Predicting Video Game Sales Performance Levels

Daniel Rios

Can we predict the performance level of a video game?

The Dataset

- From Kaggle
  - Scraped from vgchartz.com

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  - Video games with sales greater than 100,000 copies

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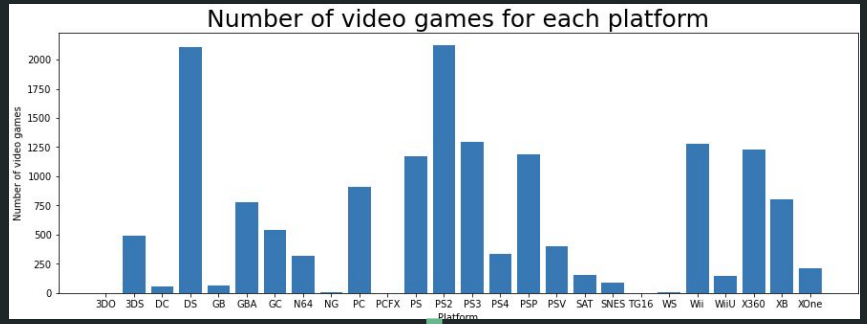
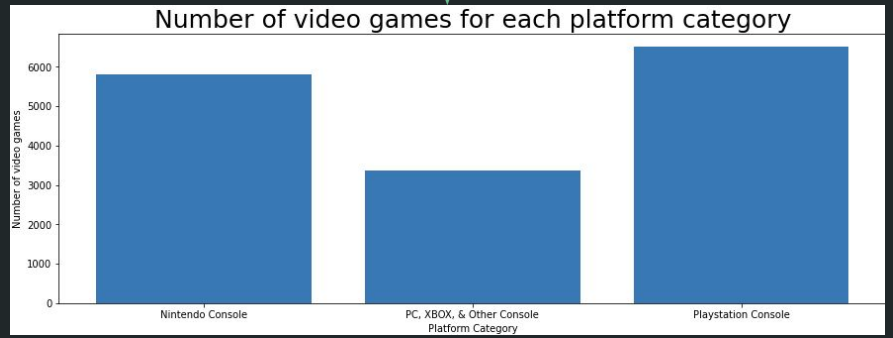
- Columns used:
  - Platform
  - Year
  - Genre
  - Publisher
  - Global Sales

Feature and Target Engineering

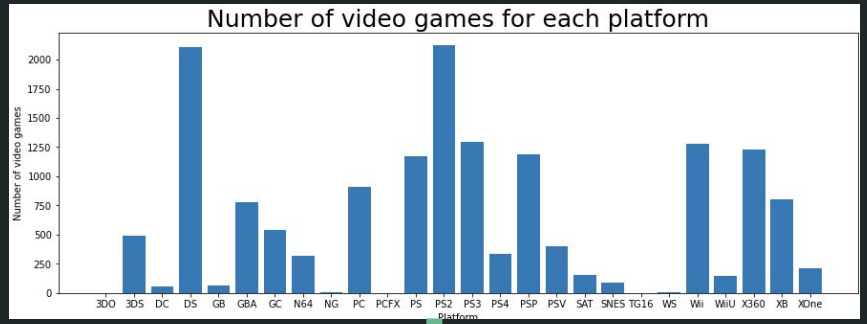
- 3 platform categories and publisher categories

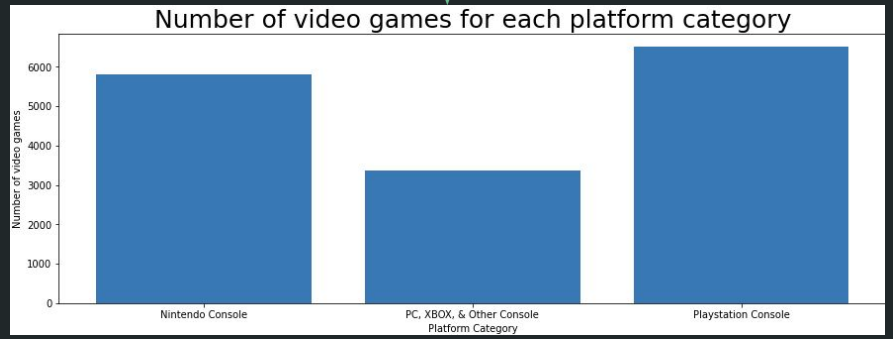




Feature and Target Engineering

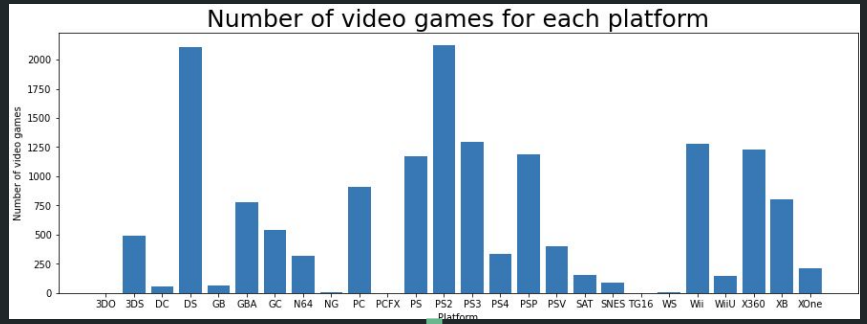
- 3 platform categories and publisher categories
- Genre left imbalanced for explanatory and predictive power

