

WEATHER IMPACT IN THE NFL DATA ANALYSIS

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POINT OF INTEREST / PURPOSE

01

FOOTBALL FANS

02

**EXTRANEIOUS
FACTORS IN SPORT**

03

FANTASY FOOTBALL

**Is weather an important factor that can predict
football plays?**

01

Data Finding

DATA COLLECTION

Play by Play

CSV data for the
2021 NFL season

1

Team Stats

HTML passing,
rushing, and kicking
stats

2

Game Weather

Weather API for
every game

3



Downloaded Set 1 Finding



01

"Play By Play 2021" Excel spreadsheet

02

Researched databases on Google for CSV or Excel files

03

Attempted to find a recent season

04

Found on <http://nflsavant.com/about.php>

Web Collection 1 Finding



01

HTML is very common in sports statistics

02

Went to the NFL website and other data analytics websites

03

Was easily accessible, and easy to manipulate

Web Collection 2 Finding



01

"Game Weather" API

02

Used free API website, and were very fortunate that the Weather was readily and easily accessible

03

Made sure that there were ways to track different locations for different weathers

04

Found other websites that are compatible with the API to find locations

02

Data Cleaning

DATA CLEANING PROCESS 1

01 Removed Indoor Teams

02 Only kept stats pertaining to chosen data

03 Removed plays that are too specific

			PlayType
GameDate	OffenseTeam	PlayType	
2021-09-12	Buffalo Bills	FIELD GOAL	3
		PASS	56
		RUSH	24
	Carolina Panthers	FIELD GOAL	2
		PASS	36
...
2021-12-26	Seattle Seahawks	PASS	27
		RUSH	24
	Tampa Bay Buccaneers	FIELD GOAL	4
		PASS	33
		RUSH	32

568 rows × 1 columns

DATA CLEANING PROCESS 2

01 Split between passing, rushing and kicking stats

02 Created 3 individual datasets

03 Only kept scoring and statistical averages

Passing Offense

	Team	Pass Completions	Pass Attempts	\
0	Tampa Bay Buccaneers	492	731	
1	Los Angeles Chargers	443	674	
2	Dallas Cowboys	444	647	
3	Kansas City Chiefs	448	675	
4	Los Angeles Rams	406	607	
5	Las Vegas Raiders	429	628	

Rushing Offense

	Team	Rushing Attempts	Yards Gained	per Rush	\
0	Philadelphia Eagles	550	4.9		
1	Indianapolis Colts	499	5.1		
2	Baltimore Ravens	517	4.8		
3	Cleveland Browns	485	5.1		
4	Tennessee Titans	551	4.4		
5	Buffalo Bills	461	4.8		
6	San Francisco 49ers	499	4.3		
7	New England Patriots	489	4.4		

Field Goal Performance

	Team	Total Field Goal Attempts	Total Field Goals Made	\
0	Minnesota Vikings	38	33	
1	Seattle Seahawks	23	17	
2	Dallas Cowboys	35	29	
3	Tampa Bay Buccaneers	31	25	
4	New Orleans Saints	30	25	
5	Cincinnati Bengals	34	29	
6	Pittsburgh Steelers	40	36	
7	Houston Texans	27	21	

DATA CLEANING PROCESS 3

01

**Parsed necessary
data from the API**

02

**Used latitude and
longitude to find stadium
coordinates**

03

**Converted time using Unix
Timestamps**

	Team	Date	Temperature	Wind Speed	Weather Description	Weather Conditions
0	Tennessee Titans	2021-09-12	82.63	8.01	Clear	clear sky
1	Tennessee Titans	2021-09-16	79.25	5.99	Clouds	broken clouds
2	Tennessee Titans	2021-09-19	72.07	1.99	Rain	light rain
3	Tennessee Titans	2021-09-26	74.48	1.01	Clear	clear sky
4	Tennessee Titans	2021-10-03	70.88	5.01	Clouds	broken clouds



