# Kaggle Competition

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# Initial Preprocessing

Removed features:

- imdb_id
- original_title
- poster_path
- status
- title

Transformed into boolean values:

- homepage
- belongs_to_collection
- original_language (english or not)

Other

- released_data --> transformed into release year, season, weekday
- runtime,budget --> missing values were added
- overview, tagline --> counting nbr of words
- genres --> multiclass hot encoding

# Initial Modelling and Testing

Using Pycaret and Sklearn we ran several regression models to see which one was the most effective. After using the model with the highest R2 value we used that against the testing data. However this led to a result of 2.7!

| | Model | MAE | MSE | RMSE | R2 | RMSLE | MAPE |
|---|---|---|---|---|---|---|---|
| et | Extra Trees Regressor | 40359419.6255 | 6345277873671296.0000 | 78546495.9100 | 0.6403 | 2.6668 | 33724.8964 |
| rf | Random Forest Regressor | 40464389.0058 | 6370684632735439.0000 | 78687119.7748 | 0.6386 | 2.6783 | 35384.5950 |
| lightgbm | Light Gradient Boosting Machine | 40573202.8891 | 6406044008808770.0000 | 78897989.0491 | 0.6369 | 2.6849 | 26582.5138 |
| gbr | Gradient Boosting Regressor | 40510681.9354 | 6581332782741144.0000 | 80066180.6416 | 0.6247 | 2.7267 | 26745.6225 |
| lr | Linear Regression | 47719073.3857 | 7007339523465278.0000 | 83154086.6867 | 0.5919 | 3.0742 | 89363.3710 |
| lasso | Lasso Regression | 47719070.0351 | 7007339410139310.0000 | 83154086.0422 | 0.5919 | 3.0742 | 89363.3156 |
| ridge | Ridge Regression | 47678028.5948 | 7005845584420441.0000 | 83145649.3636 | 0.5919 | 3.0747 | 88962.5832 |
| llar | Lasso Least Angle Regression | 47719070.0288 | 7007339423893557.0000 | 83154086.1248 | 0.5919 | 3.0742 | 89363.3266 |
| en | Elastic Net | 45065859.5544 | 7406747661059545.0000 | 85553517.1525 | 0.5667 | 2.8911 | 50749.3383 |
| omp | Orthogonal Matching Pursuit | 45468106.4857 | 7945082771729379.0000 | 88672186.1940 | 0.5329 | 2.8020 | 27866.8545 |
| br | Bayesian Ridge | 45414786.3783 | 8287460119541504.0000 | 90630269.5883 | 0.5116 | 2.8038 | 25019.5681 |
| huber | Huber Regressor | 42391838.2919 | 9045066974337708.0000 | 94253529.5678 | 0.4803 | 7.1596 | 4822.1446 |
| knn | K Neighbors Regressor | 50765711.0842 | 9946610663439126.0000 | 99264359.3609 | 0.4151 | 2.8797 | 34841.6702 |
| par | Passive Aggressive Regressor | 47201438.8758 | 10972816175919284.0000 | 103109847.9408 | 0.3545 | 2.6983 | 15900.3738 |
| dt | Decision Tree Regressor | 54217606.8776 | 12102026125779846.0000 | 109647824.6040 | 0.2481 | 3.0755 | 76291.6203 |
| ada | AdaBoost Regressor | 102294745.0899 | 13754038195547520.0000 | 116843462.6109 | 0.1839 | 4.0556 | 327196.2532 |
| dummy | Dummy Regressor | 76719259.2866 | 17704917074429304.0000 | 131560859.6130 | -0.0043 | 3.7361 | 197425.2864 |
| lar | Least Angle Regression | 5774252033611.7627 | 40675736234918144526988O832.0000 | 8462151059369.2686 | -34209048778.4355 | 8.0010 | 6723702749.9296 |

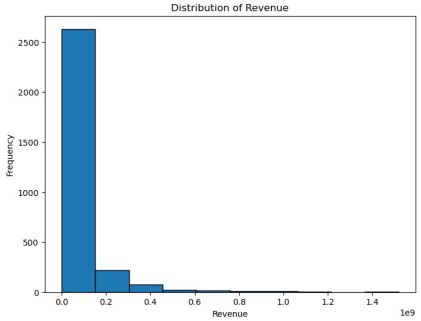
# New features and model

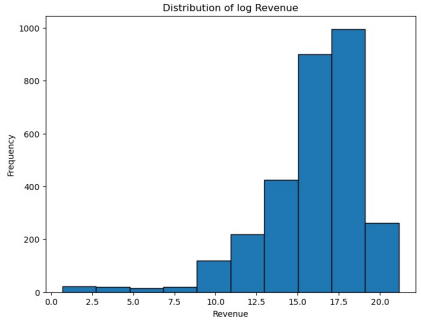
- budget_runtime_ratio : budget/popularity
- budget_year_ratio - budget/release_year
- production_companies _count - count the nbr of production companies
- Added: popularity_2, rating and totalVotes from another database
- Filled budget for the missing values (some)
- Log transformation for budget and revenue

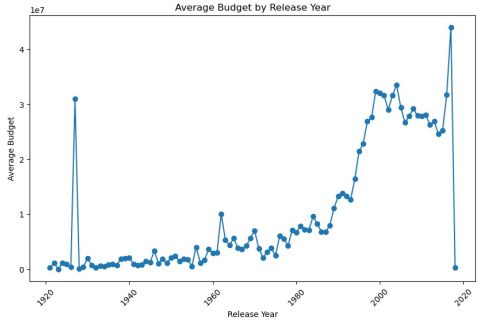
- Filtered the most common production_companies and production_countries
- The crew was broken down into different categories and counted how many participated in the movie
- Updated model to use xgboost, lightgbm and catboost
- Catboost was best

