# NFL Rankings/Playoff Predictions Project

Shivam Bhatt and Jordan Greenhall 12/05/2018

#### Overview

- Primary goal was to use historical data to predict 2017 rankings
  - Top 6 in each conference made the playoffs
- Utilized historical team rankings based on 2014, 2015, and 2016
  - Separated through NFC and AFC Conferences

# Key Variables Definitions/Glossary

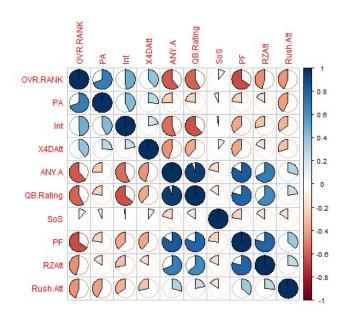
- PA: Total Points Against/Allowed
- PF: Total Points For/Scored
- Int: Total Interceptions
- X4DATT: 4th Down Attempts per game
- ANY.A: Adjusted Net Yards per Pass Attempt
- QB Rating: Average QB Rating (determined by NFL)
- SoS: Strength of Schedule
- RZAtt: Red Zone Attempts (close to scoring)
- Rush Att: Total Running Attempts by team

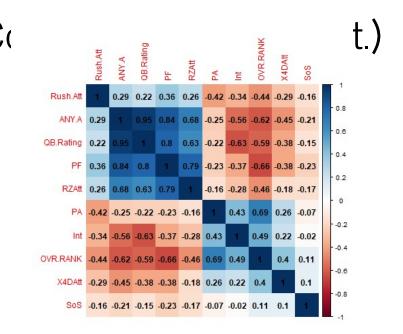
# Dependent Variable

- Rankings were sourced from playoff seedings
  - Reg season ranking was used for teams that didnot make the playoffs
- As a result, our dependent variable was created: 'OVR.RANK'