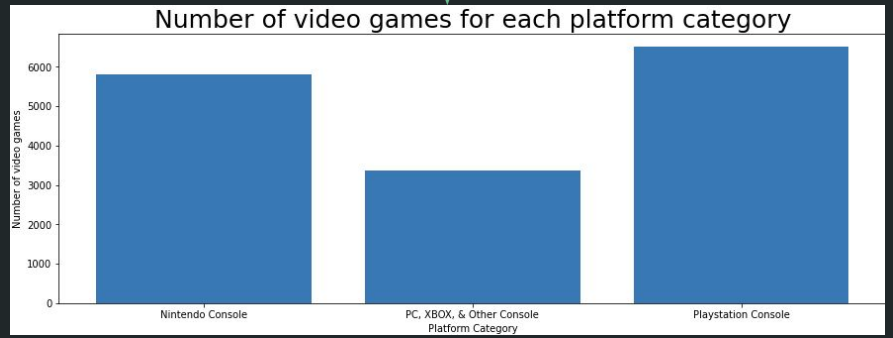




Feature and Target Engineering

- 3 platform categories and publisher categories
- Genre left imbalanced for explanatory and predictive power
- Global sales converted into 3 performance categories





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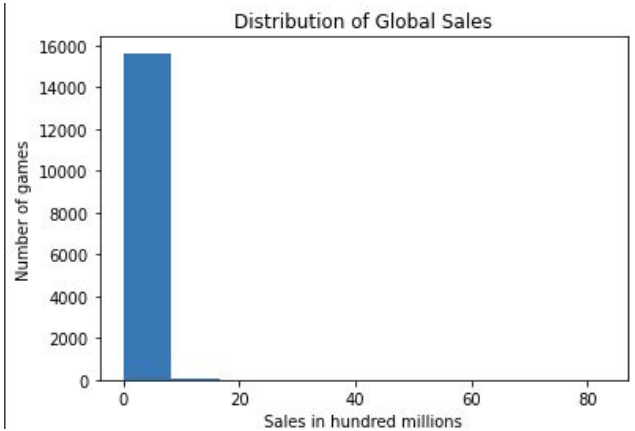
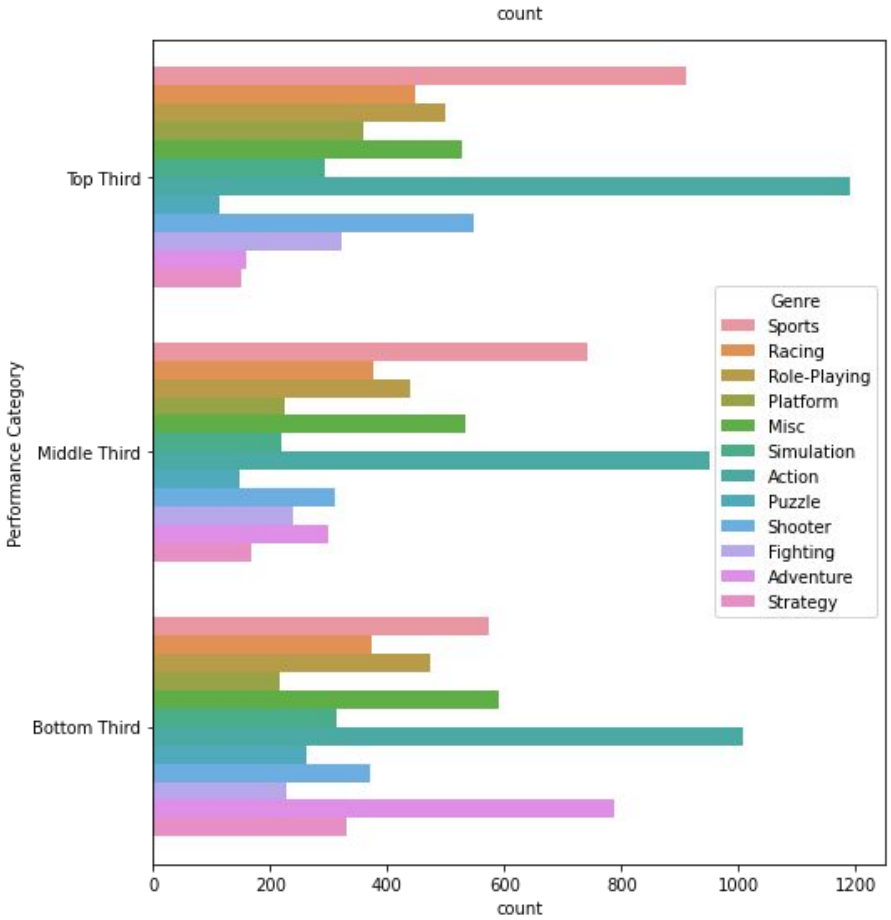
- Distribution of the global sales variable



