

12

6

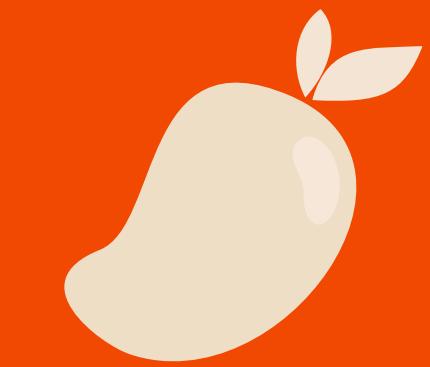
LET'S PLAY!

DECODING BOARDGAME BUZZ



TEAM SIOMAI RICE

Chua, Mancenido, Rosell, Regual





ARE OTHER PEOPLE
HAVING FUN WITH
BOARD GAMES AS
WELL?

Board Game Market Resurgence

\$18.93 B
Global Board
Game Market
(2022)



\$39.99 B
Global Board Game
Market Projection
(2028)

Reflecting a CAGR of **13.27%** during the forecast period.

In the Philippines, there has been a boom:



Credit: Gaming Library, Neutral Grounds Facebook Page



21.51%

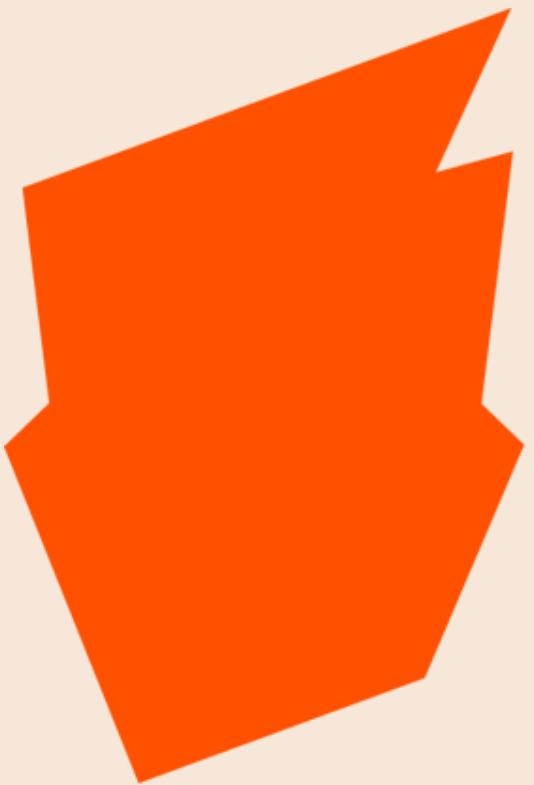
**Growth in Board Game Value Shipments
in the Philippines (2022)**

* 6WResearch (Market Research Company in India)

HOW CAN WE HELP LOCAL
BOARD GAME STORES RIDE
THIS GROWTH?

THE DATA

- The data comes from Board Game Geek found in Kaggle
- Dataset: January 2022
- They have around 2.5+ million registered users
- As per 2022, they have around 19 million reviews for board games



BOARD
GAME
GEEK

Board Game Geek (A popular board game website)



21,432

**Board Games In Board
Game Geek**

Credit: Board Game Geek (A popular board game website)



Number of
board
games

+

Limited
Space

=

Problem

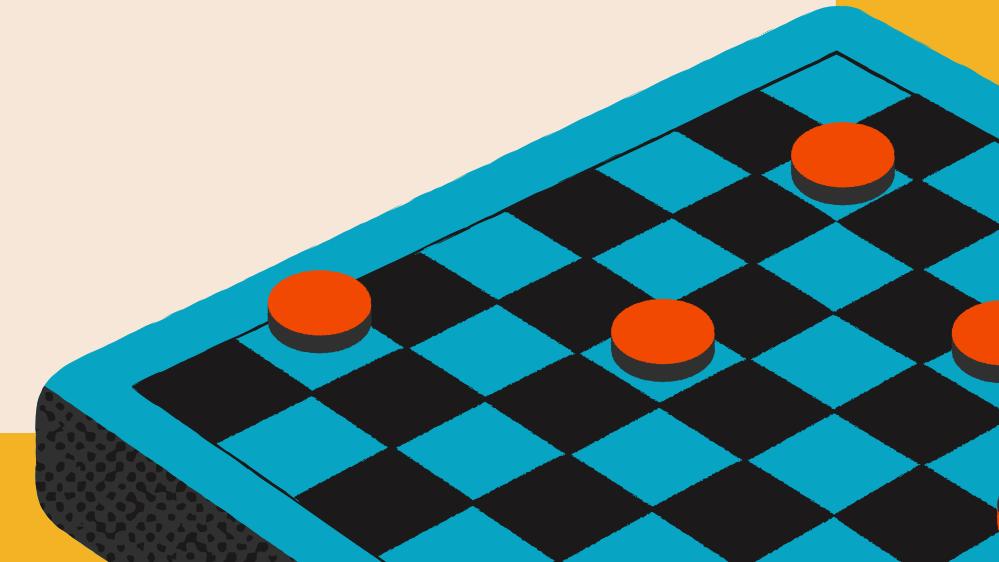


BUSINESS PROBLEM

“

**How can we help our local board game
retailers make informed decisions on
which games to stock and promote?**

”



