

# DraftAnalysis

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## **Chapter 1**

# **Analyzing the NFL Draft**

**1.1 by Henry Gorelick**

# Chapter 2

## Overview

### 2.1 Background

### 2.2 Issues

### 2.3 Claim

### 2.4 Process

### 2.5 Outcome

### 2.6 Future Work

### 2.7 Background

#### 2.7.1 Draft Rules

Each year the NFL holds its annual draft. The draft's basic rules are as follows:

Each team receives 1 pick per round

<ul>

<li>32 picks per round (+ ~50 compensatory picks)</li>

<li>7 rounds</li>

<li>~254 total picks</li>

</ul>

<li>Order reverse standings of previous season</li>

<li>Teams may pick eligible players to join their team in the upcoming season</li>

### 2.8 Issues

#### 2.8.1 Boom or Bust

A player who underperforms relative to his draft position is labeled a "Bust"

Busts lose games and get people fired

A good draft is about finding good value

## 2.9 Claim

### Collegiate performance doesn't correlate to NFL success

#### Busts

Jamarcus Russell, QB  
2007 Round 1, Pick 1

```
</li>
<li>Ryan Leaf, QB
  <ul><li>1998 <strong>Round 1, Pick 2</strong></li></ul>
</li>
<li>Trent Richardson, RB
  <ul><li>2012 <strong>Round 1, Pick 3</strong></li></ul>
</li>
<li>Mark Sanchez, QB
  <ul><li>2009 <strong>Round1, Pick 5</strong></li></ul>
</li>
```

#### 2.9.1 Steals

Tom Brady, QB  
2000 Round 6, Pick 199

```
</li>
<li>Antonio Brown, WR
  <ul><li>2010 <strong>Round 6, Pick 195</strong></li></ul>
</li>
<li>Richard Sherman, CB
  <ul><li>2011 <strong>Round 5, Pick 154</strong></li></ul>
</li>
<li>Alvin Kamara, RB
  <ul><li>2017 <strong>Round 3, Pick 67</strong></li></ul>
</li>
```

## 2.10 Data Collection and Processing

### 2.10.1 Gathering Data

Using Python's SQLite3, BeautifulSoup, and Selenium ChromeDriver libraries, I gathered data from [www.Pro-Football-Reference.com](http://www.Pro-Football-Reference.com) and [www.sports-reference.com/cfb/](http://www.sports-reference.com/cfb/)

### 2.10.2 Preprocessing

**There was a good amount of preprocessing required** Including:

- Removing players with little to no stats
- Recalculating percentage stats

#### Sample Results

```
In [1]: import sqlite3
        import pandas as pd
```

```

conn = sqlite3.connect(r'C:\NFLDraftAnalysis\PFR.db')
qbs = pd.read_sql_query("select * from Player_PickVal_Draft_CStats_QBs;", conn)
print("Quarterbacks Drafted between 2004 - 2015 (alphabetical order)")
qbs.head(20)

```

Quarterbacks Drafted between 2004 - 2015 (alphabetical order)

```

Out[1]:
   pick      name pos      college round  award_score \
0    164  A.J. McCarron QB      Alabama      5         0.0
1    163   Aaron Murray QB      Georgia      5         0.0
2     24   Aaron Rodgers QB    California      1        20.0
3    223    Alex Brink QB Washington State      7         0.0
4     1    Alex Smith QB      Utah      1         3.0
5    198  Andre Woodson QB      Kentucky      6         0.0
6     1    Andrew Luck QB      Stanford      1         3.0
7     69  Andrew Walter QB Arizona State      3         0.0
8     35   Andy Dalton QB      TCU      2         3.0
9    237   B.J. Daniels QB South Florida      7         0.0
10    11 Ben Roethlisberger QB    Miami (OH)      1        10.0
11    10   Blaine Gabbert QB      Missouri      1         0.0
12     3    Blake Bortles QB Central Florida      1         0.0
13   103    Brad Smith QB      Missouri      4         0.0
14   250  Bradlee Van Pelt QB Colorado State      7         0.0
15    22    Brady Quinn QB    Notre Dame      1         0.0
16    22  Brandon Weeden QB Oklahoma State      1         0.0
17   147   Brett Hundley QB      UCLA      5         0.0
18    56   Brian Brohm QB    Louisville      2         0.0
19    57  Brock Osweiler QB Arizona State      2         0.0

   pick_value  games  pass_cmp  pass_att  pass_yds  cmp_percent  yp_cmp \
0    0.000000    49     686    1026     9019    0.668616  13.147230
1    0.000000    52     921    1478    13166    0.623139  14.295331
2   364.307692    25     424     665     5469    0.637594  12.898585
3    0.000000    42     848    1451    10913    0.584425  12.869104
4   24.278365    25     389     587     5203    0.662692  13.375321
5    0.000000    44     791    1278     9360    0.618936  11.833123
6   33.371875    38     713    1064     9430    0.670113  13.225806
7    0.000000    45     777    1416    10617    0.548729  13.664093
8   69.795536    50     812    1317    10314    0.616553  12.701970
9    0.000000    47     649    1132     8433    0.573322  12.993837
10  123.750000    38     854    1304    10829    0.654908  12.680328
11    0.000000    29     568     933     6822    0.608789  12.010563
12    0.000000    35     585     891     7598    0.656566  12.988034
13    0.000000    48     835    1484     8799    0.562668  10.537725
14    0.000000    38     424     778     6165    0.544987  14.540094
15    0.000000    48     929    1602    11762    0.579900  12.660926
16    0.000000    30     766    1102     9260    0.695100  12.088773
17    0.000000    40     837    1241     9966    0.674456  11.906810
18    0.000000    44     780    1185    10775    0.658228  13.814103
19    0.000000    24     412     680     5082    0.605882  12.334951

   pass_td  pass_int  rush_att  rush_yds
0        77        15         3         3
1       121        41       286       388