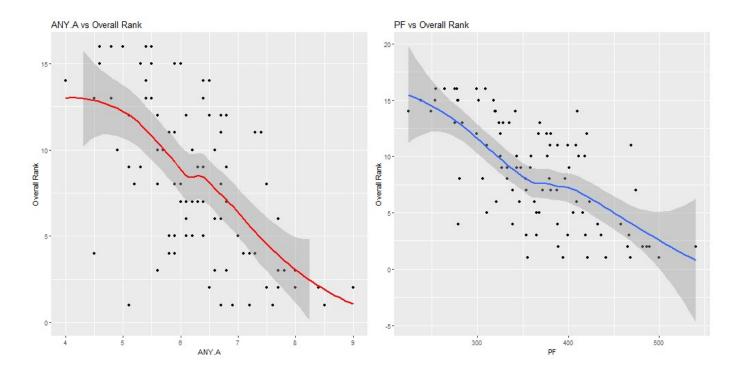
# **Correlation Studies**

piecor2 <- corrplot(cormat2, method = "pie")</pre>

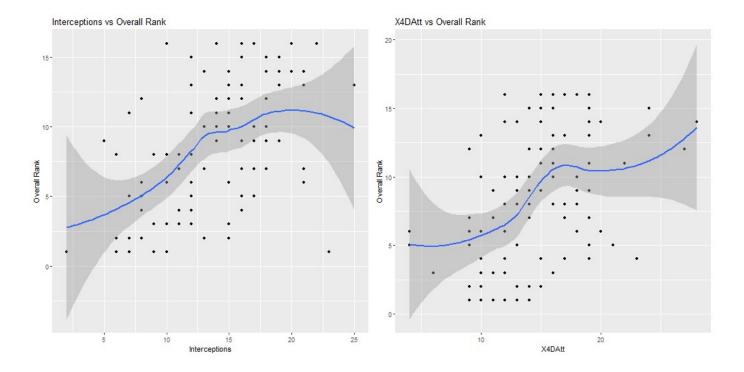


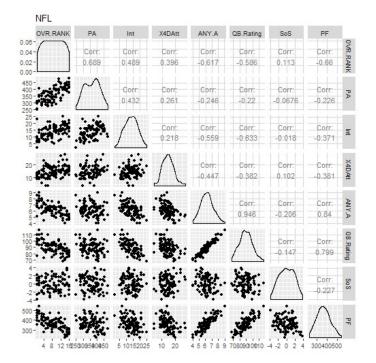


# Relationships Between Predictors and OVR.RANK



# Relationships Between Predictors and OVR.RANK





#### Linear Model

#model includes Points Allowed, tot Interceptions, tot Fumbles
Lost, Stength of schedule, 4th down attempts, Points Scored,
Av. Net Pass Yards per throw, QB Rating, Red Zone Attempts,
and Rush Attempts
summary(lmod)

```
Call:
lm(formula = OVR.RANK ~ PA + Int + tot.FL + SoS + X4DAtt + PF
+
   ANY.A + QB.Rating + RZAtt + Rush.Att, data = nflnum)
Residuals:
            10 Median
   Min
                           3Q
                                  Max
-6.3562 -1.7256 -0.1774 1.8551 4.8022
Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)
            4.507944 6.389917 0.705 0.482442
                      0.005776 7.729 1.98e-11 ***
            0.044648
PA
            0.025183 0.085432 0.295 0.768887
Int
tot.FL
            0.117958 0.090679 1.301 0.196835
           0.095095 0.147146 0.646 0.519851
SoS
                               0.440 0.661062
X4DAtt
           0.029648 0.067385
                     0.009182
                               -3.929 0.000173 ***
PF
           -0.036075
           -0.148823 0.914265
ANY.A
                                -0.163 0.871079
QB.Rating -0.027200 0.091537
                                -0.297 0.767083
RZAtt
           0.063288 0.050228
                                1.260 0.211113
Rush.Att
          -0.002016 0.006659 -0.303 0.762863
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 2.403 on 85 degrees of freedom
Multiple R-squared: 0.7595, Adjusted R-squared: 0.7312
F-statistic: 26.84 on 10 and 85 DF, p-value: < 2.2e-16
```

# Linear Model MSE

```
#MSE
sqrt(mean((testDF$OVR.RANK - testDF$1mpreds)^2))
```

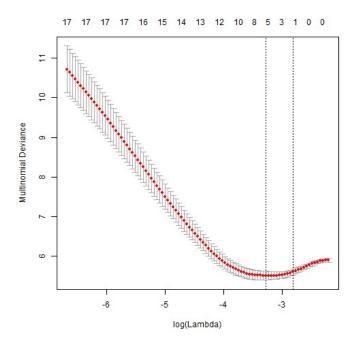
[1] 2.137696

#### Actual vs Predicted for Linear Model and Lm Resids

```
testDF[,c("Tm", "OVR.RANK", "lmpreds","lmresids")]
```

```
Tm OVR.RANK
                                   1mpreds
                                               lmresids
                              10 11.169853 -1.16985289
      Arizona Cardinals
1
                                  6.409490 -0.40949042
2
        Atlanta Falcons
                               6
3
       Baltimore Ravens
                               7
                                  4.267437
                                             2.73256255
          Buffalo Bills
                                  9.794775 -3.79477496
4
5
      Carolina Panthers
                               5
                                  7.008049 -2.00804886
6
          Chicago Bears
                              15
                                  9.853343
                                             5.14665730
7
     Cincinnati Bengals
                               9 10.249156 -1.24915588
       Cleveland Browns
8
                              16 16.780958 -0.78095804
         Dallas Cowboys
9
                               9 7.659741
                                             1.34025874
10
         Denver Broncos
                              12 13.090993 -1.09099346
          Detroit Lions
                               7
                                  6.879561
                                             0.12043932
11
12
     Green Bay Packers
                              11 11.370582 -0.37058151
         Houston Texans
                              15 12.488925
13
                                            2.51107509
                              14 13.068457 0.93154315
     Indianapolis Colts
14
15 Jacksonville Jaguars
                                  1.940301
                                            1.05969889
     Kansas City Chiefs
16
                                  3.905779
                                             0.09422107
                               4
17 Los Angeles Chargers
                                  3.205069
                                             4.79493058
                               8
       Los Angeles Rams
                                  3.779665 -0.77966488
18
                               3
19
         Miami Dolphins
                              11 12.992521 -1.99252119
20
     Minnesota Vikings
                               2
                                  2.050812 -0.05081211
21 New England Patriots
                                  1.751485 -0.75148516
                               1
22
                               4 3.483963
                                             0.51603651
     New Orleans Saints
23
        New York Giants
                              16 13.743920
                                             2.25608044
24
          New York Jets
                              13 11.027072
                                             1.97292834
25
        Oakland Raiders
                              10 11.207414 -1.20741396
26
   Philadelphia Eagles
                               1 2.282115 -1.28211521
27
   Pittsburgh Steelers
                               2
                                  4.218301 -2.21830063
28
   San Francisco 49ers
                              13 11.003883
                                             1.99611669
       Seattle Seahawks
                                  5.785792 2.21420837
29
                              14 10.884879
30 Tampa Bay Buccaneers
                                             3.11512148
31
       Tennessee Titans
                                  8.604656 -3.60465611
32
   Washington Redskins
                              12 10.695510
                                             1.30448990
```