OBJECTIVES

1

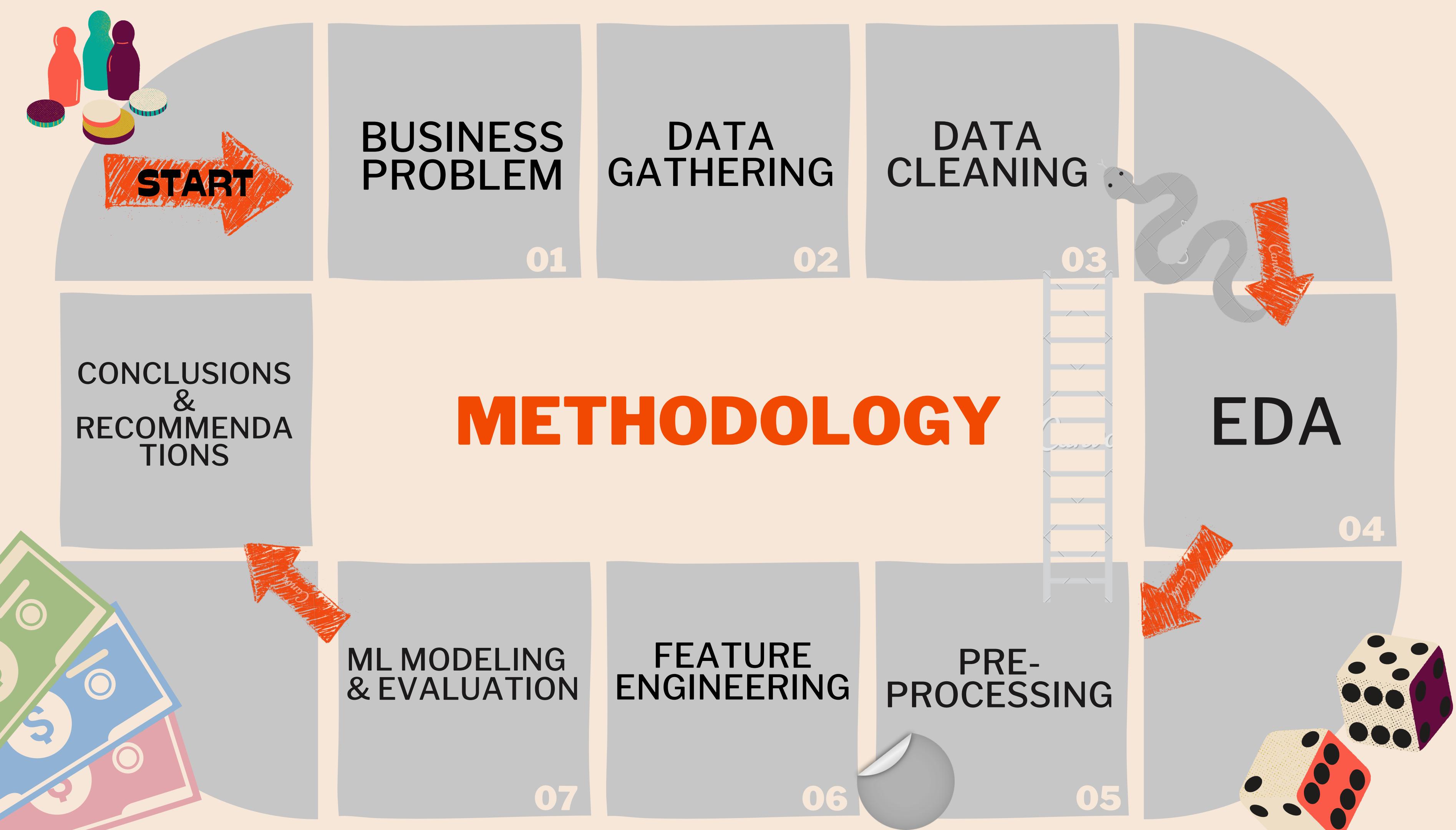
Determine the key features and characteristics of board games that correlate with positive and negative user reviews

2

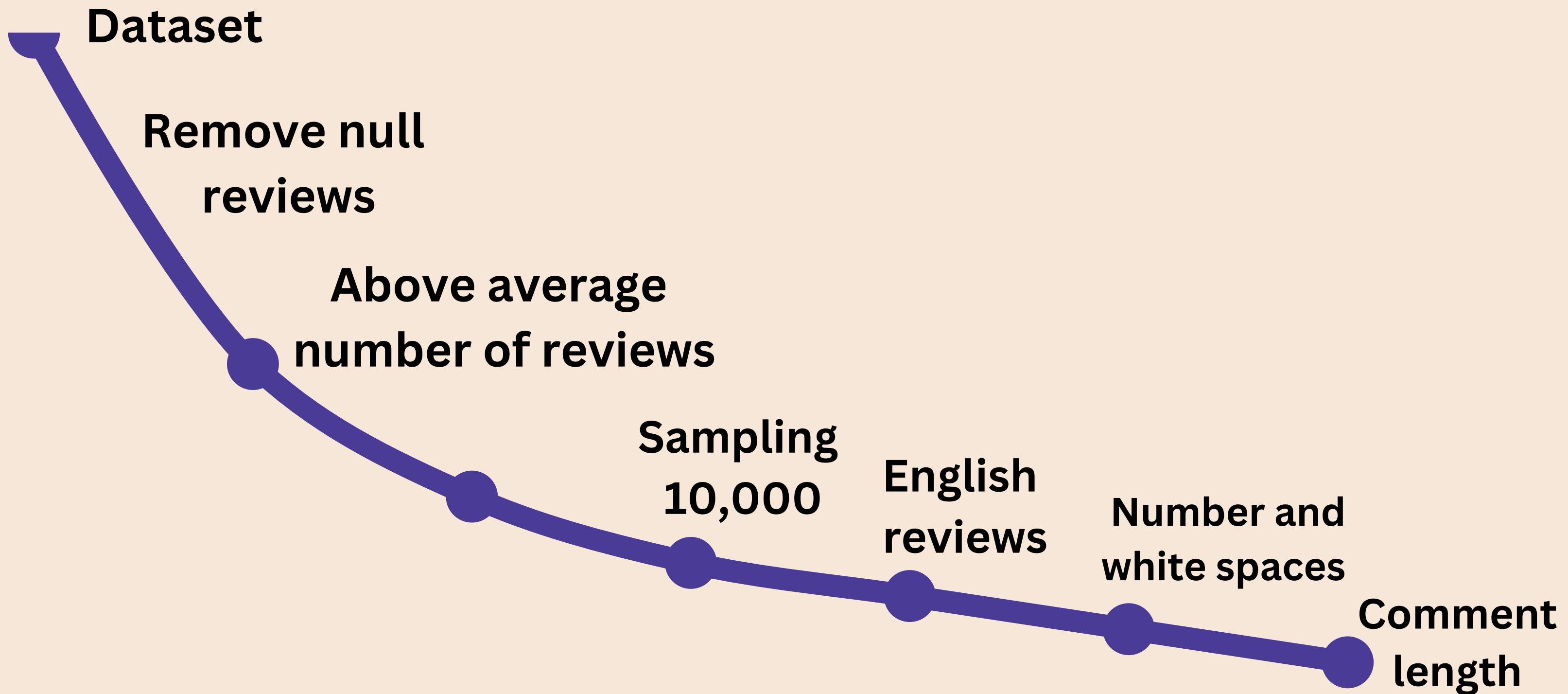
Find the most important factors for board games based on user reviews through topic modeling

