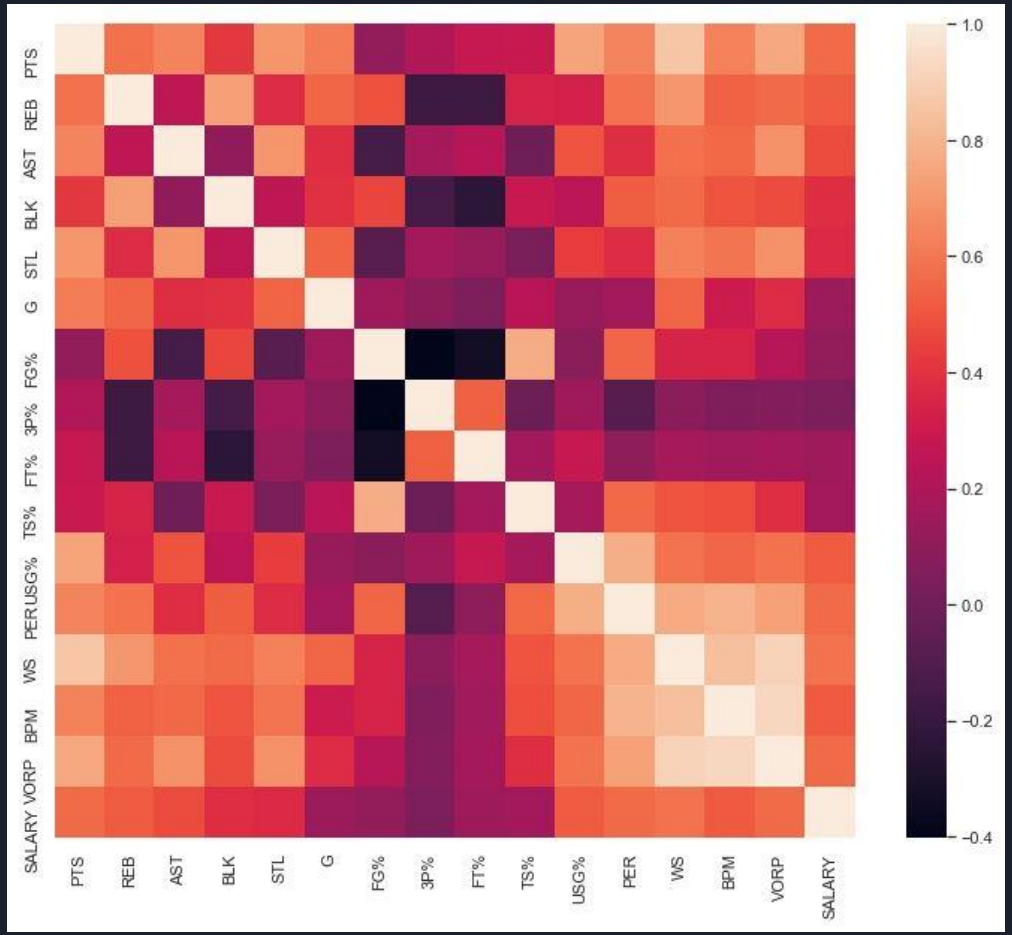
Predicting NBA salaries

Teams signing players

- Based on market
- See what similar players have been paid
- Sources: NBA.com and Basketball-Reference.com

EDA


PTS
REB
AST
BLK
STL
G
FG%
3P%
FT%
TS%
USG%
PER
WS
BPM
VORP
SALARY
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4

Dummy (mean) Regressor

- R^2 (train) = 0
- R^2 (test) = -0.001144622163
- A R^2 (train) = -0.1595744681
- A R^2 (test) = -0.4704311638
- MAE (train) = 7067479.768
- MAE (test) = 6951335.557
- RMSE (train) = 8290153.791
- RMSE (test) = 8507852.202

Linear Regression (unscaled)

- R^2 (train) = 0.6214726672
- R^2 (test) = 0.3892925341
- A R^2 (train) = 0.5610693694
- A R^2 (test) = 0.1030234095
- MAE (train) = 3993532.992
- MAE (test) = 4959487.834
- RMSE (train) = 5100481.887
- RMSE (test) = 6644895.294

Linear Regression (scaled)