## Lasso Model



```
#Lasso <- cv.glmnet(x = Xvar, y = Yvar, family =
"multinomial", alpha = 1)
#Variables Selected: tot Fumbles Lost, Sack Pctg, SRS, All
purpose yds, tot plays</pre>
```

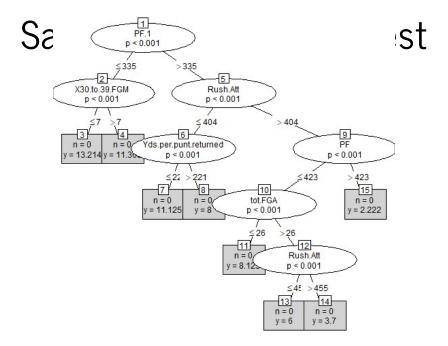
# Lasso MSE

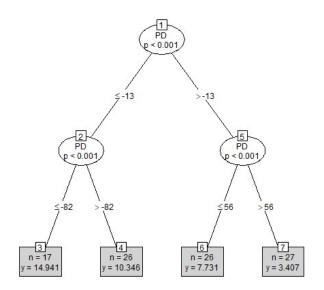
```
#MSE
sqrt(mean((testDF$OVR.RANK - testDF$Lassopreds)^2))
```

[1] 2.391868

### Actual vs Predicted for Lasso and Lasso Residuals

```
Tm OVR.RANK Lassopreds Lassoresids
                                    10.801851
      Arizona Cardinals
                                                -0.8018510
1
                                10
2
        Atlanta Falcons
                                 6
                                     4.974133
                                                 1.0258667
3
       Baltimore Ravens
                                 7
                                     5.208623
                                                 1.7913768
          Buffalo Bills
4
                                 6
                                    11.043498
                                                -5.0434977
5
      Carolina Panthers
                                 5
                                     5.492590
                                                -0.4925903
6
                                15
          Chicago Bears
                                     9.503536
                                                 5.4964638
7
     Cincinnati Bengals
                                    11.667183
                                                -2.6671825
                                 9
8
       Cleveland Browns
                                16
                                    15.887873
                                                 0.1121270
9
         Dallas Cowboys
                                     7.339884
                                9
                                                 1.6601160
                                12
10
         Denver Broncos
                                    13.458356
                                                -1.4583562
11
          Detroit Lions
                                     7.432291
                                7
                                                -0.4322908
12
      Green Bay Packers
                                11
                                     9.761486
                                                 1.2385142
13
         Houston Texans
                                    13.286427
                                                 1.7135731
                                15
     Indianapolis Colts
14
                                    14.954214
                                                -0.9542137
                                14
15 Jacksonville Jaguars
                                 3
                                     4.233084
                                                -1.2330838
     Kansas City Chiefs
                                     5.822988
16
                                                -1.8229877
                                 4
17 Los Angeles Chargers
                                 8
                                     4.749259
                                                 3.2507414
                                 3
18
       Los Angeles Rams
                                     3.401234
                                                -0.4012341
19
         Miami Dolphins
                                11
                                    11.642895
                                                -0.6428954
20
      Minnesota Vikings
                                 2
                                     2.289364
                                                -0.2893636
21 New England Patriots
                                 1
                                     2.483334
                                                -1.4833342
22
     New Orleans Saints
                                     2.463745
                                                 1.5362552
                                 4
23
        New York Giants
                                16
                                    12.418299
                                                 3.5817010
24
          New York Jets
                                    12.165929
                                13
                                                0.8340709
25
        Oakland Raiders
                                    11.088812
                                10
                                                -1.0888119
26
    Philadelphia Eagles
                                 1
                                     3.034987
                                                -2.0349870
27
    Pittsburgh Steelers
                                 2
                                     4.366767
                                                -2.3667671
    San Francisco 49ers
28
                                13
                                    10.189331
                                                 2.8106687
29
       Seattle Seahawks
                                     7.059937
                                8
                                                 0.9400628
                                     9.714469
30 Tampa Bay Buccaneers
                                                 4.2855315
                                14
31
       Tennessee Titans
                                 5
                                    10.325844
                                                -5.3258441
32
    Washington Redskins
                                12
                                     9.973885
                                                 2.0261146
```





Questions?