

Predicting NBA Player Salaries



April 27, 2018

Background & Goals:

- NBA Agent for Klay Thompson of the GSW
- Klay Thompson's contract is expiring at the end of this season
- What is the minimum / maximum annual salary Klay Thompson should agree to?

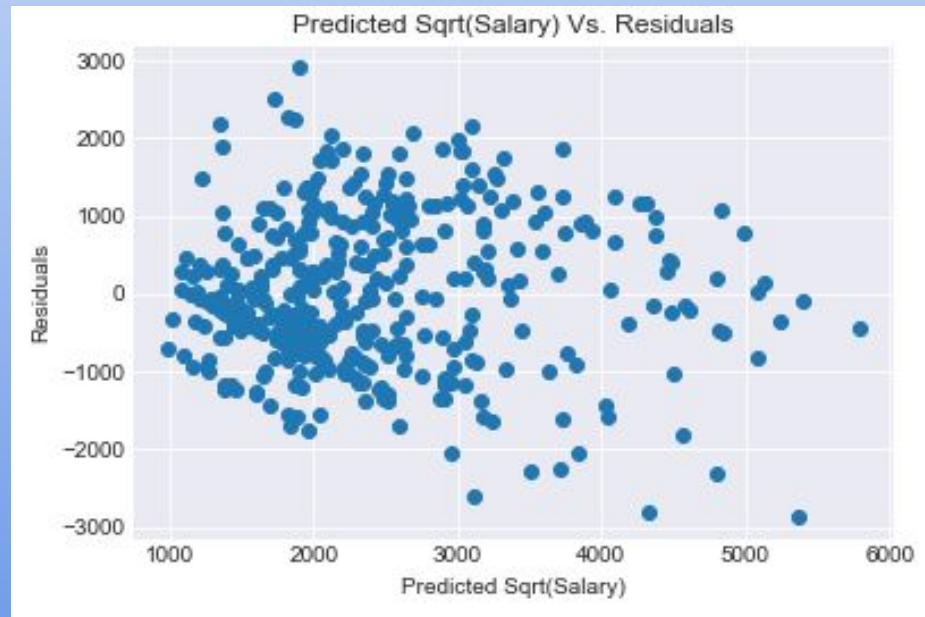
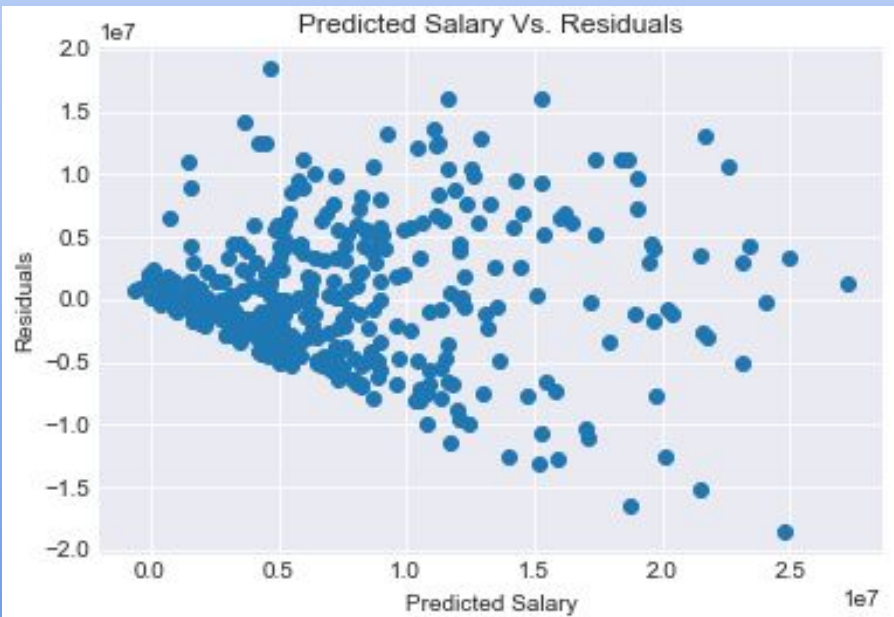


Data

- NBA 2016-2017 player statistics data
- 2017-2018 NBA salary data
- Playoff data (binary column whether or not he made the playoffs)

