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.

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

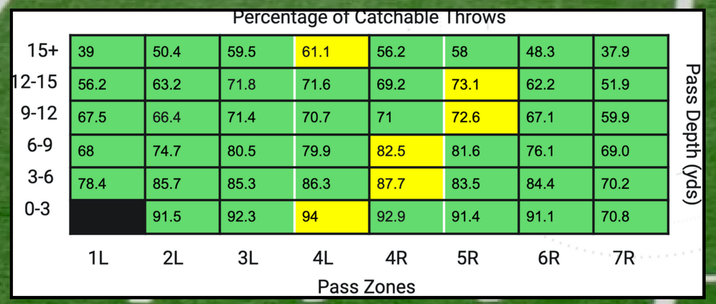
Methods & Findings (QB Frequency)

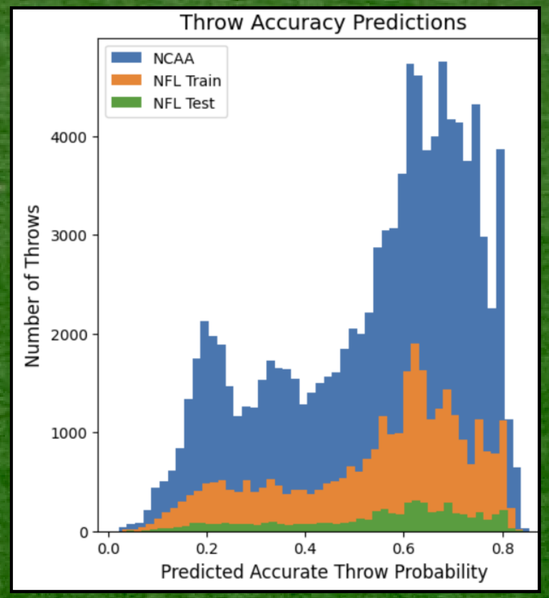
Analyze throws based on game situation

- Down and distance
- Pass zone and red zone
- Pass depth

Findings:

- Pass depth & zone affect accuracy
- Most NFL throws are between hashes and sidelines





Summary + Future Goals

- Play-level models for difficulty/accuracy and value expecations
- Scores over expected
- Cross-season comparisons

Future Goals:

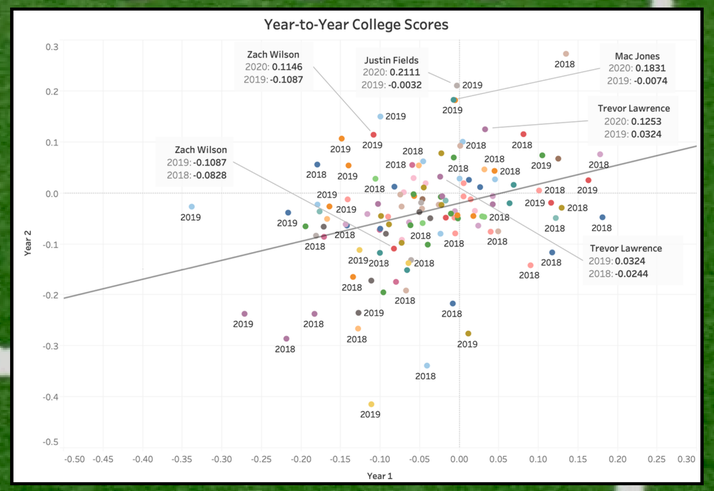
- Interactive model allowing users to select a player and see score
- Breakdown about how we rate players' throws

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

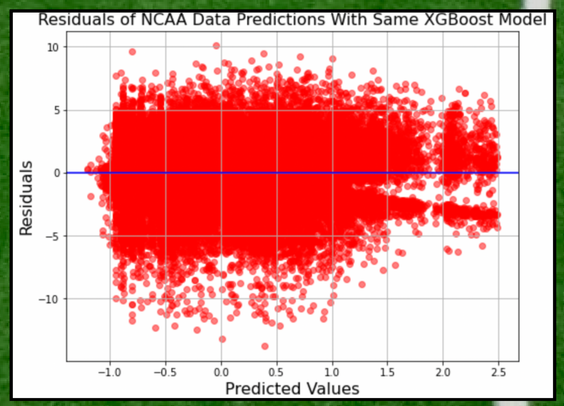


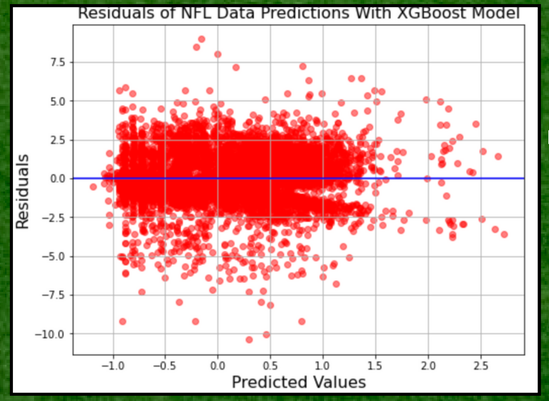
Methods & Findings (QB Value)

- 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





"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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A special thank you to Kaleb Loar, Weller Ross, and Jacob Baldwin from PFF and The Data Mine Staff!

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