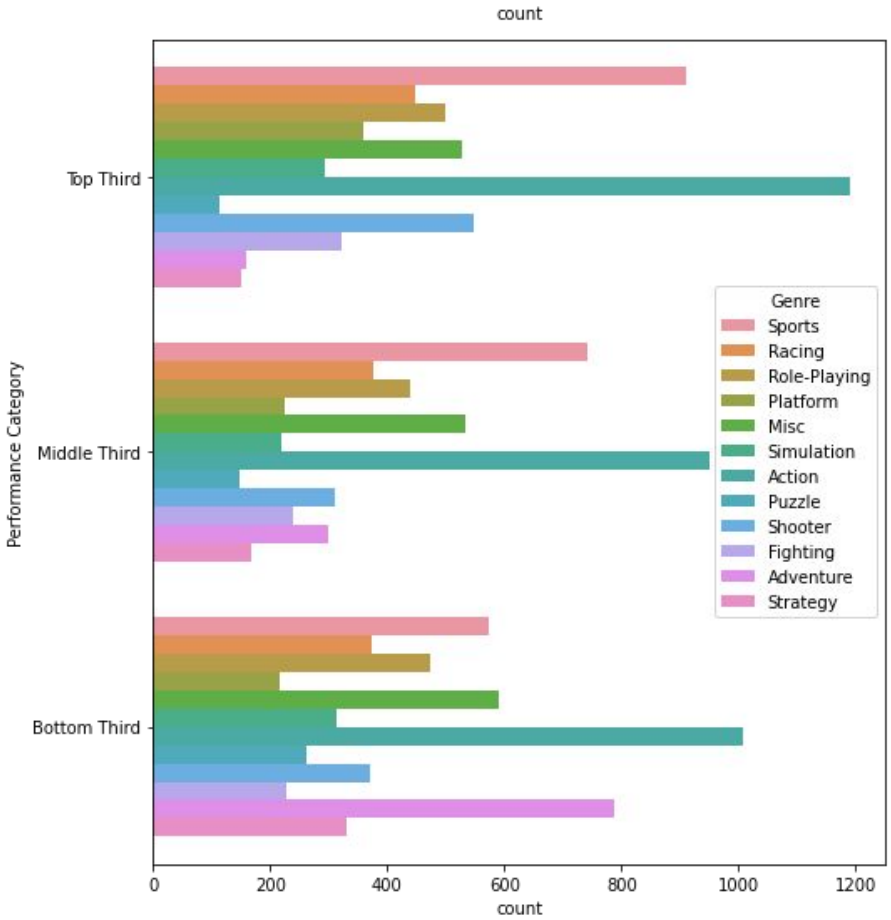
Data Exploration

- Number of games by genre in each performance category
  - Adventure games in top third vs. bottom third



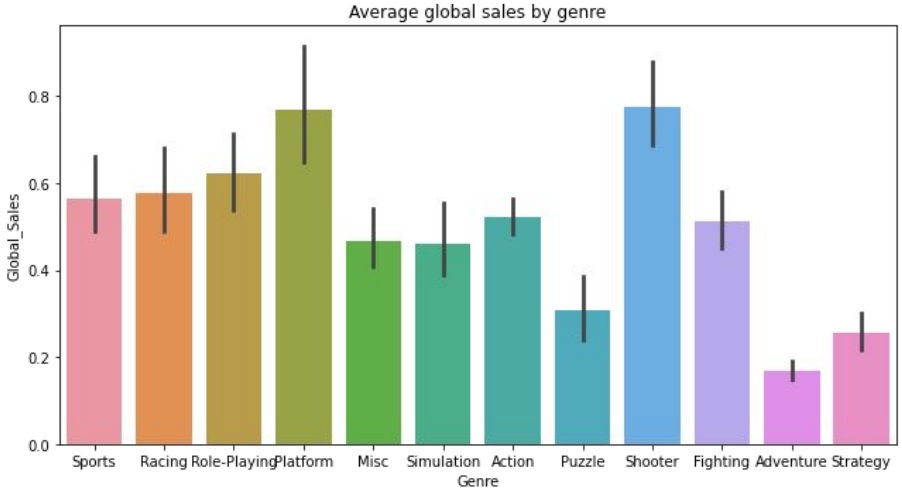
Data Exploration

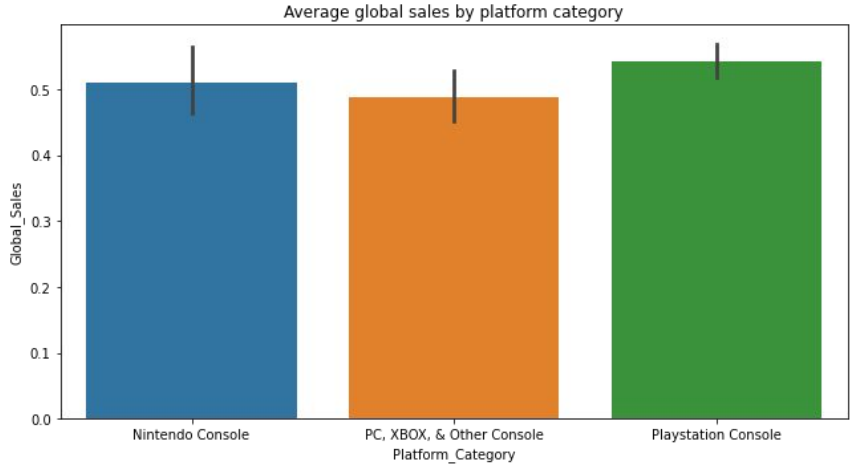
- Number of games by genre in each performance category
  - Adventure games in top third vs. bottom third
  - Action and sports tied with the variability of Playstation



