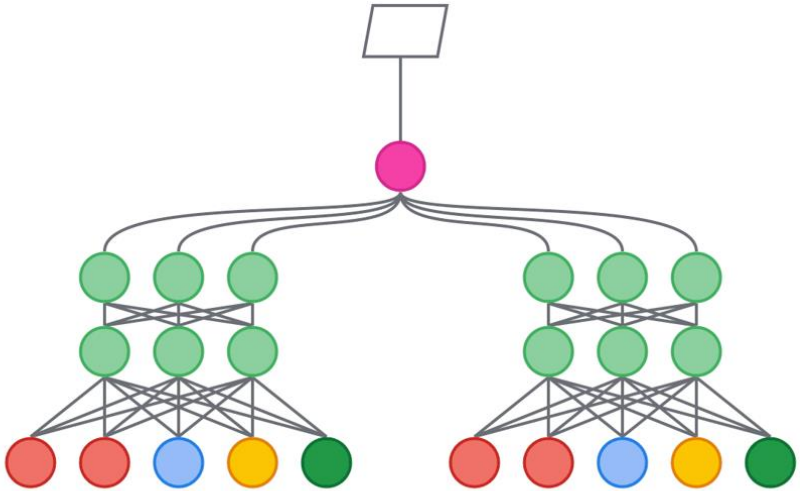






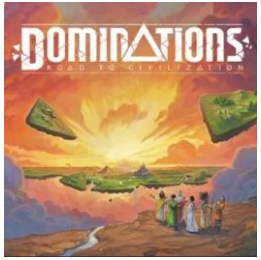
Stage 3: Deep Neural Network

Similar Users



User id
User features

Item id
Item features



Stage 4: User Criteria

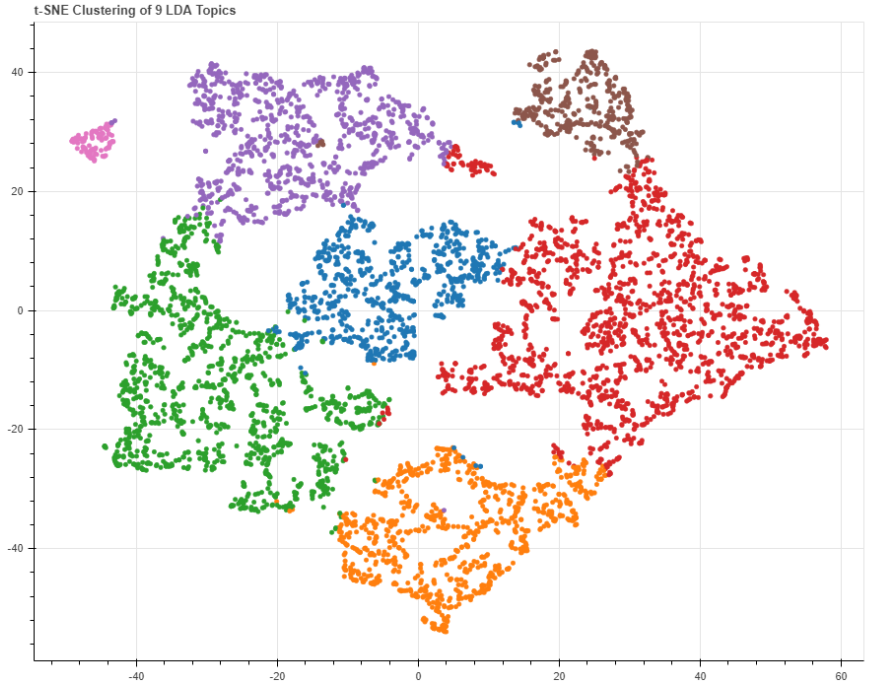
Default Recommendations

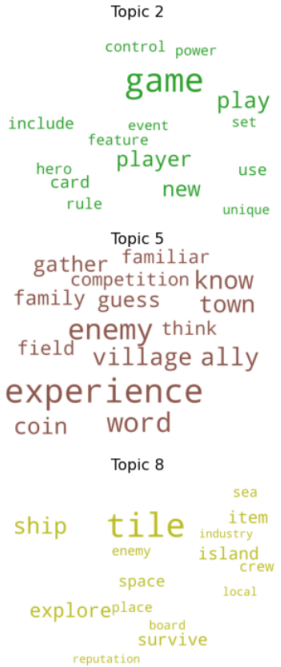
name	freq	rank
Robin of Locksley	4	2771.0
Wayfinders	4	4781.0
Catacombs Cubes	4	6784.0
Deep Vents	4	7478.0
Totemic	4	8792.0
Clank! Legacy: Acquisitions Incorporated	3	73.0
King of Tokyo: Dark Edition	3	804.0
Marvel United	3	1945.0
Wreck Raiders	3	2000.0
Dominations: Road to Civilization	3	2208.0

Recommendations by Popularity

	name	rank
400	Pandemic Legacy: Season 1	2.0
242	Gloomhaven: Jaws of the Lion	13.0
14	Root	28.0
65	The 7th Continent	31.0
79	Everdell	36.0
73	Mechs vs. Minions	40.0
446	The Crew: The Quest for Planet Nine	45.0
389	The Quacks of Quedlinburg	69.0
54	Clank! Legacy: Acquisitions Incorporated	73.0
711	Paladins of the West Kingdom	75.0

