Capstone Project 2

Prediction of board game rates based on their reviews

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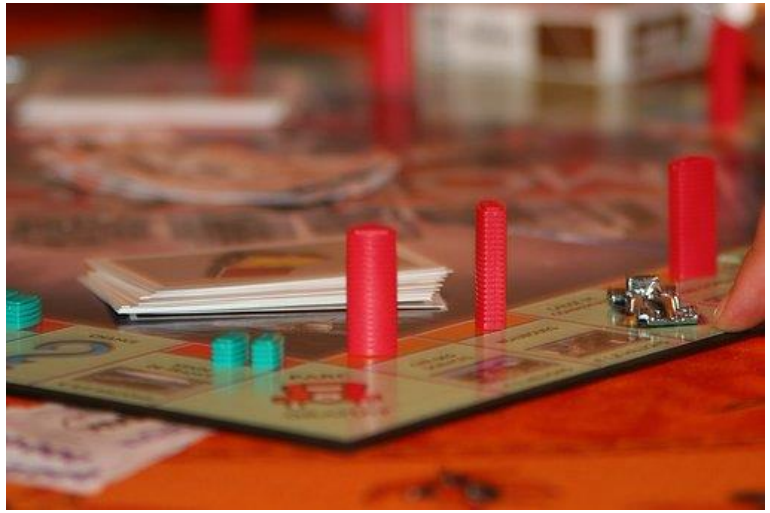
Problem Statement



- Board games have regained popularity in recent years

- **Purpose: build a model with machine learning and natural language processing to predict the rates of board games considering the reviews of players, the number of players, the average time of a game, the number of rates… ….**

Dataset

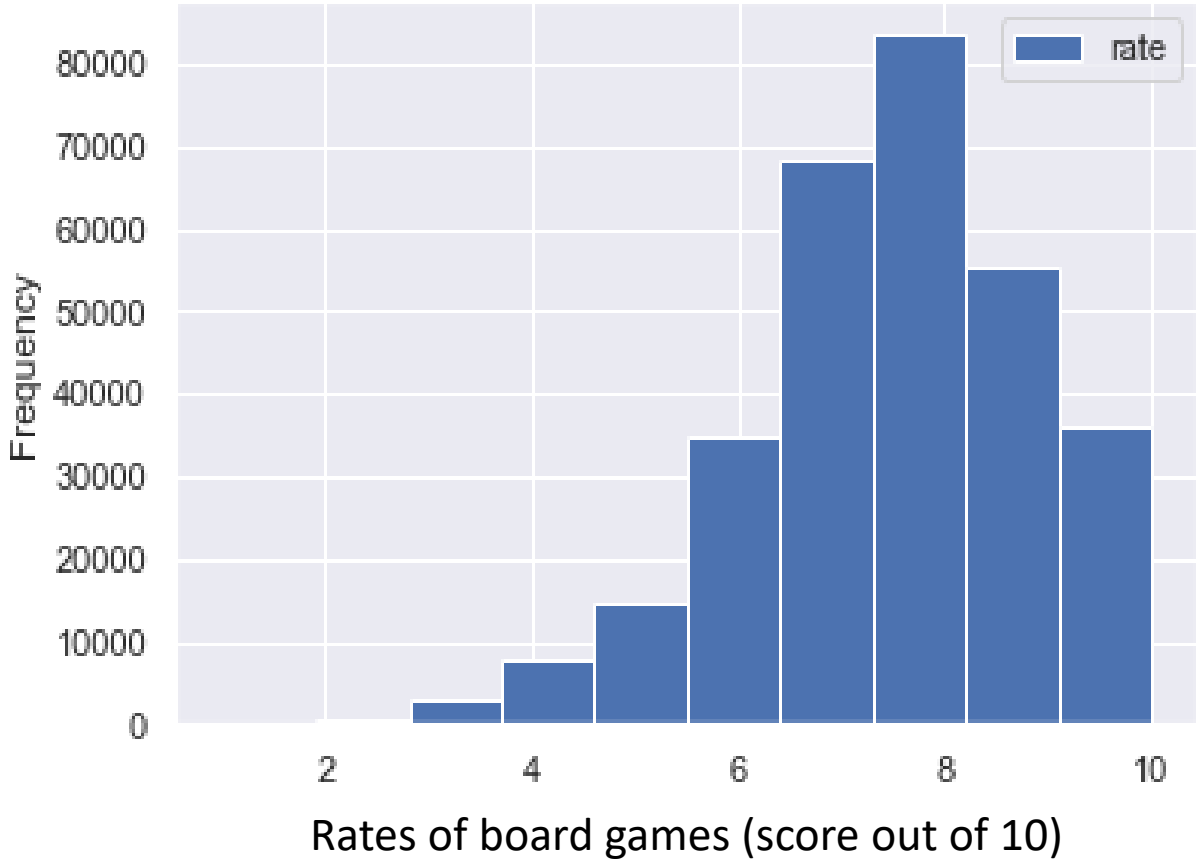
- Scraping and APIs on the website: https://boardgamegeek.com