Data Exploration

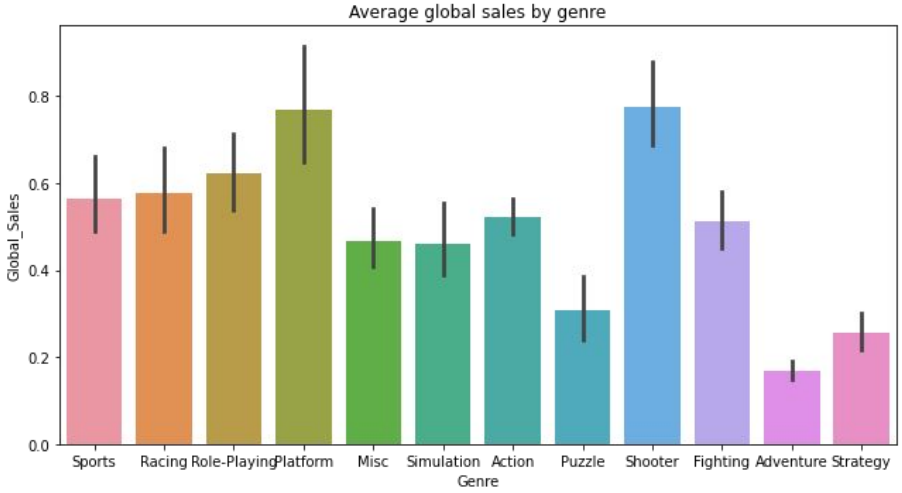
- Global sales by genre and platform category
  - Adventure games have lowest average global sales

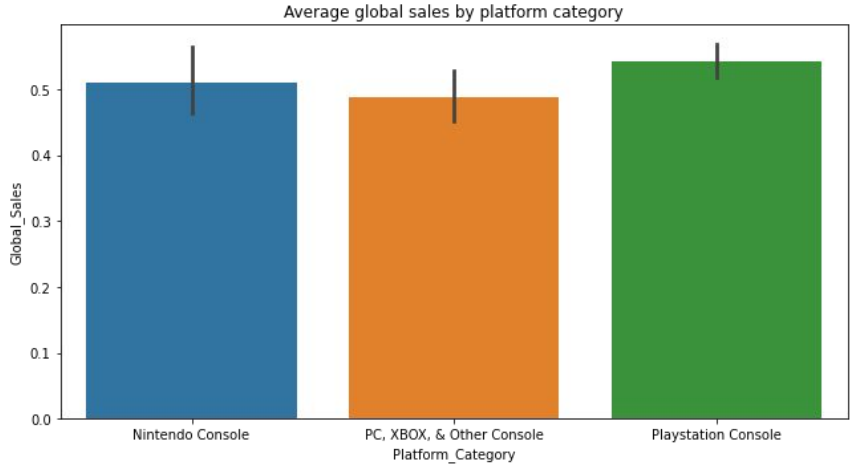




Data Exploration

- Global sales by genre and platform category
  - Adventure games have lowest average global sales
  - Global sales does not vary much due to the console





Training and Testing Models

- Using categorical variables to predict another categorical variable

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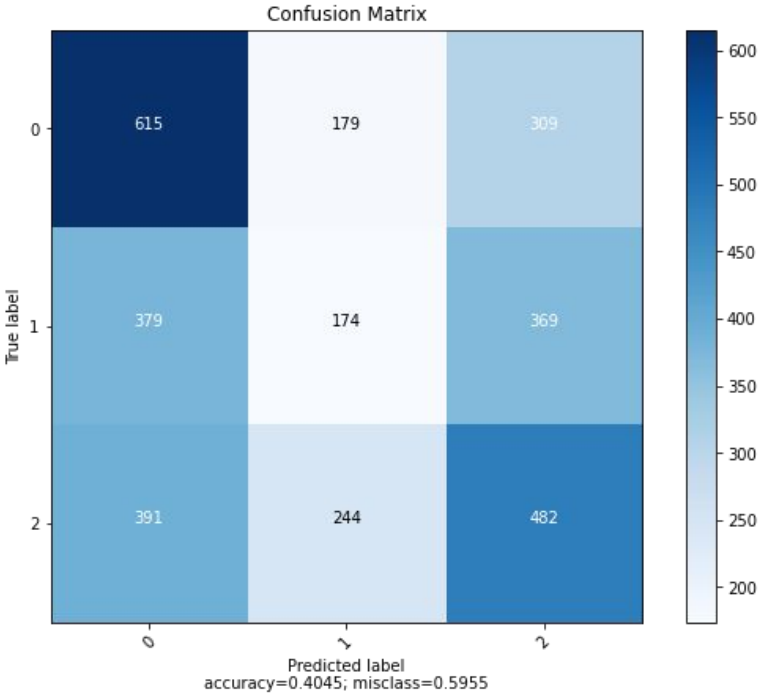
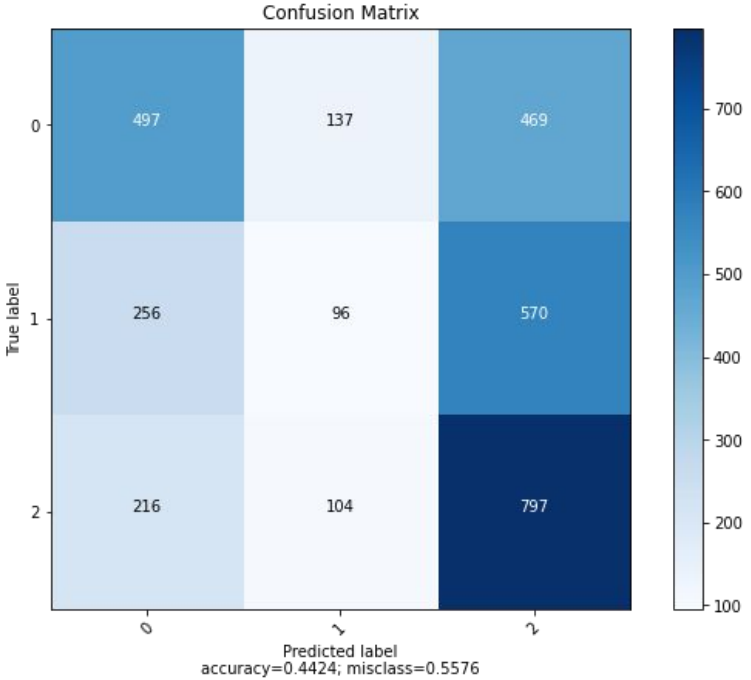
Model Type	Range of Accuracies (%)
Logistic Regression	40 – 48
9 Nearest Neighbors (Optimized KNN)	40 – 45
Random Forest Classifier	40 – 47
Support Vector Classifier	42 – 44
Gradient Boosting Classifier	43 – 45