- R^2 (train) = 0.6214726672
- R^2 (test) = 0.3892925341
- A R^2 (train) = 0.5610693694
- A R^2 (test) = 0.1030234095
- MAE (train) = 3993532.992
- MAE (test) = 4959487.834
- RMSE (train) = 5100481.887
- RMSE (test) = 6644895.294

Ridge Regression (scaled) (mean R^2 = 0.4327860265)

- R^2 (train) = 0.5856605149
- R^2 (test) = 0.4230847569
- A R^2 (train) = 0.3422731583
- A R^2 (test) = 0.1526557367
- MAE (train) = 4209099.691
- MAE (test) = 4715319.277
- RMSE (train) = 5336306.281
- RMSE (test) = 6458438.588

Lasso Regression (scaled) (mean R^2 = 0.3745317665)

- R^2 (train) = 0.6214726262
- R^2 (test) = 0.3893765573
- A R^2 (train) = 0.2747230059
- A R^2 (test) = 0.1031468186
- MAE (train) = 3993490.105
- MAE (test) = 4958987.241
- RMSE (train) = 5100482.162
- RMSE (test) = 6644438.164

ElasticNet Regression (scaled) (mean R^2 = 0.4327837711)

- R^2 (train) = 0.5784262474
- R^2 (test) = 0.4226972406
- A R^2 (train) = 0.342270543
- A R^2 (test) = 0.1520865722
- MAE (train) = 4255236.742
- MAE (test) = 4710168.547
- RMSE (train) = 5382690.005
- RMSE (test) = 6460607.303

DecisionTreeRegressor (scaled) (mean R^2 = 0.3628601174)

- R^2 (train) = 0.4798729114
- R^2 (test) = 0.1060998076
- A R^2 (train) = 0.2611888595
- A R^2 (test) = -0.3129159076
- MAE (train) = 4591332.135
- MAE (test) = 5796544.278
- RMSE (train) = 5978845.4
- RMSE (test) = 8039259.411

RandomForestRegressor (scaled) (mean R^2 = 0.4407261668)

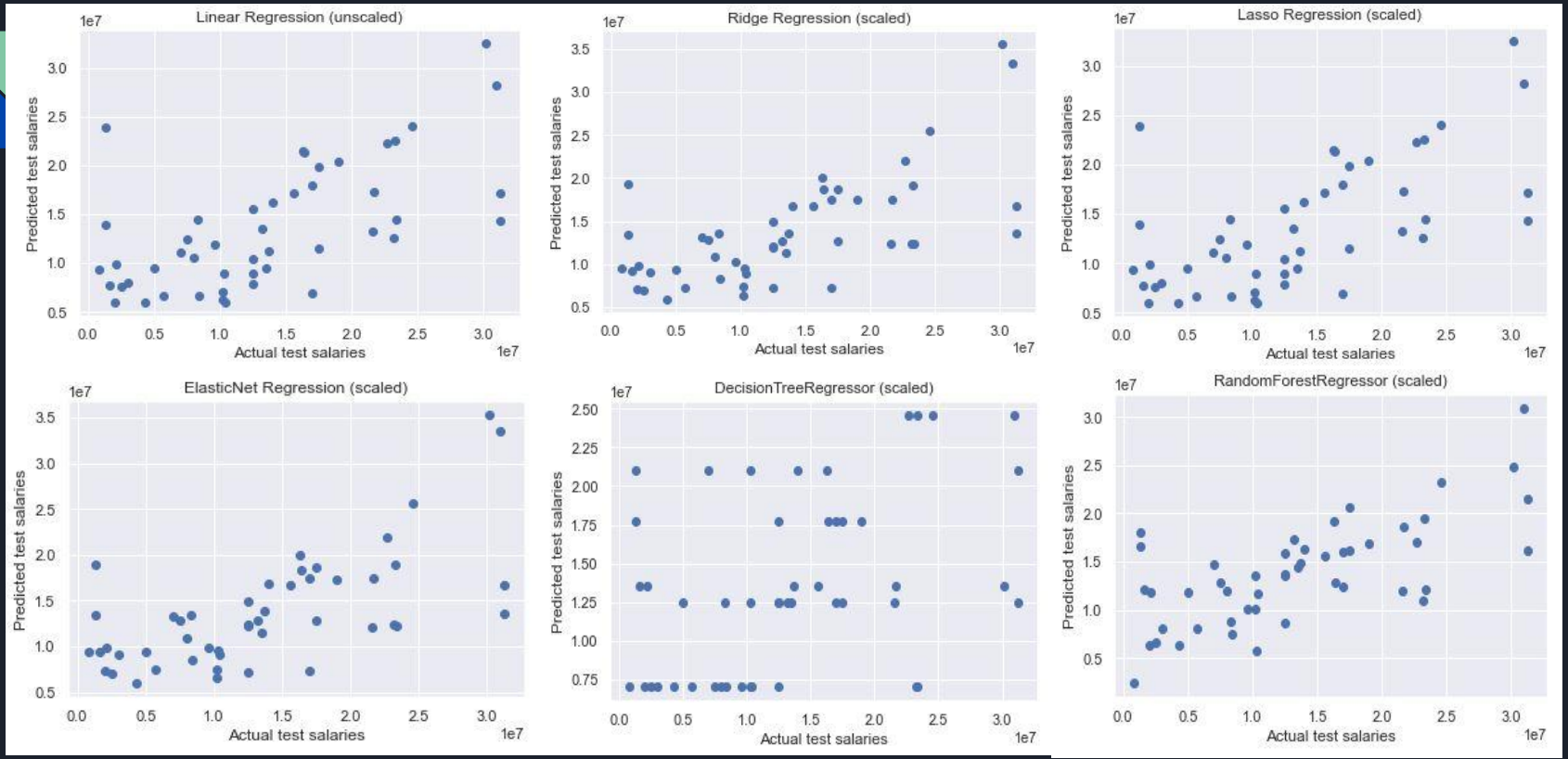
- R^2 (train) = 0.9055482711
- R^2 (test) = 0.461732025
- A R^2 (train) = 0.3514803424
- A R^2 (test) = 0.2094189117
- MAE (train) = 2008312.709
- MAE (test) = 4598098.391
- RMSE (train) = 2547812.965
- RMSE (test) = 6238365.243

