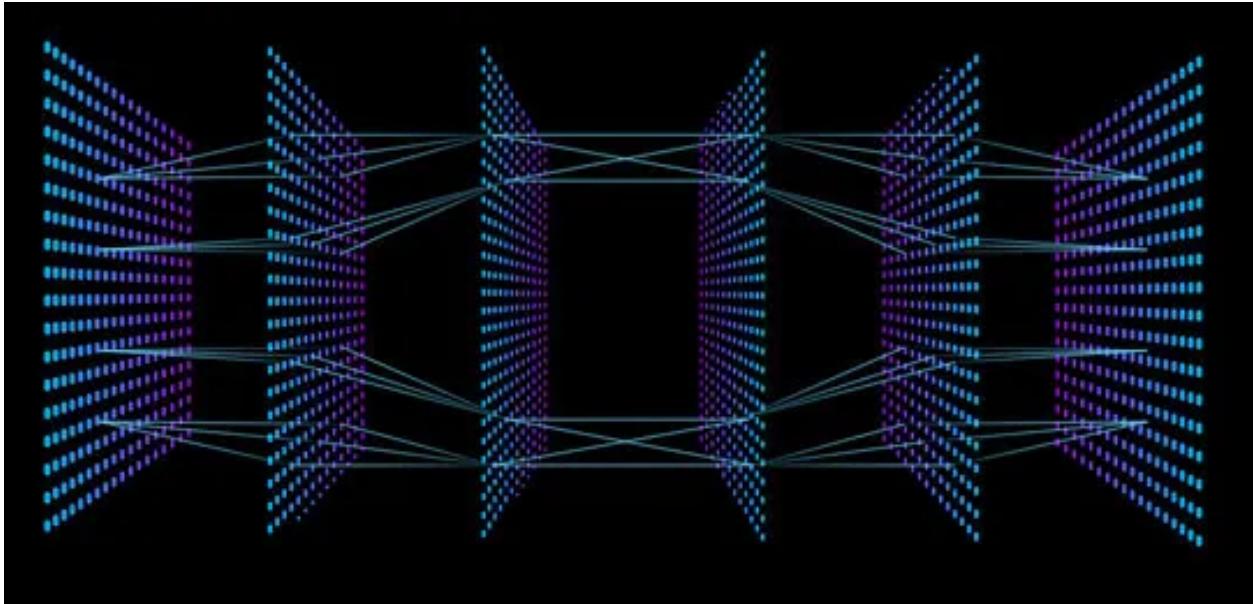


# Data Analysis for USU Football

Insights for Recruiting, Retention, & Offensive Playbook Strategy



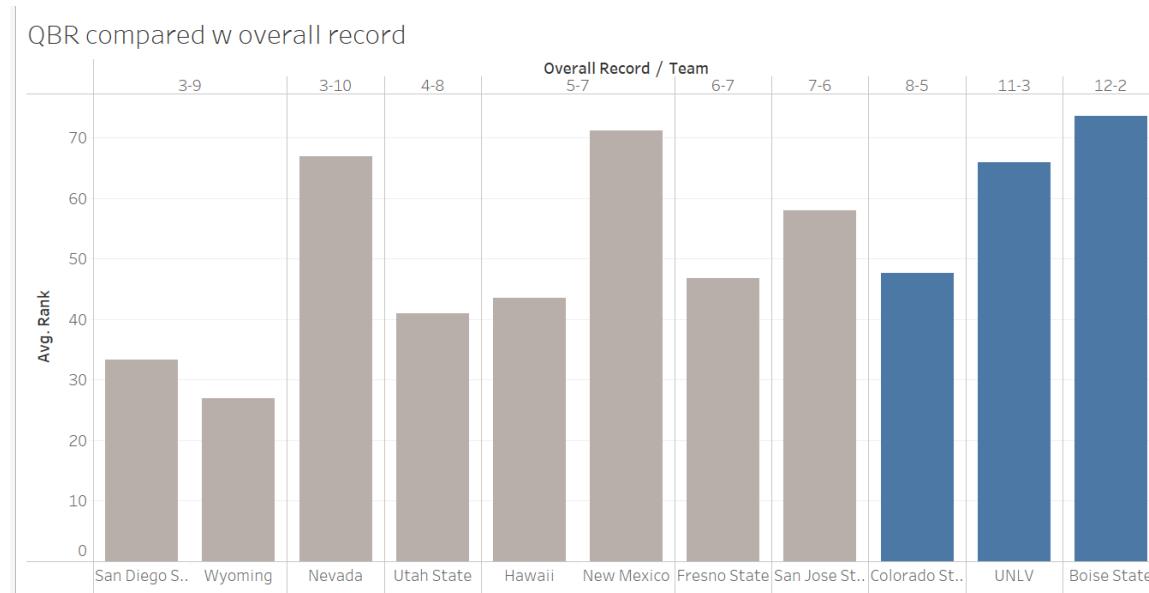
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## I. Overview & Context

During the past few years, football has been in a transformative era with NIL. (Overview) The goal of USU football should be to dominate the MWC to make it to the CFP. However, within this conference, there are several other competitive teams that have a higher offensive grade, defensive grade, and more impact players. In order to face this challenge, we used several key metrics to optimize player performance and game strategy that we believe will help USU to perform well and beat other teams. Through a thorough analysis of historical game data alongside current game data, we have learned that USU will significantly benefit from using data to analyze both strategy and key metrics to have a team that can dominate the MWC.

## II. 3. Data Sources & Collection Methods

We received multiple data files from the school with different grades for each team. We also began to perform web scraping to pull college football data from sports-reference.com and other websites that we cleaned and normalized for data analysis. We focused on collecting data on different positions and the benefits they bring to the offensive grade of the team.

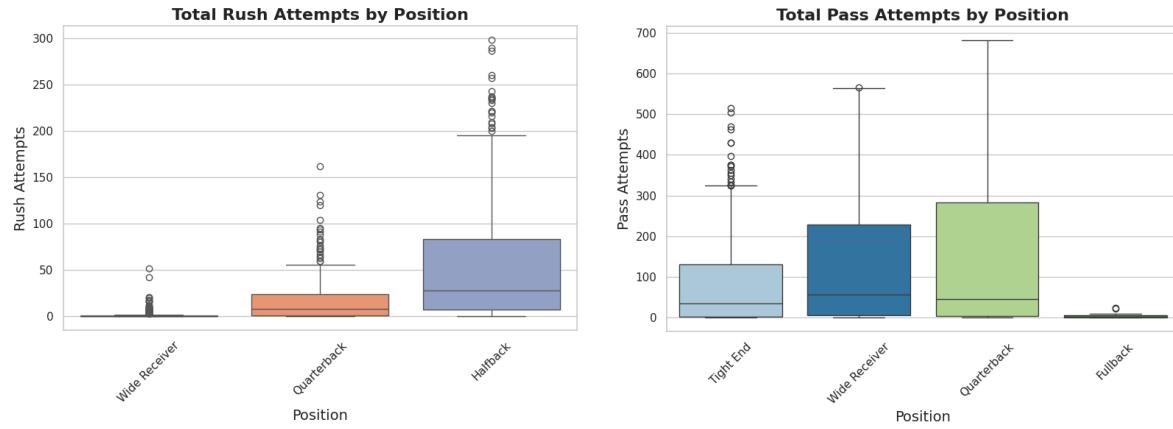


*Despite outliers, a team typically performs better with better quarterbacks.*

### 3.1 Methodology & Analysis Approach

Through web scraping, exploratory data analysis through pandas, and data visualization with matplotlib, seaborn and tableau, we tracked and compared key metrics including the total rush attempts by position, the total pass attempts by position, and the correlation between the number of rush attempts by a team compared to that team's offensive grade. We believe that while the number of rush and pass attempts are both positively correlated with the overall

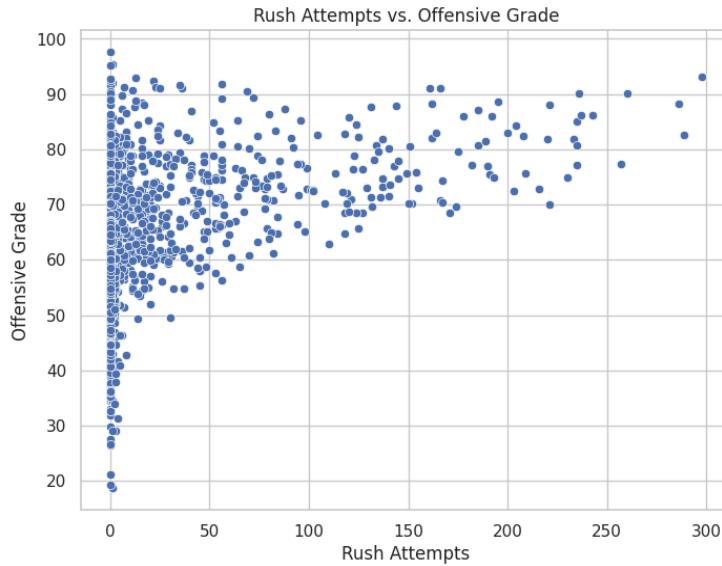
offensive grade of that team, choosing to pass over playing would result in a higher yard gain per play even considering incomplete passes. Here are some visualizations to show our findings:



*These positions have the highest impact on passing/rushing compared to other players.*

While each position can receive investment, these positions have a higher level of impact and should receive a higher investment because how well a team plays on offense is more directly correlated to these players. For example, focusing on having a good quarterback compared to having the best fullback can be well worth the investment.

Below the correlation between how well a team performs on offense is compared to the amount of rushes they attempt. A more detailed analysis is available on python notebooks below showing the correlation between player type, the rush attempts, and their offensive grade.



*While passing typically earns more yards per play, rushing also helps exhaust the defensive team and directly improves the team's offense.*

Rushing, passing, and player choice can significantly affect how well a team can pay when they have a limited budget to pay players.

### III. Recommendations & Strategic Implications for USU

The analysis reveals significant trends in game performance and player efficiency, highlighting areas for improvement focused on player choice for recruitment and strategies for offensive play calling. Generally, offensive plays should tend to **pass more**, if they have the option, therefore a focus should be put on playing excellent Quarterbacks and wide receivers in order to reach an optimal pass-play ratio. There is likely a fallacy of “running causes winning”, which leads to USU running more often than the optimal rate. In reality, teams that win often and run often often gain a lead early on and then choose to run, as it is less risky and they can maintain their lead. Therefore, rushing should be used when there is a point advantage already and gaining further points won't have a strong effect on winning or losing the game.

However, where points matter, in a tie in a case that USU is behind in points, then playing offensively by passing more may lead to a more optimal offensive strategy. In cases where passes are not possible, more effort should be made to play great halfbacks who are the main rushers for any rushes. In order to give the quarterback the time needed to make a great play, a good offensive line is necessary to give the QB the time and breathing space to make more passes. More study may be necessary to find out what can help USU pass more and perform better offensively. They are both highly involved in the game and likely, positively correlated with the outcome of the game.

### IV. Further Study

While this study shows that passing more might lead to a better optimized offensive strategy, there are several other important factors that can have a high impact on how well the team does. One potential study is creating a Machine Learning model to predict how the team performs in past seasons and compare those results to the real team performance of the last season. If the model performs well, it could be used to find out if there are any specific teams that USU struggles against, so that they can create specific strategies focused on high-impact games against difficult opponents to perform well.

While this data might not be available or might be costly to obtain, doing a data analysis on

## v. Python Notebooks

For detailed analysis and code, refer to our Python notebooks available on Github [link]

<https://colab.research.google.com/drive/1auMJa-Xnx8TnPqfAtyQ72p5Oc7vYbi9a>

<https://colab.research.google.com/drive/1auMJa-Xnx8TnPqfAtyQ72p5Oc7vYbi9a>

Below are relevant research links we used during the case study:

<https://medium.com/@joerosborne/intro-to-web-scraping-build-your-first-scraper-in-5-minutes-1c36b5c4b110>