Projecting NFL Wins

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Goals and Assumptions

Can we predict NFL win totals entering the season?

- Using team-based metrics
- Three prior seasons of data (2010-2016)

Assumptions:

- Roster and coaching changes not considered
- Scheduling

Features

Examples:

- Standings: Wins, Points Scored, Points Against
- Passing: TD, Yards, Yards/Attempt
- Rushing: TD, Yards, Yards/Attempt
- Passing Defense: TD, Yards, INT, Sacks
- Rushing Defense: TD, Yards, Yards/Attempt
- Special Teams (for and against): FG made, FG attempted

Top 30 PCA features explained 90% of the variance

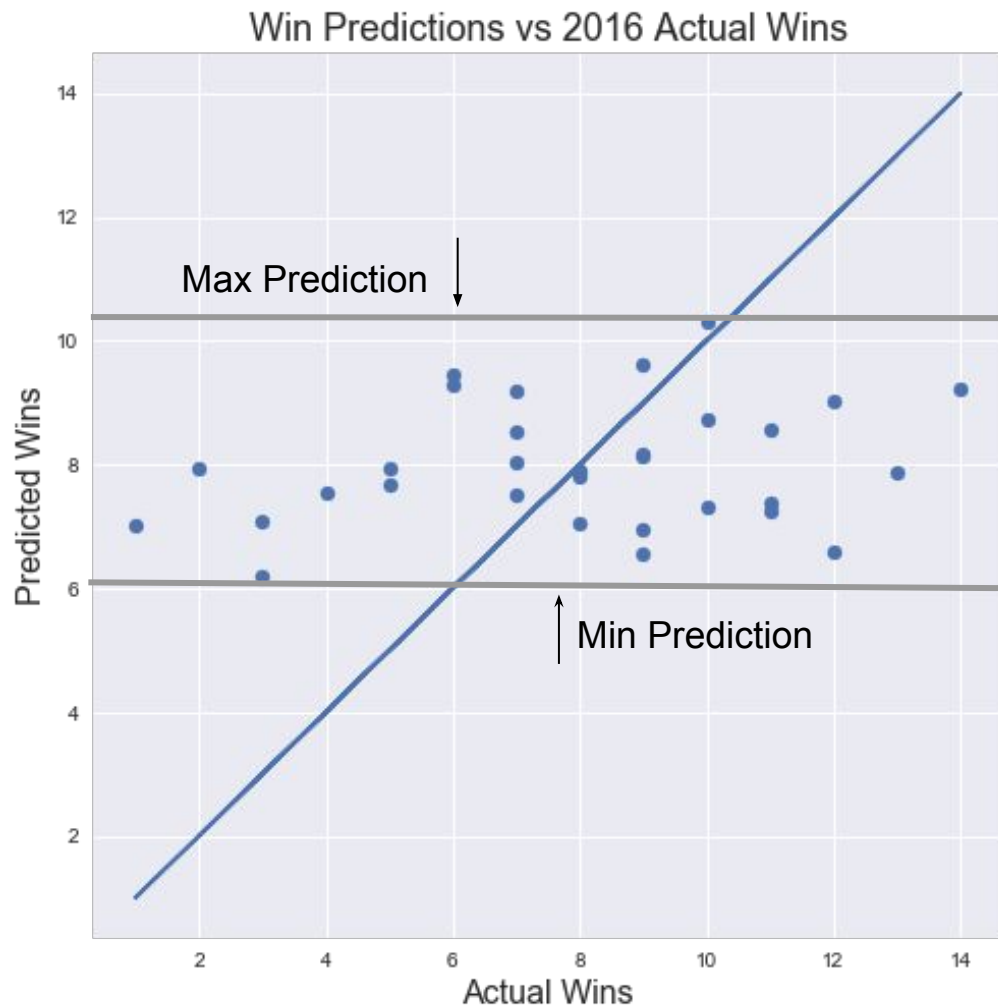# Initial Results

Training: 96 Teams
(2010:2012-2012:2014)