```

2	43	13	160	336
3	76	43	246	98
4	47	8	286	1072
5	79	25	5	5
6	82	22	163	957
7	85	36	0	0
8	71	30	413	1611
9	52	39	526	2068
10	84	34	269	246
11	40	18	221	458
12	56	19	194	565
13	56	33	799	4289
14	37	30	420	2274
15	95	39	254	182
16	75	27	1	1
17	75	25	479	1747
18	71	24	172	44
19	33	15	137	221

```
In [2]: conn = sqlite3.connect(r'C:\NFLDraftAnalysis\PFR.db')
qbs = pd.read_sql_query("select * from DraftedPlayers order by av desc;", conn)
print("All Players Drafted between 2004 - 2015 (ordered by Approximate Value, excludes offensive linemen and s
# see https://www.pro-football-reference.com/blog/indexd961.html?page_id=8061 for AV Method
qbs.head(20)
```

All Players Drafted between 2004 - 2015 (ordered by Approximate Value, excludes offensive linemen and s

```
Out[2]:
```

	year	round	pick	name	prof_url	pos	age	\
0	2004	1	4	Philip Rivers	/players/R/RivePh00.htm	QB	22	
1	2005	1	24	Aaron Rodgers	/players/R/RodgAa00.htm	QB	21	
2	2004	1	11	Ben Roethlisberger	/players/R/RoetBe00.htm	QB	22	
3	2008	1	3	Matt Ryan	/players/R/RyanMa00.htm	QB	23	
4	2004	1	1	Eli Manning	/players/M/MannEl00.htm	QB	23	
5	2006	1	12	Haloti Ngata	/players/N/NgatHa20.htm	DT	22	
6	2004	4	126	Jared Allen	/players/A/AlleJa22.htm	DE	22	
7	2011	1	1	Cam Newton	/players/N/NewtCa00.htm	QB	22	
8	2005	1	1	Alex Smith	/players/S/SmitAl03.htm	QB	21	
9	2007	1	11	Patrick Willis	/players/W/WillPa98.htm	LB	22	
10	2007	1	7	Adrian Peterson	/players/P/PeteAd01.htm	RB	22	
11	2007	1	14	Darrelle Revis	/players/R/ReviDa99.htm	DB	22	
12	2005	3	65	Frank Gore	/players/G/GoreFr00.htm	RB	22	
13	2004	1	3	Larry Fitzgerald	/players/F/FitzLa00.htm	WR	21	
14	2005	1	27	Roddy White	/players/W/WhitRo00.htm	WR	23	
15	2012	3	75	Russell Wilson	/players/W/WilsRu00.htm	QB	23	
16	2006	1	11	Jay Cutler	/players/C/CutlJa00.htm	QB	23	
17	2008	1	18	Joe Flacco	/players/F/FlacJo00.htm	QB	23	
18	2009	1	1	Matthew Stafford	/players/S/StafMa00.htm	QB	21	
19	2008	2	50	Calais Campbell	/players/C/CampCa99.htm	DE	22	

	drafted_by	college	career_length	av	games_played	\
0	NYG	North Carolina State	14	134	209	
1	GNB	California	13	128	162	
2	PIT	Miami (OH)	14	120	213	
3	ATL	Boston Col.	10	120	171	