3

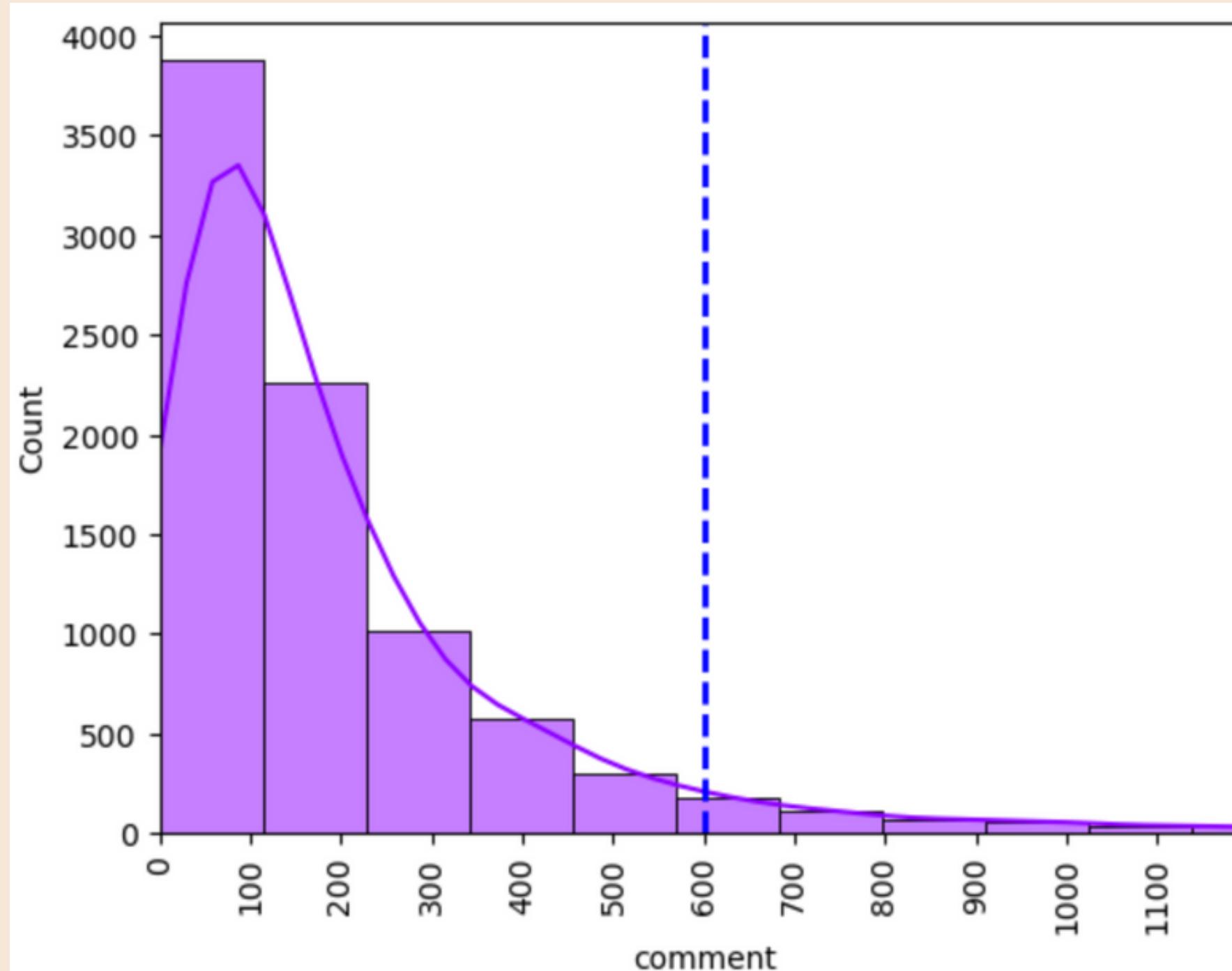
Create recommender engine that can take a game description as an input, and recommend games that fit their description



DATA CLEANING



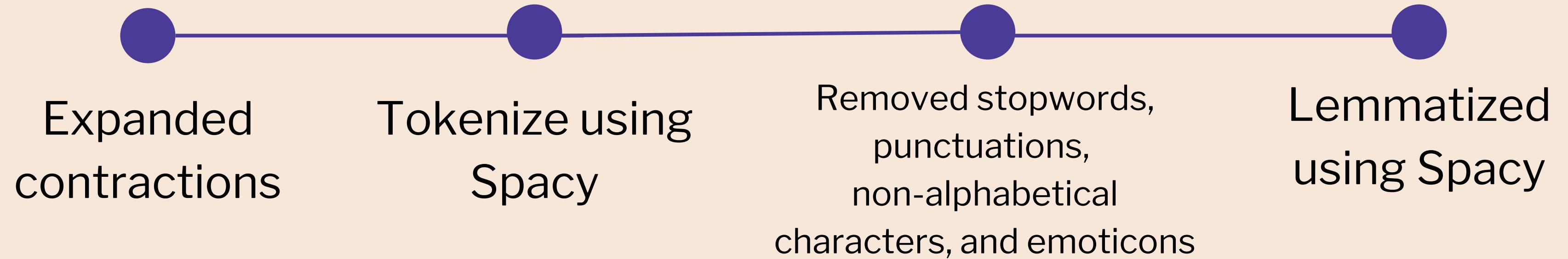
DATA CLEANING



Comment lengths above 600 characters impact the model more despite having less counts.

- **Long comments**
(> 600 characters)
- **Short comments**
(< 10 characters)

DATA PREPROCESSING

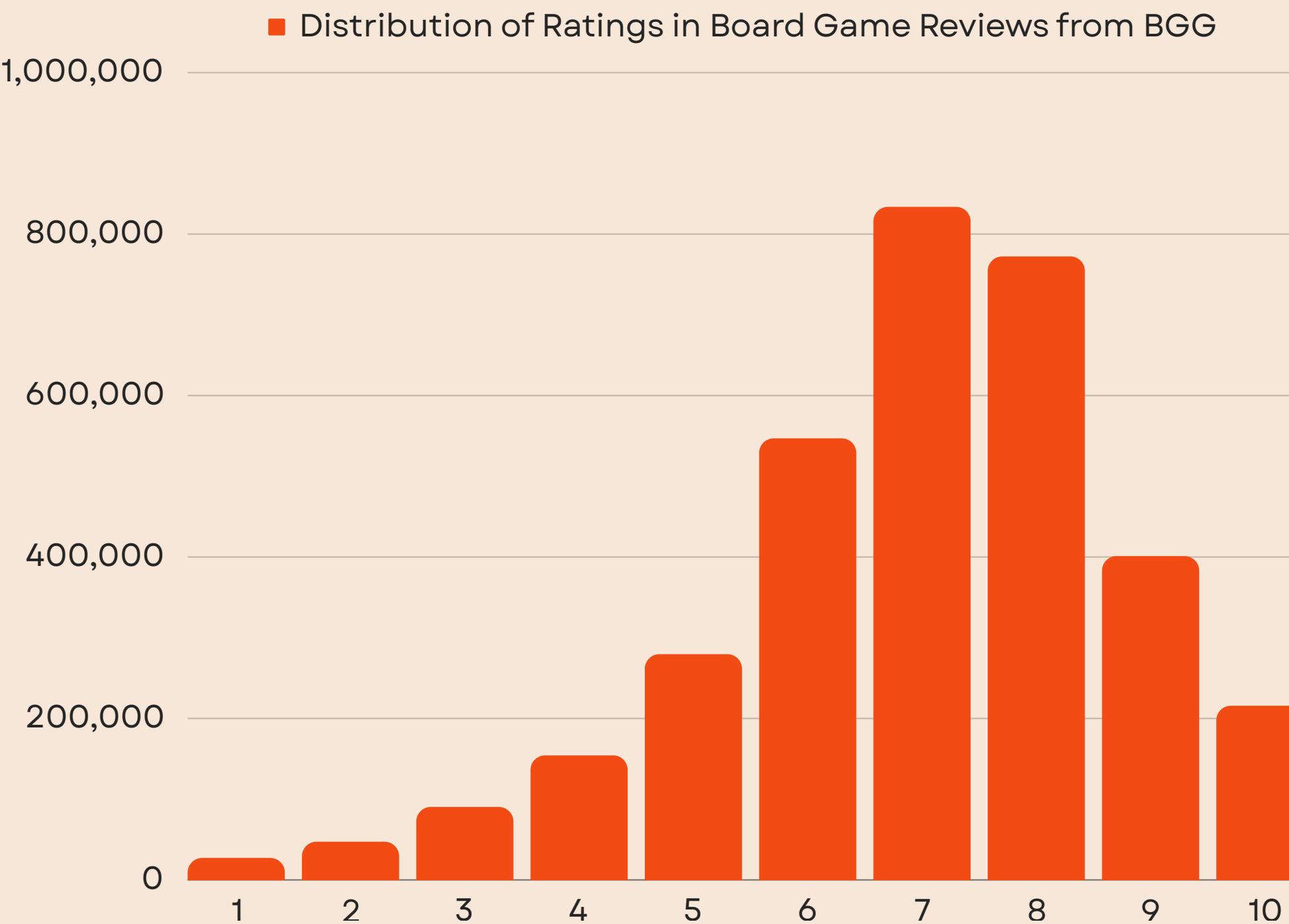




EXPLORATORY DATA ANALYSIS (EDA)

RATINGS

Users tend to rate board games **7 to 8** on a scale of 1 to 10.