Confusion Matrices

KNN

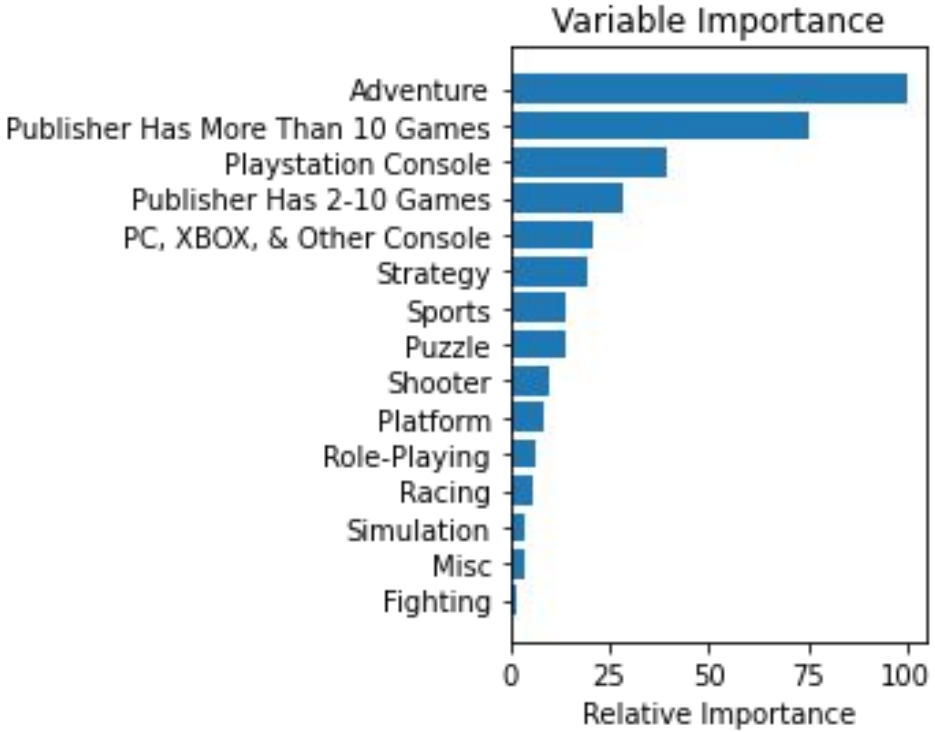


Random Forest



Feature Importance

- Playstation has the most variability in performance category



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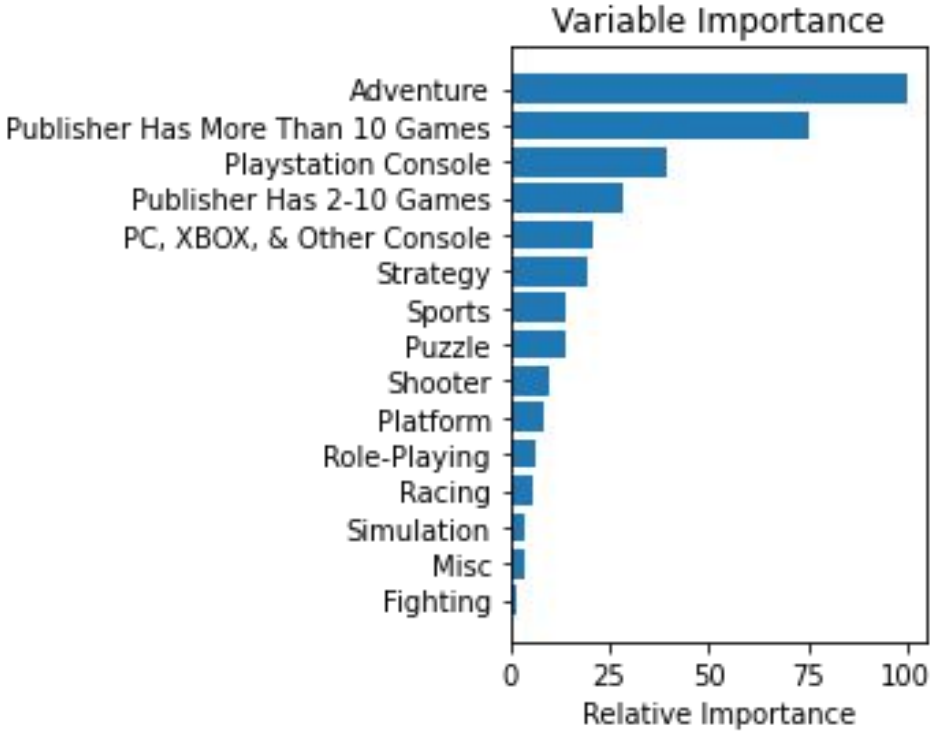
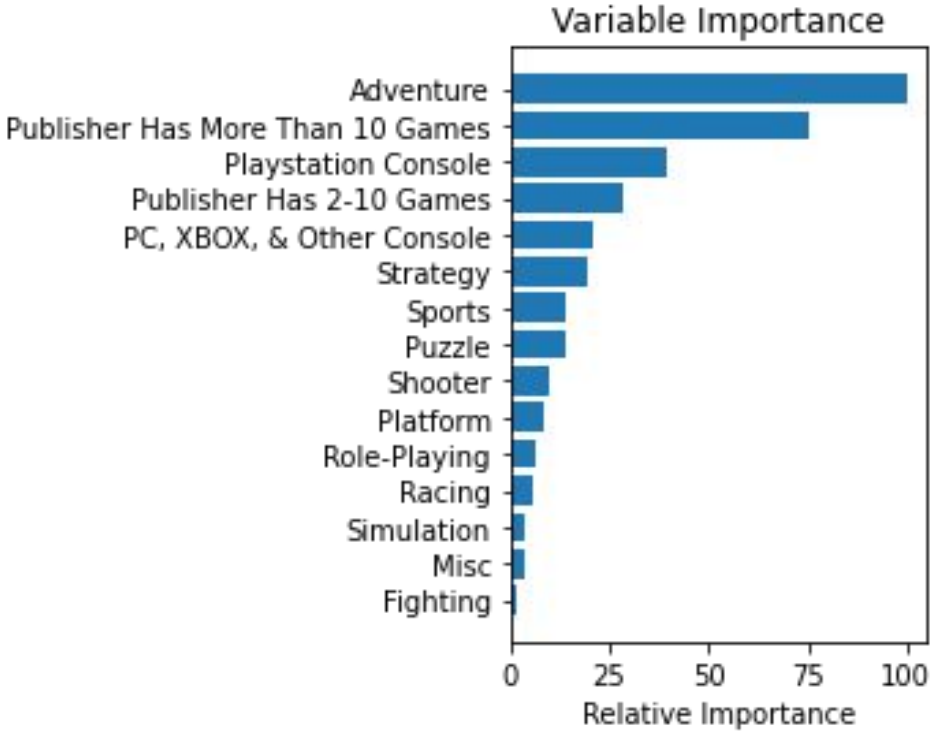


Feature Importance

