

Under the Radar:

Finding the NFL's Least Appreciated Stars



Cole Foster & Zoey Lee



Agenda

- Introduction
- State of the Art
- Materials
- Methods
- Results
- Conclusion

Introduction

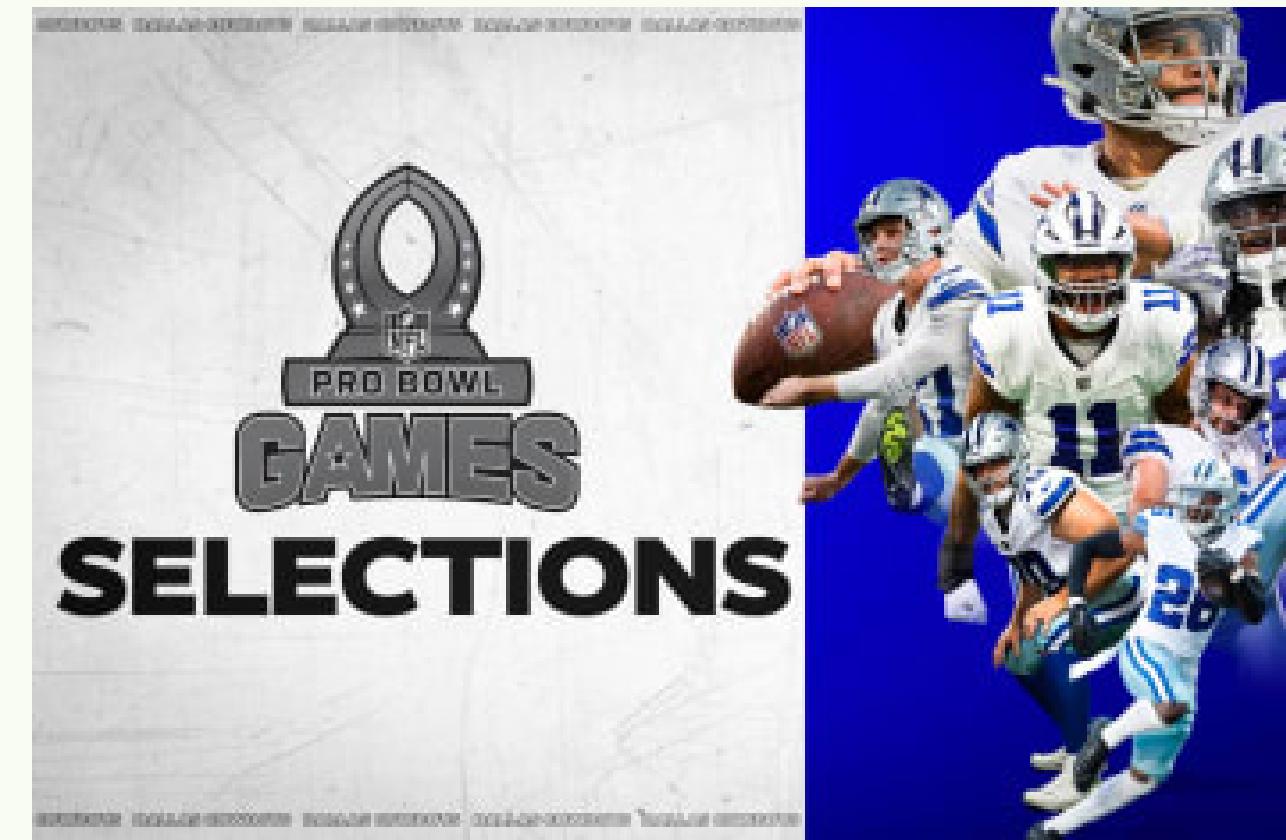
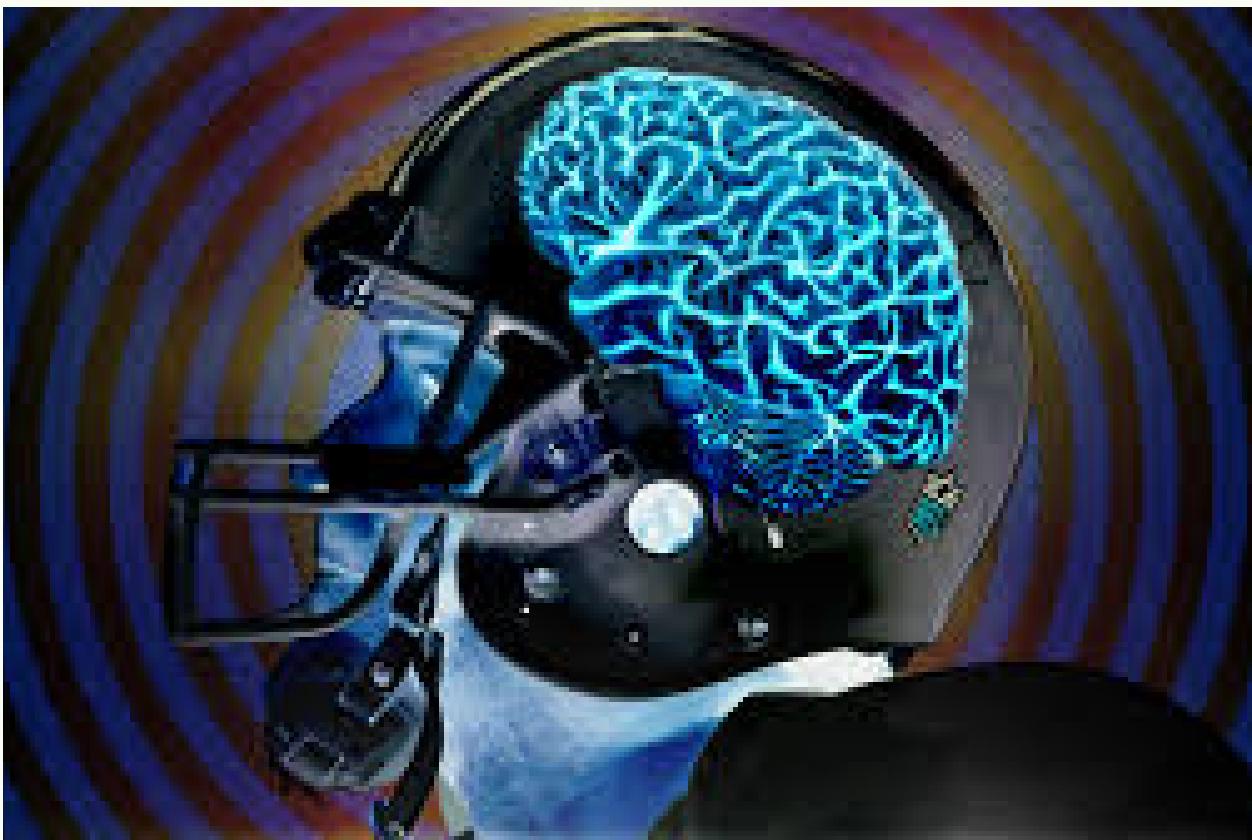
- What is the Pro Bowl?
 - All-star game
 - Players selected by fans, coaches and media
- Inconsistencies in selection
 - Impacts on player contracts



Questions

1. What stats are most important for Pro Bowl selection?
2. Can our model predict Pro Bowlers?
3. Who are the most underrated or overrated players in the NFL?

Modern Research



Chronic Traumatic
Encephalopathy (CTE) &
how to improve player
safety

"How do we get players to
play in the games?"

Materials

Data Sources : nfl.com & pro-football-reference.com

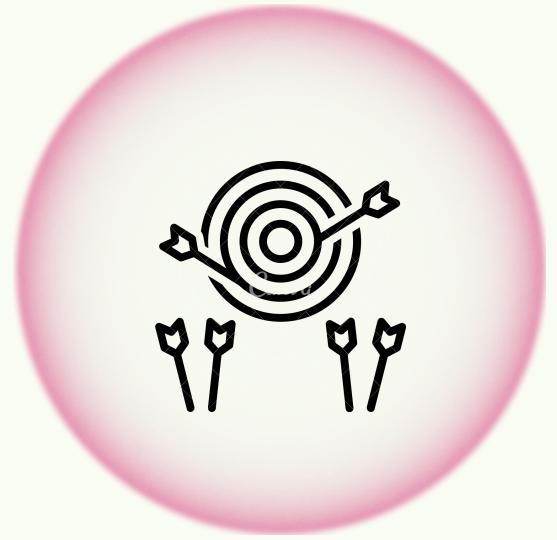
	Quarter Backs	Running Backs	Wide Receivers
Stats Measured	Passing yards, Yards per attempt, Attempts, Completions, Completion%, Touchdowns, Interceptions, Rate, 1st downs, 1st down%, 20 yard passes, 40 yard passes, Longest pass, Sacks taken, Sack yards lost	Rushing yards, Attempts, Touchdowns, 20 yard rushes, 40 yard rushes, Longest rush, 1st downs, 1st down%, Fumbles	Receptions, Yards, Touchdowns, 20 yard receptions, 40 yard receptions, Longest reception, 1st downs, 1st down%, Fumbles
Number of Players	165	224	240
Number of Seasons	675	674	645

Methods

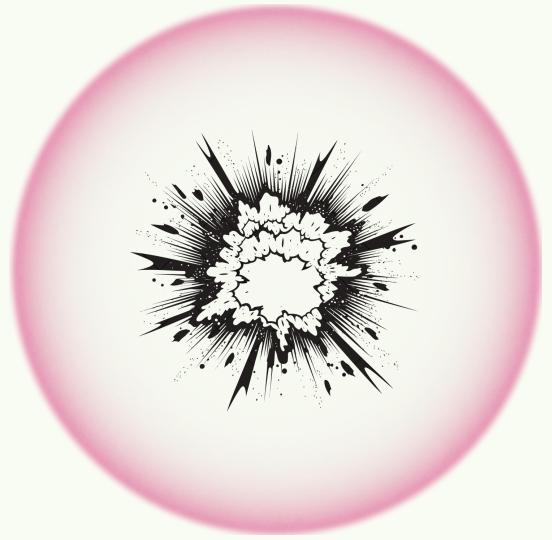
Data Manipulation	Statistical Learning Approaches	Performance Evaluation
<ul style="list-style-type: none">• Min-max scaled to gauge relative feature importance• Unimportant variables removed.• Dataset divided into passing, rushing, and receiving.• 80/20 test split	<ul style="list-style-type: none">• Radial SVM<ul style="list-style-type: none">◦ cost and gamma hyperparameters were tuned to maximize performance• LDA• Random Forest<ul style="list-style-type: none">◦ ntrees was tuned manually	<ul style="list-style-type: none">• Confusion Matrix<ul style="list-style-type: none">◦ F1 Score• # of pro bowl awards assigned<ul style="list-style-type: none">◦ favored model closest to actual #

Stat Importance on Selection

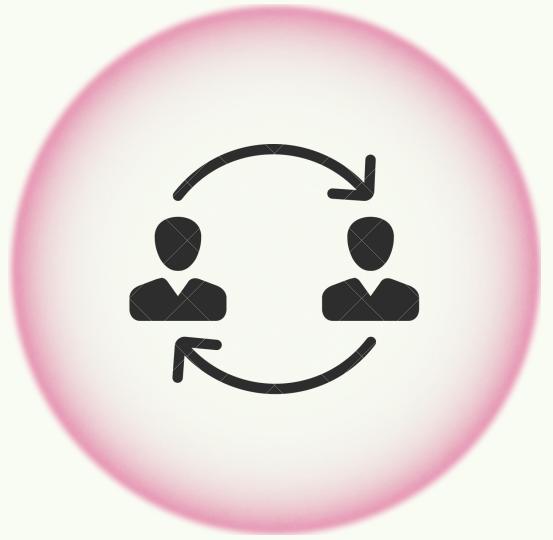
Interesting Finds...