REVIEWS

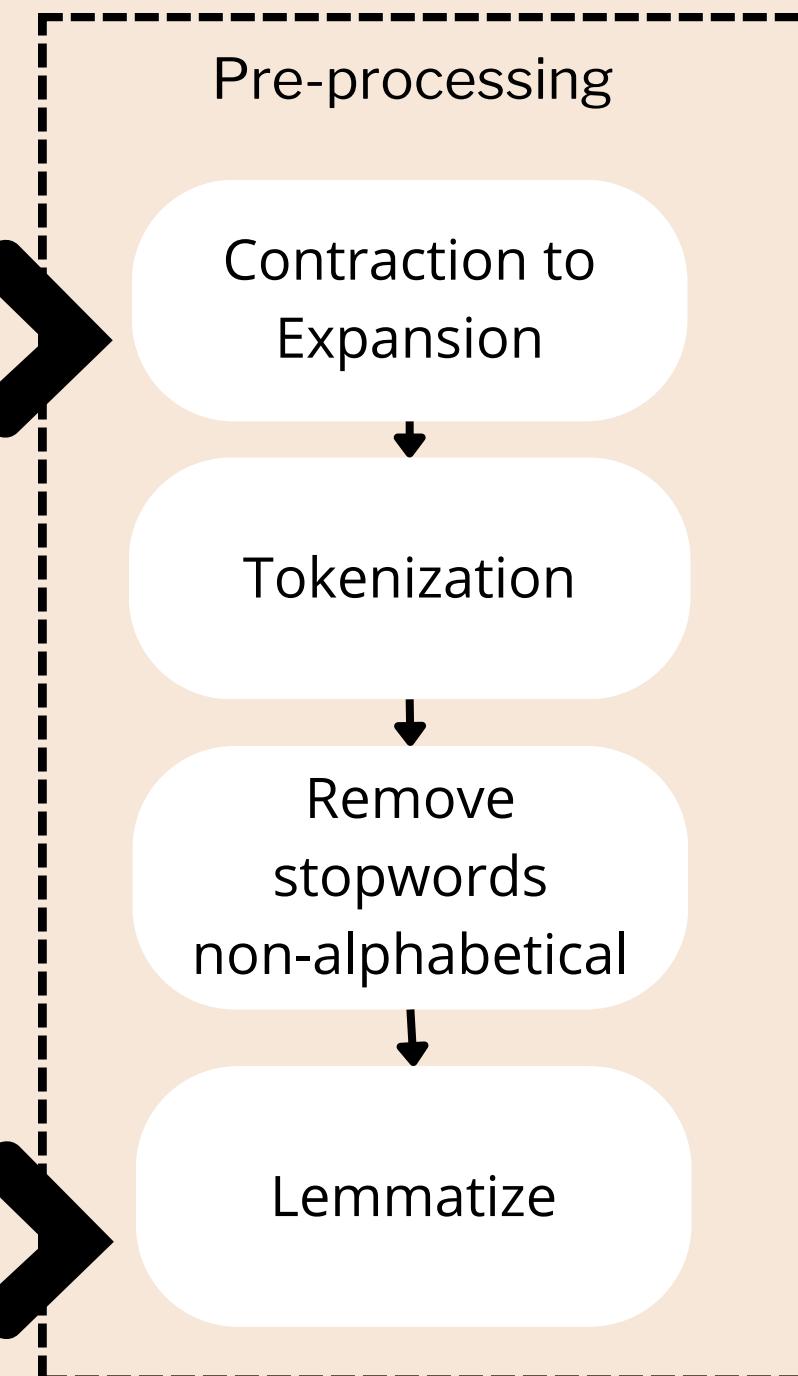
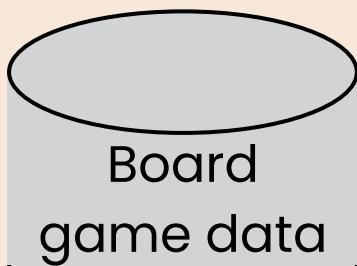
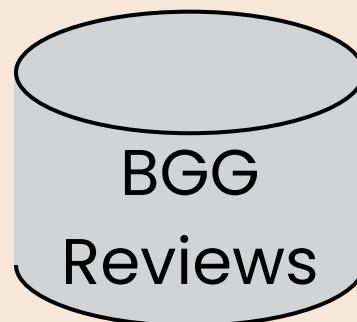
LOW REVIEWS

*Ratings 1 - 6

Ratings 1 - 6

MACHINE LEARNING PIPELINE

INPUT



Feature Engineering

N-grams

TF - IDF

Embedding

ML Algorithms

LDA

TextBlob

OUTPUT

Topic Label

User Sentiments

Board Game
Recommender Engine

Cosine Similarity

LLM



WHAT DO THE CUSTOMERS THINK?

1

**Multi-labeled
Classification**

2

**Text
Summarization**

MULTILABEL CLASSIFICATION

1

Gather labels "**Excitement**", "**Frustration**", "**Joy**", "**Curiosity**", "**Disappointment**", "**Competitiveness**", "**Nostalgia**", "**Satisfaction**", "**Confusion**", and "**Connection**".

2

Classify reviews using **Multilabel Zero Shot Classifier**.

3

Split the classified dataset according to **User Ratings (High: 7-10, Low: 1-6)**

4

Create a wordcloud reflecting what customers think.

