Predicting the 2021 Fantasy Football Draft ARIMA

May 4, 2021

1 Who should be the first pick drafted in the 2021 NFL Fantasy Draft? This project aims to predict players total points for next season to provide an objective ranking.

[1]:
```
# Import Libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns; sns.set()
import sklearn
```

[2]:
```
# df_2020 = pd.read_csv('2020NFLFantasyStats.csv', header = 1)
# df_2020['Player'] = df_2020['Player'].str.split('\\').str[0].str.
 ↪replace('[+,*]','')
# df_2019 = pd.read_csv('2019NFLFantasyStats.csv',header = 1)
# df_2019['Player'] = df_2019['Player'].str.split('\\').str[0].str.
 ↪replace('[+,*]','')
```

[3]:
```
# Load in the Data
list_of_names =␣
 ↪['2020NFLFantasyStats','2019NFLFantasyStats','2018NFLFantasyStats','2017NFLFantasyStats','2
df_list = []

for i in range(len(list_of_names)):
    temp_df = pd.read_csv( list_of_names[i] + '.csv',header = 1)
    temp_df['Player'] = temp_df['Player'].str.split('\\').str[0].str.
 ↪replace('[+,*]','').str.strip()
    df_list.append(temp_df)
```

[4]:
```
# Add the year column to each dataset
for dataset in df_list:
    df_2020 = df_list[0]
    df_2020['Year'] = 2020
    df_2019 = df_list[1]
    df_2019['Year'] = 2019
    df_2018 = df_list[2]
```

```
    df_2018['Year'] = 2018
    df_2017 = df_list[3]
    df_2017['Year'] = 2017
    df_2016 = df_list[4]
    df_2016['Year'] = 2016
    df_2015 = df_list[5]
    df_2015['Year'] = 2015
    df_2014 = df_list[6]
    df_2014['Year'] = 2014
    df_2013 = df_list[7]
    df_2013['Year'] = 2013
    df_2012 = df_list[8]
    df_2012['Year'] = 2012
    df_2011 = df_list[9]
    df_2011['Year'] = 2011
    display(dataset)
```

```
      Rk          Player   Tm FantPos  Age   G  GS  Cmp  Att  Yds  ...  2PM  \
0      1   Derrick Henry  TEN      RB   26  16  16    0    0    0  ...  1.0
1      2    Alvin Kamara  NOR      RB   25  15  10    0    0    0  ...  NaN
2      3     Dalvin Cook  MIN      RB   25  14  14    0    0    0  ...  3.0
3      4    Travis Kelce  KAN      TE   31  15  15    1    2    4  ...  1.0
4      5   Davante Adams  GNB      WR   28  14  14    0    0    0  ...  NaN
..   ...             ...  ...     ...  ...  ..  ..  ...  ...  ...  ...  ...
621  622   Andre Roberts  BUF      WR   32  15   0    0    0    0  ...  NaN
622  623    Nate Sudfeld  PHI      QB   27   1   0    5   12   32  ...  NaN
623  624  Nsimba Webster  LAR     NaN   24  16   0    0    0    0  ...  NaN
624  625  Dede Westbrook  JAX      WR   27   2   0    0    0    0  ...  NaN
625  626  Kendall Hinton  DEN      WR   23   1   0    1    9   13  ...  NaN

     2PP  FantPt    PPR   DKPt   FDPt    VBD  PosRank  OvRank  Year
0    NaN   314.0  333.1  341.1  323.6  184.0        1     1.0  2020
1    NaN   295.0  377.8  383.8  336.3  165.0        2     2.0  2020
2    NaN   294.0  337.8  346.8  315.8  164.0        3     3.0  2020
3    NaN   208.0  312.8  316.8  260.3  117.0        1     4.0  2020
4    NaN   243.0  358.4  362.4  300.9  117.0        1     5.0  2020
..   ...     ...    ...    ...    ...    ...      ...     ...   ...
621  NaN    -1.0    3.1    5.1    1.1    NaN      245     NaN  2020
622  NaN    -2.0   -1.5    0.5   -0.5    NaN       81     NaN  2020
623  NaN    -2.0   -2.0   -1.0   -2.0    NaN      248     NaN  2020
624  NaN    -2.0   -0.6    0.4   -1.1    NaN      247     NaN  2020
625  NaN    -3.0   -2.8   -0.8   -0.8    NaN      249     NaN  2020

[626 rows x 34 columns]
```

```
      Rk               Player   Tm FantPos  Age   G  GS  Cmp  Att   Yds  ...  \
0      1  Christian McCaffrey  CAR      RB   23  16  16    0    2     0  ...
