Sports Betting with Data Science

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Problem Statement and Opportunity

Mobile sports betting generated $165.6m in New York in September 2023 (iGB)

73.5 million American adults have bet on NFL football this season (AGA)

How to we predict the outcome of NFL games?

1. **Primary audience**: Online Sportsbooks (FanDuel, Caesars, DraftKings, BetMGM)

2. **Secondary audience**: at-home betters searching for advantageous odds
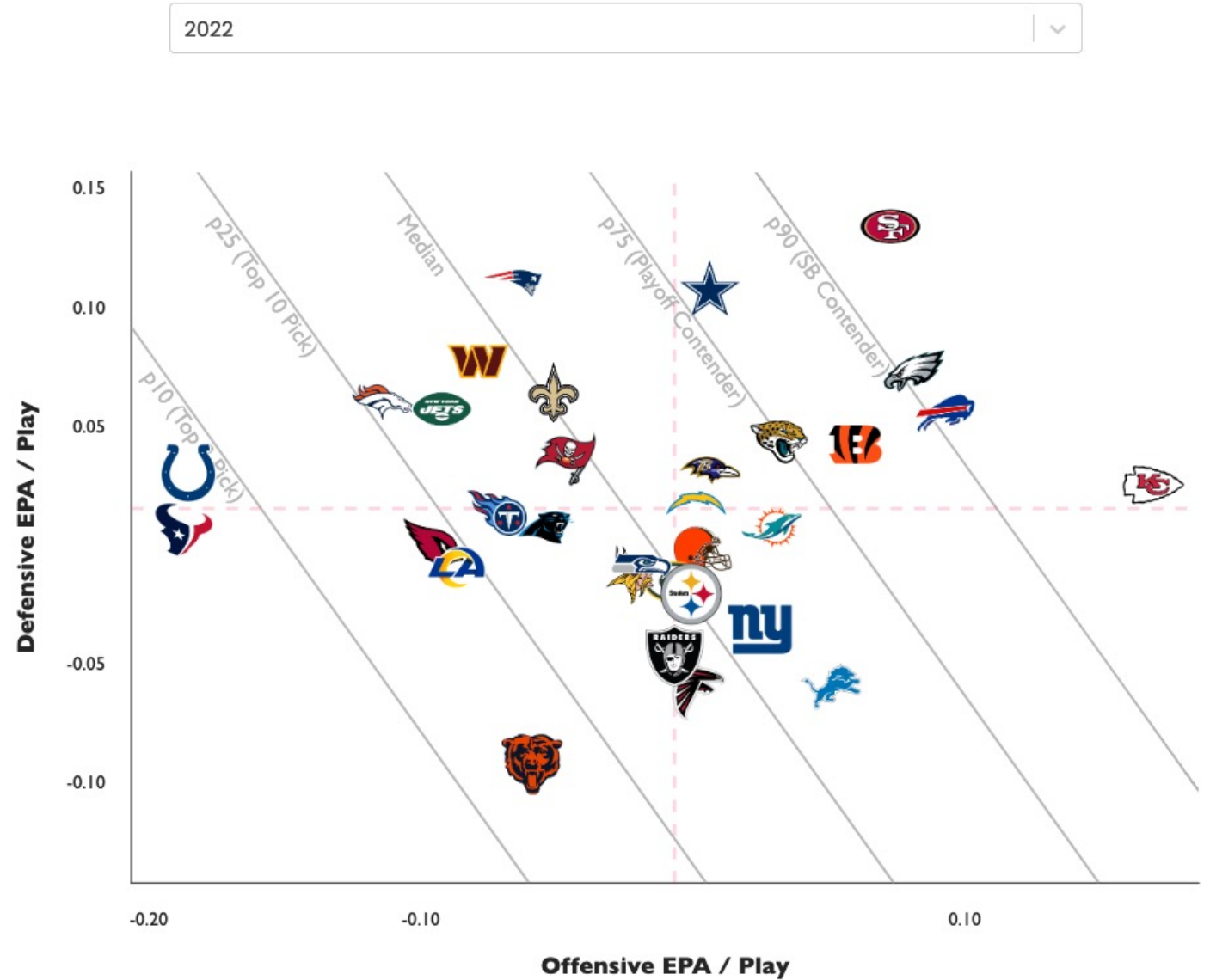
Methodology

2 Regression Models:

- Home Offense vs Away Defense

- Away Offense vs Home Defense

Target variable: Expected Points

Scaling Data Sets

- In-season data: Bye Weeks

- Historical data: Games

Impact

Help people make informed decisions on 3 key outputs:

1. Moneyline
   o   Who is going to win?

2. Spread
   o   How much will the better team win by?

3. Point Total
   o   How many points will the teams score combined?

Sports Books set the line as close to even as possible to ensure profits.

Betters can compare their lines with those from the books to find profitable bets.