HIGH RATINGS (7-10)

Customers tend to like games that give:

- Excitement
- Curiosity
- Nostalgia
- Competitiveness

Connection'
Excitement'
Disappointment' Confusion'
Satisfaction'
Joy' Competitiveness'
Curiosity'
Frustration'
Nostalgia'

LOW RATINGS (1-6)

Customers tend to not like games that give:

- Frustration
- Confusion

Satisfaction 'Competitiveness'
Frustration '
Excitement'
Disappointment '
Joy 'Connection'
Curiosity '
Nostalgia'
Confusion'

SUMMARIZATION

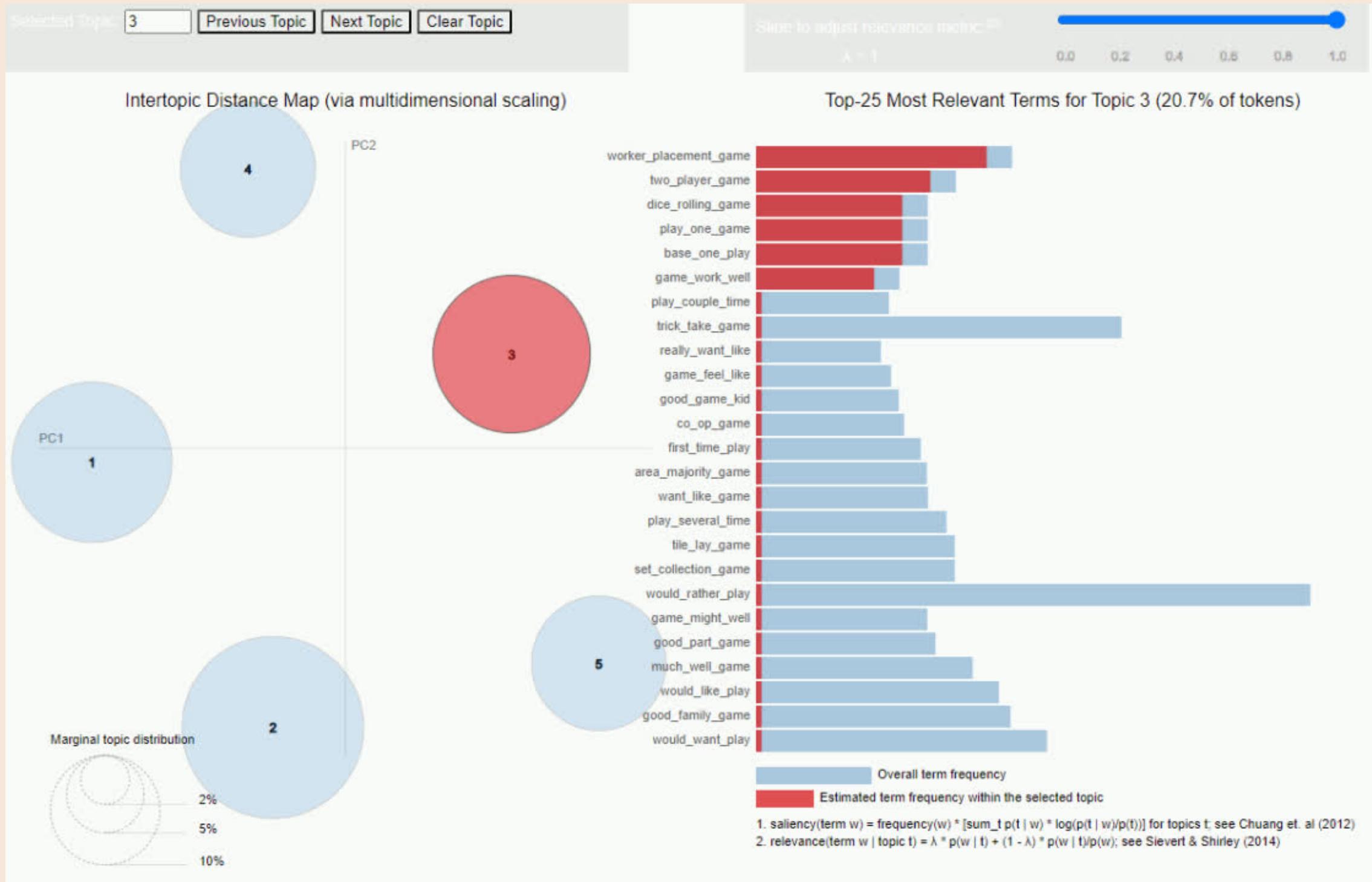
POSITIVE

- Classic
- Nostalgic
- Easy to Learn
- Clear and Quick
- Hilarious
- Simple and Engaging
- Great Replayability



- Feels Solo
- Slow and Costly
- Unbalanced
- Theme could be deeper
- Boring
- Complicated
- Lacks fun factor

Topic Modeling



TF-IDF Vectorizer

Latent Dirichlet Allocation (LDA)

GridSearchCV

	Entire Dataset		Low Reviews	
	1 Word	Bigrams	Trigrams	Trigrams
No. of Topics	5	5	5	5
Log Likelihood	-9553.55	-2156.96	-453.41	-169.13
Model Perplexity	42.17	30.91	30.40	44.90



Topics



1 coop

co-op game
area control game
one favorite game
game feel like
really enjoy game

2 family

trick take game
first time play
would like play
great family game
game work well
feel like play