```

```
1      2        Lamar Jackson  BAL      QB   22  15  15  265  401  3127  ...
2      3        Derrick Henry  TEN      RB   25  15  15    0    0     0  ...
3      4          Aaron Jones  GNB      RB   25  16  16    0    0     0  ...
4      5      Ezekiel Elliott  DAL      RB   24  16  16    0    0     0  ...
..   ...                  ...  ...     ...  ...  ..  ..  ...  ...   ...  ...
614  615      Ray-Ray McCloud  CAR     NaN   23   6   0    0    0     0  ...
615  616     Darrius Shepherd  GNB      WR   24   6   0    0    0     0  ...
616  617      Jarrett Stidham  NWE      QB   23   3   0    2    4    14  ...
617  618       Michael Walker  JAX      WR   23   7   0    0    0     0  ...
618  619        Corey Clement  PHI     NaN   25   4   0    0    0     0  ...

     2PM  2PP  FantPt    PPR   DKPt   FDPt    VBD  PosRank  OvRank  Year
0    1.0  NaN   355.0  471.2  477.2  413.2  215.0        1     1.0  2019
1    NaN  NaN   416.0  415.7  429.7  421.7  152.0        1     2.0  2019
2    NaN  NaN   277.0  294.6  303.6  285.6  136.0        2     3.0  2019
3    NaN  NaN   266.0  314.8  322.8  290.3  125.0        3     4.0  2019
4    NaN  NaN   258.0  311.7  319.7  284.7  117.0        4     5.0  2019
..   ...  ...     ...    ...    ...    ...    ...      ...     ...   ...
614  NaN  NaN    -2.0   -2.0   -1.0   -2.0    NaN      244     NaN  2019
615  NaN  NaN    -2.0   -0.9    0.1   -1.4    NaN      242     NaN  2019
616  NaN  NaN    -2.0   -1.6   -0.6   -0.6    NaN       73     NaN  2019
617  NaN  NaN    -3.0   -0.5    1.5   -1.5    NaN      246     NaN  2019
618  NaN  NaN    -4.0   -4.0   -2.0   -4.0    NaN      165     NaN  2019

[619 rows x 34 columns]

      Rk              Player   Tm FantPos  Age   G  GS  Cmp  Att   Yds  ...  \
0      1        Todd Gurley  LAR       RB   24  14  14    0    0     0  ...
1      2      Saquon Barkley  NYG       RB   21  16  16    0    0     0  ...
2      3  Christian McCaffrey  CAR       RB   22  16  16    1    1    50  ...
3      4       Alvin Kamara  NOR       RB   23  15  13    0    0     0  ...
4      5    Patrick Mahomes  KAN       QB   23  16  16  383  580  5097  ...
..   ...                ...  ...      ...  ...  ..  ..  ...  ...   ...  ...
603  604        Kaelin Clay  NYG      NaN   26   2   0    0    0     0  ...
604  605           JJ Jones  2TM       WR   26   4   0    0    0     0  ...
605  606      Kyle Lauletta  NYG       QB   23   2   0    0    5     0  ...
606  607     Riley McCarron  NWE      NaN   25   1   0    0    0     0  ...
607  608        Jojo Natson  LAR      NaN   24  13   0    0    0     0  ...

     2PM  2PP  FantPt    PPR   DKPt   FDPt    VBD  PosRank  OvRank  Year
0    3.0  NaN   313.0  372.1  379.1  342.6  178.0        1     1.0  2018
1    1.0  NaN   295.0  385.8  391.8  340.3  159.0        2     2.0  2018
2    NaN  NaN   279.0  385.5  392.5  332.0  143.0        3     3.0  2018
3    3.0  NaN   273.0  354.2  360.2  313.7  138.0        4     4.0  2018
4    1.0  NaN   417.0  417.1  437.1  429.1  134.0        1     5.0  2018
..   ...  ...     ...    ...    ...    ...    ...      ...     ...   ...
603  NaN  NaN    -2.0   -2.0   -1.0   -2.0    NaN      242     NaN  2018
```

```
604  NaN  NaN    -2.0   -0.7    0.3   -1.2    NaN      239     NaN  2018
605  NaN  NaN    -2.0   -2.2   -1.2   -1.2    NaN       75     NaN  2018
606  NaN  NaN    -2.0   -2.0   -1.0   -2.0    NaN      241     NaN  2018
607  NaN  NaN    -2.0   -2.0   -1.0   -2.0    NaN      240     NaN  2018

[608 rows x 34 columns]
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```
      Rk             Player   Tm FantPos  Age   G  GS  Cmp  Att  Yds  ...  \
0      1        Todd Gurley  LAR      RB   23  15  15    0    0    0  ...
1      2       Le'Veon Bell  PIT      RB   25  15  15    0    0    0  ...
2      3        Kareem Hunt  KAN      RB   22  16  16    0    0    0  ...
3      4       Alvin Kamara  NOR      RB   22  16   3    0    0    0  ...
4      5      Melvin Gordon  LAC      RB   24  16  16    0    0    0  ...
..   ...                ...  ...     ...  ...  ..  ..  ...  ...  ...  ...
584  585          John Ross  CIN      WR   22   3   1    0    0    0  ...
585  586        Jake Rudock  DET      QB   24   3   0    3    5   24  ...
586  587         Tyler Bray  KAN      QB   26   1   0    0    1    0  ...
587  588  Teddy Bridgewater  MIN      QB   25   1   0    0    2    0  ...
588  589       Devante Mays  GNB      RB   23   8   0    0    0    0  ...

     2PM  2PP  FantPt    PPR   DKPt   FDPt    VBD  PosRank  OvRank  Year
0    NaN  NaN   319.0  383.3  391.3  351.3  192.0        1     1.0  2017
1    NaN  NaN   257.0  341.6  349.6  299.1  130.0        2     2.0  2017
2    NaN  NaN   242.0  295.2  302.2  268.7  115.0        3     3.0  2017
3    1.0  NaN   239.0  320.4  327.4  279.9  112.0        4     4.0  2017
4    NaN  NaN   230.0  288.1  294.1  259.1  103.0        5     5.0  2017
..   ...  ...     ...    ...    ...    ...    ...      ...     ...   ...
584  NaN  NaN    -1.0   -0.8    0.2   -0.8    NaN      224     NaN  2017
585  NaN  NaN    -1.0   -1.0    NaN    NaN    NaN       72     NaN  2017
586  NaN  NaN    -2.0   -2.0   -1.0   -2.0    NaN       74     NaN  2017
587  NaN  NaN    -2.0   -2.3   -1.3   -1.3    NaN       75     NaN  2017
588  NaN  NaN    -2.0    1.1    2.1   -0.4    NaN      160     NaN  2017

[589 rows x 34 columns]
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```
      Rk           Player   Tm FantPos  Age   G  GS  Cmp  Att   Yds  ...  2PM  \
0      1    David Johnson  ARI      RB   25  16  16    0    0     0  ...  1.0
1      2  Ezekiel Elliott  DAL      RB   21  15  15    0    0     0  ...  NaN
2      3    Aaron Rodgers  GNB      QB   33  16  16  401  610  4428  ...  1.0
3      4     LeSean McCoy  BUF      RB   28  15  15    0    0     0  ...  1.0
4      5     Le'Veon Bell  PIT      RB   24  12  12    0    1     0  ...  1.0
..   ...              ...  ...     ...  ...  ..  ..  ...  ...   ...  ...  ...
569  570      Tyler Ervin  HOU      RB   23  12   0    0    0     0  ...  NaN
570  571    Brett Hundley  GNB      QB   23   4   0    2   10    17  ...  NaN
571  572   Keshawn Martin  SFO     NaN   26   1   0    0    0     0  ...  NaN
572  573    Kalif Raymond  DEN     NaN   22   4   0    0    0     0  ...  NaN
573  574   Matthew Slater  NWE      WR   31  13   0    0    0     0  ...  NaN
```

```
     2PP  FantPt    PPR   DKPt   FDPt    VBD  PosRank  OvRank  Year
0    NaN   328.0  407.8  416.8  367.8  191.0        1     1.0  2016
1    NaN   293.0  325.4  332.4  309.4  156.0        2     2.0  2016
2    1.0   380.0  380.0  397.0  387.0  119.0        1     3.0  2016
3    NaN   248.0  298.3  304.3  273.3  111.0        3     4.0  2016
4    NaN   242.0  317.4  324.4  279.9  105.0        4     5.0  2016
..   ...     ...    ...    ...    ...    ...      ...     ...   ...
