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# Predicting Board Game Complexity

#### Problem Statement

With platforms like Kickstarter, anyone with an idea can easily make and produce a board game on their own. But while it's easy to produce a game, it's hard to know how how complicated the game will be for players. There is a complexity, or weight, rating on Board Game Geek, though it relies on community voting. Is it possible to predict that rating knowing what a creator would know at the start of their project?

Is there a correlation between the mechanics and features of a board game and the game's complexity rating, or weight, on Board Game Geek?

## Data Sources



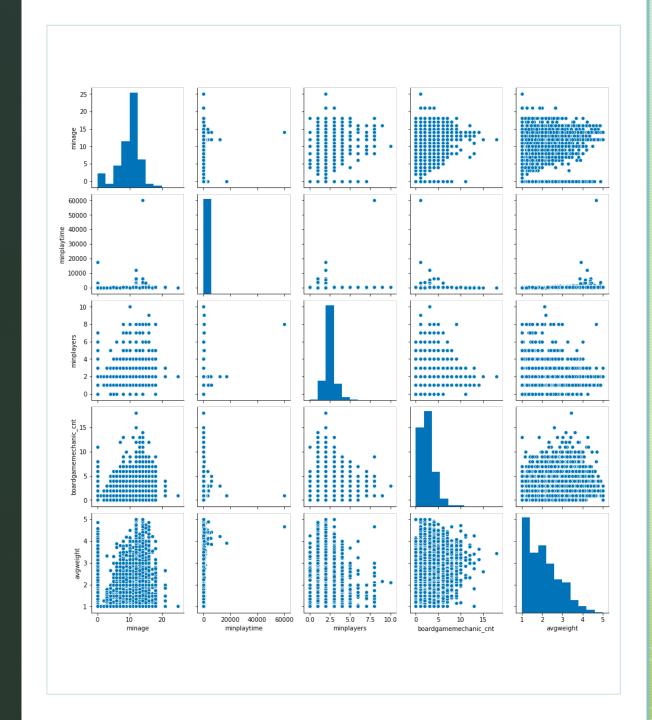
**Board Game Geek** 



Kaggle

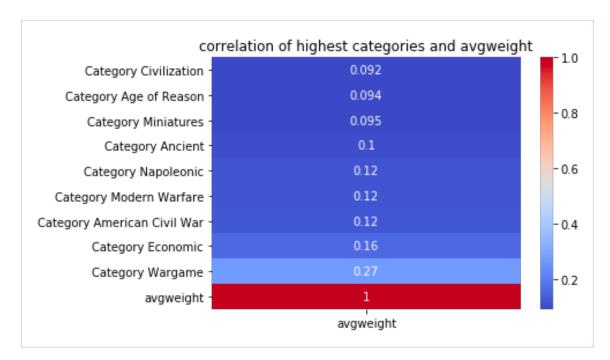
#### EDA

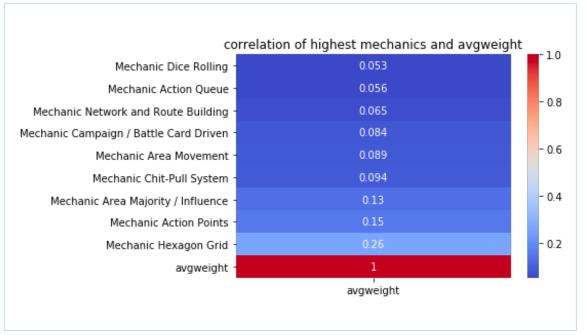
- Not much correlation
- Had to decide between regression and classification



