Combine Scores x Snap Count

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Project Overview

Big Question:

Is a player's performance at the NFL combine a good predictor for their success in the league?

NFL Combine:

- 40 yd Dash
- Vert Jump
- Bench Press
- etc.

Are some tests more important than others?

Project Overview expanded

Measuring Success:

- Snap Count

Why it Matters?

- $$$$ and resources invested into scouting and analyzing combine results

Goal:

- Find insights as to whether or not 4 days of evaluation can forecast the longevity and level of contribution of an athlete's NFL career

Data

FP - Yearly Snap Counts

Kaggle - Combine Results

Scraped & Looped Yearly 2016 - 2023

Combined yearly snap counts

Cleaned names (Jr., iii, etc)

Removed duplicate names

Adjusted positions

Inner join by player

Random Forest- Binary Target Variable

WRs

- Accuracy : 0.6912
- Sensitivity : 0.6944
- Specificity : 0.6875

RBs

- Accuracy : 0.6512
- Sensitivity : 0.8261
- Specificity : 0.4500

Dline

- Accuracy : 0.6962
- Sensitivity : 0.8500
- Specificity : 0.2105

LBs

- Accuracy : 0.7358
- Sensitivity : 0.9459
- Specificity : 0.2500

DBs

- Accuracy : 0.6923
- Sensitivity : 0.8852
- Specificity : 0.3000

Over 50 career snaps- Positive
Under 50 career snaps- Negative

Overall we saw accuracy around 70%, LBs being the highest and RBs being the lowest.

Sensitivity was very high for every position except WR. Meaning we measured true positives very well.

Specificity varied between positions but was very low for the defensive positions. Meaning that we did not identify negatives very well.

Linear Regression Significant Variables

WRs

- Shuttle ** (Negative)
- 40 yd * (Negative)

Emphasis - quickness and speed

RBs

- Weight ***
- 40 yd * (Negative)
- Height * (Negative)

Emphasis- size and speed

Dline

- Height **
- Bench *
- Weight .

Emphasis- Size and strength

LBs

- 40 yd ** (Negative)
- 3 Cone . (Negative)