Test: 32 Teams (2013:2015)

Features: 3 PCA Team Stats

Target: Next Season Team Wins
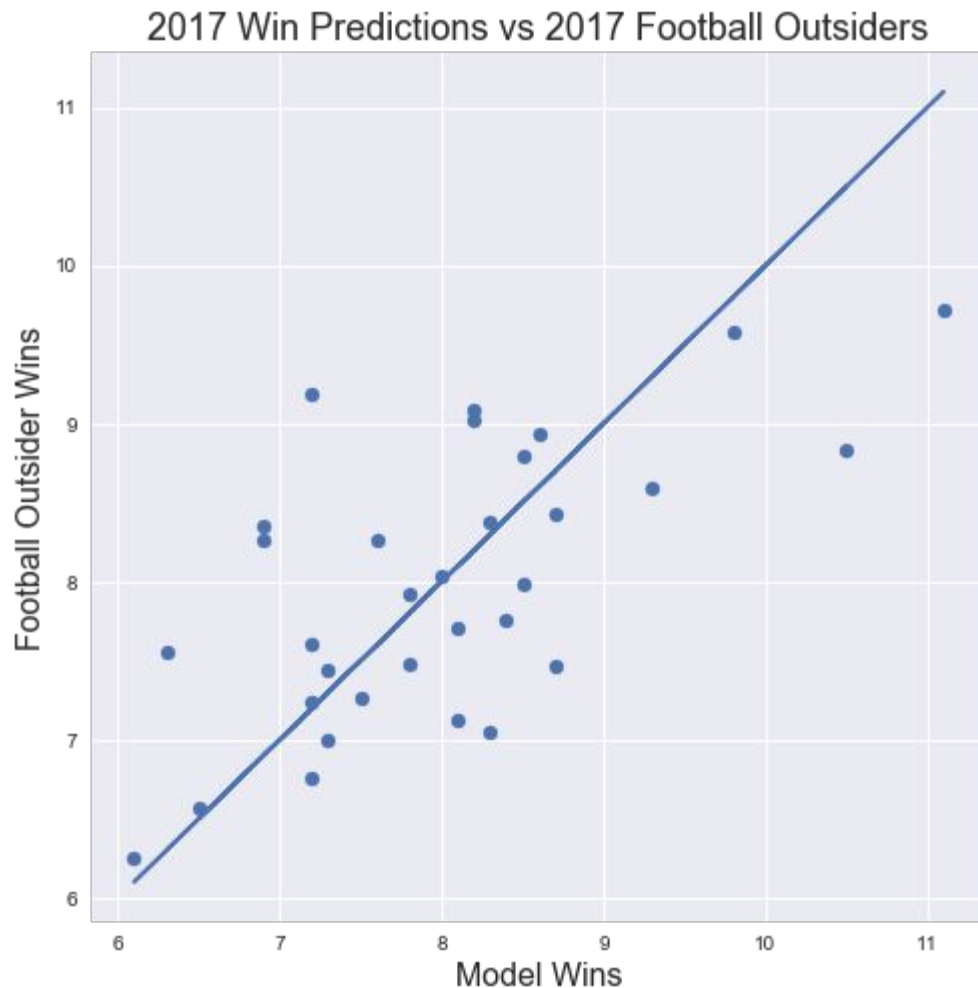
Model: Elastic Net Cross Validation

R2 = 0.0561253

Win Predictions vs 2016 Actual Wins

Initial Correlation

Football Outsiders 2017:

Correlation: 0.657

Spearman-Rank: 0.566

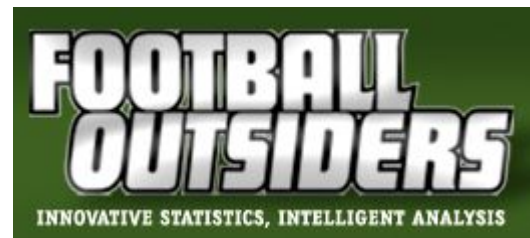2017 Win Predictions vs 2017 Football Outsiders

New Features

Football Outsiders Metrics - Defense-adjusted Value Over Average

- Total DVOA
- Offense DVOA
- Defense DVOA
- ST DVOA
- Est. Wins: number of games that team should have won if it faced an average schedule of opponents and average luck
- WtdDVOA: gives recent games more weight than games early in the season

DVOA Correlation

DVOA measures a team's efficiency by comparing success on every single play to a league average based on situation and opponent.