# Mechanics & Categories

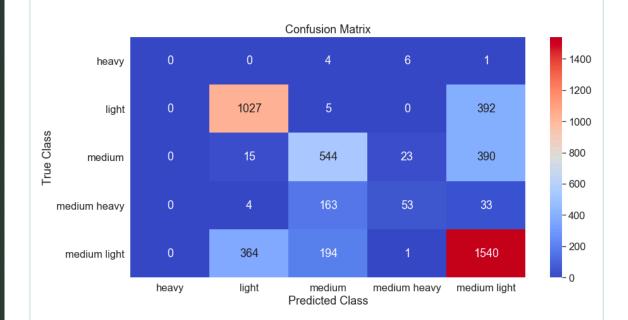
- 103 total mechanics
- 82 total categories
- None are highly correlated with weight





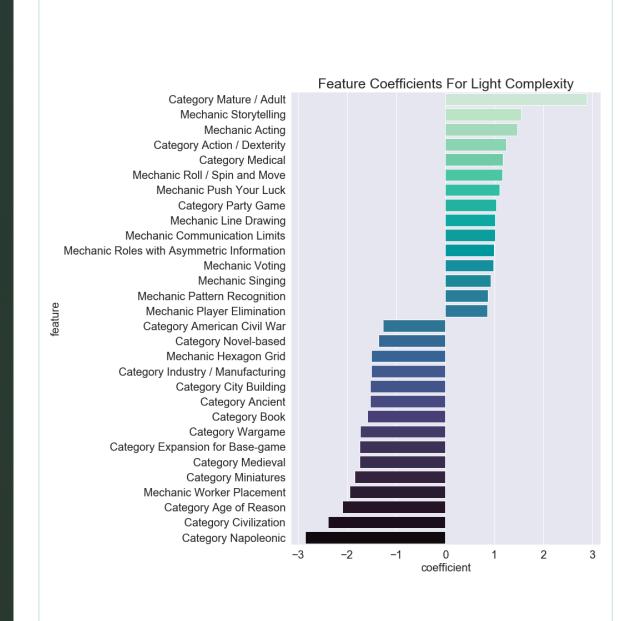
## Voting Classifier Model

- 66% accurate
- TPR "light": 72%
- TPR "medium light":73%
- TPR "medium": 55%
- TPR "medium heavy":21%
- TPR "heavy": 0%



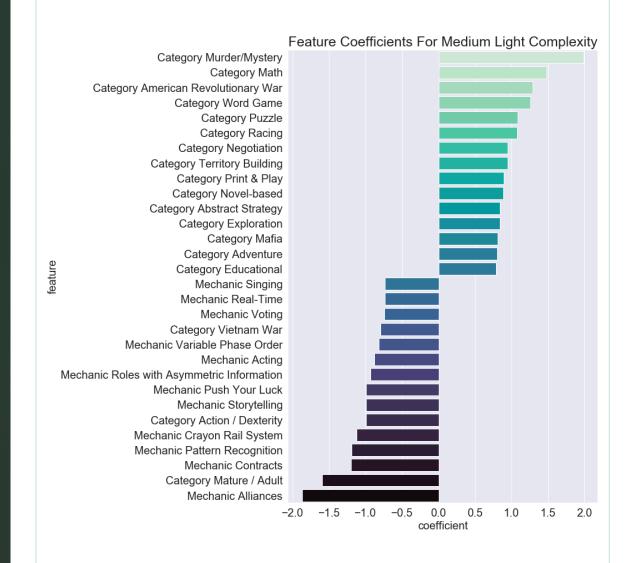
#### Linear Regression: Light Complexity

- Mature/Adult is the biggest positive coefficient
- Napoleonic and Civilization the biggest negative coefficients



