

Fantasy Football Recommendation System

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Predicting Fantasy Points

- Matchups are important
- Predict fantasy points by player against specific team
- Only use current year data
- Bootstrapping allows for distribution of predicted scores

Week 10 QB Predictions

player	team	opp	fantasy_points ▲	variance
Aaron_Rodge...	GB	TEN	21.7	2.46
Matt_Ryan	ATL	PHI	17.6	3.96
Ben_Roethli...	PIT	DAL	16.2	3.18
Dak_Prescott	DAL	PIT	15.7	2.1
Eli_Manning	NYG	CIN	15	3.17
Tom_Brady	NE	SEA	14.9	2.45
Joe_Flacco	BAL	CLE	14.4	1.14
Drew_Brees	NO	DEN	13.8	1.56
Cam_Newton	CAR	KC	13.1	3.73
Marcus_Mari...	TEN	GB	13	3.59
Case_Keenum	LAR	NYJ	12.7	3.78
Blaine_Gabb...	SF	ARI	12.3	3.08
Carson_Palm...	ARI	SF	12.2	2.38

Accuracy (Playing Quarterbacks)

$$m = \sqrt{\frac{1}{N_{qb}} \sum_{qb} (S_p - S_a)^2}$$

prediction method	m	$VAR(S_p - S_a)$
ESPN	6.46	40.633
My pred	7.26	35.789

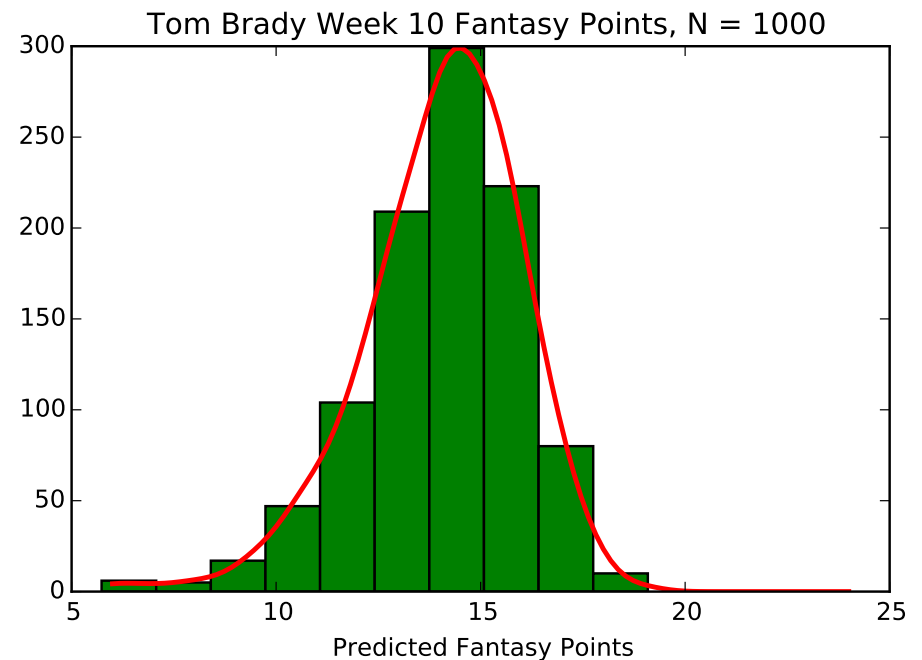
Systematic Error in Pred

- Historically, predicted scores have been lower than actual scores across the board
- In QB case this shift is about 4 fantasy points

prediction method	m	$VAR(S_p - S_a)$
ESPN	6.46	40.633
My pred	7.26	35.789
with correction	5.87	35.789

Probability of Winning Matchup

- Prediction gives distribution of possible scores
- Monte Carlo Simulation
- See how scores of correlated players distort the score probability distributions
 - Not enough data to treat individual player combination



Improvements

- Add weighting to cost function to emphasize recent games.
- Handle Injured Players/replacements

Learning Procedure

- Weekly player data scraped from fftoday.com
- Construct 3 matrices

$$Y : n_{teams} \times n_{plyrs}$$

$$A : n_{teams} \times \alpha$$

$$B : n_{plyrs} \times \alpha$$

- Cost Function Minimized

$$J = \text{Tr} [(AB^{\top} - Y)^{\top} (AB^{\top} - Y)] + \frac{\lambda}{2} \text{Tr} [A^{\top} A] + \frac{\lambda}{2} \text{Tr} [B^{\top} B]$$

- Regularization term and alpha are allowed to vary in cross validation
- Bootstrapping performed