GradientBoostingRegressor (scaled) (mean R^2 = 0.4395221139)

- R^2 (train) = 0.8855335992
- R^2 (test) = 0.4143208777
- A R^2 (train) = 0.3500841534
- A R^2 (test) = 0.1397837892
- MAE (train) = 1054246.233
- MAE (test) = 5030078.541
- RMSE (train) = 2804798.077
- RMSE (test) = 6507308.537

AdaBoostRegressor (scaled) (mean R^2 = 0.4576899585)

- R^2 (train) = 0.7856629242
- R^2 (test) = 0.3119801129
- A R^2 (train) = 0.3711511221
- A R^2 (test) = -0.01052920916
- MAE (train) = 3257417.705
- MAE (test) = 5425524.857
- RMSE (train) = 3838055.389
- RMSE (test) = 7052969.782


Linear Regression (unscaled)
Ridge Regression (scaled)
Lasso Regression (scaled)
ElasticNet Regression (scaled)
DecisionTreeRegressor (scaled)
RandomForestRegressor (scaled)
Predicted test salaries
Actual test salaries
1e7

ElasticNet regression(scaled) (mean R^2 = 0.3255089928)

- R^2 (train) = 0.5455805423
- R^2 (test) = 0.4821033177
- A R^2 (train) = 0.2178774491
- A R^2 (test) = 0.2393392479
- MAE (train) = 3644945.945
- MAE (test) = 3290803.783
- RMSE (train) = 4477399.322
- RMSE (test) = 4227838.632

Ridge Regression (scaled) (mean R^2 = 0.3255239243)

- R^2 (train) = 0.5530187069
- R^2 (test) = 0.4829340165
- A R^2 (train) = 0.2178947633
- A R^2 (test) = 0.2405593368
- MAE (train) = 3609410.286
- MAE (test) = 3275991.795
- RMSE (train) = 4440603.976
- RMSE (test) = 4224446.576

RandomForestRegressor (scaled) (mean R^2 = 0.2183300533)

- R^2 (train) = 0.9154689561
- R^2 (test) = 0.4711292819
- A R^2 (train) = 0.09359548732
- A R^2 (test) = 0.2232211329
- MAE (train) = 1474121.486
- MAE (test) = 3419278.908
- RMSE (train) = 1931103.21
- RMSE (test) = 4272396.981

Recommendations

- Analyze how much they are overpaying for a player
- Analyze how much other teams are overpaying for their players and determine if their “mistake” signing is worth trading for.
- Gauge the trajectory a player is taking based on how much a team has overpaid them over the past few years.