- Playstation has the most variability in performance category
- Games that are made by publishers with prior experience have more variance in performance
- Platform is one of the only genres that explains some variance *and* performs better in regards to global sales



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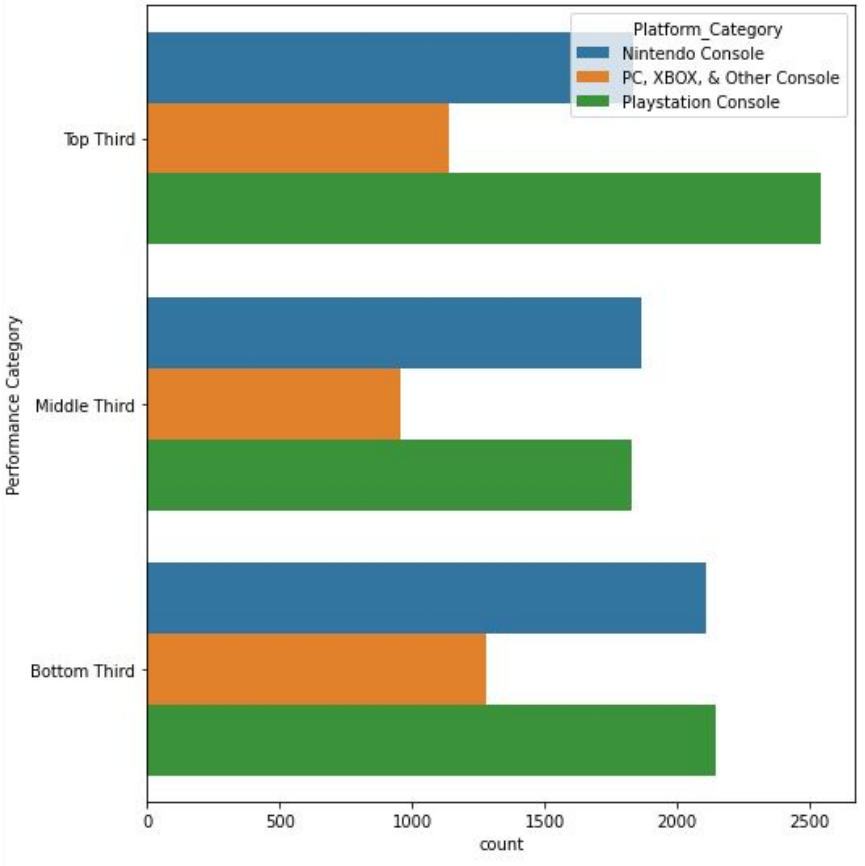