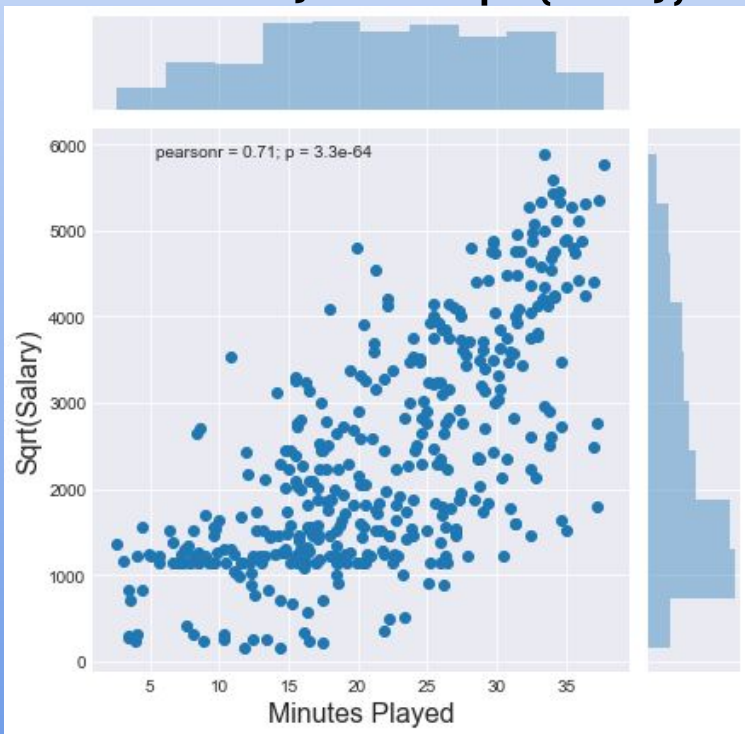
Linear Regression Assumption - Homoscedasticity

- Regressed salary, $\log(\text{salary})$, and $\sqrt{\text{salary}}$ on PPG
- Plotted the scatterplot for predicted salaries and residuals:

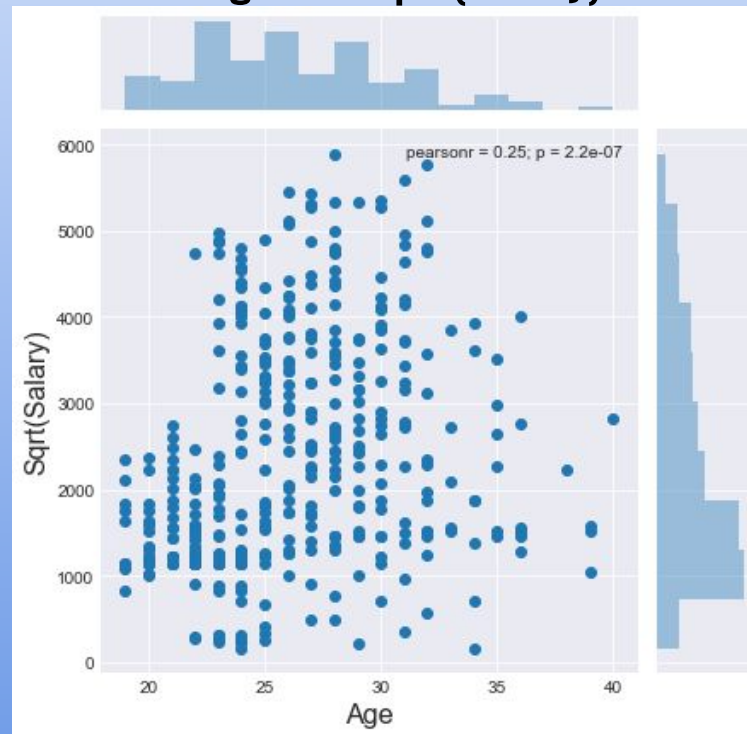


EDA - Feature Correlation

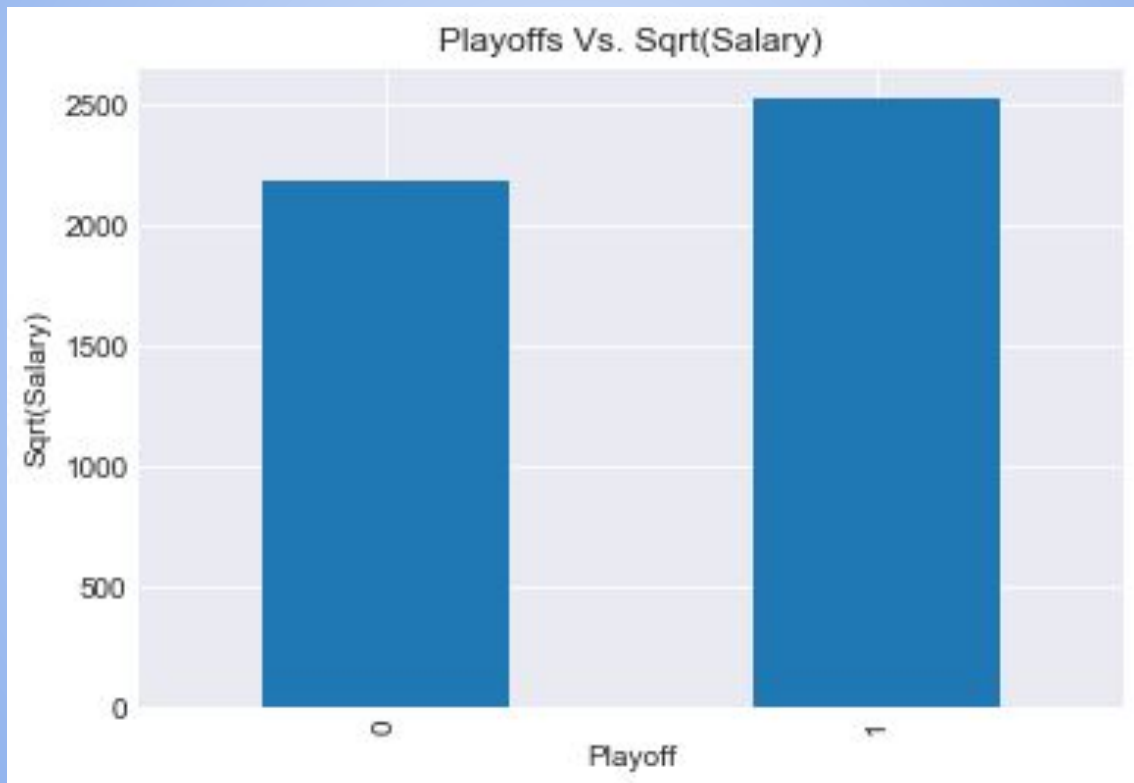
Minutes Played Vs. Sqrt (Salary)