4	SDG	Mississippi	14	112	229
5	BAL	Oregon	12	101	177
6	KAN	Idaho State	11	99	187
7	CAR	Auburn	7	95	122
8	SFO	Utah	13	93	166
9	SFO	Mississippi	7	92	112
10	MIN	Oklahoma	11	91	146
11	NYJ	Pittsburgh	10	90	145
12	SFO	Miami (FL)	13	90	209
13	ARI	Pittsburgh	14	89	231
14	ATL	Ala-Birmingham	10	88	171
15	SEA	Wisconsin	6	88	108
16	DEN	Vanderbilt	11	87	153
17	BAL	Delaware	10	86	163
18	DET	Georgia	9	85	138
19	ARI	Miami (FL)	10	85	167

	games_started	all_pros	pro_bowls	\
0	205	0	7	
1	155	2	6	
2	211	0	6	
3	171	1	4	
4	227	0	4	
5	173	2	5	
6	181	4	5	
7	121	1	3	
8	161	0	3	
9	112	5	7	
10	136	4	7	
11	142	4	7	
12	195	0	5	
13	229	1	11	
14	149	1	4	
15	108	0	4	
16	153	0	1	
17	163	0	0	
18	138	0	1	
19	149	1	3	

	college_stats_link
0	<a href="https://www.sports-reference.com/cfb/players/p...">https://www.sports-reference.com/cfb/players/p...</a>
1	<a href="https://www.sports-reference.com/cfb/players/a...">https://www.sports-reference.com/cfb/players/a...</a>
2	<a href="https://www.sports-reference.com/cfb/players/b...">https://www.sports-reference.com/cfb/players/b...</a>
3	<a href="https://www.sports-reference.com/cfb/players/m...">https://www.sports-reference.com/cfb/players/m...</a>
4	<a href="https://www.sports-reference.com/cfb/players/e...">https://www.sports-reference.com/cfb/players/e...</a>
5	<a href="https://www.sports-reference.com/cfb/players/h...">https://www.sports-reference.com/cfb/players/h...</a>
6	
7	<a href="https://www.sports-reference.com/cfb/players/c...">https://www.sports-reference.com/cfb/players/c...</a>
8	<a href="https://www.sports-reference.com/cfb/players/a...">https://www.sports-reference.com/cfb/players/a...</a>
9	<a href="https://www.sports-reference.com/cfb/players/p...">https://www.sports-reference.com/cfb/players/p...</a>
10	<a href="https://www.sports-reference.com/cfb/players/a...">https://www.sports-reference.com/cfb/players/a...</a>
11	<a href="https://www.sports-reference.com/cfb/players/d...">https://www.sports-reference.com/cfb/players/d...</a>
12	<a href="https://www.sports-reference.com/cfb/players/f...">https://www.sports-reference.com/cfb/players/f...</a>
13	<a href="https://www.sports-reference.com/cfb/players/l...">https://www.sports-reference.com/cfb/players/l...</a>



```

14 https://www.sports-reference.com/cfb/players/r...
15 https://www.sports-reference.com/cfb/players/r...
16 https://www.sports-reference.com/cfb/players/j...
17 https://www.sports-reference.com/cfb/players/j...
18 https://www.sports-reference.com/cfb/players/m...
19 https://www.sports-reference.com/cfb/players/c...

```

## 2.11 Outcome

In the end, I wasn't able to accomplish all of my goals. But, I did get the results I expected! Using matplotlib, pandas, and sklearn I demonstrate below that a player's collegiate accomplishments do not correlate to their NFL success.

### 2.11.1 Results

```

In [3]: from PFRDataAnalysis.Predictor import *

import warnings
warnings.simplefilter(action='ignore', category=FutureWarning)
warnings.simplefilter(action='ignore', category=Warning)
warnings.simplefilter(action='ignore', category=DeprecationWarning)

In [6]: player = Player("Cam Newton", "QB", "Auburn")
prediction = predict_player_pick(r'C:\NFLDraftAnalysis\PFR.db', player, True)
print(f"{player.name}\n"
      f"Actual Pick: {prediction[1]}\n"
      f"Predicted Pick: {prediction[0]}")