3 complexity

two player game
tile lay game
game easy teach
deck building game
base one play



4 teachability

worker placement game
game ever play
great gateway game
game easy learn



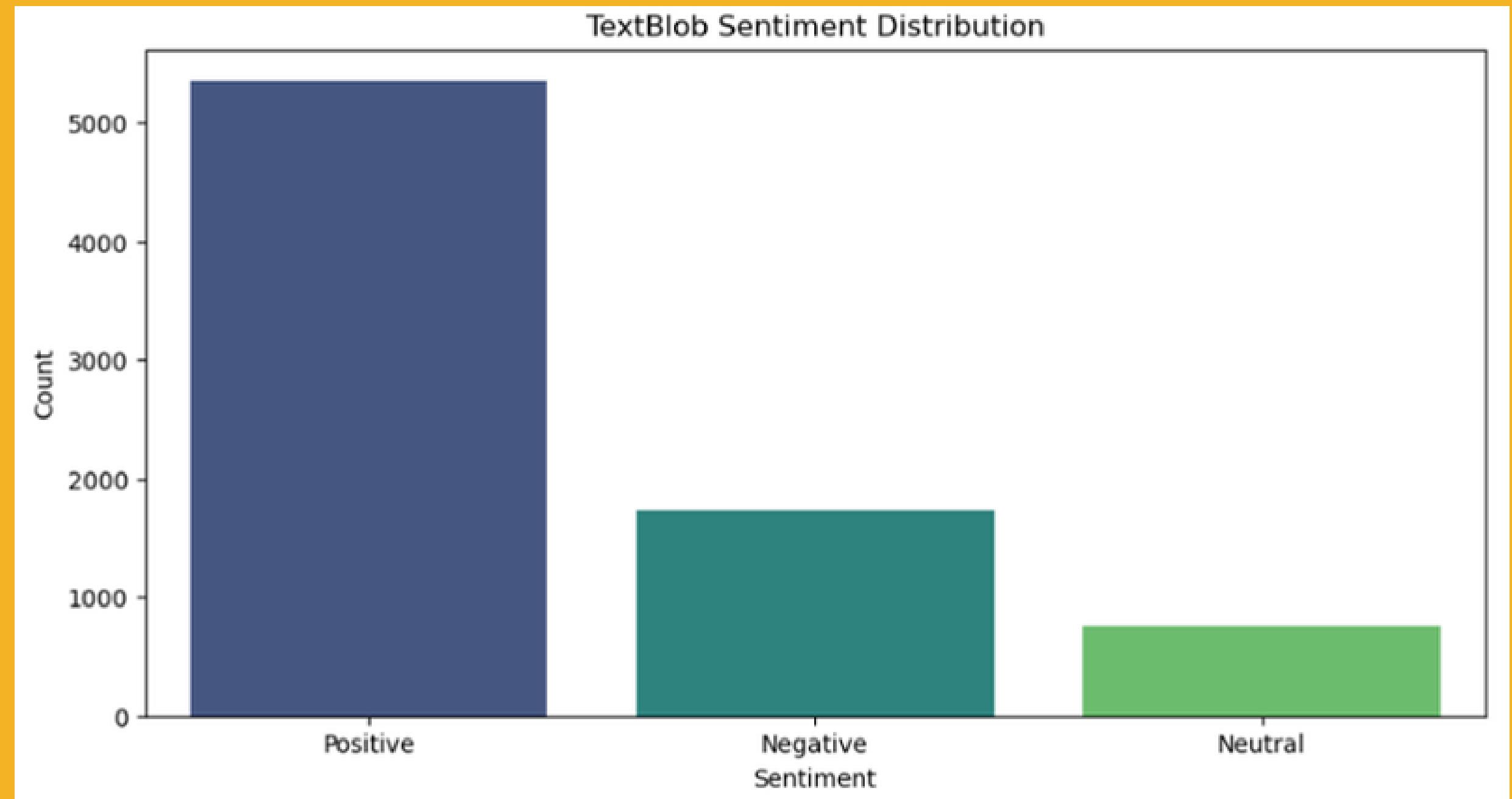
5 sentiment

would rather play
really like game
game lot fun
look forward play
game **really like**

SENTIMENT ANALYSIS

TextBlob

**Input: Comments
from the reviews**



POSITIVE REVIEWS

Tend to favor
cooperative group
party games

Positive Sentiment Word Cloud



Game complexity, first time plays, and other specific genres and long duration games

NEGATIVE REVIEWS

Negative Sentiment Word Cloud



STREAMLIT APP

**BOARD GAME
RECOMMENDER
ENGINE**



QR Code

BOARD GAME RECOMMENDER ENGINE

Select a Target User:

Board Game Player

Describe a board game that you would want to get recommendations from:

Fantasy game

Select a game:

Whitehall Mystery

Pipeline

Hadrian's Wall

- Used text embedding to convert game description to numerical values
- Takes a game description as an input, and puts out a list of similar games
- Uses cosine distance to find similarity

BOARD GAME RECOMMENDER ENGINE

Board Game Info

Whitehall Mystery

October 1888: During the construction of the Metropolitan Police headquarters near Whitehall, which would later be known as Scotland Yard, the remains of a body were found. In September, a severed arm had already been discovered in the muddy shore of the River Thames. There is another murderer roaming the streets of London in Whitehall, amusing himself by spreading the pieces of a poor woman around Whitehall, like some kind of macabre treasure hunt. The identity of this monster and his unfortunate victim are a mystery, the Whitehall Mystery.

Year Published: 2017

Users Rated: 2830

Average Score: 7.58492

Board Game Reviews

Top User Reviews and Sentiment Analysis

	user	rating	comment
2,845	lyingb	9	Great game - quicker version of Letters From Whitechapel. Very playable, and replaya
4,412	Lemem	7	A fun hidden movement game where one player tries to hunt down the other before t
5,365	Ranior	7	This was a cool hidden movement game. It had a lot of the fun deductive elements th

- Gives out the game info and user reviews regarding the game

BOARD GAME RECOMMENDER ENGINE

GPT3 LLM Recommendation for the Board Game Player

Based on the user reviews, the main takeaways for this game, "Whitehall Mystery," are:

1. Quicker version of "Letters From Whitechapel": This game offers a hidden movement mechanic similar to "Letters From Whitechapel" but plays in a shorter time frame, approximately an hour or less.
2. Playable and replayable: Players found the game to be enjoyable and replayable, indicating its potential for multiple plays without losing its appeal.
3. Fun deductive elements: The game includes deductive elements that resemble those found in "Fury of Dracula," allowing players to strategize and outguess each other's tendencies.
4. Power cards and interesting options: The inclusion of power cards adds an additional layer of strategic decision-making, offering interesting options for all players.
5. Positive comparison to "Fury of Dracula": While some players slightly prefer "Fury of Dracula" for its better theming and more interesting decisions and tracking, "Whitehall Mystery" is still regarded as a great option for a quicker hidden movement experience.

Based on these takeaways, it is recommended that board game players who enjoy hidden movement mechanics and deductive gameplay give "Whitehall Mystery" a try. Its shorter playtime, replayability, and interesting options provided by power cards make it an appealing choice for those looking for a quicker hidden movement experience. Additionally, if players are fond of games like "Fury of Dracula" and "Letters From Whitechapel," they are likely to find "Whitehall Mystery" to be an enjoyable addition to their collection.

- GPT3 gives out a summary of the user reviews
- GPT3 also gives out a main takeaway depending on the target user



INSIGHTS & RECOMMENDATIONS

OBJECTIVE

1

Determine the key features and characteristics of board games that correlate with positive and negative user reviews

FINDINGS

Positive reviews

- easy to learn and teach, quick games
- there are specific genres

Negative reviews

- slow, complicated, and too solo-focused
- there are specific genres

INSIGHTS FOR STAKEHOLDER

- Board game retailers can focus on looking and stocking up on quick-to-play and teach board games for their on-site inventory.
- Use the most-mentioned genre games to know which games to stock more on.

OBJECTIVE

2

**Find the most
important factors
for board games
based on user
reviews through
topic modelling**

FINDINGS

- Users want to have fun.
- Users want games that are easy to understand, and playable with others.
- Users care about the mechanics or genre, and whether a game is a “gateway game”.

INSIGHTS FOR STAKEHOLDER

- Retailers could stock up on “gateway games”
- Host game nights where a game is featured.

OBJECTIVE

3

Create recommender engine that can take a game description as an input, and recommend games that fit their description

FINDINGS

- Created a recommender engine that takes in a game description as an input, and outputs similar games
- Uses text embedding and similarity scores to find similar games
- Outputs similar games with their description, top user reviews, and sentiment analysis

INSIGHTS FOR STAKEHOLDER

- Board game retailers can use the recommender to get games based on the characteristics they want.
- They can see actual reviews of recommended games to help them with their final decision.

RECOMMENDATIONS

- Process the complete dataset of 19 million reviews
- Incorporate other LLMs that can be trained using BoardGame dataset
- Explore other similarity measures for evaluation
- Add a dataset accounting for a boardgame's sales

LIMITATIONS

- Users are limited to rating a board game once.
- Users are required to be aged 18 and up.
- Rating from a scale of 1 to 10 is very subjective per person.
- Focused on characteristics of popular games
- English comments (what's popular there may not be what would be popular here)
- Most popular boardgames would have a lot of reviews
- Datasets have no price info
- Higher rated games don't always mean they sell well