Age Vs. Sqrt (Salary)



EDA - Playoffs



Models

- 3 sets of models
- Determined model performance with 5-fold cross validation R^2
 - Model 1: Highest correlated features to salary (taking out multicollinear features)
 - Model 2: Highest correlated features to salary (including multicollinear features)
 - Model 3: All numeric features (except age)

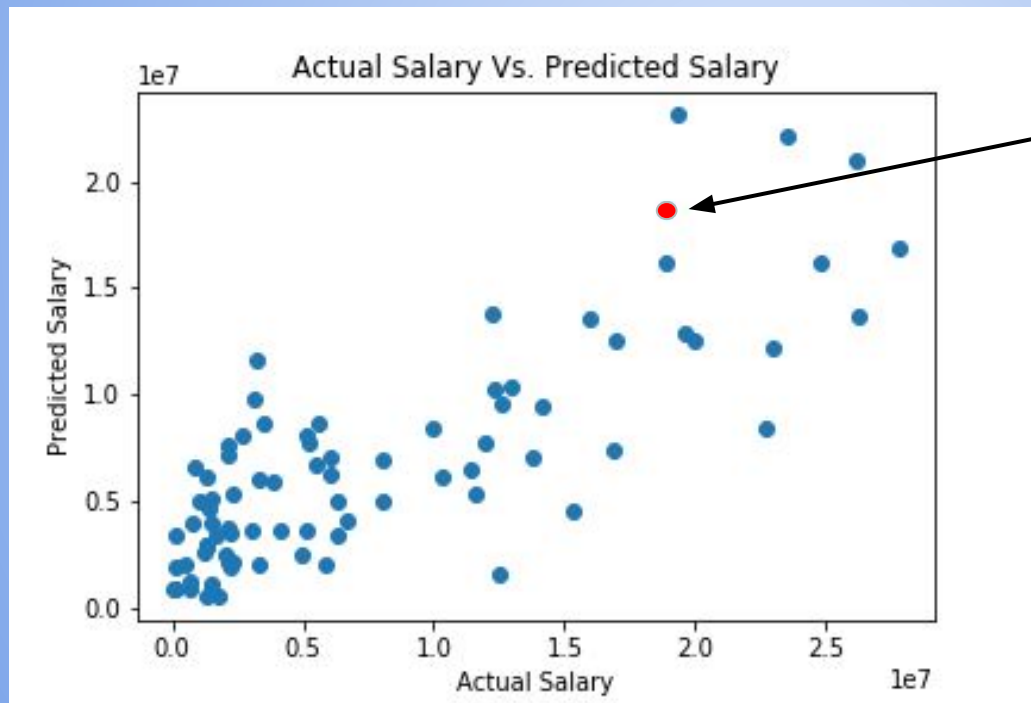
Model Performance

- Linear Regression showed overfitting - used Ridge, Lasso, and ElasticNet to regularize the models
 - Optimized hyperparameters using grid-search
- Results:

CV R² Scores

	LR	Ridge	Lasso	ElasticNet
Model 1	0.543	0.545	0.544	0.545
Model 2	0.537	0.543	0.542	0.545
Model 3	0.553	<u>0.564</u>	0.561	0.562

Model Analysis - Actual Salary Vs Predicted Salary



Klay Thompson Current & Predicted Salary

- In 2017-2018, Klay Thompson was paid \$17.8 million
- Based off last year's stats, my model predicted \$18.7 million
 - With an RMSE (Standard Deviation) of \$720,523

Conclusion

- Based on his performance this year, I am 95% confident that his salary should be between \$17.9 and \$20.9 million.
- As his agent, you should aim to negotiate a contract for \$20.9 million!

Next Steps:

- More years of player stats & salary data
- Create more predictor features: team market size, social media following, injuries, etc.
- Set rules for model that takes into account NBA cap rules
- Experiment with other models