

Fantasy Football Points Projection System

By Amar Srinivas

Project link: <https://github.com/amarsrinivas/Capstone-Project>



Motivation:



YAHOO! SPORTS
**FANTASY
FOOTBALL**

- Fantasy Football is a huge part of the sports culture in the United States and helps the casual fan get more involved in the sport.
- Many people set their starting lineups based on the projections given to them by various fantasy football sites.

This project serves to determine which sites provide more accurate projections and subsequently builds a model that can accurately project points totals for players

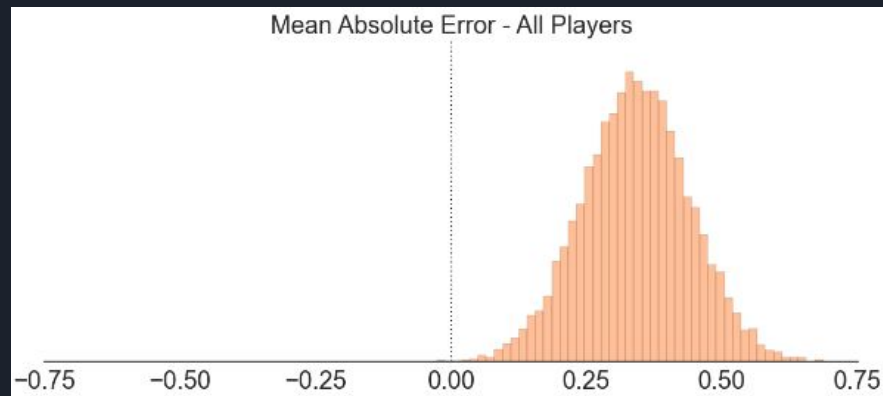
Gathering the Data

	CMP	FG	FL	FPTS	INTS	PASS_ATT	PASS_TD	PASS_YDS	POSITION	Player	REC	REC_TD	REC_YDS	RUSH_ATT	RUSH_YDS
1	27.0	0.0	22.7	0.7	40.0	2.9	315.0	QB	Peyton Manning (DEN)				2.0	0.0	0.0
2	27.0	0.0	21.9	0.9	42.0	2.6	311.0	QB	Drew Brees (NO)				2.0	0.1	0.0
3	24.0	0.0	21.9	0.6	39.0	2.3	276.0	QB	Nick Foles (PHI)				4.0	0.2	0.0
4	20.0	0.0	20.6	0.7	33.0	1.6	254.0	QB	Colin Kaepernick (SF)				6.0	0.3	0.0
5	24.0	0.0	19.6	0.9	41.0	1.7	282.0	QB	Andrew Luck (IND)				4.0	0.2	0.0
6	19.0	0.0	19.1	0.7	30.0	1.8	225.0	QB	Russell Wilson (SEA)				6.0	0.2	0.0
7	26.0	0.0	19.0	1.2	44.0	2.0	305.0	QB	Matthew Stafford (DET)				2.0	0.1	0.0
8	23.0	0.0	18.1	0.7	36.0	1.9	278.0	QB	Tom Brady (NE)				2.0	0.1	0.0
9	20.0	0.0	17.6	0.6	30.0	1.7	250.0	QB	Aaron Rodgers (GB)				3.0	0.1	0.0
10	23.0	0.0	17.4	0.8	36.0	1.8	269.0	QB	Matt Ryan (ATL)				2.0	0.1	0.0
11	21.0	0.0	17.2	1.1	36.0	1.9	259.0	QB	Jay Cutler (CHI)				2.0	0.1	0.0
12	17.0	0.0	16.5	1.2	29.0	1.2	225.0	QB	Cam Newton (CAR)				6.0	0.3	0.0
13	20.0	0.0	16.4	1.1	34.0	1.5	241.0	QB	Ryan Tannehill (MIA)				4.0	0.2	0.0
14	18.0	0.0	16.4	0.6	29.0	1.2	212.0	QB	Robert Griffin III (WAS)				6.0	0.2	0.0
15	20.0	0.0	16.4	0.8	34.0	1.3	224.0	QB	Geno Smith (NYJ)				5.0	0.3	0.0
16	22.0	0.0	16.2	0.8	34.0	1.6	253.0	QB	Ben Roethlisberger (PIT)				2.0	0.1	0.0
17	19.0	0.0	16.2	0.7	31.0	1.5	214.0	QB	Alex Smith (KC)				4.0	0.2	0.0
18	22.0	0.0	15.7	1.2	33.0	1.7	261.0	QB	Tony Romo (DAL)				2.0	0.1	0.0
19	20.0	0.0	15.5	0.9	32.0	1.6	236.0	QB	Andy Dalton (CIN)				3.0	0.1	0.0
20	23.0	0.0	15.2	1.1	36.0	1.6	253.0	QB	Philip Rivers (SD)				2.0	0.1	0.0
21	22.0	0.0	14.9	1.1	36.0	1.3	252.0	QB	Ryan Fitzpatrick (HOU)				3.0	0.1	0.0