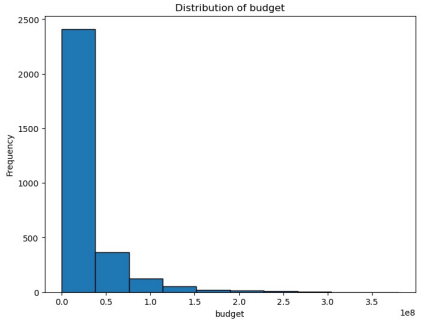
# New features and model

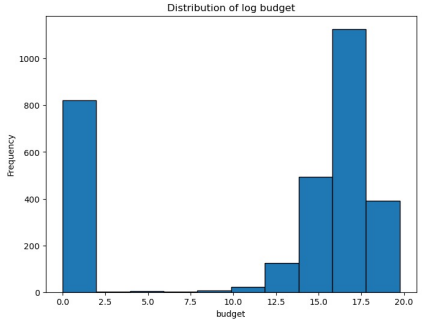
- Exponential distribution for revenue and budget
- Close to normal distribution after log transformation
- Budget year ratio can make the budget feature more stationary



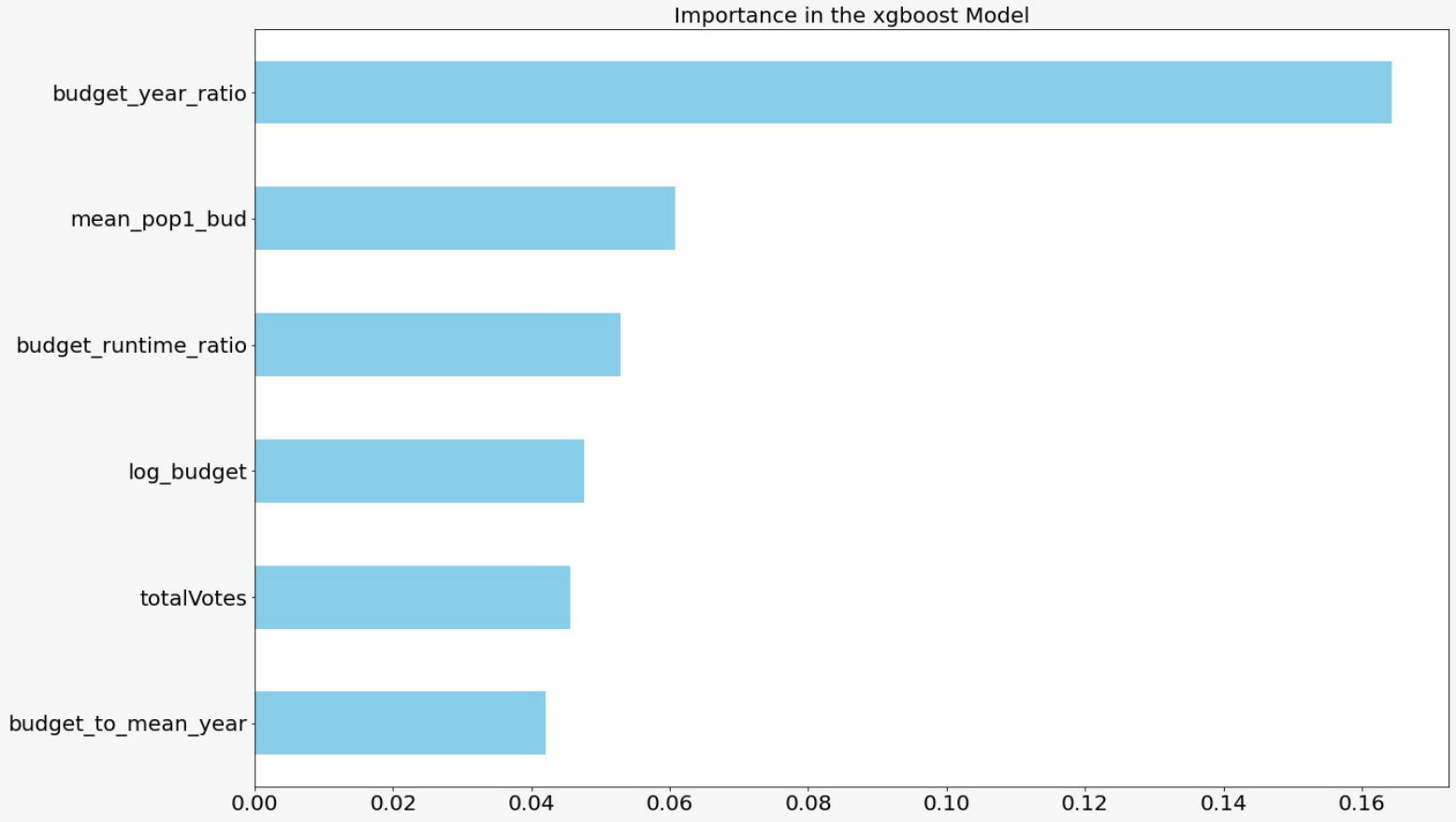



# Final score = 1.97
# (Root mean squared logarithmic error)

# Most relevant features



# Thank you for listening!

Q&A

Link to Git: https://github.com/annagrimlund/BigData