03

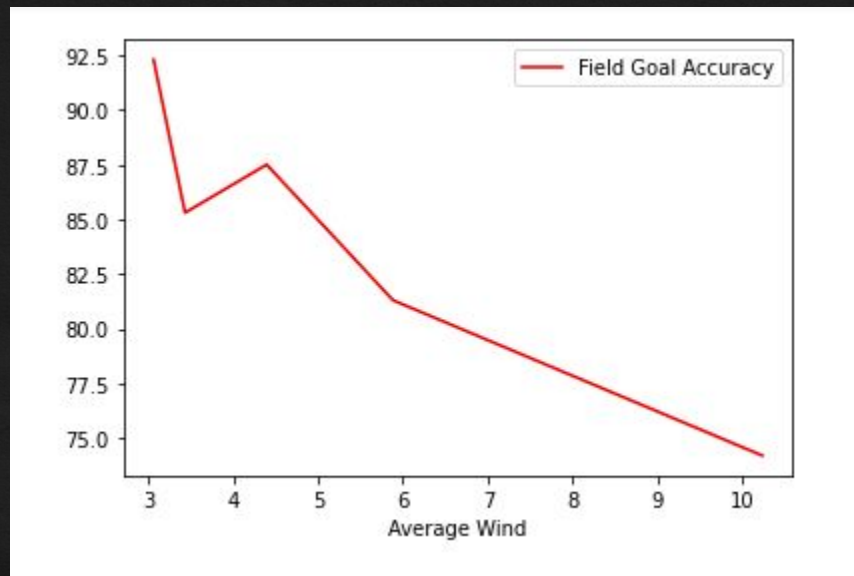
Insights and Visualizations

How wind affects kickers

		Total Field Goal Attempts	Total Field Goals Made	Field Goal Accuracy
Team	Average Wind			
New England Patriots	3.062500	39.0	36.0	92.3%
Cincinnati Bengals	3.433214	34.0	29.0	85.3%
Kansas City Chiefs	4.394286	32.0	28.0	87.5%
Tennessee Titans	5.883571	32.0	26.0	81.3%
Miami Dolphins	10.234643	31.0	23.0	74.2%

Increasing wind speed decreases accuracy percentage

How wind affects kickers



Increasing wind speed decreases accuracy percentage

How “Hot” and “Cold” impacts the type of play

More field goals kicked in colder temperatures

More passing in warmer temperatures

		PlayType		
Date	Team	Temperature	PlayType	
2021-09-12	New England Patriots	77.74	FIELD GOAL	3
			PASS	42
			RUSH	31
2021-11-28	New England Patriots	36.63	FIELD GOAL	6
			PASS	33
			RUSH	23
2021-09-19	Cincinnati Bengals	85.86	FIELD GOAL	1
			PASS	30
			RUSH	20
2021-12-19	Cincinnati Bengals	37.89	FIELD GOAL	3
			PASS	23
			RUSH	21
2021-09-12	Miami Dolphins	89.89	FIELD GOAL	1
			PASS	28
			RUSH	20
2021-11-28	Miami Dolphins	75.56	FIELD GOAL	2
			PASS	33
			RUSH	34
2021-09-19	Kansas City Chiefs	83.14	PASS	32
			RUSH	18

