NFL Draft Strategy and Trends

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Abstract— This project addresses a particular need for NFL fans regarding historical and current draft trends and results. Through the creation of an interactive visualization dashboard, patterns in player success, team peformance, and draft trends are uncovered. Built with Streamlit, through the use of Python, this dashboard leverages player-specific statistics, team affiliations, and collegiate backgrounds to enable the user to explore past draft results both league-wide and team-specific. Core use cases in this dashboard include color coded visualizations, team styling, and interactive filters to give freedom to the user. The most used performance-based metric used throughout the dashboard is the Weighted Approximate Value (w_av) which helps quantify player impact throughout an entire career or by season. Findings from this dashboard help build storylines and narratives for reasoning behind past seasons success, while also offereing insights into which draft strategies consistently lead to NFL success.

1 Introduction

The NFL Draft is one of the most consequential events for all NFL franchises. The direction of each and every organization depends on the handful of picks each general manager will make on the three-day event.

Despite the many sleepless nights of scouting and analysis, many teams consistently fail to find value not only in the late rounds, but early rounds as well. Recent research actually has started to suggest that most of the value of the NFL Draft comes in the early rounds (Smith 2024). Despite rounds one and two typically offering the more blue-chip prospects, team performance success has often been correlated with the on-field success of the draftees in rounds three through five.

Similarly, in a few studies from the past decade show that many skill players selected in the later rounds have outperformed those "early round" scouted players (King 2013). Along the same lines, some teams will heavily focus on certain metrics, such as 40-yard dash and vertical leap physical metrics, despite not always correlating to NFL success (Sumersports 2024).

The underlying research problem for this project in particular is centered around sports analysts or in-depth fans who want to track ongoing and historical trends among yearly drafts. These people need a simpler way to explore these narratives and build solid storylines for upcoming seasons and drafts.

Although there are many draft data dashboards around currently, this one is aimed to have a multi-purpose approach by having general draft statistics, team-specific picks and player performance, as well as team by team comparison on one large visualization.

2 Related Work

Previous pieces of work have focused on identifying any factors that can predict player success and valuate how all the teams use their draft capital. In particular, one area is the predictive value of any draft round. As discussed in the introduction, the middle rounds have found to contain lots of long-term value relative to the cost of the draft pick itself (Bryant 2024).

Other works have looked to explore and expand on draft efficiency and team-level outcomes. Watson (2016) developed a model to study each team's efficiency when drafting relative to the actual success of their picks. Along with that, others have specifically examined first-round draft picks using linear regression. Results of this showed that conference, position, and age significantly influence productivity early on in a career (Bernal, Long, Worley 2017). This was part of the reason for me to include such specific visualizations around school and position.

Aside from specific player metric, some geographic biases were determined in team decision making. This is a section that I wish I could have had more data to explore in more depth. Accessing a geographical representation country-wide of how often NFL franchises draft outside of their region could provide some interesting insights.

These are only a few of the many research projects around the NFL draft, and countless scouts and data analysts for NFL teams are spending all of their time attempting to crack the code of the who to pick with valuable assets.

3 Data and Methods

3.1 Data

The dataset used for this project contains draft pick information since 1980. For this subset, I've decided to use only NFL Drafts since 2010. I chose to do this to maintain consistency between NFL franchises and relevant position metrics.

Each row in the dataset includes one player drafted, along with any relevant background information, collegiate information, and position-based NFL statistics.

- *Name, team, college*—basic information to identify players
- *Year, round, pick*—indicate year, round, and overall pick number used in my visualizations
- *Games, pro_bowl, all_pro, position_stats*—longevity and NFL honor metrics

- *W_AV*—Weighted Approximate Value, a metric created by Pro Football Reference to measure total player contribution over time [Pro Football Reference 2024]

A majority of the data used in the visualizations come from the features listed above, along with some mapped conferences, team colors, position groups, and others to help add context to the overall dataset.

Lastly, there are a couple calculated values used in a couple of the visualizations. The first field is the draft grade score assigned to each individual team for the selected draft year(s) on the second page of the dashboard. This value is calculated using a few different factors, such as total player impact, draft efficiency, and a recency value (since w_av is cumulative over a career). This impact score used in the calculation takes into account the weighted approximate value with career accolades (pro-bowl, all-pro, etc.). The recency factor took a little tweaking in order to hit the correct amount and not overscale the more recent years. I think in the future scope of this project, the calculations for this draft grade could certainly be improved, but for the context of creating helpful and meaningful visualizations, this calculated value will do for the time being.

