Classifying Game Success

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Problems

- Developers
  - Hard to tell if your game will succeed when shipped
  - Will critic scores reflect real-world user feedback?
- Users
  - Do critic scores reflect how I will enjoy the game?

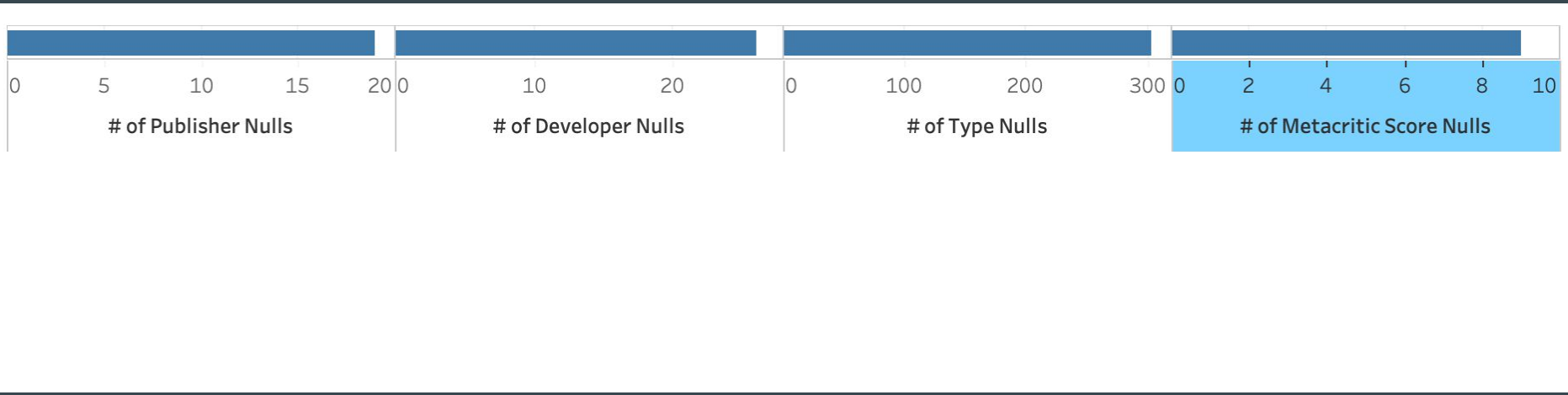
Data Source

RAWG API

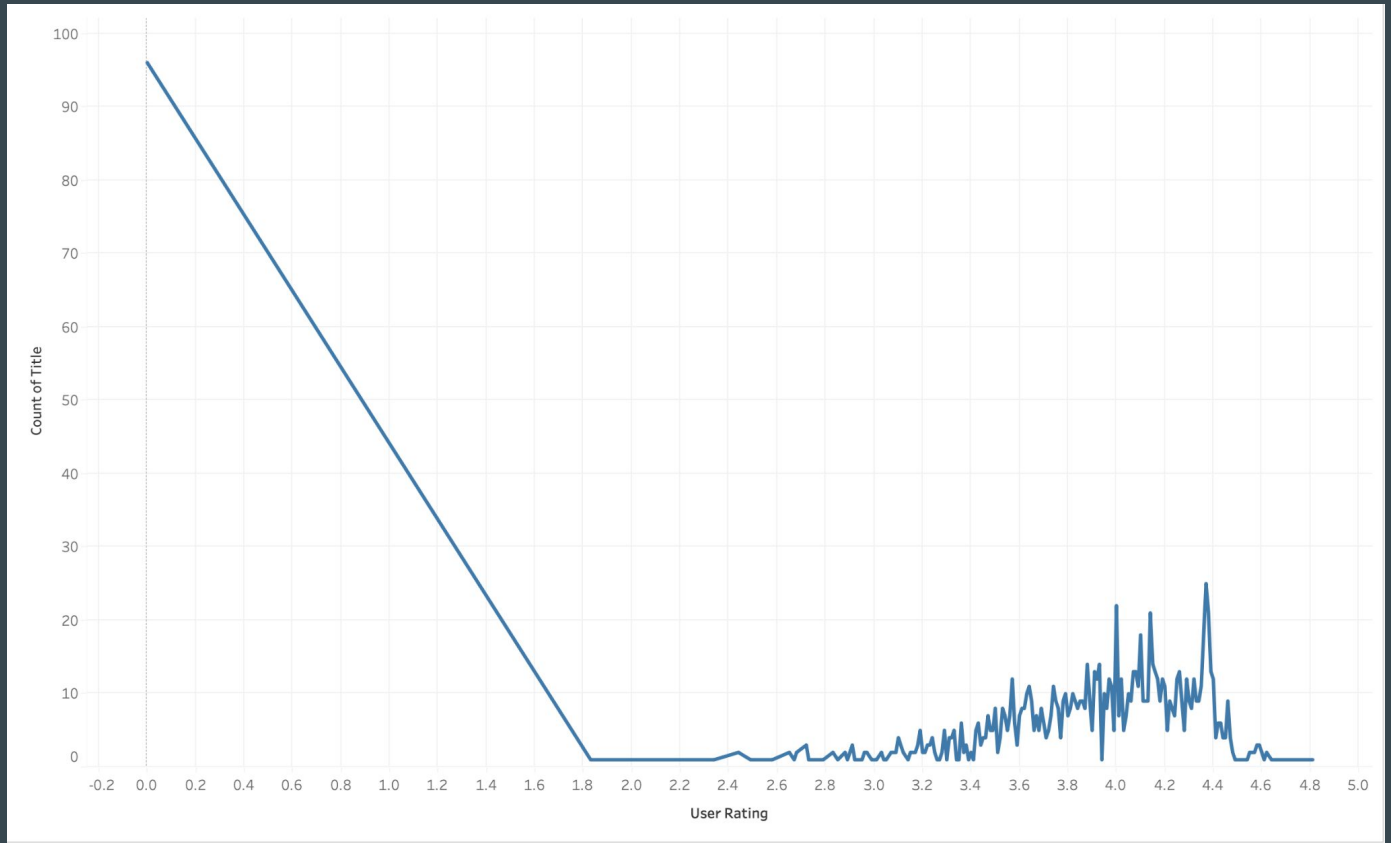
- Advantages
  - Free
  - Quick and easy to use
- Disadvantages
  - Limited (data features and amount of data)