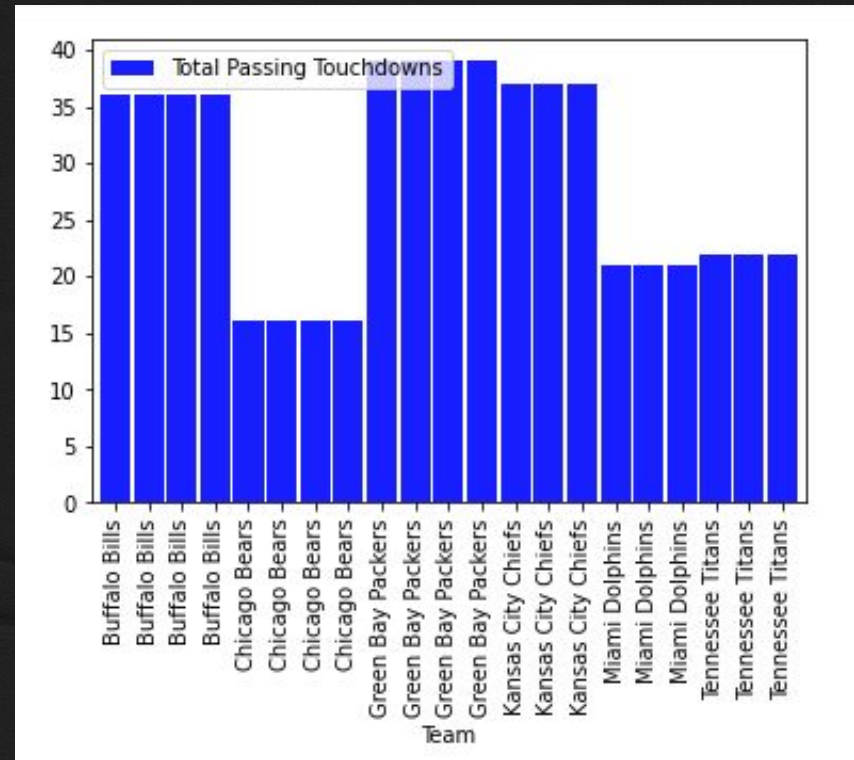
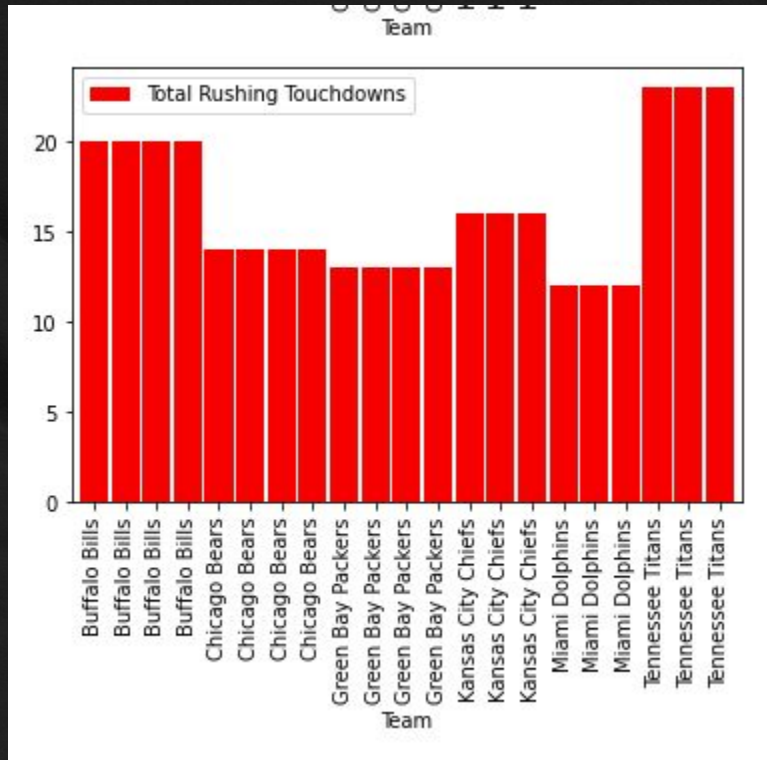
How rain impacts playtype