A limitation of the dataset used was the physical traits and measured values for the draft prospects each year. In the beginning, my scope for this was to use some of the measurables to find feature importance using some machine learning methods and then portray that information in an interactive way to the user. Due to inconsistencies in years and large amounts of effort to track down measurables for each draft candidate, that led me to the current approach to be outlined in the next subsection. In a normal set of data with hundreds of thousands of rows of data, a few blanks or nulls would be easily removed without much worry, but with each draft year only including ~250-300 participants, removing values can be destructive to the gathered results and interpreted meaning behind them.

3.2 Methodology

The interactive multipage Streamlit dashboard aims to give the user the control to view content and visualizations that best fit what they would like to analyze.

The first page in the dashboard introduces the user to the dataset and gives an overview of each year of the draft. It was designed to highlight the overall draft activity and positional trends with clean, interactive visualizations and graphics.

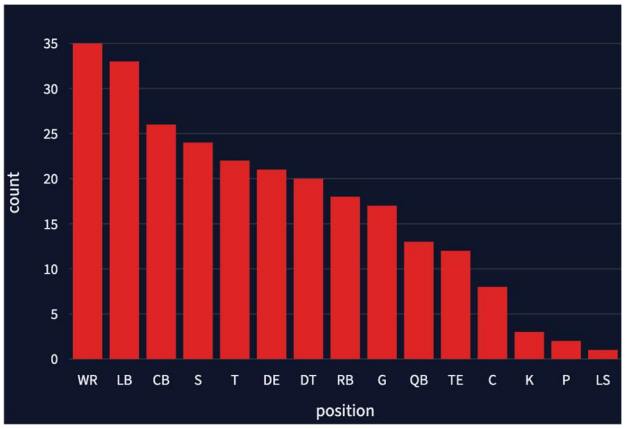

Fig. 1. Number of Players Drafted by Position.

Fig. 2. Players Drafted by Position and Round.

The above two figures depict the first graphics presented to the user upon entering the dashboard. These two work in tandem to breakdown positions drafted throughout the whole draft, as well as round by round. The heatmap allows the addition of multiple years to show the cumulative build-up of important positions for each of the seven rounds.

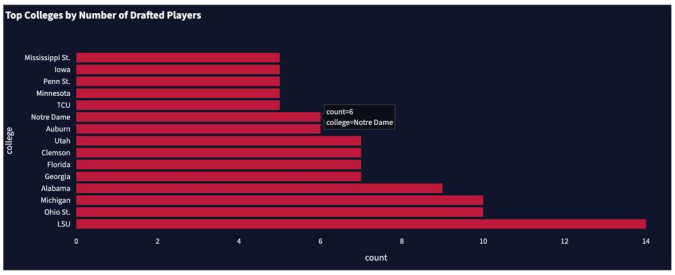

Fig. 3. College & Conference Draftee Count Breakdown

Figure 3 depicts the cumulative number of players drafted from each college, as well as conference if toggled, for each year that is selected. This graph will not often change too much, because each year the larger conferences and school will have popular recruits graduating and preparing for the draft. This landing page overall serves a good purpose for those that want to get some quick information about the draft year they're curious about, as well as confirm or build any narratives about positions in the NFL Draft.

The second page is targeted towards team specific information. This is the most complex page, due to both year and team-based filtering. The page itself maintains a visually pleasing color scheme for each team, while also displaying relevant information for each draft class. The team draft grade is a complex calculation and certainly could use some improvement down the road but gives an immediate validation for one's favorite team or targeted team for analysis.

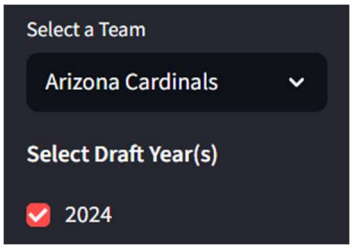

Fig. 3. Year and Team Filter

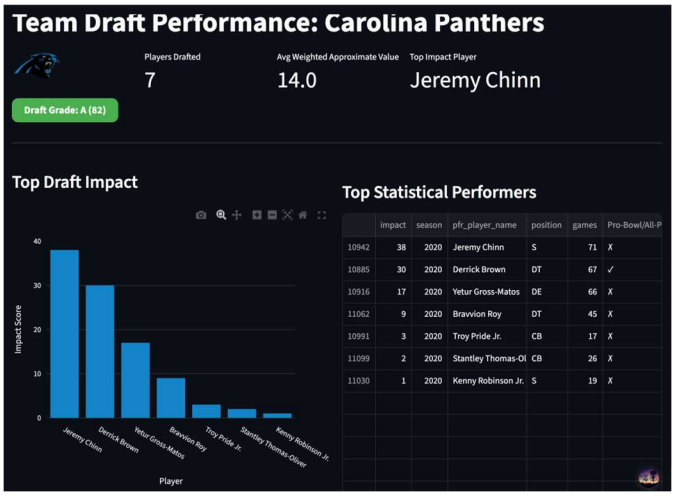

Fig. 4. College & Conference Draftee Count Breakdown

As seen in Figure 4, the user is in control of which team info to display. The table on the right side gives some additional information that can be downloaded to a csv for addition use if needed. The statistics included in this table are mapped to only be relevant to the specific position of the player as well.

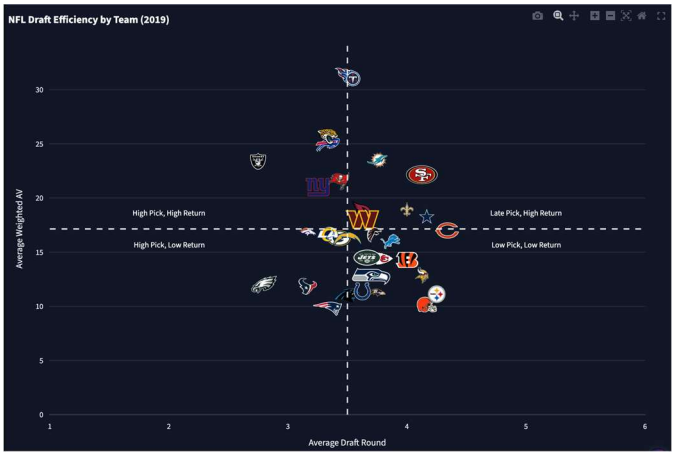

Fig. 5. NFL Draft Efficiency by Team & Year

Figure 4 depicts the main visualization of the Streamlit application. This scatterplot includes all 32 NFL teams on the same plane to compare draft efficiency for each. The graph is split into four quadrants. The x axis displays the average round between all of one team's picks, while the y axis is the average of each player's weighted approximate value. This helps place each team into one of four quadrants. The best performing teams, or ones who got the most value out of the worst average pick position, would be placed in the upper right. The worst performing teams would then accordingly be in the lower left. Hovering over one of these teams shows a breakdown of each player, the pick position, and career average weight approximate value.

4 Results and Observations

Results from this project and the visualizations have mostly confirmed any thoughts or trends I've noticed through my years of following football and the NFL Draft.

From the first page of the dashboard, the heatmap yields consistent results for highly sought after positions in the early rounds and later rounds. Typically, wide receivers and cornerbacks are almost always picked early, while running backs and linebackers are typically mid-to-late round picks. The high-risk/high-reward draft choice is quarterback, where there were either many selected early or almost no quarterbacks. In terms of schools and conferences, it was demonstrated that Power Five programs, like Alabama and Georgia dominated the NFL Draft year after year.

In the team-based visualizations, it became clear when exploring through different teams and years that many of the high impact players were coming from earlier round selections, which means while important to hit on late round picks for extra value, it is even more important to get the consistent performers early while possible. In terms of the Draft Efficiency, teams that have been successful in the recent decades (49ers and Seahawks) consistently extracted high impact from below-average draft slots. Other the other side of the coin, teams that have struggled (Jets, Raiders) continued to fail to take advantage of higher draft pick order.

From all of these results, I have come across these storylines from various news sources and outlets during the build-up to the NFL Draft. If anything, this helps confirm the results, but I do think there could still be some digging and additional insights from other eyes interacting with the dashboard.

References

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