Data Cleaning

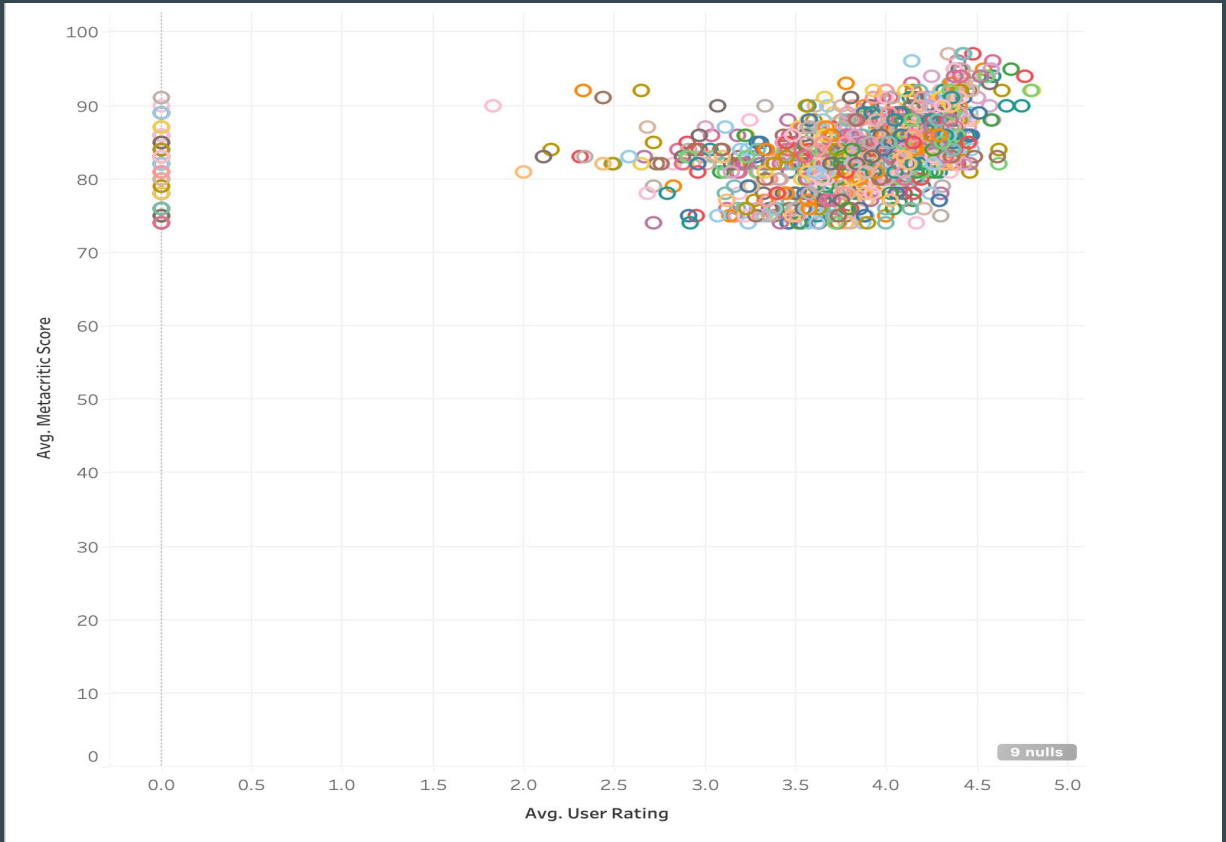
Nulls


0
5
10
15
20
# of Publisher Nulls
0
10
20
# of Developer Nulls
0
100
200
300
# of Type Nulls
0
2
4
6
8
10
# of Metacritic Score Nulls

User Rating Anomalies



Rating Correlation



Process

Manual Temporal Data Split

- Ordered data by release date
- First 80% = train set
- Last 20% = test set
- Avoids temporal leakage when using calculated features from my data

Added/Calculated Features

- Mean user reviews
  - Per developer
  - Per publisher
- Mean critic scores
  - Per developer
  - Per publisher
- Calculated after splitting to avoid leaks

All Features Used

- Genres (TF-IDF)
- Developer (TF-IDF)
- Publisher (TF-IDF)
- Dev_avg_usr
- Dev_avg_critic
- Pub_avg_user
- Pub_avg_critic

Two Regressions

- MultiOutputRegressor
  - Two regression outputs for one trained model
- XGBRegressor
  - Used inside the MultiOutputRegressor
- User rating and critic score predictions are both output

Magic Quadrant

- GaussianMixtureModel to Compute Boundaries
  - Seeks to cluster my data to give more meaningful and mathematically justified quadrant separations
  - Does not assume the shape of clusters
  - Tries to fit two gaussians:
    - Cluster A: High Ratings
    - Cluster B: Low Ratings
- Check whether predicted ratings/scores fall above or below these boundaries