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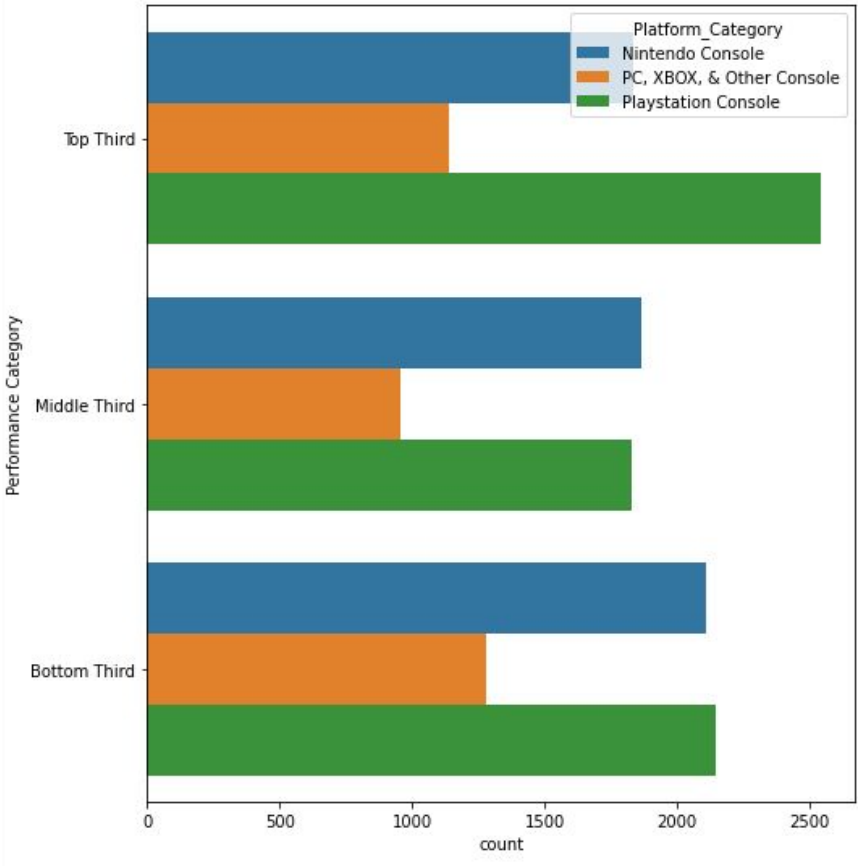
  - Adjusting the number of classes



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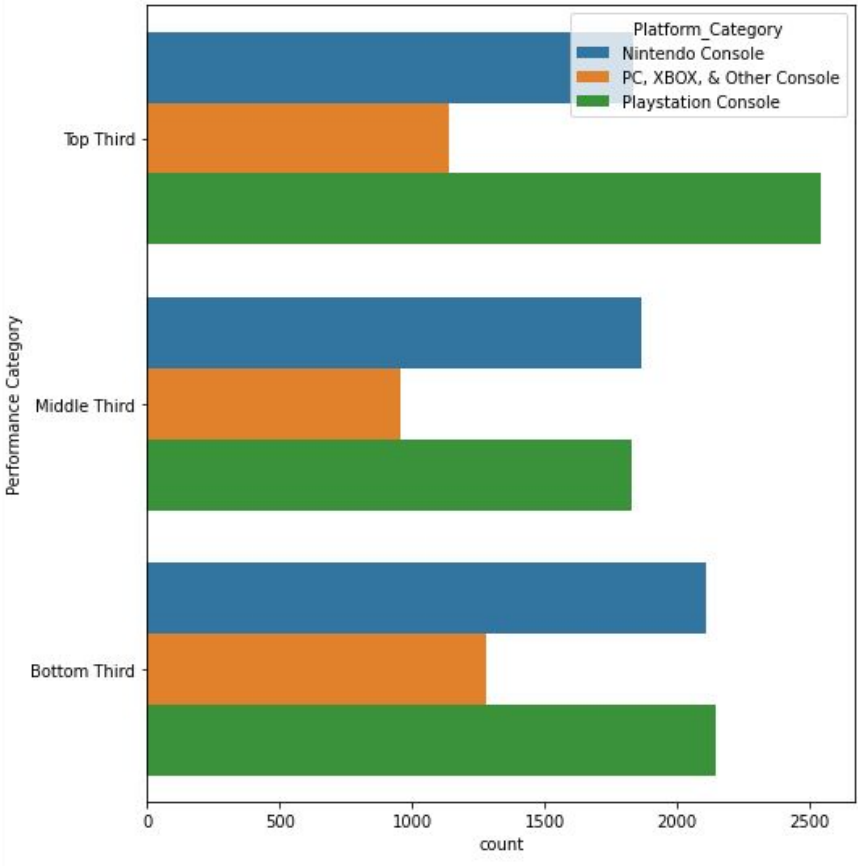