Today	Spread	Total	Moneyline
JAX JAGUARS	+2.5 −108	O 41 −110	+120
NO SAINTS	-2.5 −112	U 41 −110	−142

SGP   Today 8:18 PM

Sun Oct 22nd	Spread	Total	Moneyline
BUF BILLS	-9 −110	O 40 −110	−440
NE PATRIOTS	+9 −110	U 40 −110	+340

Introducing the Data Sets

Offensive Metrics:

- o Points per game, rushing yards per game, passing yards per game.
- o Formations and tendencies
  - How many wide receivers are on the field? Do they use more than one TE?
- o Play call breakdown:
  - How many pass plays vs run plays?
- o Penalties per game and penalty yards per game
- o Depth-of-target
  - Are they taking risks throwing down-field or

Top Rushing Offenses

Top Scoring Offenses
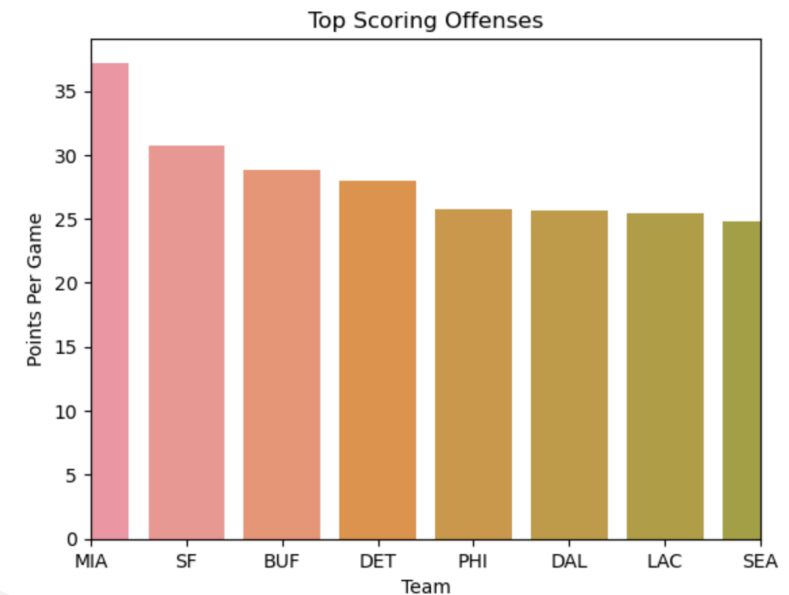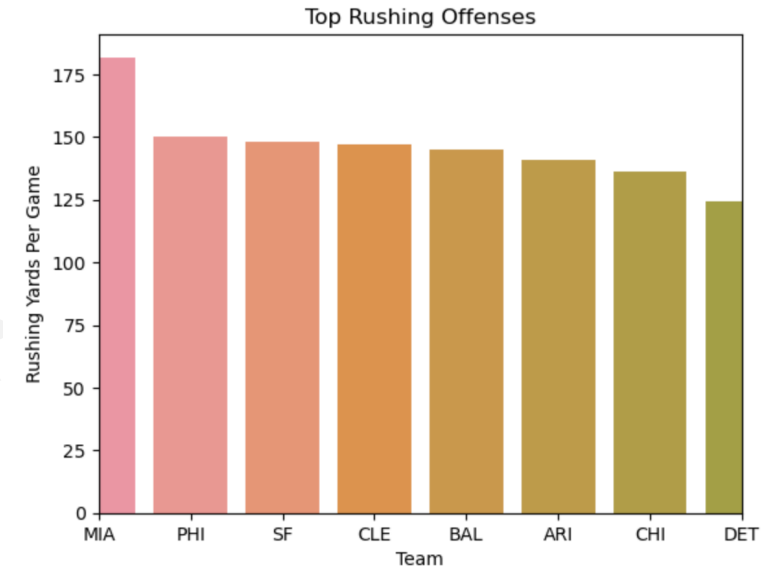
Introducing the Data Sets

Defensive Metrics:

- o Tracking how teams playing against them perform in the same metrics

- o Defensive tendencies and formations

  - ▪ Do they prefer a 4-3, 3-4, dime or nickel formations?

  - ▪ Do they run a zone or man defense?

