Pro Football Focus: Identifying NFL Throws

Goals and Objectives
Predict college quarterback success in the NFL

Background Information
While some quarterbacks seem to have the potential to succeed in the NFL, many times their professional careers fall short of expectations. Quantifying how well QBs will throw in the NFL is an unsolved problem; but an important way to analyze a QBs future is through their college throws.

Methods & Findings (QB Frequency)
Analyze throws based on game situation
- Down and distance
- Pass zone and red zone
- Pass depth
Findings:
- Pass depth & zone affect accuracy
- Most NFL throws are between hashes and sidelines

Methods & Findings (QB Difficulty)
Quantify challenges of throwing into tight coverage
Determined likelihood of throwing an accurate pass based on external factors
Findings:
- Tighter coverage, pass depth and zones impact expected accuracy

Methods & Findings (QB Value)
Assign value to different types of throws
Derived factors related to effectiveness and impact of each throw
Findings:
- XGBoost performs better for EPA prediction than Random Forest
- Graphs of these models performances

Machine Learning
Models:
- Linear Regression on Expected Points Added (EPA)
- Logistic Regression on Accuracy
- XGBoost on EPA and Accuracy
- Random Forest Regressor on EPA

Performance:
- XG Boost performed best (after optimization) when predicting EPA
- Random Forest also performed well, but not as good as XG Boost

Summary + Future Goals
- Play-level models for difficulty/accuracy and value expectations
- Scores over expected
- Cross-season comparisons

Future Goals:
- Interactive model allowing users to select a player and see score
- Breakdown about how we rate players’ throws

“It's been great working with the students of the Data Mine this year. They've provided great insights and foundational research to a very difficult football analytics problem. We're looking forward to extending their work to provide these learnings to our team clients.” - PFF

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