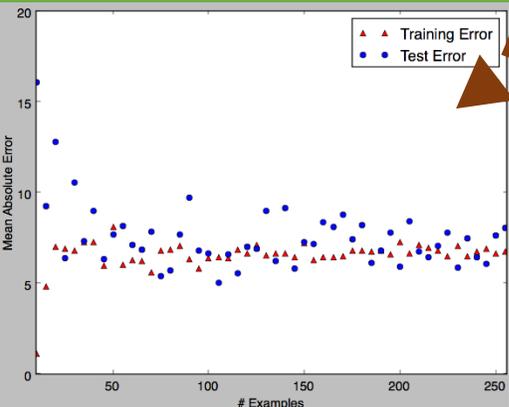


Above is our initial Examples vs. Mean Absolute Error charts. At first, we looked only one game back to predict quarterback stats and scoring for an upcoming game. We next tried a lookback of six games (chart directly above). We ultimately decided to use a lookback of three games (chart below). A lookback of three games avoided overfitting while also providing a suitable number of training examples for our model.



# CS 229 DAILY FANTASY FOOTBALL ML

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**Goal** ▶ Estimate fantasy score for a quarterback in a given week

**Strategy** ▶ Implement linear regression on the 5 stats which determine fantasy score

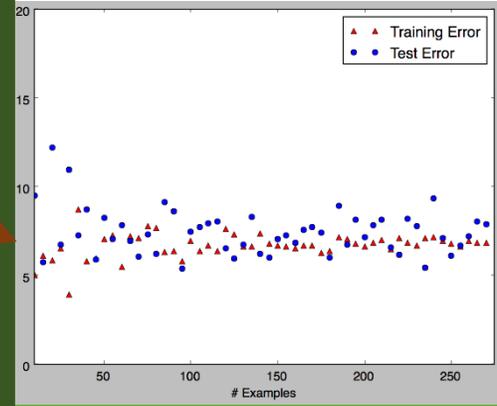
- Touchdowns Thrown
- Yards Thrown
- Interceptions Thrown
- Touchdowns Run
- Yards Run

**Feature Progression** ▶ 1: five stats above 2: The features above for three preceding games 3. defensive ranking for the previous games

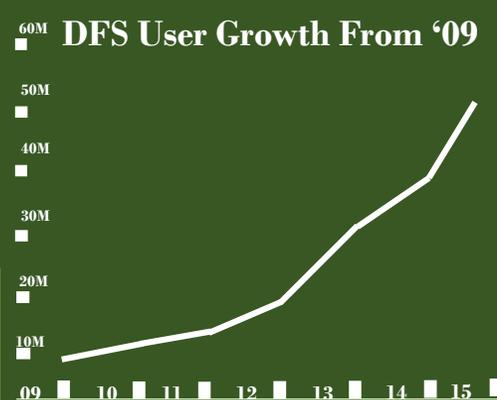
## PERFORMANCE

To the right is a comparison of prediction methods for Week 16 of the 2014 NFL season. When we tested the 16 QBs in our data set on our trained linear regression prediction model, we accurately forecasted (within 5 fantasy points) the actual fantasy scores for 8 of them, while a fantasy “expert” online only accurately forecasted 3. Additionally, our model was severely wrong (greater than 10 fantasy points off the actual) for just 3 QBs while the expert was wrong for 10. Granted, this is just one example in a highly variable and hard to predict environment, but it shows the value of implementing a simple machine learning model on a feature-heavy data set.

Predicting Fantasy Scores for QBs, 2014 Week 16					
Linear Regression	Pred. Pts.	Human Expert	Pred. Pts.	Actual Week 16	Actual Pts.
Matt Ryan	23.8	Drew Brees	28	Russell Wilson	36.4
Ryan Tannehill	21.1	Andrew Luck	24.8	Ryan Tannehill	30.1
Derek Carr	20.8	Aaron Rodgers	23.8	Colin Kaepernick	29.6
Eli Manning	20.8	Matt Ryan	23.3	Eli Manning	27.3
Drew Brees	19.8	Matthew Stafford	23.3	Philip Rivers	27.2
Ben Roethlisberger	18.1	Tom Brady	23	Matt Ryan	17.6
Russell Wilson	17.3	Ben Roethlisberger	22.8	Aaron Rodgers	17.5
Philip Rivers	17.2	Peyton Manning	21.5	Derek Carr	16.7
Aaron Rodgers	16.6	Ryan Tannehill	18.8	Peyton Manning	16.4
Andrew Luck	14.2	Russell Wilson	18.5	Andy Dalton	15.3
Tom Brady	14.2	Andy Dalton	16.5	Drew Brees	15.3
Colin Kaepernick	14	Colin Kaepernick	16	Joe Flacco	13.3
Joe Flacco	13.4	Eli Manning	16	Ben Roethlisberger	12.4
Andy Dalton	13	Joe Flacco	16	Tom Brady	11.2
Peyton Manning	12.2	Philip Rivers	16	Matthew Stafford	7.9
Matthew Stafford	11.3	Derek Carr	15.3	Andrew Luck	2.4



The chart above is the final iteration of our model. In this stage we looked back three games (which we determined to be optimal) and added a feature to consider the quality of the defense opposing a quarterback. The new approach unfortunately did not have huge impact, even though it was fairly significant to implement. In the chart, training and test error converge, but we still have high bias.



We are excited to continue the pursuit of a more powerful model for predicting quarterback fantasy scores, specifically by reducing the bias of our existing model. Numerous approaches are being considered: providing more granular defensive features, adding features such as player injuries, generating quarterback specific models, and more. Our planned approaches were generated based upon analyses of our model and research conducted on the problem space. Past efforts have endeavored to predict quarterback scores based solely on generalized quarterback features, but few have generated models based on granular defensive statistics or features specific to a given quarterback.