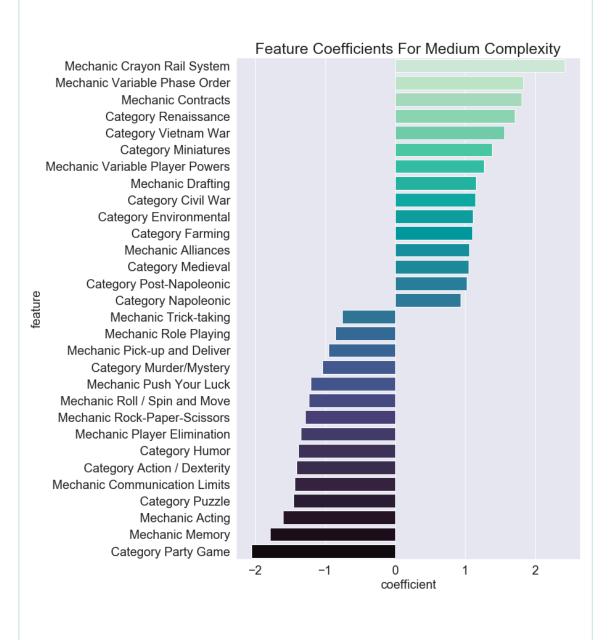
#### Medium Light

- Murder/Mystery biggest positive coefficient
- Alliances and Mature/Adult biggest negative coefficients



### Medium Complexity

- Crayon Rail System is biggest positive coefficient
- Party Game and
  Memory are biggest
  negative coefficients

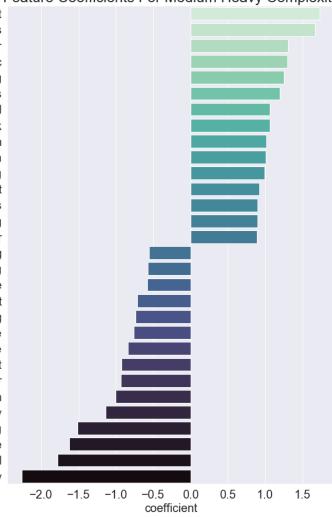


# Medium Heavy Complexity

- Pike and Shot and End Game Bonuses are biggest positive coefficients
- Action/Dexterity and Paper-and-Pencil are biggest negative coefficients

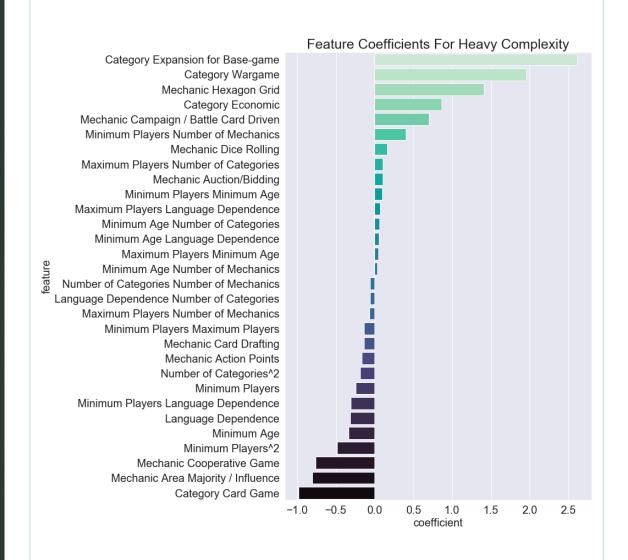
Feature Coefficients For Medium Heavy Complexity

Category Pike and Shot Mechanic End Game Bonuses Category Korean War Category Economic Mechanic Network and Route Building Category Trains Category Political Category Book Category Age of Reason Category Civilization Category City Building Mechanic Worker Placement Category American Indian Wars Mechanic Action Drafting Category American Civil War Category Racing Mechanic Card Drafting Category Dice Mechanic Point to Point Movement Category Bluffing Mechanic Cooperative Game Category Card Game Mechanic Hand Management Category Humor Category Deduction Mechanic Memory Mechanic Betting and Bluffing Mechanic Roll / Spin and Move Mechanic Paper-and-Pencil Category Action / Dexterity



#### Heavy Complexity

- Expansions and Wargames are the biggest positive coefficients
- Minimum Number of Players Squared and Cooperative Games are biggest negative coefficients



## **Production Model**

Live demo of deployed model here

#### Recommendations

- Use Natural Language Processing on descriptions
- More game information (number of pieces, size of rulebook, etc.)
- Image recognition on game boards