6

4

**THANK YOU
FOR COMING!**
We hope you had fun!



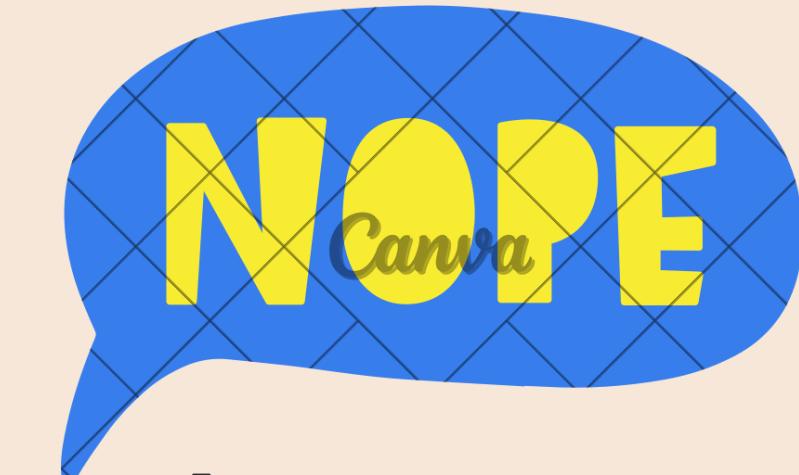
TEAM SIOMAI RICE
Chua, Mancenido, Rosell, Reguyal

APPENDIX

SUMMARIZATION

POSITIVE

classic
nostalgic
easy-to-learn
Clear and quick
hilarious.
simple, engaging,
limited downtime,
great replay-ability.



feels solo
slow and costly
unbalanced
theme could be deeper
did not grab me
brain burn-y
boring
lacks the fun factor.

- SUMMARIZATION

**feels solo
slow and costly
unbalanced
theme could be deeper
did not grab me
brain burn-y
boring
lacks the fun factor.**

+ SUMMARIZATION

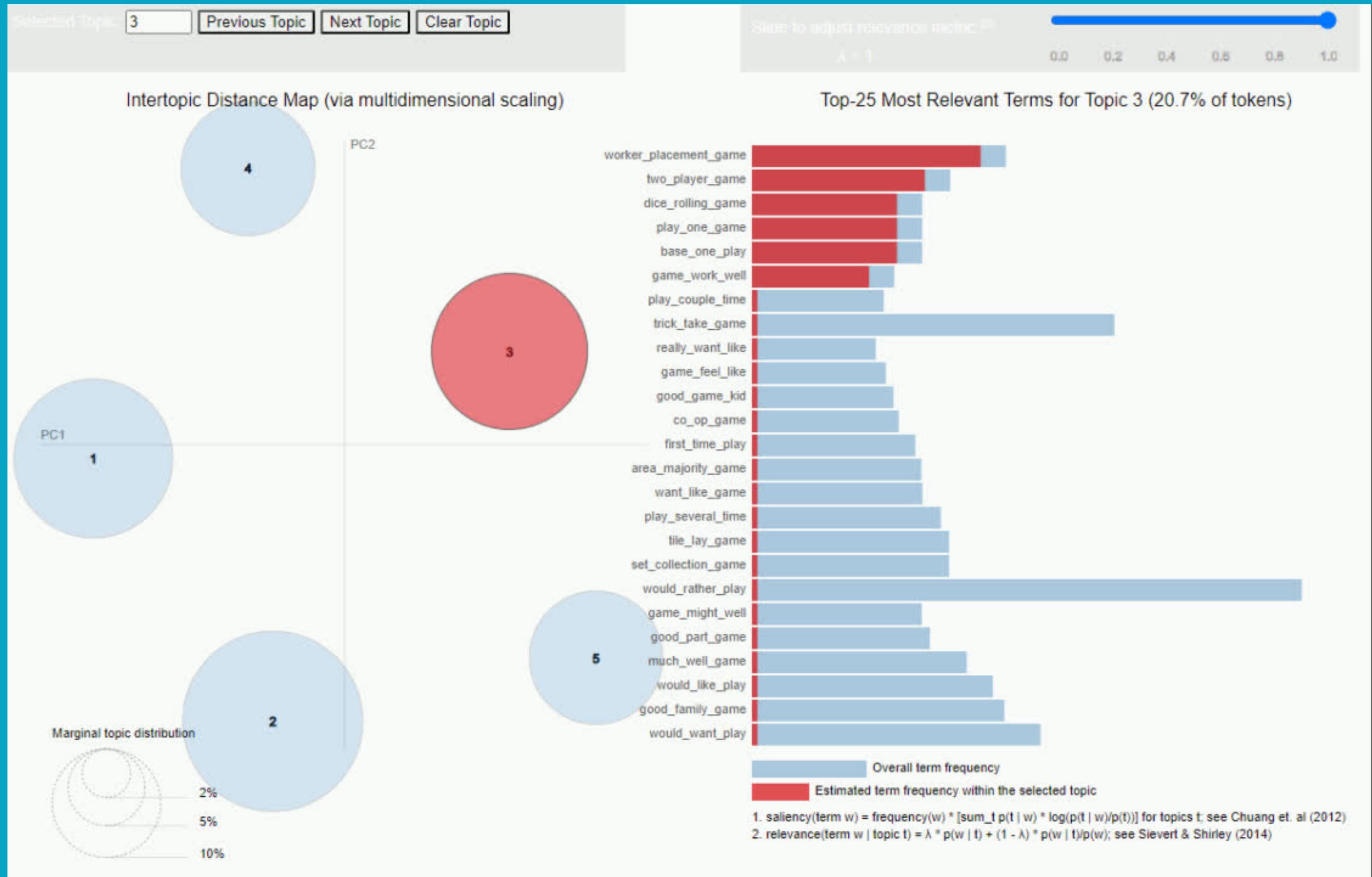
More than **classic** and **nostalgic** battlefield game. A very enjoyable, **easy-to-learn** game which is good for enticing people who are not "into" board games. **Clear and quick.** The inside historical jokes/references are **hilarious**. We all enjoyed ourselves, made up stories, named the stars. It was a good time! The go-to game for my family - **simple, engaging, limited downtime, great replay-ability.**