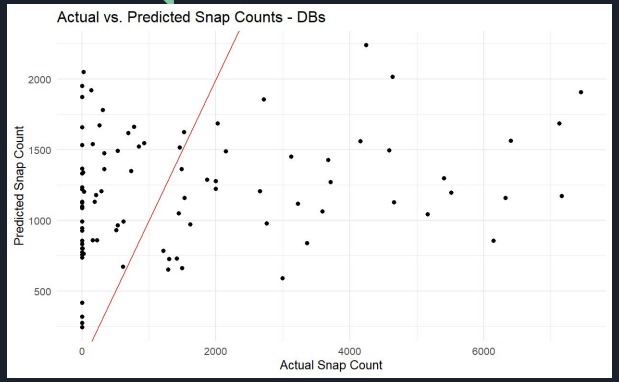
Emphasis- speed and movement

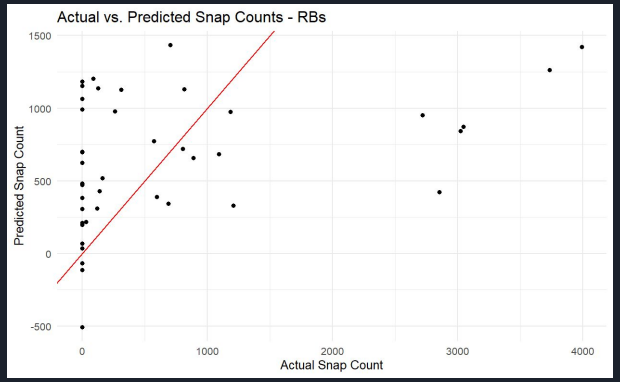
DBs

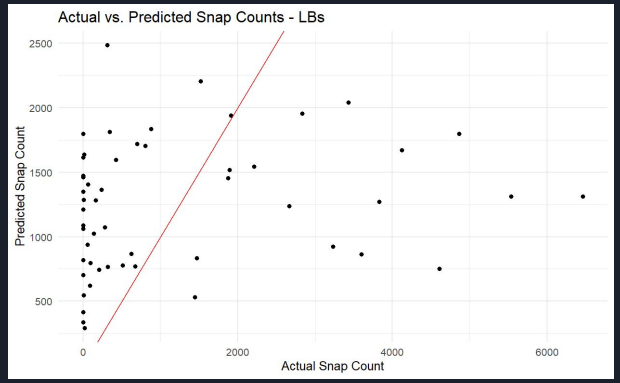
- 40 yd ***
- Weight *

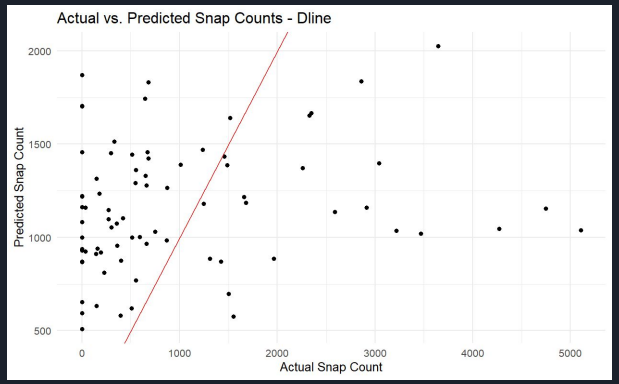
Emphasis- Speed, weight

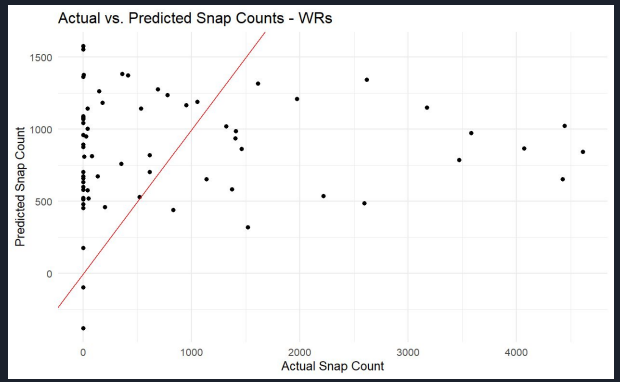
Linear Regression Predictions











XGBoost - Regression using Squared Error Loss

height, weight, 40 yd, vertical, bench, broad jump, 3 cone and shuttle

Overall: *Best model*
- MSE: 131.1538
- RMSE: 11.45224
- MAE: 4.342135

WR
- MSE: 807.599
- RMSE: 28.41829
- MAE: 11.98234

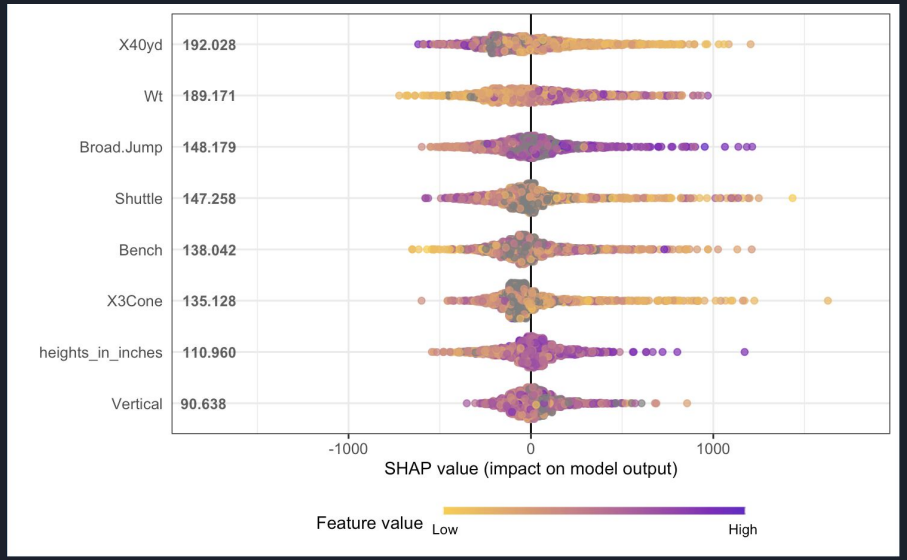
DLine
- MSE: 1230.553
- RMSE: 35.07925
- MAE: 19.55388