Correlation of various stats from year to year, 2000-2014		
Stat	**Correlation with wins Y+1**	**Correlation with same stat Y+1**
DVOA	.38	.52
VOA (not adjusted for opponent)	.35	.44
Points scored - points allowed	.34	.39
Wins	.30	.30
Yards gained - yards allowed	.29	.47

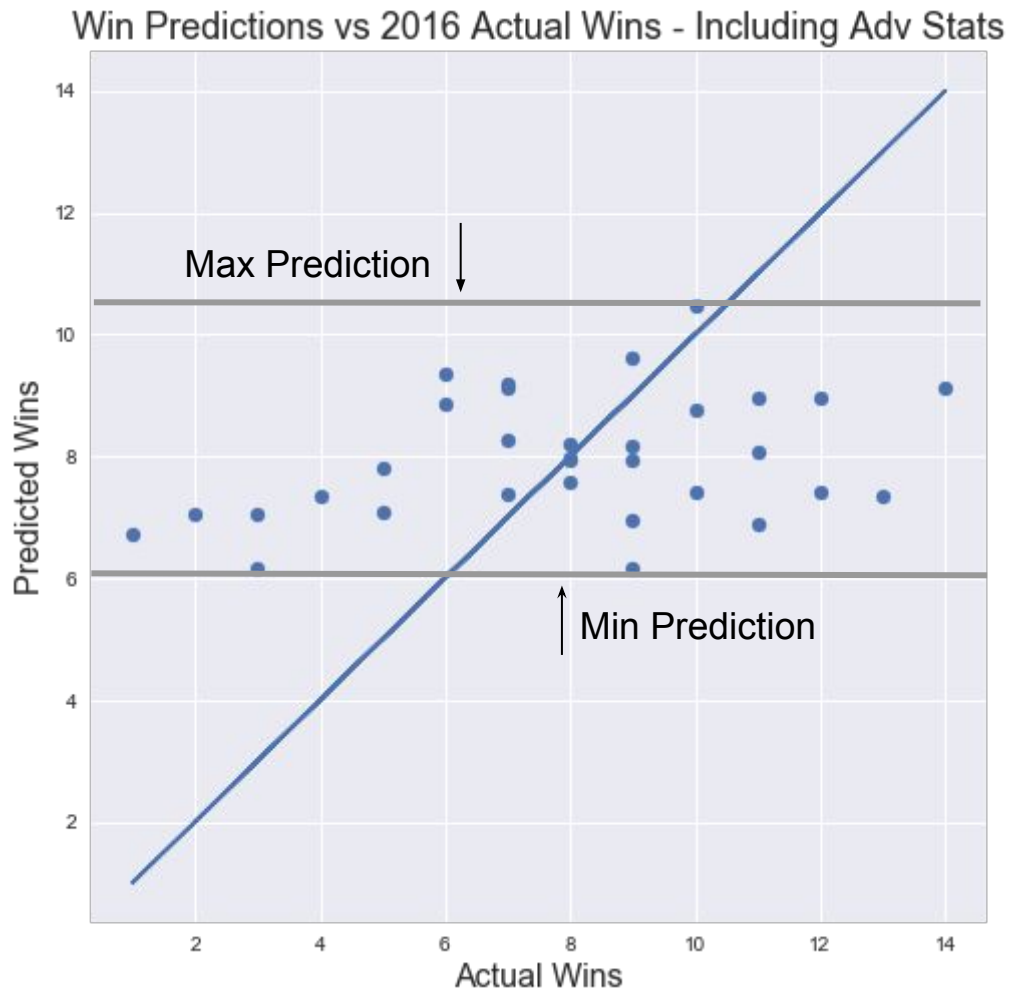# Improved Results

Training: 96 Teams
(2010:2012-2012:2014)