Rushing attempts &
Receptions inversely
correlated with selection



Highly Explosive plays
have the most impact on
WRs



Turnovers negatively
impact QBs far more
than WRs or RBs

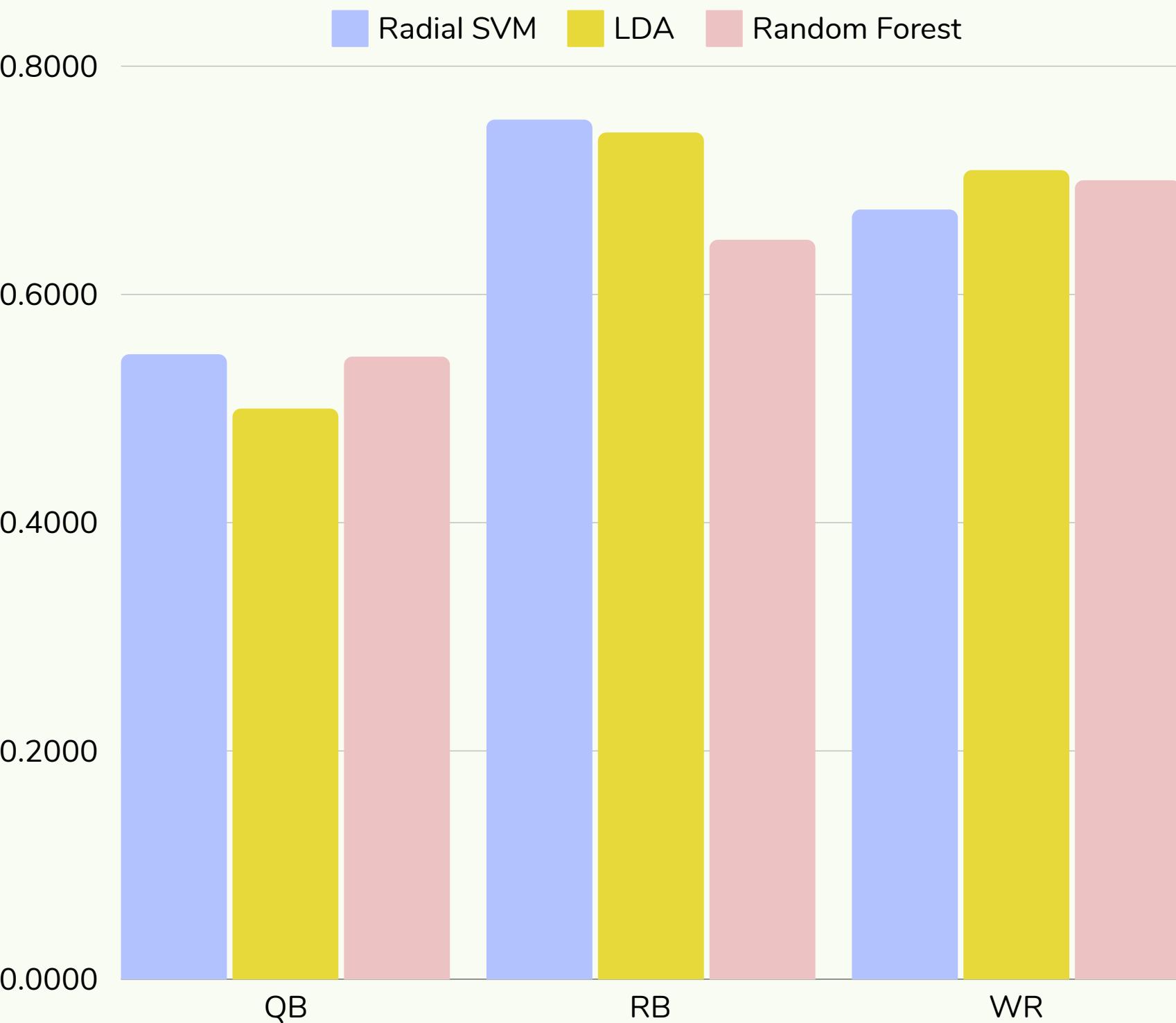
Q1 : What stats are most important for Pro Bowl selection?

Model to Predict Pro Bowlers?