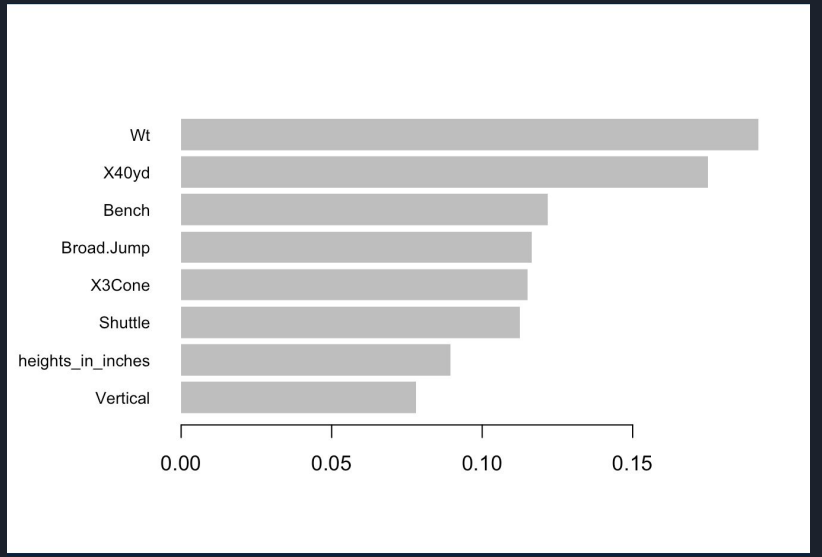
LB
- MSE: 37091.36
- RMSE: 192.5912
- MAE: 44.81875

DB
- MSE: 82091.64
- RMSE: 286.5164
- MAE: 126.4767

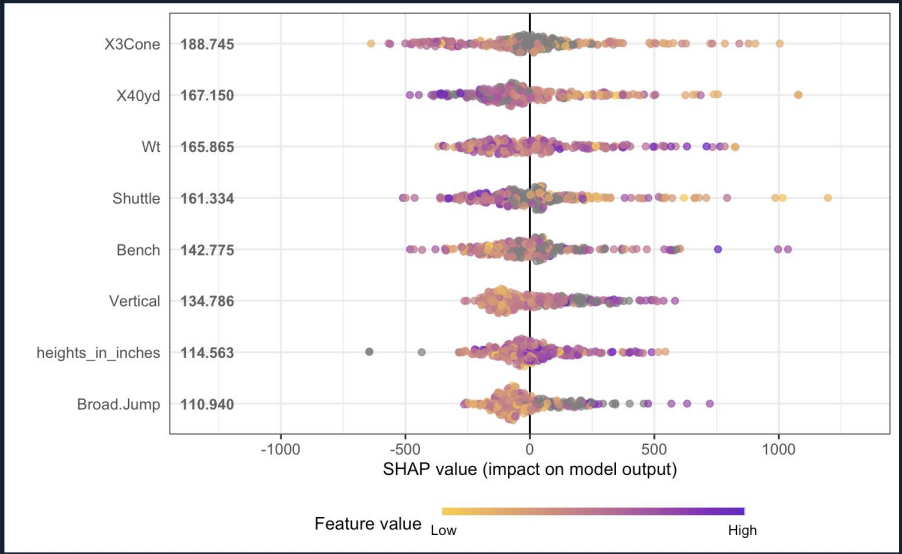
RB
- MSE: 684.8822
- RMSE: 26.17025
- MAE: 11.68648

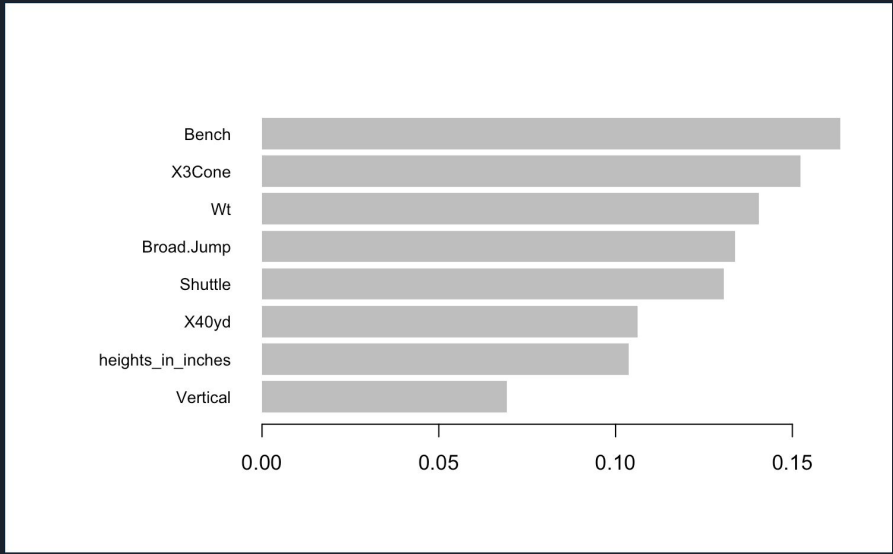
Overall


X40yd 192.028
Wt 189.171
Broad.Jump 148.179
Shuttle 147.258
Bench 138.042
X3Cone 135.128
heights_in_inches 110.960
Vertical 90.638
-1000
0
1000
SHAP value (impact on model output)
Feature value
Low
High

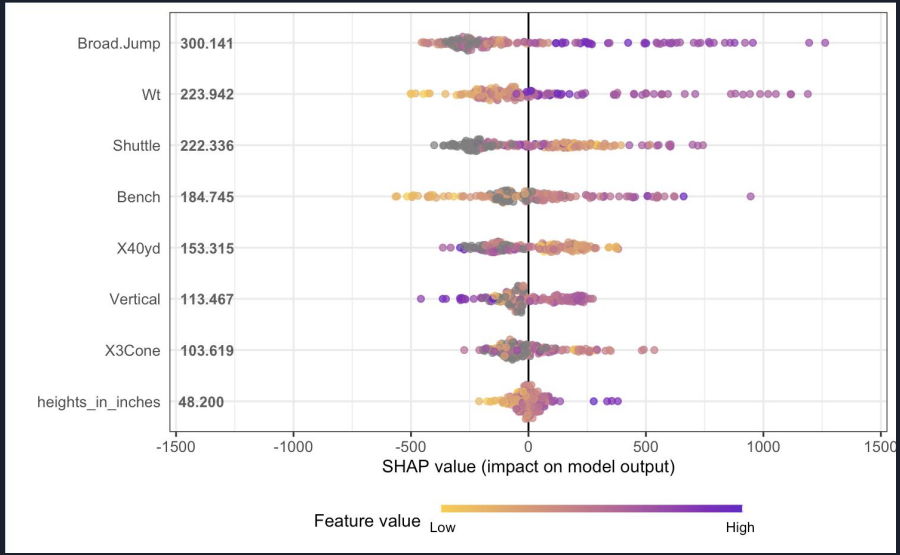

Wt
X40yd
Bench
Broad.Jump
X3Cone
Shuttle
heights_in_inches
Vertical
0.00
0.05
0.10
0.15

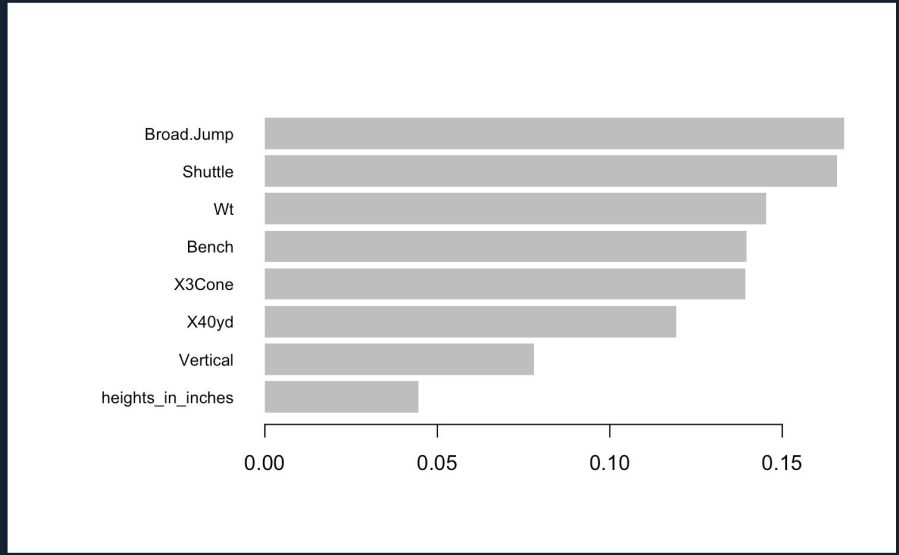
WRs


X3Cone 188.745
X40yd 167.150
Wt 165.865
Shuttle 161.334
Bench 142.775
Vertical 134.786
heights_in_inches 114.563
Broad.Jump 110.940
-1000
-500
0
500
1000
SHAP value (impact on model output)
Feature value
Low
High