- SUMMARIZATION

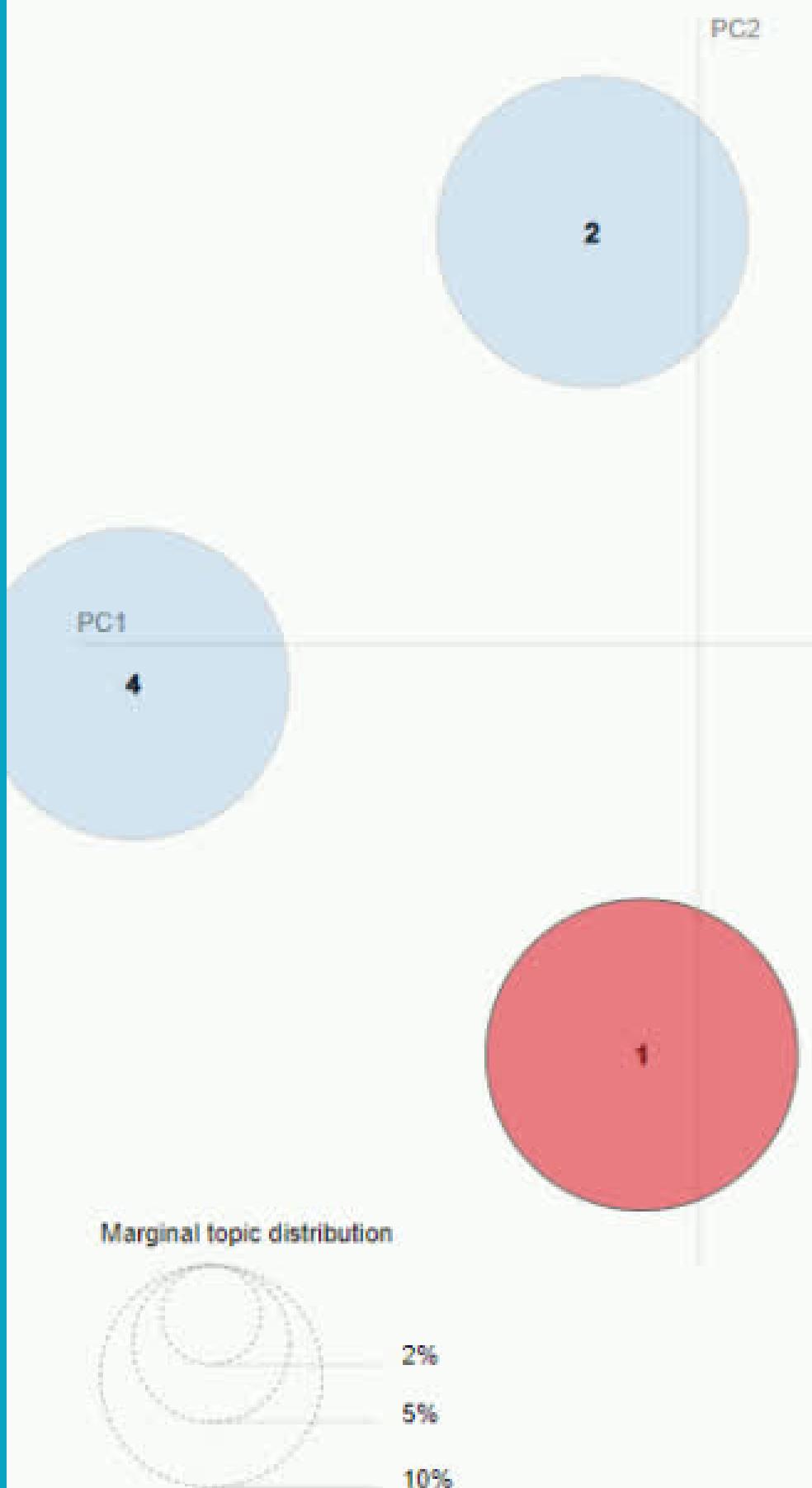
It **feels solo** with little incentive to interact with other players. The game can be **slow and costly**. The factions combination is **unbalanced**. The game is not as fun as smashing it up. The **theme** could be deeper. Interesting game hampered by a horrible combat system. The game did not grab me. A **brain burn-y** puzzle. Nice filler. A bit **boring** bidding game. A very smart game design that **lacks the fun factor**.

TEAM SIOMAI

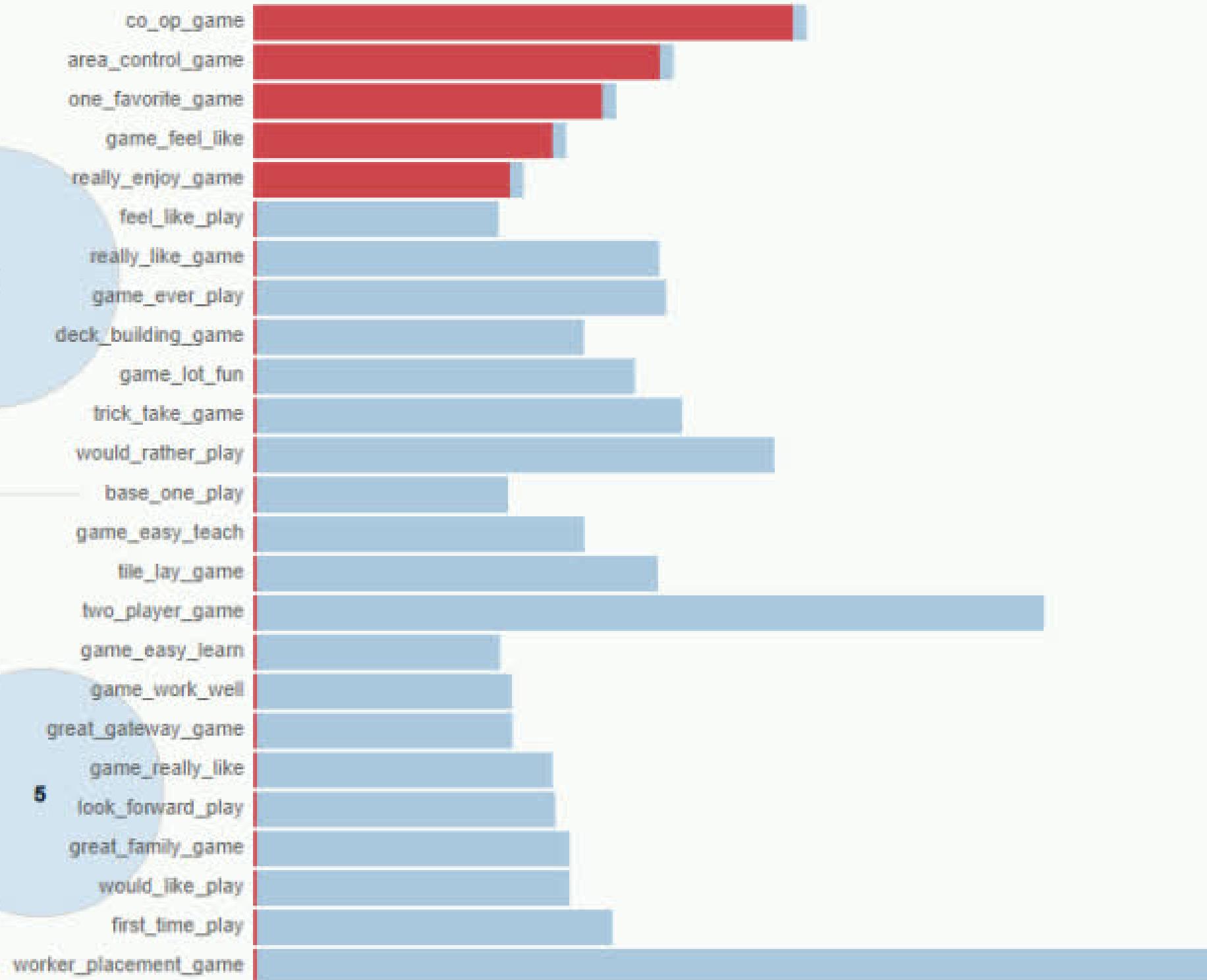




Intertopic Distance Map (via multidimensional scaling)



Top-25 Most Relevant Terms for Topic 1 (19.7% of tokens)



Overall term frequency

Estimated term frequency within the selected topic

1. saliency(term w) = frequency(w) * [sum_t p(t | w) * log(p(t | w)/p(t))] for topics t; see Chuang et. al (2012)

2. relevance(term w | topic t) = λ * p(w | t) + (1 - λ) * p(w | t)/p(w); see Sievert & Shirley (2014)