GameDate	OffenseTeam	PlayType	
2021-09-12	Buffalo Bills	FIELD GOAL	3
		PASS	56
		RUSH	24
	Carolina Panthers	FIELD GOAL	2
		PASS	36
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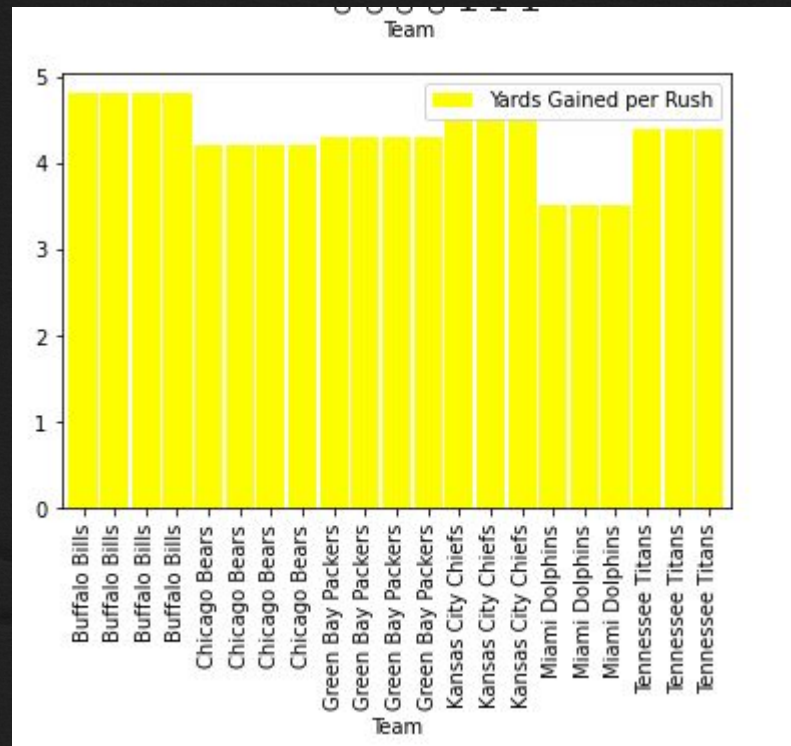
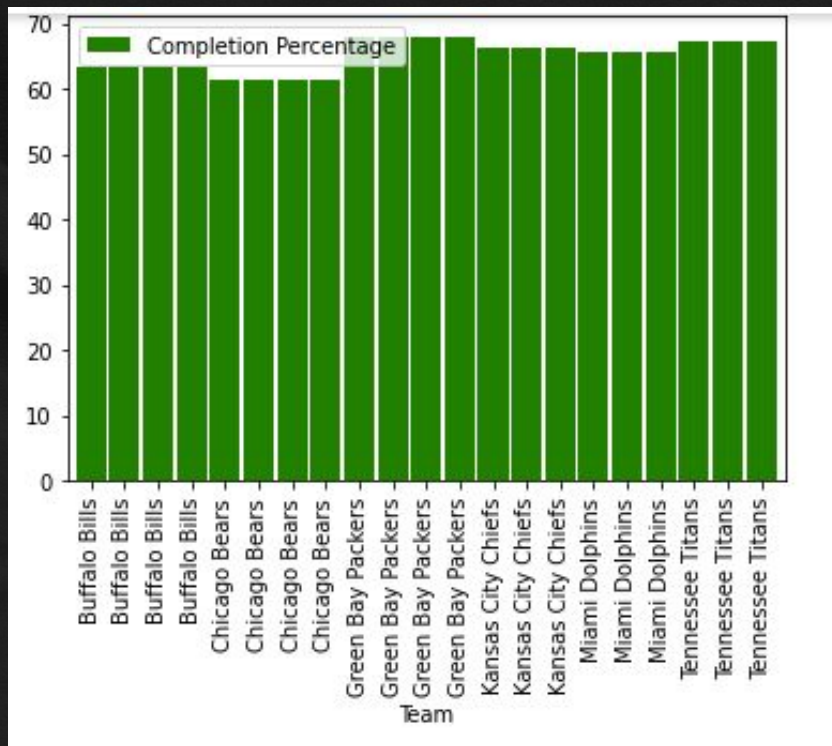
Team	Weather	Description	PlayType	Pass Ratio %	Rush Ratio %
Buffalo Bills	Rain	FIELD GOAL	3	58.62	38.79
		PASS	68	58.62	38.79
		RUSH	45	58.62	38.79
Chicago Bears	Rain	FIELD GOAL	1	60.00	38.18
		PASS	33	60.00	38.18
		RUSH	21	60.00	38.18
Green Bay Packers	Rain	FIELD GOAL	3	52.17	43.48
		PASS	36	52.17	43.48
		RUSH	30	52.17	43.48
Kansas City Chiefs	Rain	FIELD GOAL	2	65.38	32.05
		PASS	51	65.38	32.05
		RUSH	25	65.38	32.05

Pass/Rush ratio seems to be the same whether rain or not

Passing / Rushing per Team



Completion Percent / AVG Rush Yards



03

Results / Conclusion

RESULTS & CONCLUSION

- 01 **Wind and FG percentage have a very high correlation**
- 02 **Teams are more likely to throw in warmer weather, which means that more field goals are going to be kicked in colder weather**
- 03 **It is difficult to make a conclusion for passing and rushing when involving conditions other than simply temperature**

Takeaways and Difficulties

- 01 **We learned how effective using the `groupby()` method can be, especially for simple data consolidation and readability**
- 02 **Figuring out which specific variables to use to draw a conclusion is a difficulty because of only indoor stadium sample space**
- 03 **In addition, very difficult to convert dataframe type in visualizations, but learned how to strip and type cast entire columns**



THANK YOU!