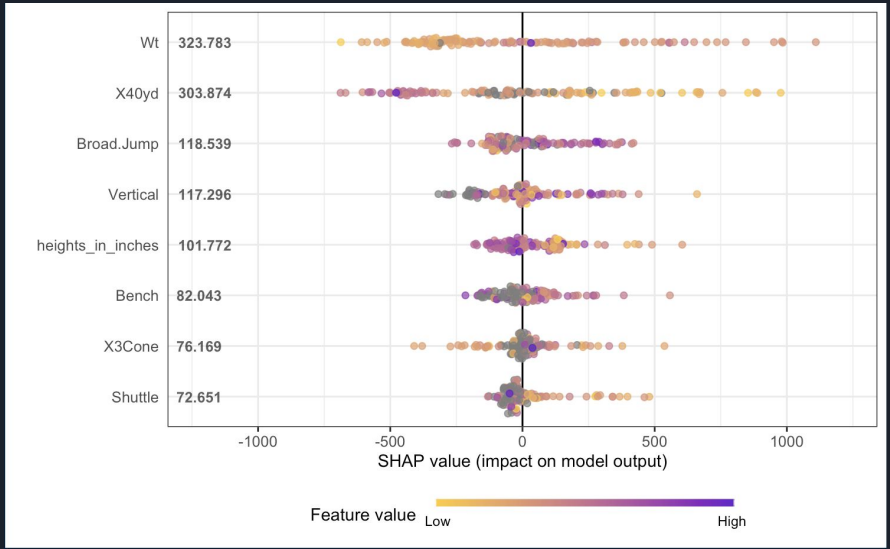

Bench
X3Cone
Wt
Broad.Jump
Shuttle
X40yd
heights_in_inches
Vertical
0.00
0.05
0.10
0.15

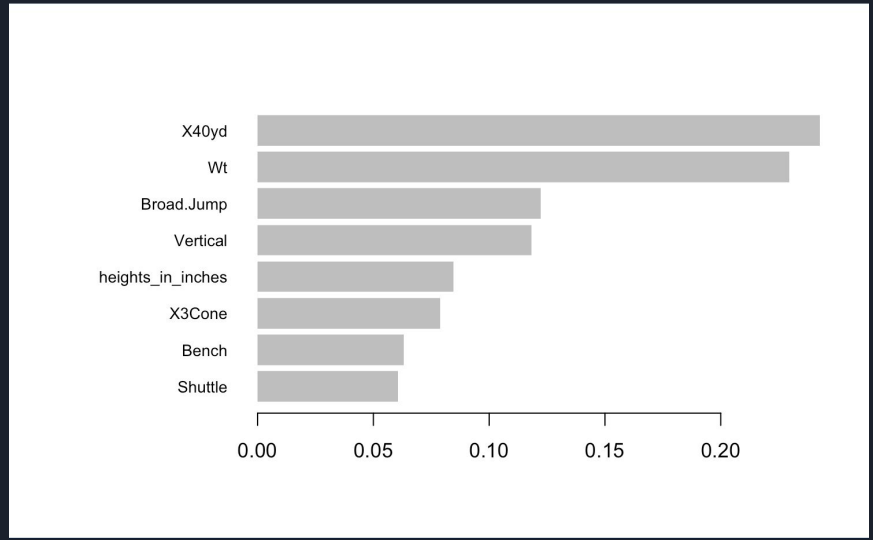
DLine


Broad.Jump 300.141
Wt 223.942
Shuttle 222.336
Bench 184.745
X40yd 153.315
Vertical 113.467
X3Cone 103.619
heights_in_inches 48.200
-1500
-1000
-500
0
500
1000
1500
SHAP value (impact on model output)
Feature value
Low
High