Observations

- QBs are harder to predict
- LDA tended to be much more “strict” when choosing pro bowlers, notably removing more than 40 pro bowl seasons

F1 Scores Per Model



Q2 : Can our model predict Pro Bowlers?

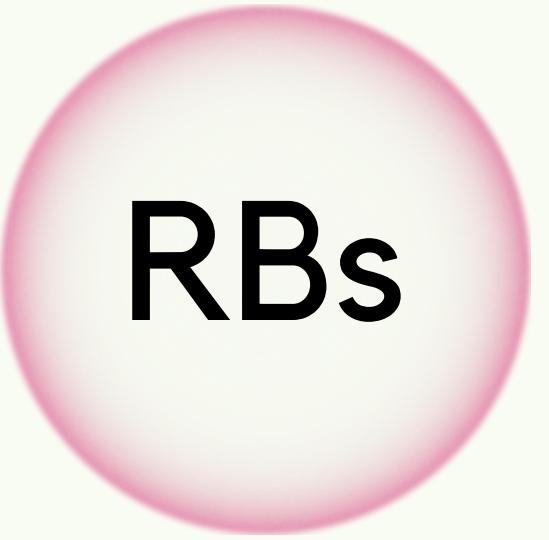
Overrated or Underrated?

Interesting Finds...



QBs

Overrated QBs more at
the beginning of the data
range



RBs

Even spread of over and
underrated RBs



WRs

Underrated WRs from
NFC South between
2005-2015

Q3 : Who are the most underrated or overated players in the NFL?

Overrated or Underrated?

Continued...

QB	Overrated	Underrated
1	Dan Marino (-2)	Trent Green (+2)
2	Rich Gannon (-2)	Ryan Tannehill (+1)
3	Troy Aikman (-2)	Chad Pennington (+1)
4	Brad Johnson (-1)	N/A
5	Brian Griese (-1)	N/A

RB	Overrated	Underrated
1	Marshall Faulk (-3)	Fred Taylor (+3)
2	Jerome Bettis (-2)	Clinton Portis (+2)
3	Ahman Green (-1)	Tiki Barber (+1)
4	Arian Foster (-1)	Shaun Alexander (+1)
5	Le'Veon Bell (-1)	LaDainian Tomlinson (+1)

WR	Overrated	Underrated
1	Amari Cooper (-1)	Roddy White (+3)
2	Antonio Freeman (-1)	Steve Smith (+2)
3	Calvin Johnson (-1)	Marques Colston (+1)
4	Chris Godwin (-1)	Dez Bryant (+1)
5	Cris Carter (-1)	Demaryius Thomas (+1)

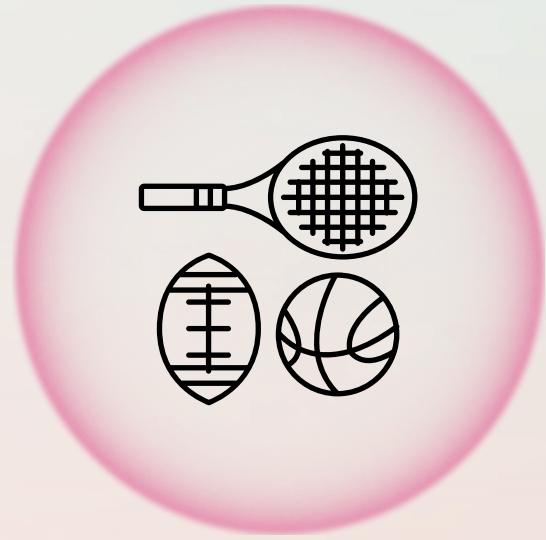
Future Work



Study More
Positions



Award
Analysis



Include
Other Sports

Conclusion

Set out to answer 3 questions...

1. Which are the most significant stats?
2. Are we able to predict Pro-Bowlers?
3. Who are the most underrated or overrated players?



Our Results...

- Identified notable statistics, varying for each position
- Successfully created models to predict Pro Bowlers, QBs challenging
- Identified underrated/overrated players



Thank you!

Do you have any questions?