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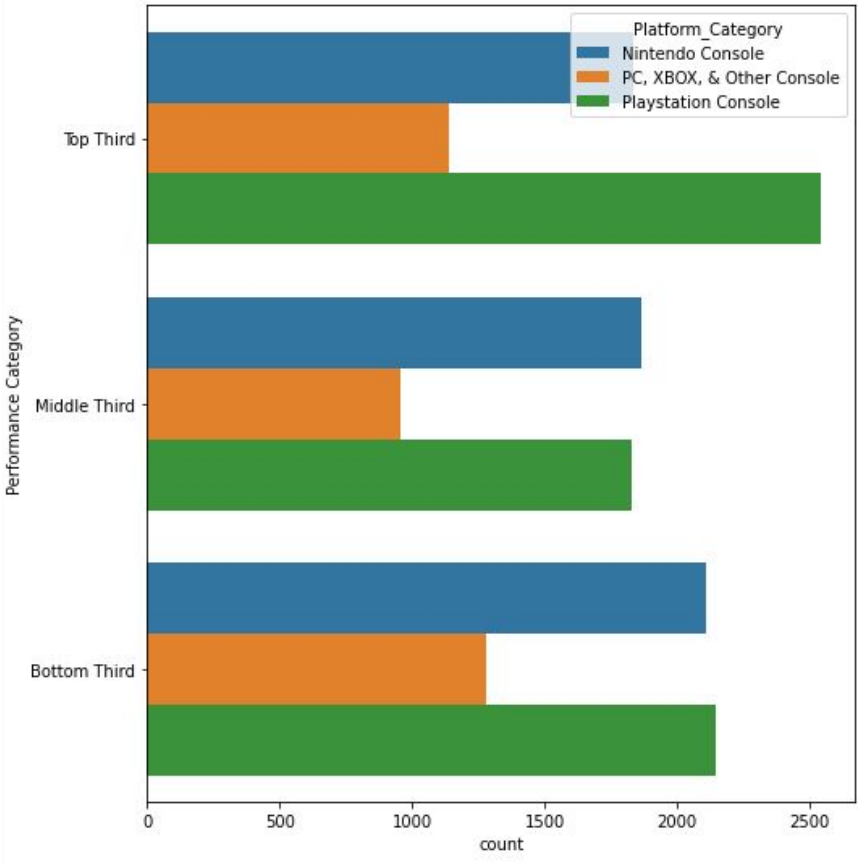

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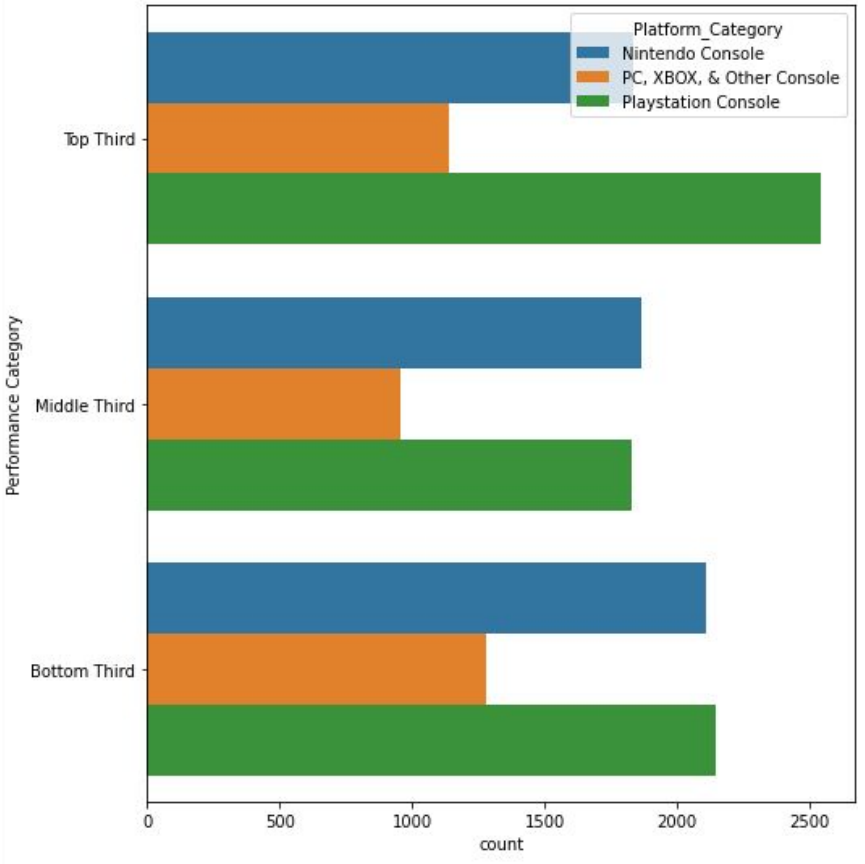
    - PCA/MCA did not help address this issue
- Could use further parameter tuning in GBC



Model Comparison and Evaluation

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  - Logistic Regression
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- 9-Nearest Neighbors was more accurate with the under represented class
  - Range of accuracies 40% – 45%
  - 597 for the “middle third” class

Final Notes

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- If the model predicts a video game to be in the top third, take this with extreme caution.
- If the model predicts a video game to be in the bottom third, you can expect the game to perform badly.
- Adventure games tend to not do well
- Shooter, Platform, and Role-Playing games tend to outperform the others

Thank you! Questions?

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