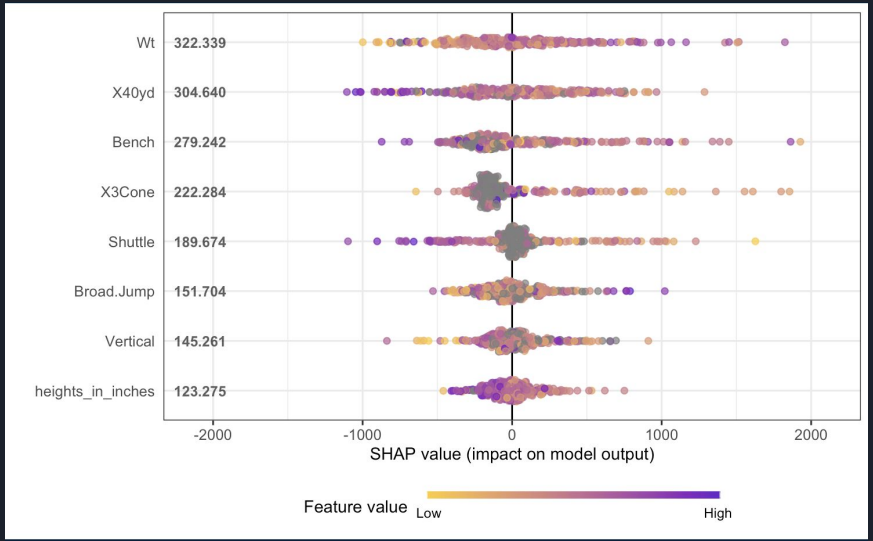

Broad.Jump
Shuttle
Wt
Bench
X3Cone
X40yd
Vertical
heights_in_inches
0.00
0.05
0.10
0.15

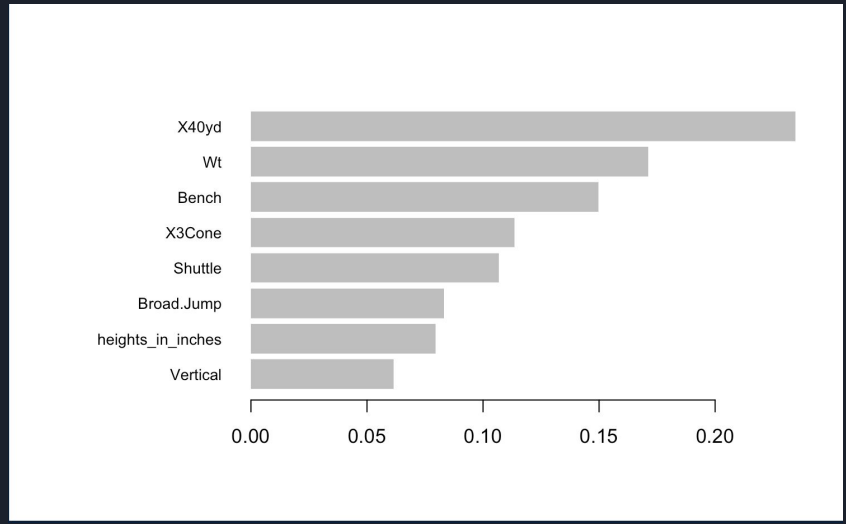
LB


Wt 323.783
X40yd 303.874
Broad.Jump 118.539
Vertical 117.296
heights_in_inches 101.772
Bench 82.043
X3Cone 76.169
Shuttle 72.651
-1000
-500
0
500
1000
SHAP value (impact on model output)
Feature value
Low
High