Topic Modelling





Stage 4: User Criteria

Recommendations BEFORE Diversifying

name	rank	topic_no
Pandemic Legacy: Season 1	2.0	4
Gloomhaven: Jaws of the Lion	13.0	2
Root	28.0	4
The 7th Continent	31.0	4
Everdell	36.0	0
Mechs vs. Minions	40.0	4
The Crew: The Quest for Planet Nine	45.0	4
The Quacks of Quedlinburg	69.0	6
Clank! Legacy: Acquisitions Incorporated	73.0	2
Paladins of the West Kingdom	75.0	4

Recommendations AFTER Diversifying

name	rank	topic_no
Pandemic Legacy: Season 1	2.0	4
Gloomhaven: Jaws of the Lion	13.0	2
Everdell	36.0	0
The Quacks of Quedlinburg	69.0	6
PitchCar	377.0	1
Undaunted: North Africa	1581.0	3
ShipShape	4458.0	8
Root	28.0	4
Clank! Legacy: Acquisitions Incorporated	73.0	2
Targi	122.0	6

Conclusions

Goals

- Reduce user churn.
- Increase time spent on website.
- Attract new users to BGG community.
- Attend to every users' personal needs.

Moving Forward

- A/B Testing.
- Constant update of database with new user ratings and board games.
- Include data from other major websites.
- Analyse online discussions using NLP techniques.

THANKS !

Do you have any questions?

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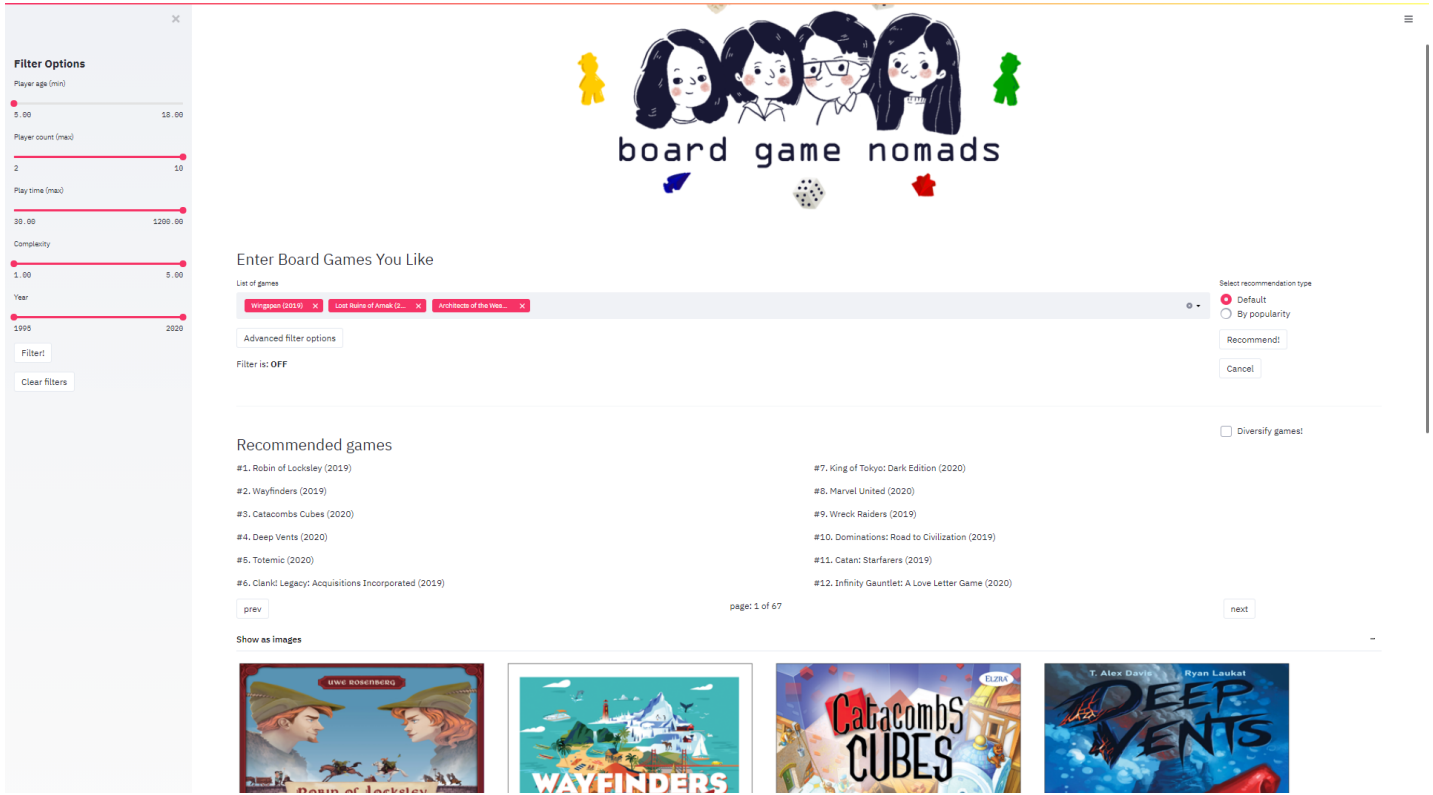
Deployment: Web Application