Test: 32 Teams (2013:2015)

Features: 3 PCA Team Stats, 6 DVOA

Target: Next Season Team Wins
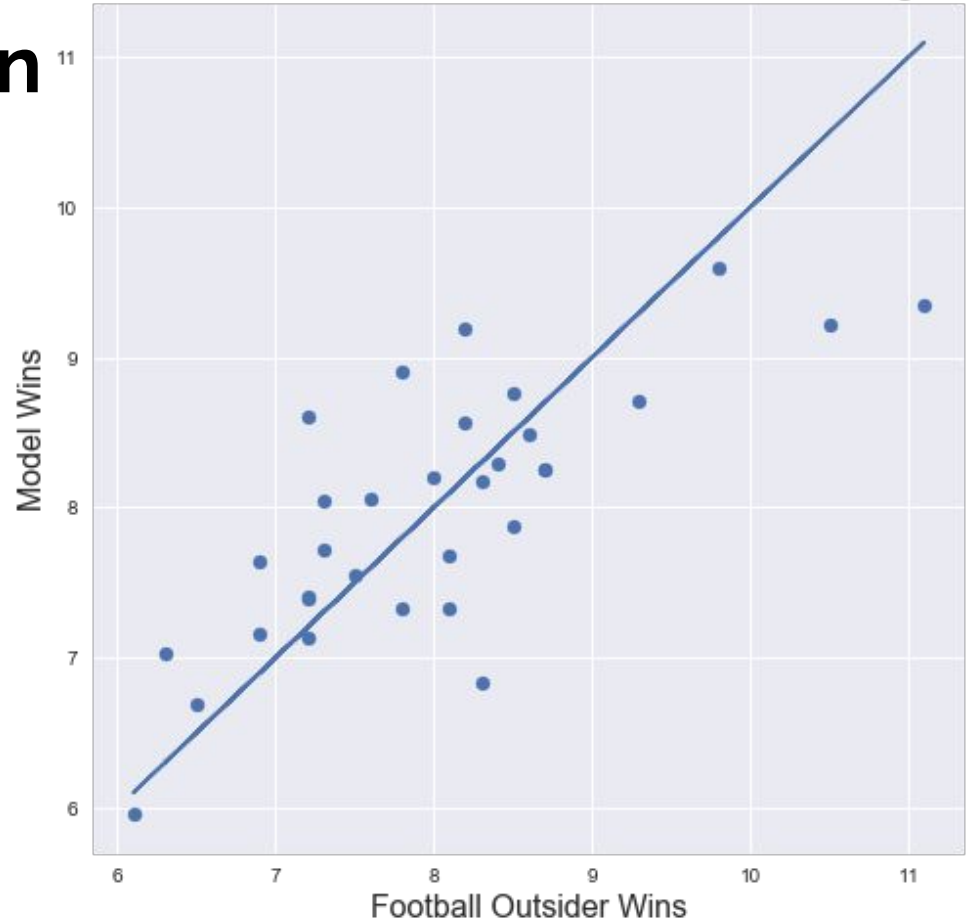
Model: Elastic Net Cross Validation

R2 = 0.1248913

Win Predictions vs 2016 Actual Wins - Including Adv Stats

Stronger Correlation

Football Outsiders 2017:

Correlation: 0.767

Spearman-Rank: 0.727

2017 Win Predictions vs 2017 Football Outsiders - Including Adv Stats

Next Steps

- Quantify the offseason

- Play by play metrics

- Player based features

- Measure of schedule

- Classify good/bad teams

- Calculate playoff odds

- Use different timeframes