```

```

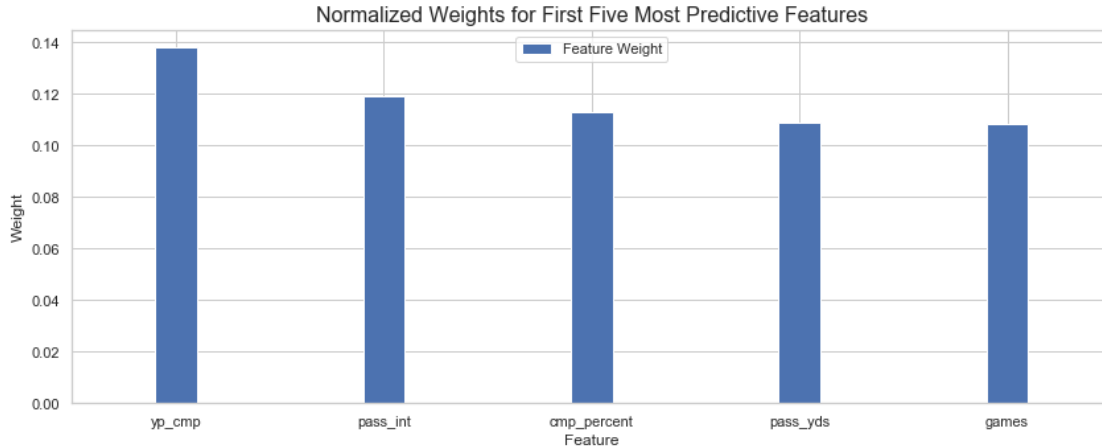
Connecting to SQLite3
SQLite3 Connected
Training QBs
Training set has 90 samples.

```

```

0
games      0.108134
pass_cmp   0.102652
pass_att   0.106762
pass_yds   0.108813
cmp_percent 0.112977
yp_cmp     0.138018
pass_td    0.102373
pass_int   0.118974
rush_att   0.101297

```

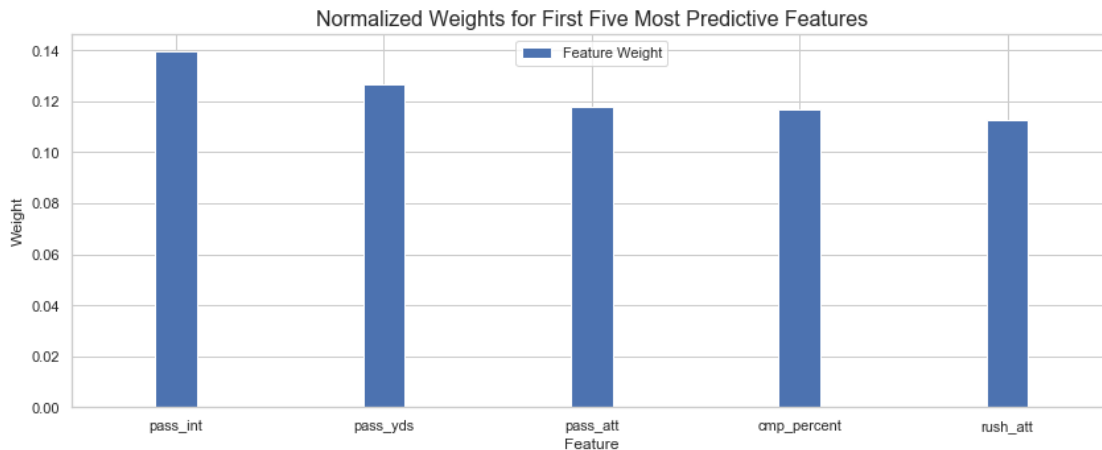


Cam Newton  
 Actual Pick: 1  
 Predicted Pick: 3

```
In [5]: player = Player("Derek Anderson", "QB", "Oregon State")
        prediction = predict_player_pick(r'C:\NFLDraftAnalysis\PFR.db', player, True)
        print(f"{player.name}\n"
              f"Actual Pick: {prediction[1]}\n"
              f"Predicted Pick: {prediction[0]}")
```

Connecting to SQLite3  
 SQLite3 Connected  
 Training QBs  
 Training set has 90 samples.

```
0
games      0.110348
pass_cmp   0.085553
pass_att   0.118024
pass_yds   0.126626
cmp_percent 0.116633
yp_cmp     0.090065
pass_td    0.100284
pass_int   0.139528
rush_att   0.112939
```



Derek Anderson  
 Actual Pick: 213  
 Predicted Pick: 1

## 2.12 Future Work

**Include NFL Combine Data in training data** I predict this will massively affect the results, and make my prediction model accurate instead of intentionally inaccurate.

**Use Collegiate Production to Predict NFL Production**

**Include Players Drafted After 2015**

**Reverse Predictions** Predict collegiate stats based on NFL production

In [ ]: