

Tech

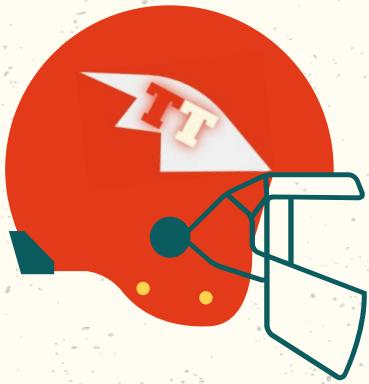


Titans

# Running Up The ★Score★

NFL Running Back Salary and  
Production Forecasting





# ★ Team Members ★

Gabriel Galley

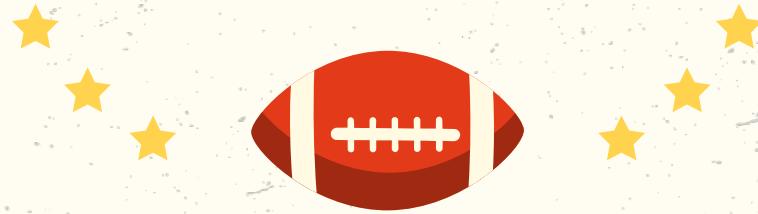
Tony Lockhart

Asa Adomatis

Dexter Johnson

Gerardo Castanos

Gabriel Jean-jumeau



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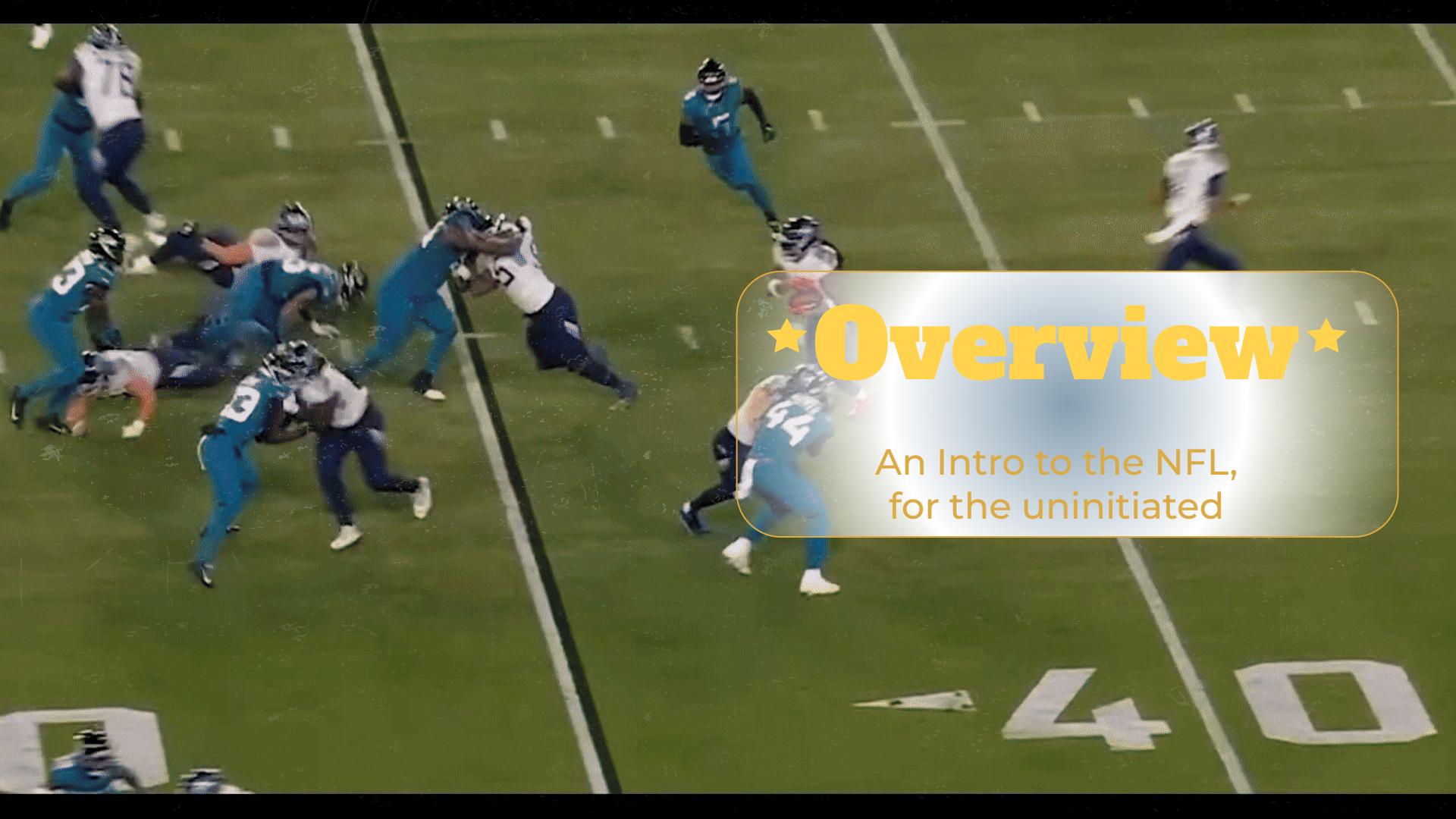
## THE DATA

Visualizations and interpretations

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## CONCLUSIONS

Answers, and more questions?

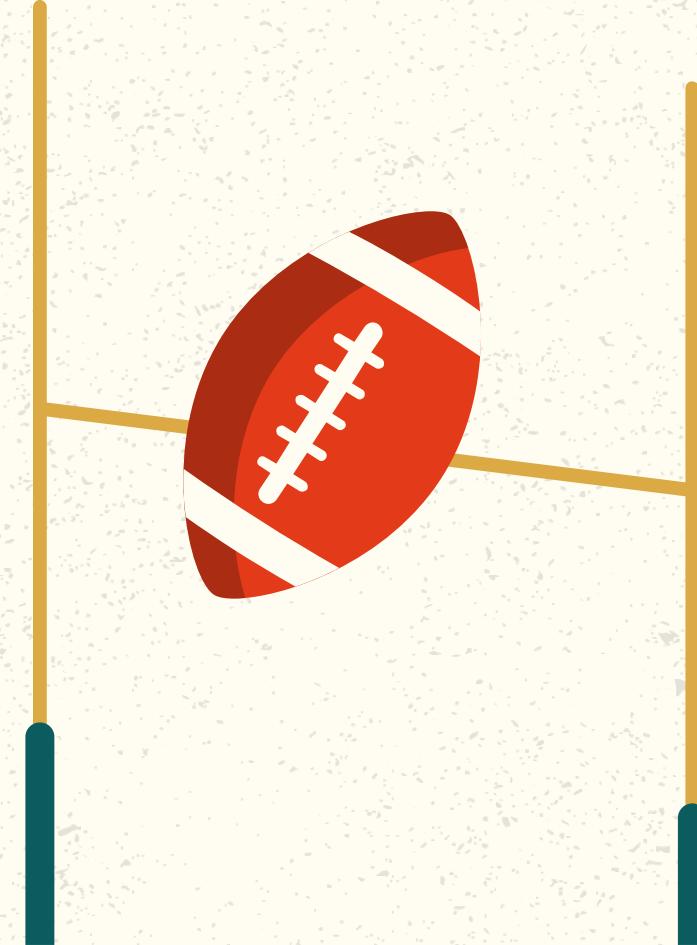


# ★Overview★

An Intro to the NFL,  
for the uninitiated

# ★ National Football League ★

- NFL has 32 teams of 53 players, 17 games per season
- That's ~30,000 player-games per season
- Data ripe for the analysis!
- Of 19 positions per team, we'll focus on **running backs**



# ★ QUICK KEY TERMS ★

## CAP HIT (SALARY CAP)

**Cap Hit** refers to the total salary penalty of a specific player towards their team's yearly total **Salary Cap**, usually equivalent to their total pay



## RUNNING BACKS

We took a closer look at one position in particular: **running backs**, those who carry the ball in hand - the bell cows of their teams

## PRODUCTION

In this study, we will define a player's **production** as **rushing yards/attempts** per season, a sum of the total yards/attempts by a particular player throughout a single season. We will also use **Touchdowns** as a metric for production in one instance.



# ★ What are we ★ trying to learn?

What are the critical factors that most effectively determine running back cap hit?

- What is the correlation between player position and cap hit?
  - Any significant outliers?
- How does a running back's production correlate with their cap hit?
  - Are there any correlations present between cap hit and age/years of experience?



# Our Datasets

```
[34] # Import the required libraries and dependencies  
  
import pandas as pd  
from pathlib import Path  
  
from prophet import Prophet  
import datetime as dt  
import numpy as np  
from io import StringIO  
import requests  
  
%matplotlib in
```

## NFL Player Data

- Basic stats, career stats, and game logs provided by Pro Football Reference (17-18), NFL Stats (17-19), and Stathead (17-18)

```
# Step 1: Scrape Rushing Data  
url = "https://www.pro-football-reference.com/years/2017/rushing.htm"  
rushing_results = requests.get(url).text  
df_2017_NFL_Rushing = pd.read_html(rushing_results)[0]  
  
# Check columns  
# display(df_2017_NFL_Rushing)  
  
# Simplify column names  
df_2017_NFL_Rushing.columns = df_2017_NFL_Rushing.columns.get_level_values(0)  
  
# Check Columns after Flattening:  
# display(df_2017_NFL_Rushing.columns)  
  
# Print out exact column names  
# print(list(df_2017_NFL_Rushing.columns))  
  
# Strip out blank spaces  
df_2017_NFL_Rushing.columns = df_2017_NFL_Rushing.columns.str.strip()  
df_2017_NFL_Rushing = df_2017_NFL_Rushing.rename(columns={c:c.replace(' ','') for c in df_2017_NFL_Rushing.columns})  
  
# Print Clean data  
# Replace NaN with 0
```



## NFL Salary Data

- Contextualized salary cap data and cap hit %, both provided by Kaggle.com

Python

# The Merge

## Our Master List

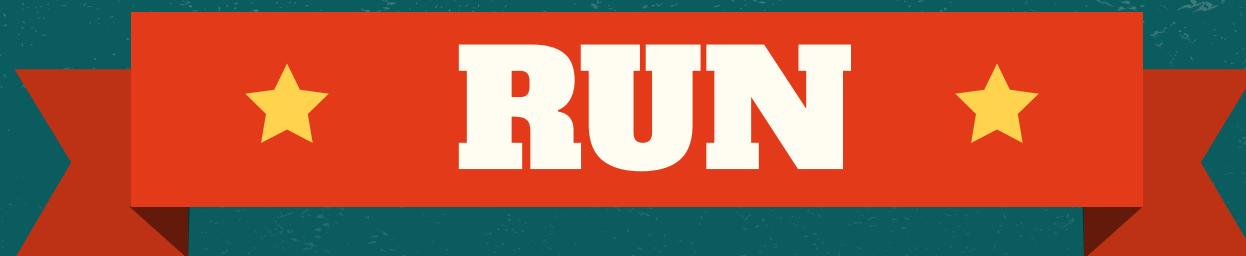
- We took the data from both player data and salary CSVs, scrubbed them, and combined them to make our final dataset





# Data on the

## RUN

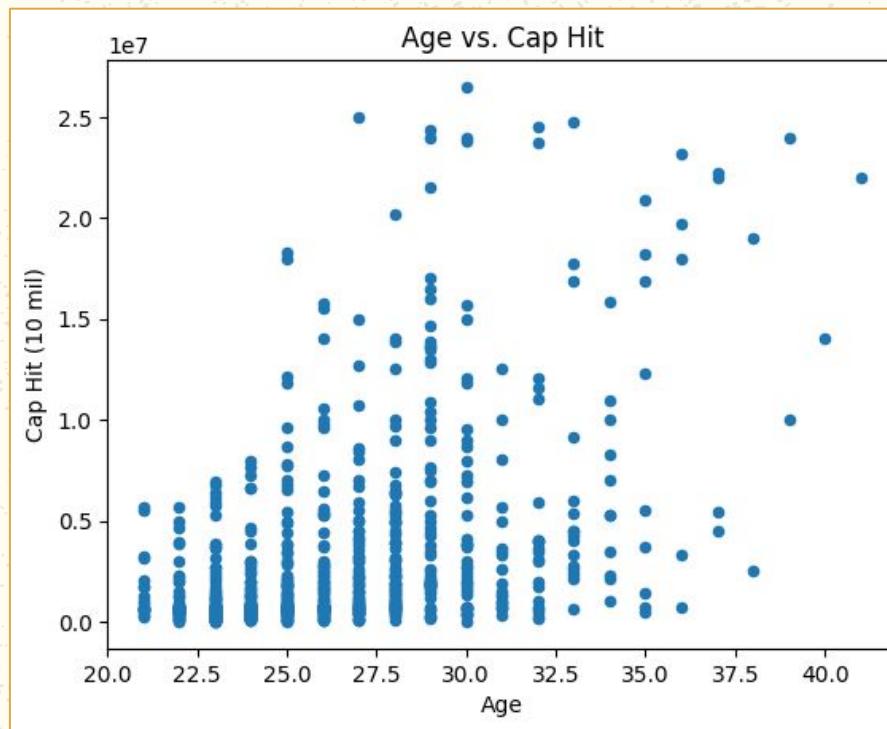




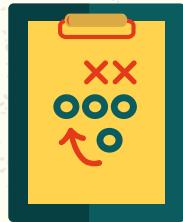
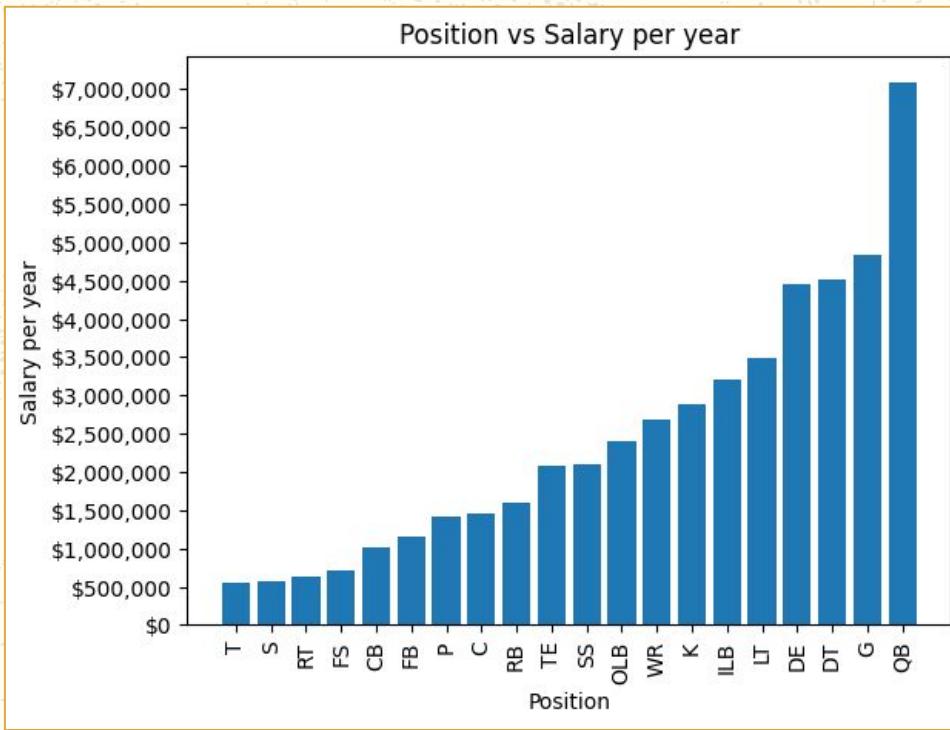
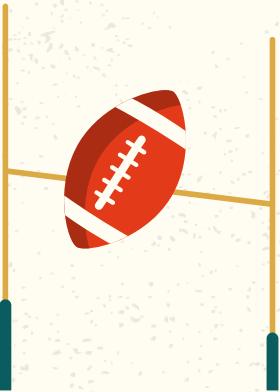
**Please hold  
for a brief  
demo**



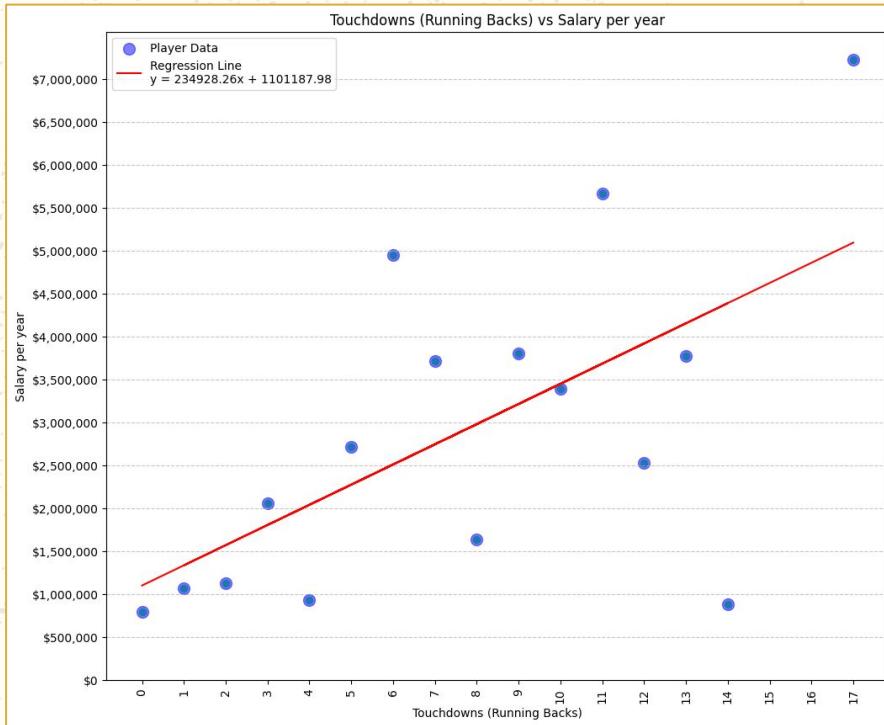
# ★ Age v. Salary ★



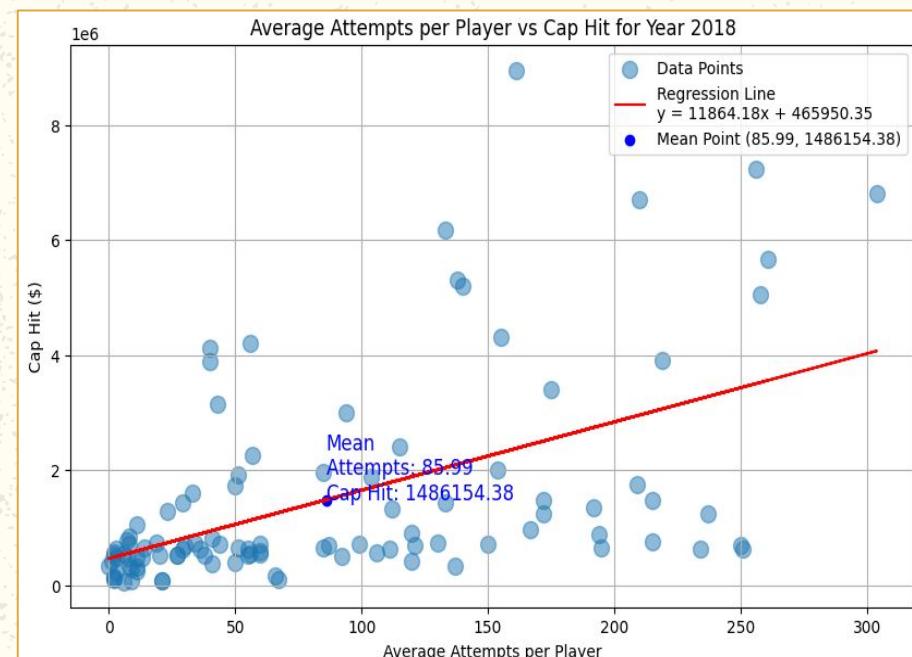
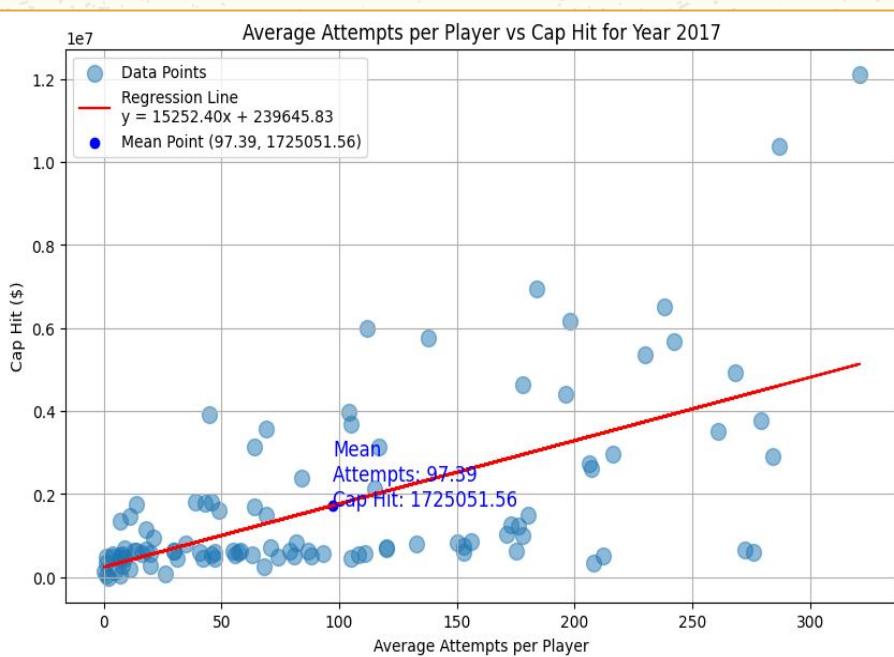
# ★ Position v. Salary ★



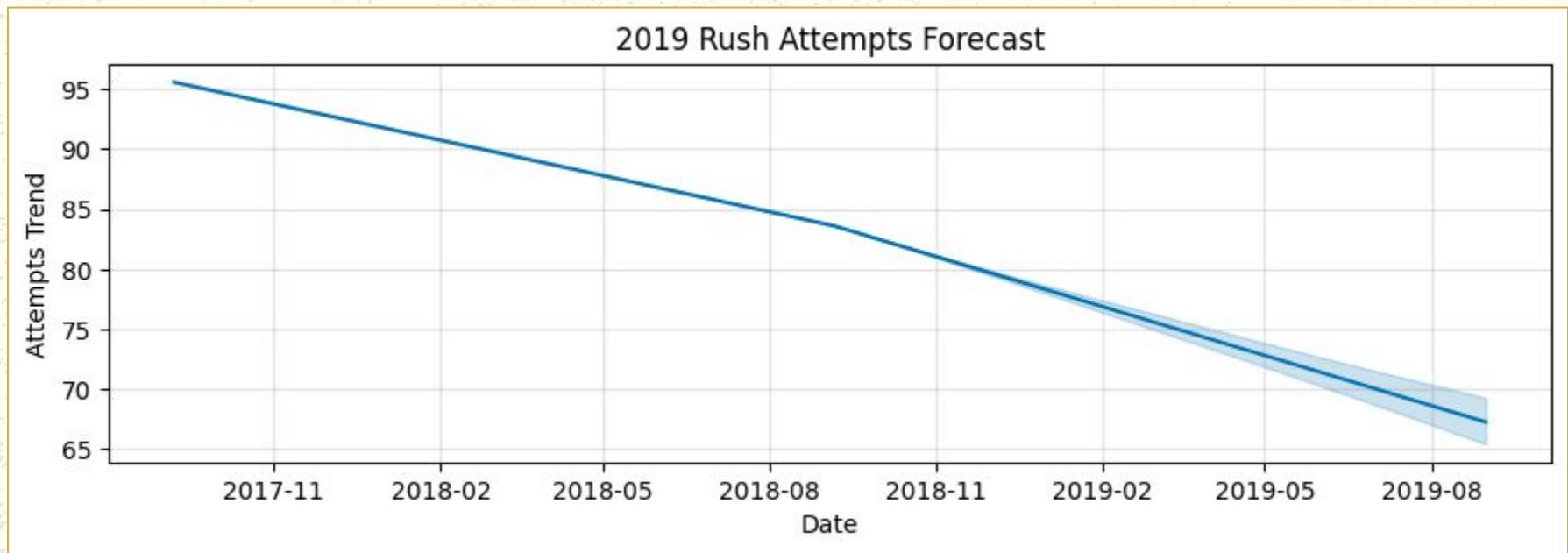
# Touchdowns v. Salary



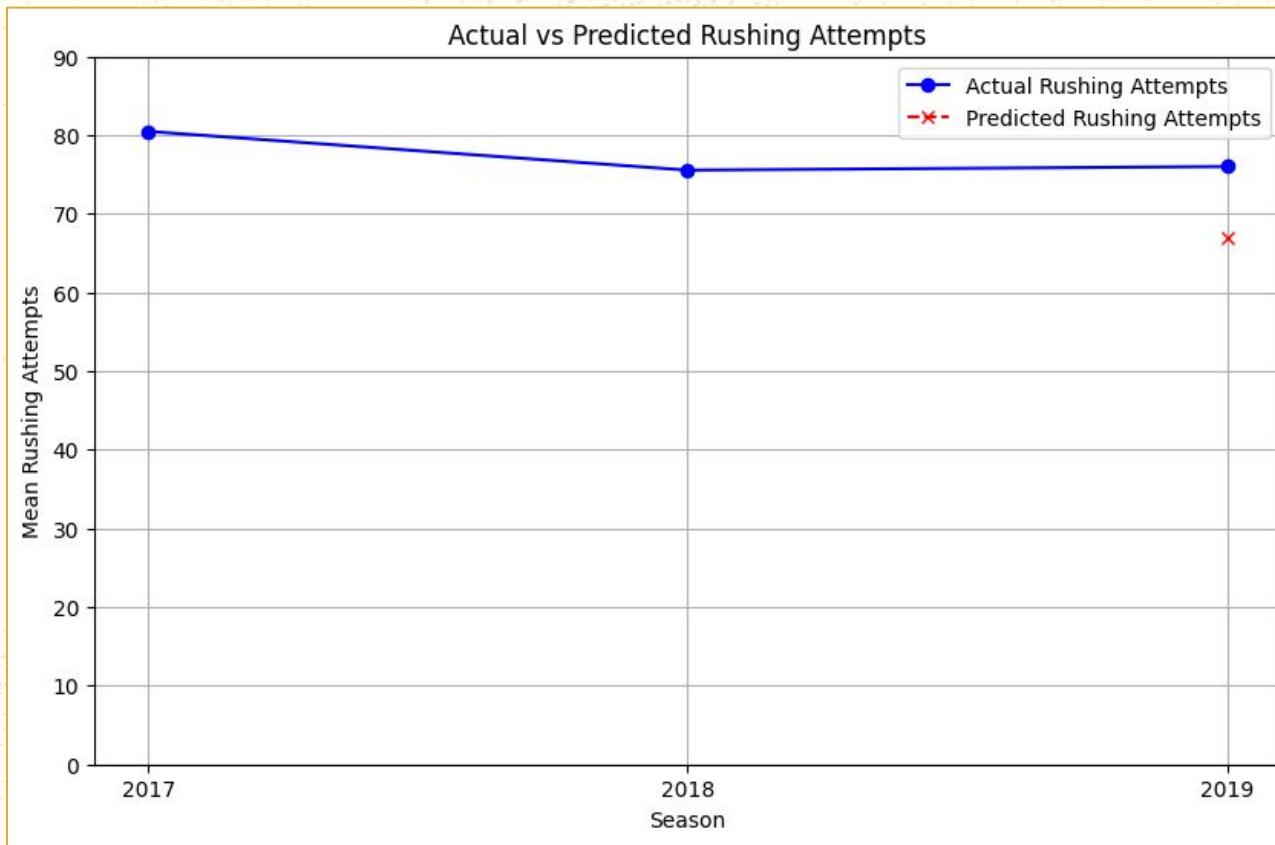
# 2017/18 Avg. Rush Attempts v. Salary



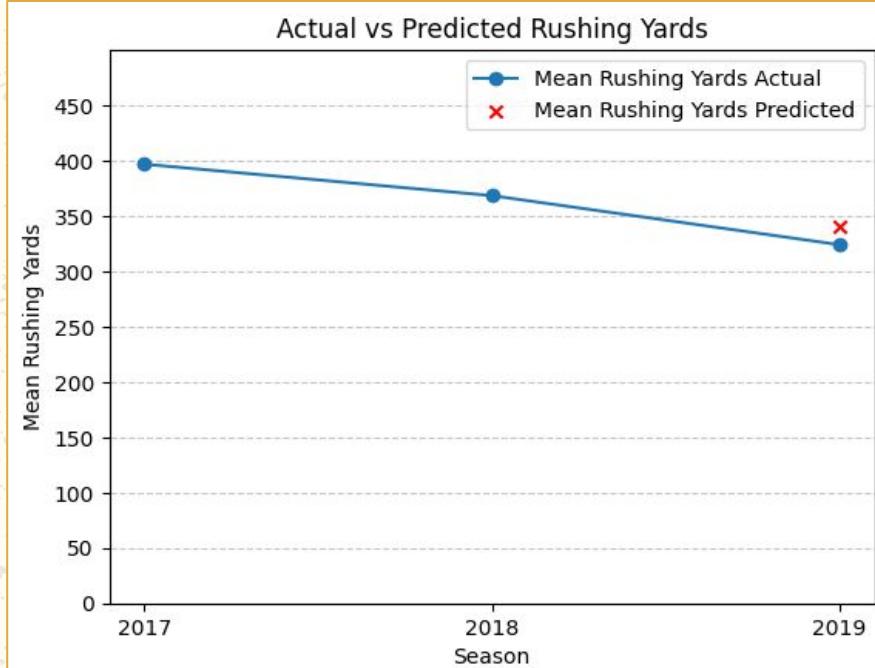
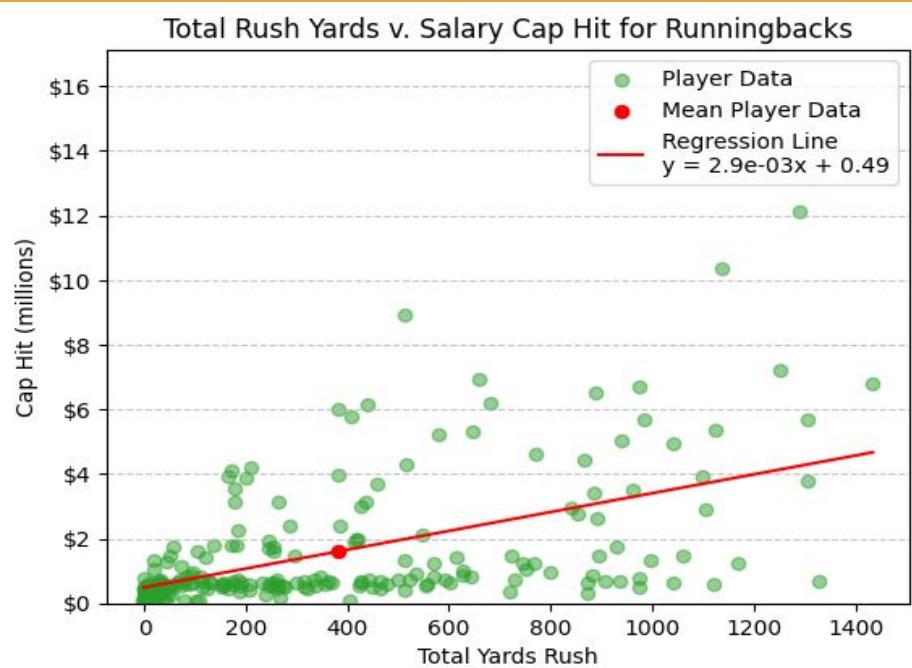
# Predicted Rush Attempts over Time



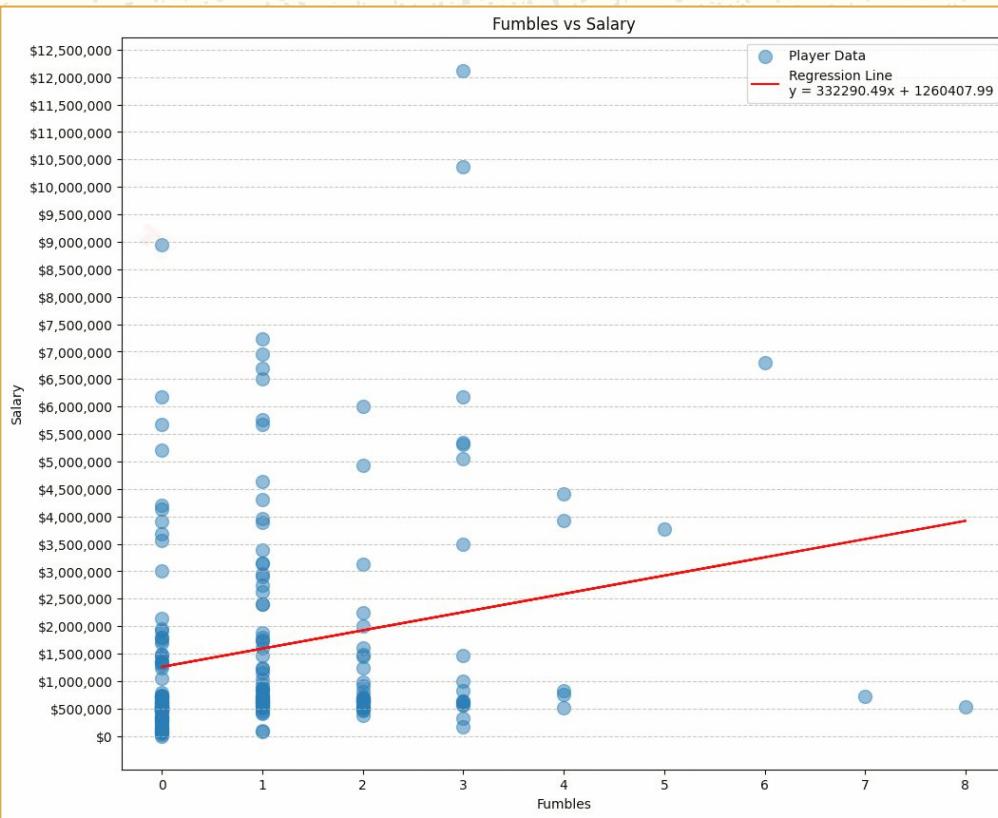
# ★ Actual Vs Predicted Rush Attempts ★



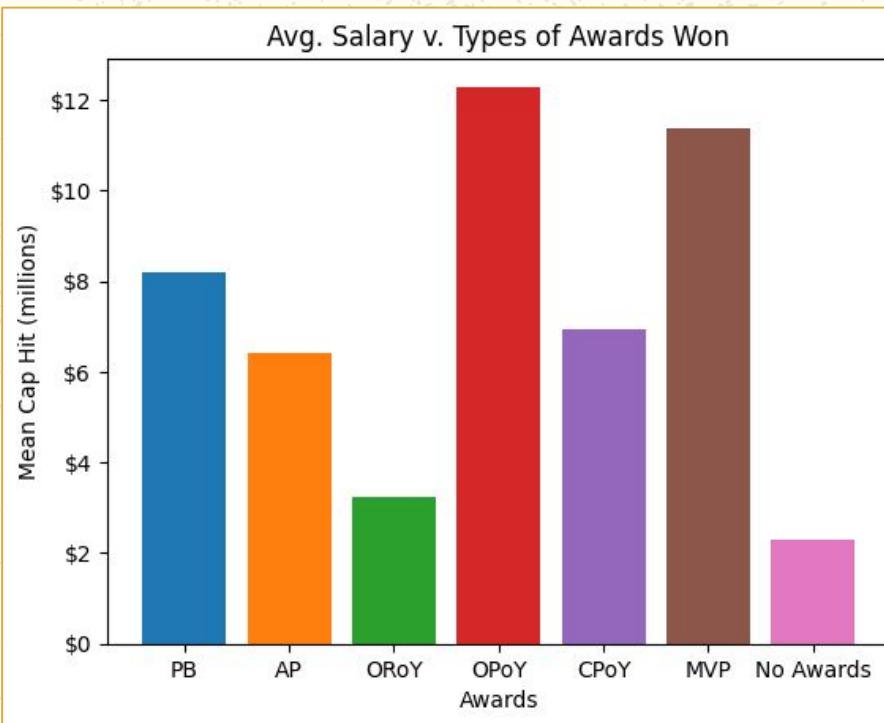
# ★ Rush Yards over Time ★



# ★ Fumbles v. Salary ★



# Awards Received v. Salary



# ★ Running the Numbers ★



# ★ Which ★ Factors impact Cap Hit the most...



**Touchdowns**



**Stats**



**Fumbles**



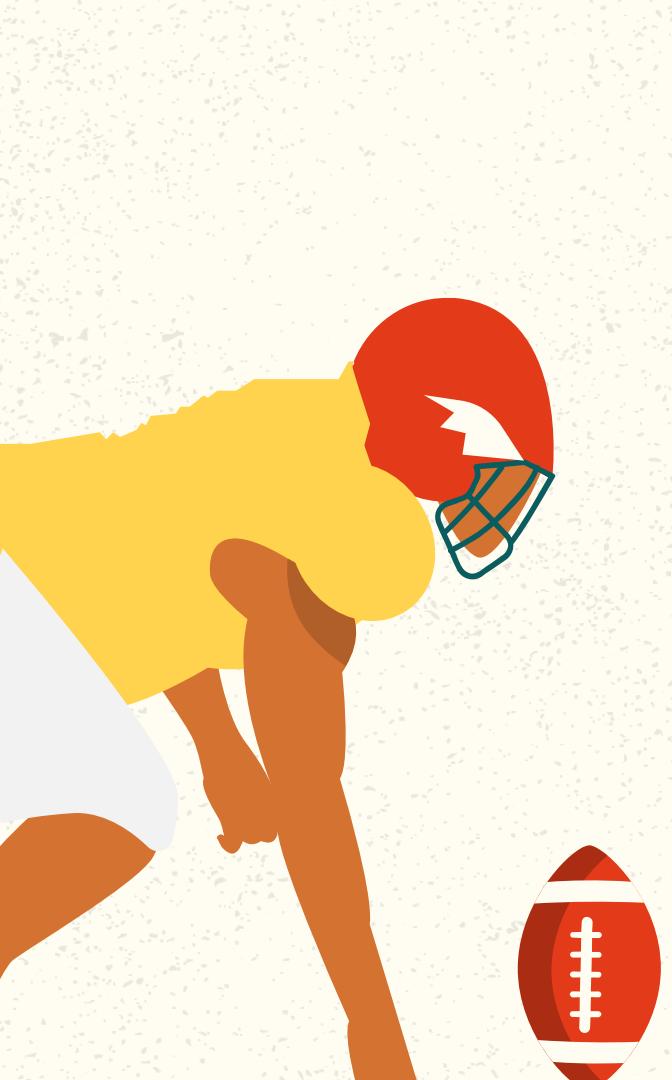
**Position**



**Age**



**Awards**



# ★ Where Do We Go From Here? ★



Other positions



Wider range of years

# ★ THANKS! ★

Q&A time!

Tech



Titans

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