  - ▪ How quickly do they pressure the opposing QB?
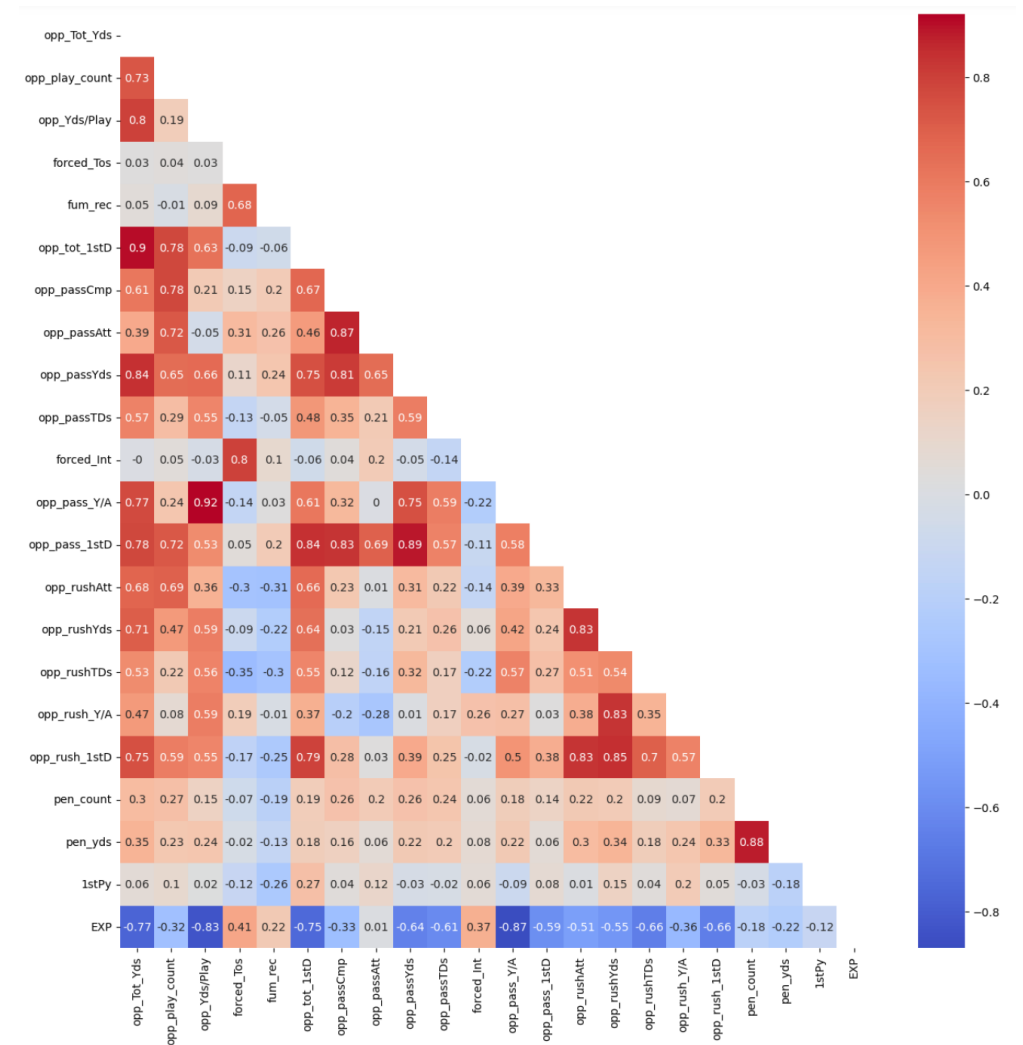
Next steps

1. Keeping up-to-date data sets
   1. Option 1: Scraping from ESPN
   2. Option 2: Sportsbetting api

2. Adding features to team offense
   - Redzone conversion rate
   - Turnovers

3. Player bonuses:
   - The Tom Brady Effect

4. Combining team offense and team defense in a single regression.

5. Special Teams (kick / punt returns) metrics
   - In 2007, Devin Hester broke the record for kick returns in a season with 6. That's 36 points not currently being counted for the Bears in 2007

New York Jets Team Stats 2010

[More NFL Teams ⌄]

Players | **Team**

[2010 Regular Season ⌄]

Team Statistics

SCORING	NY JETS	OPPONENTS
Total Points Per Game	22.9	14.5
Total Points	367	304
Total Touchdowns	39	36
1ST DOWNS		
Total 1st downs	307	272
Rushing 1st downs	118	70
Passing 1st downs	171	169
1st downs by penalty	18	33
3rd down efficiency	93-235	81-219
3rd down %	39.57	36.99
4th down efficiency	5-14	4-6
4th down %	35.71	66.67
PASSING		
Comp-Att	288-525	269-531
Net Passing Yards	3,242	3,210
Yards Per Pass Attempt	6.5	6.5
Net Passing Yards Per Game	202.6	200.6
Passing Touchdowns	20	24
Interceptions	14	12
Sacks-Yards Lost	28-178	40-244
RUSHING		
Rushing Attempts	534	408
Rushing Yards	2,374	1,454
Yards Per Rush Attempt	4.4	3.6
Rushing Yards Per Game	148.4	90.9
Rushing Touchdowns	14	11
OFFENSE		
Total Offensive Plays	1087	979
Total Yards	5,794	4,908
Yards Per Game	362.1	306.8
RETURNS		
Kickoffs: Total	73-1,428	63-1,588