- For each of the 50 most rated boardgames:

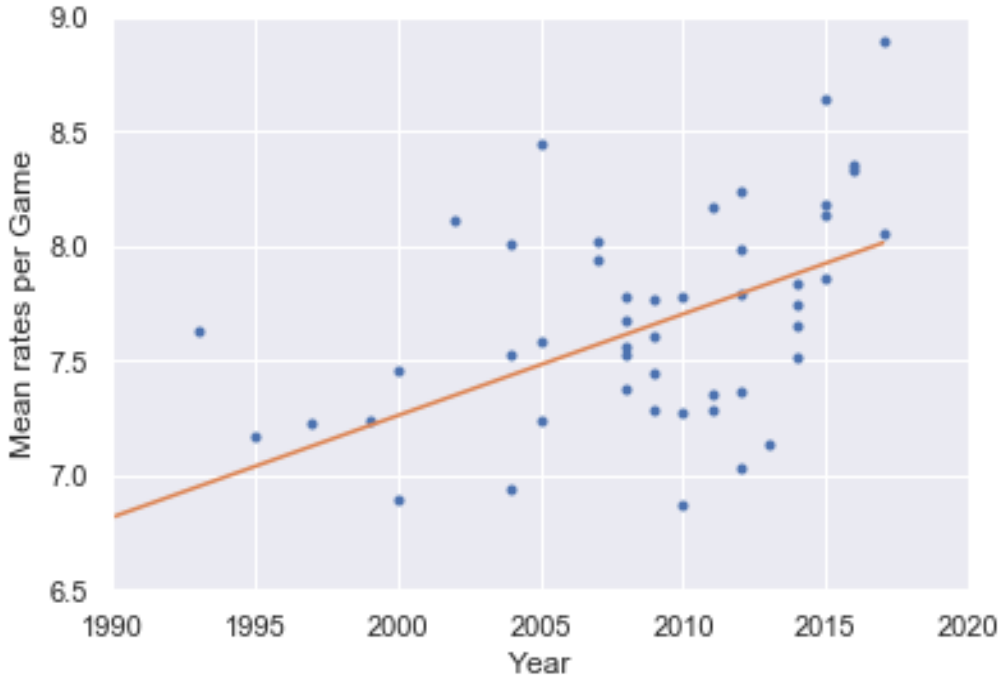
  - ID
  - Name
  - Year of design
  - Minimum and maximum number of players required
  - Minimum and maximum number of minutes required to complete the game
  - Minimum age required
  - Category
  - Number of rates
  - Username of players
  - Reviews
  - Rates (score out of 10)