Results

Confusion Matrix

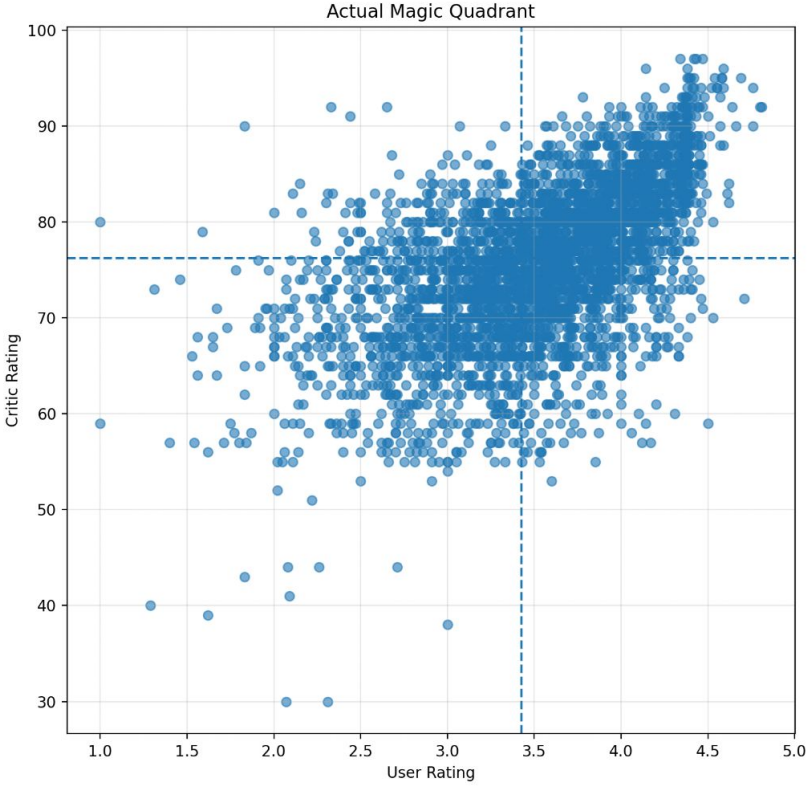
Accuracy

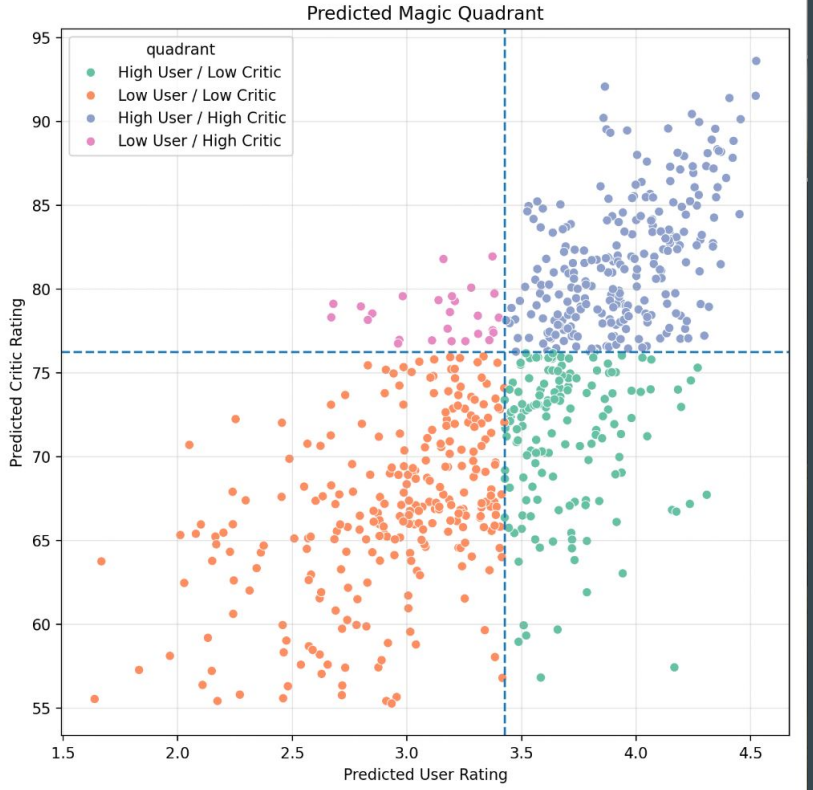
```
=== USER RATING REGRESSION ===
MAE: 0.12317844667699603
RMSE: 0.23527006672453396
R²: 0.8418285888412467

=== CRITIC SCORE REGRESSION ===
MAE: 2.1864733748965794
RMSE: 4.295064033267768
R²: 0.7859115509174033

=== QUADRANT CLASSIFICATION ===
Accuracy: 0.8708333333333333
Macro F1: 0.8212407391818319
```

Final Plots


Actual Magic Quadrant
Critic Rating
User Rating
100
90
80
70
60
50
40
30
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0


Predicted Magic Quadrant
quadrant
High User / Low Critic
Low User / Low Critic
High User / High Critic
Low User / High Critic
Predicted Critic Rating
Predicted User Rating
95
90
85
80
75
70
65
60
55
1.5
2.0
2.5
3.0
3.5
4.0
4.5

Thank You