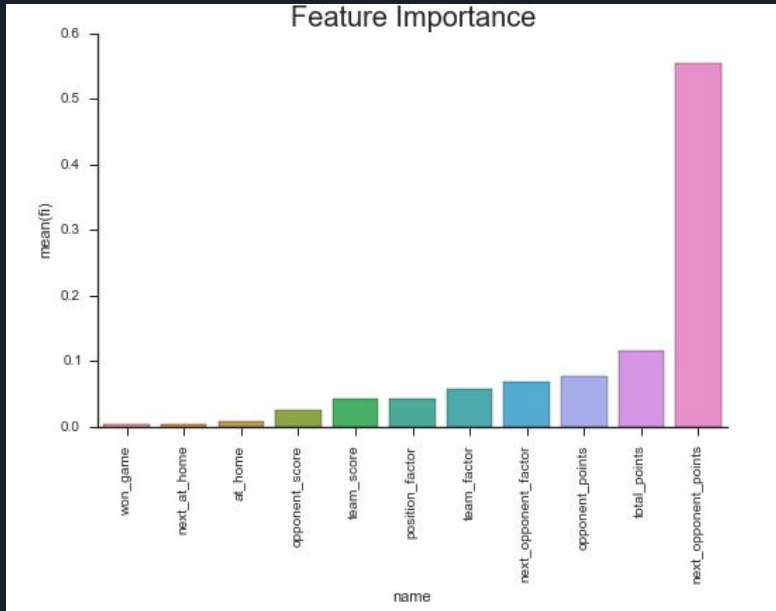
- The first step in creating the model was to scrape ESPN, CBS, numberFire and other prognosticators to obtain the relevant data
- Once the data had been gathered fundamental EDA was done in order to see which columns had irrelevant and unnecessary data
- In order to show which sites had more accurate predictions, absolute and relative error as metrics were used

Absolute error = (projected fantasy points – actual fantasy points scored)

Relative error = $\frac{\text{projected fantasy points} - \text{actual fantasy points scored}}{\text{projected fantasy points}}$



Feature Engineering & Importance



- Had to narrow down the features and figure out which ones were relevant
- Engineered a feature, “Next Opponent Points Scored” which gave the most signal
- This is the amount of points a players future opponent has given up to people at that same position in previous weeks.

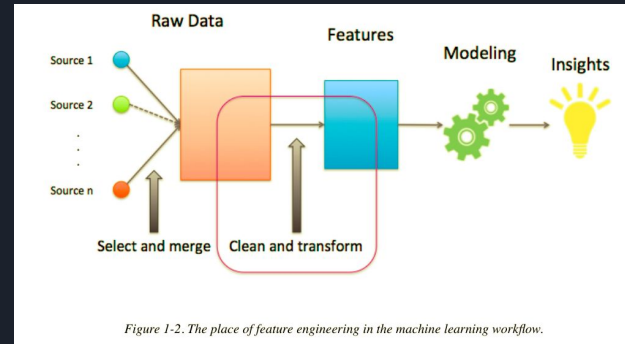
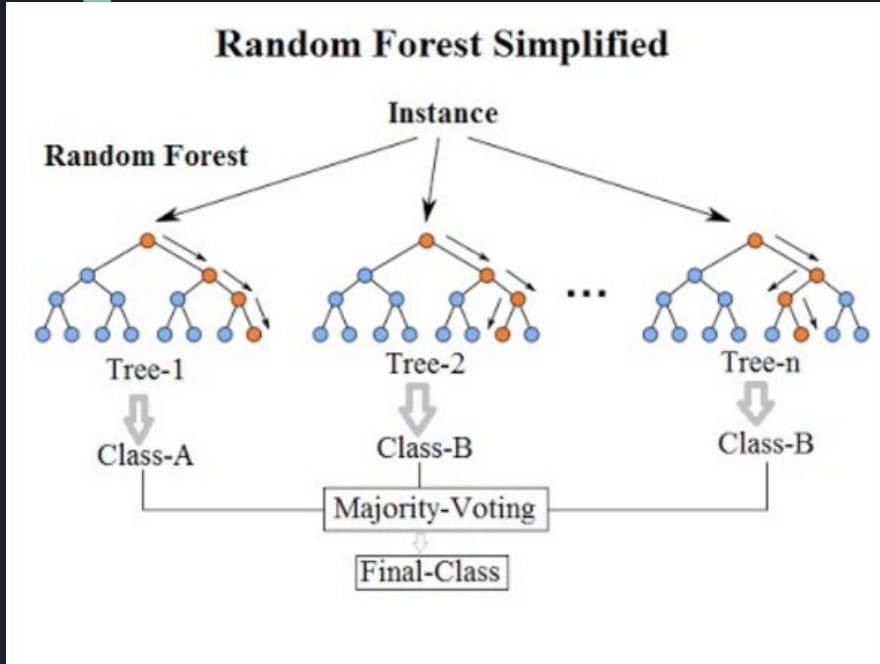


Figure 1-2. The place of feature engineering in the machine learning workflow.