- Dataset with 304864 raws

Distribution of all the rates

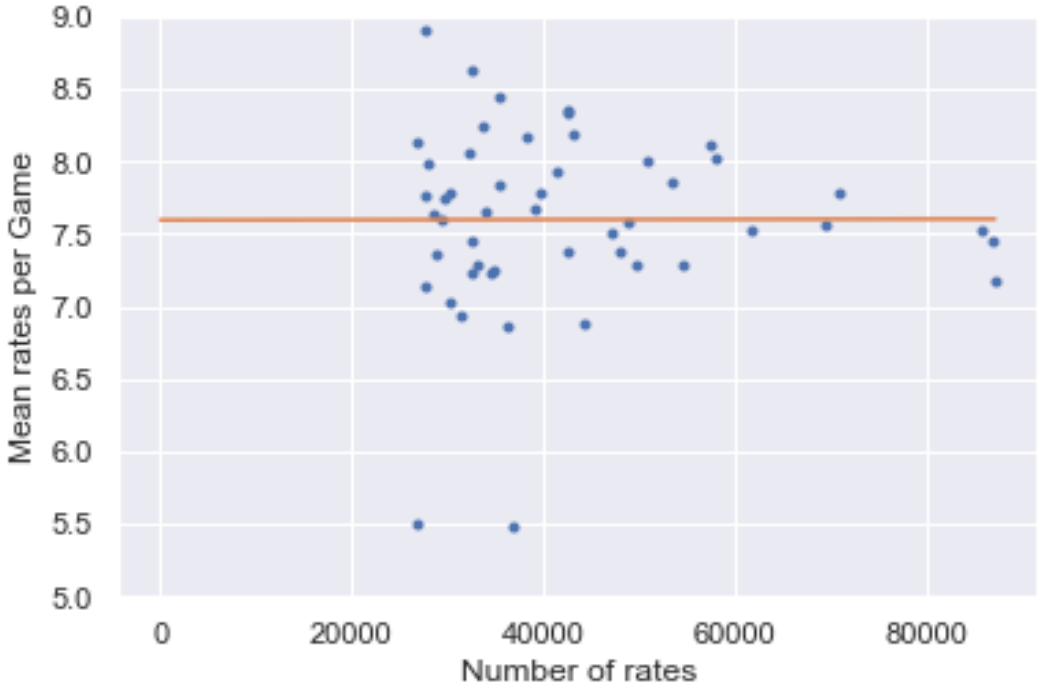


Relation between year of design and mean rates per game



- **Positive correlation between the *year of the design of a game* and the *mean of rates of this game*. More a boardgame is recent and more he seems to have higher mean rates.**

Relation between the mean rates per boardgame and the number of rates per games



- No correlation between the *number of rates of a game* and the *mean of rates of this game*.
- No bias in the rates related to the fact we took the 50 most rated games from boardgamegeek.com.

Linear Regression Model

$R^2 = 0.636$

Most significant features ($p < 0.05$):

Features	+ / -	Coefficients
Year	+	0.043
Max_play	-	0.099
Min_age	+	0.095
Nb_rate	+	8.42^{e-06}

Linear Regression Model

Natural Language Processing
Only the preprocessed 'review' column

- CountVectorizer
- TdidfVectorizer
- Doc2Vectorizer

Machine Learning Algorithms
Entire dataset

- Random Forest Regressor
- Support Vector Regressor

In a pipeline and using a cross-validation with 5 folds:

R^2 training data = 0.21
R^2 test data = 0.21

Best predictor words

=> New model with only reviews as features

‘Good words’	P(high rate|word)
Love	
Favorite	
Great	
Best	
Perfect	
Excellent	
Fantastic	
Amazing	
Awesome	
Firm	

‘Bad words’	P(high rate|word)
Precio	
Better	
Long	
Like	
Felt	
Bad	
Maybe	
Wa	
Random	
Boring	

Conclusion

➔We choose the model with TfidfVectorizer to process the ‘review’ column and Random Forest Regressor as machine learning algorithm.

➔Managers of gaming shops or department stores should focus on more recently created games, games with a minimum age not too low and a maximum number of players not too high.

➔We need to improve the natural language processing of the ‘review’ column with a more powerful computer to improve the model.