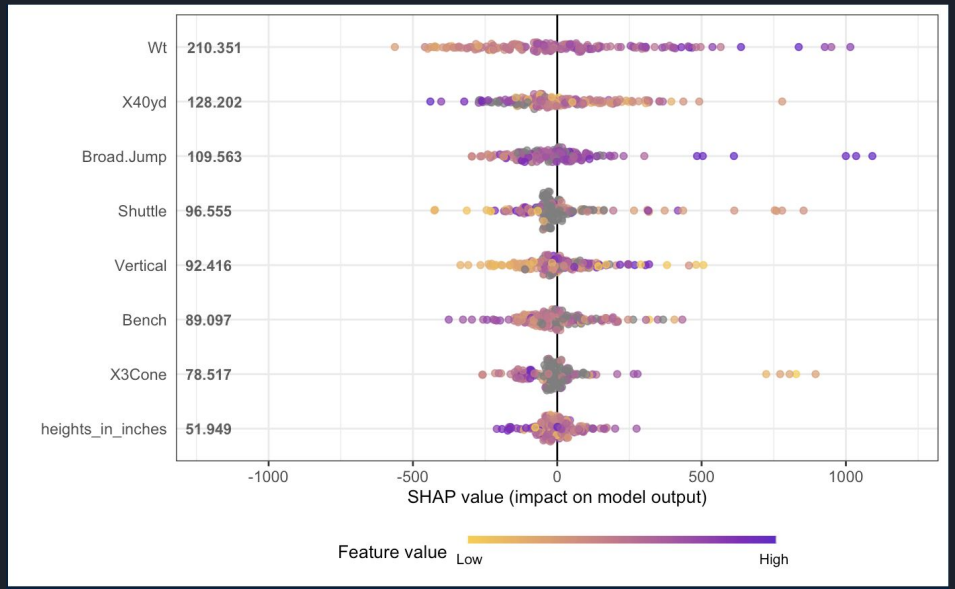

X40yd
Wt
Broad.Jump
Vertical
heights_in_inches
X3Cone
Bench
Shuttle
0.00
0.05
0.10
0.15
0.20

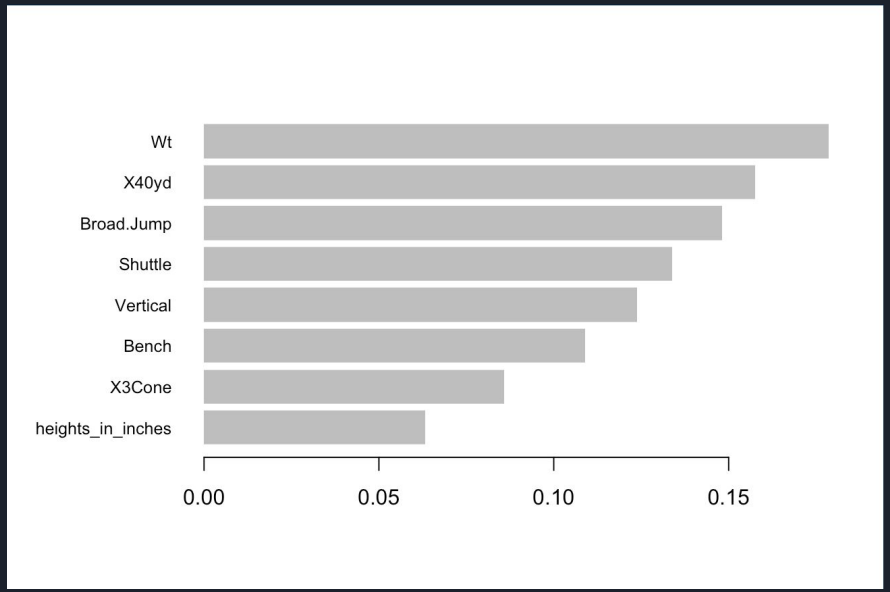
DBs


Wt 322.339
X40yd 304.640
Bench 279.242
X3Cone 222.284
Shuttle 189.674
Broad.Jump 151.704
Vertical 145.261
heights_in_inches 123.275
-2000
-1000
0
1000
2000
SHAP value (impact on model output)
Feature value
Low
High


X40yd
Wt
Bench
X3Cone
Shuttle
Broad.Jump
heights_in_inches
Vertical
0.00
0.05
0.10
0.15
0.20

RBs


Wt 210.351
X40yd 128.202
Broad.Jump 109.563
Shuttle 96.555
Vertical 92.416
Bench 89.097
X3Cone 78.517
heights_in_inches 51.949
-1000
-500
0
500
1000
SHAP value (impact on model output)
Feature value
Low
High


Wt
X40yd
Broad.Jump
Shuttle
Vertical
Bench
X3Cone
heights_in_inches
0.00
0.05
0.10
0.15

Further Work

Positional focus

Weighted combine events

Event x Position

College stats & awards

Prior school & conference impact

Other career outcomes indicators

NFL stats & awards

Career earnings

Conclusions

The combine can be a tool, but there is more to football than just physical measurements.

Technique, production, and personality are not measured in these combine events.

Overall, we were able to find what physical traits matter most for each position, but were unsuccessful in being able to predict career snaps accurately.