Building the Model:

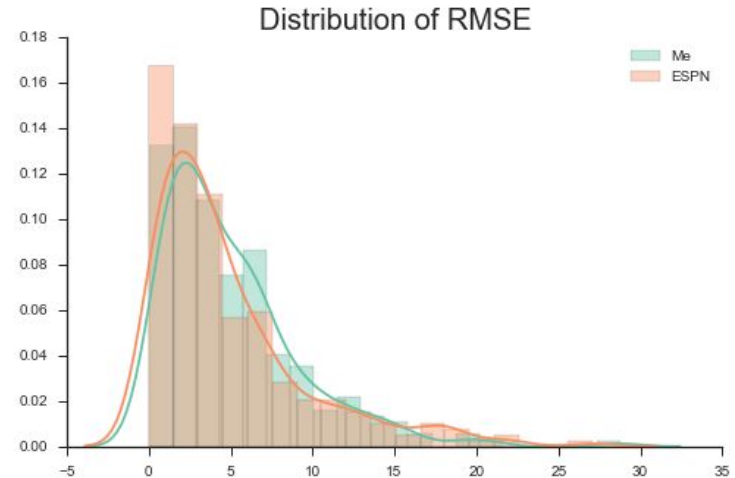
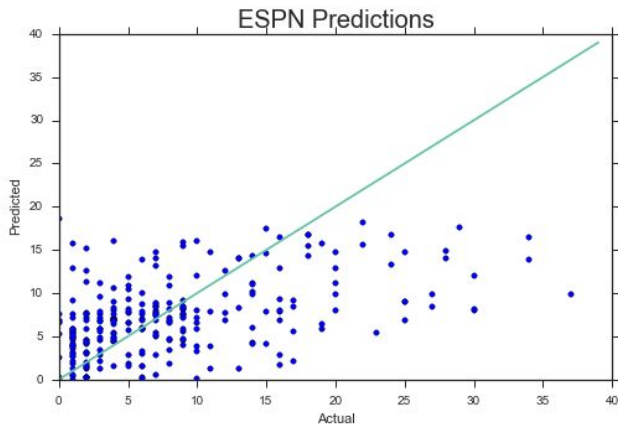
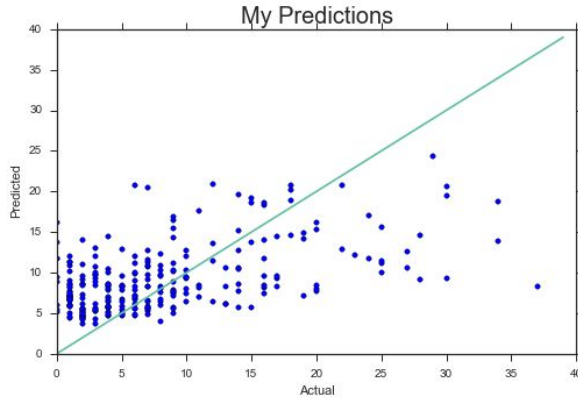


- Used a combination of Random Forest Regressor and cross-validated with Gradient Boost. Also used some hyperparameter optimization
- The model predicts points on a week-by-week basis, therefore the trained model uses week 1 data to predict week 2 outcomes, and then takes week 1 and week 2 data to predict week 3 fantasy points.

Results

- Root-mean-square-error (RMSE) score was utilized here since it would be the most appropriate.
- The model performed slightly better than ESPN's model and ended up with a smaller RMSE

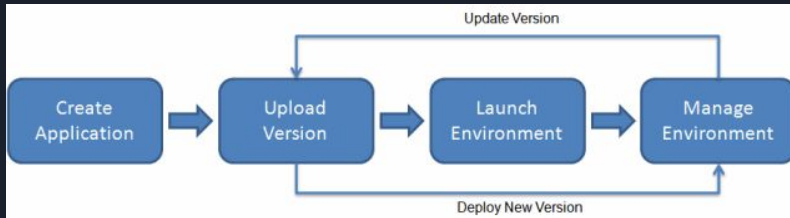
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Prediction for Week 3  
My RMSE: 6.56041003517  
ESPN RMSE: 6.767002702
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Next Steps:



- Expanding upon the initial model and giving it more data so that predictions on a season-by-season basis can be made as opposed to a week-by-week basis.
- Building a webapp using Flask and Elastic Beanstalk (provided by AWS)



Choose A Player	or	Choose A Player	
A.J. Green (WR, CIN) vs. Denver Broncos		Alshon Jeffery (WR, PHI) vs. Washington Redskins	
Recs	2.30	Recs	3.98
Rec Yards	32.90	Rec Yards	55.07
Rec TDs	0.23	Rec TDs	0.48
Total Points	4.68	Total Points	8.39
Sit him.		Start him!	