569  NaN    -2.0    1.1    3.1   -0.4    NaN      160     NaN  2016
570  NaN    -2.0   -1.5   -0.5   -0.5    NaN       70     NaN  2016
571  NaN    -2.0   -2.0   -1.0   -2.0    NaN      213     NaN  2016
572  NaN    -2.0   -2.0   -1.0   -2.0    NaN      214     NaN  2016
573  NaN    -2.0   -1.5   -0.5   -1.5    NaN      212     NaN  2016

[574 rows x 34 columns]


      Rk           Player   Tm FantPos  Age   G  GS  Cmp  Att   Yds  ...  2PM  \
0      1    Antonio Brown  PIT      WR   27  16  16    0    0     0  ...  2.0
1      2  Devonta Freeman  ATL      RB   23  15  13    0    0     0  ...  NaN
2      3     Julio Jones  ATL      WR   26  16  16    0    0     0  ...  NaN
3      4  Adrian Peterson  MIN      RB   30  16  16    0    0     0  ...  NaN
4      5       Cam Newton  CAR      QB   26  16  16  296  495  3837  ...  NaN
..   ...              ...  ...     ...  ...  ..  ..  ...  ...   ...  ...  ...
569  570  Frankie Hammond  KAN     NaN   25   9   0    0    0     0  ...  NaN
570  571   Raheem Mostert  3TM     NaN   23  11   0    0    0     0  ...  NaN
571  572      Isaiah Pead  STL      RB   26   2   0    0    0     0  ...  NaN
572  573     Sean Renfree  ATL      QB   25   2   0    3    7    11  ...  NaN
573  574    Glenn Winston  CLE      RB   26   3   0    0    0     0  ...  NaN

     2PP  FantPt    PPR   DKPt   FDPt    VBD  PosRank  OvRank  Year
0    NaN   252.0  388.2  393.2  320.2  125.0        1     1.0  2015
1    NaN   243.0  316.4  324.4  279.9  123.0        1     2.0  2015
2    NaN   239.0  375.1  379.1  307.1  111.0        2     3.0  2015
3    NaN   231.0  260.7  269.7  245.7  110.0        2     4.0  2015
4    NaN   389.0  389.1  409.1  399.1  105.0        1     5.0  2015
..   ...     ...    ...    ...    ...    ...      ...     ...   ...
569  NaN    -2.0   -2.0   -1.0   -2.0    NaN      206     NaN  2015
570  NaN    -2.0   -2.0   -1.0   -2.0    NaN      164     NaN  2015
571  NaN    -2.0   -1.7   -0.7   -1.7    NaN      163     NaN  2015
572  NaN    -2.0   -2.0   -1.0   -1.0    NaN       73     NaN  2015
573  NaN    -3.0   -2.8   -1.8   -2.8    NaN      165     NaN  2015

[574 rows x 34 columns]


      Rk           Player   Tm FantPos  Age   G    GS  Cmp  Att  Yds  ...  2PM  \
0      1  DeMarco Murray  DAL      RB   26  16  16.0    0    0    0  ...  NaN
1      2    Le'Veon Bell  PIT      RB   22  16  16.0    0    0    0  ...  NaN
```

```
2      3  Marshawn Lynch  SEA      RB   28  16  14.0    0    0    0  ...  NaN
3      4   Antonio Brown  PIT      WR   26  16  16.0    2    2   20  ...  1.0
4      5      Matt Forte  CHI      RB   29  16  16.0    0    0    0  ...  2.0
..   ...             ...  ...     ...  ...  ..   ...  ...  ...  ...  ...  ...
756  757    Isaiah Burse  DEN     NaN   23  12   0.0    0    0    0  ...  NaN
757  758      Matt Flynn  GNB      QB   29   7   0.0    8   16   66  ...  NaN
758  759    Tauren Poole  3TM      RB   25   3   0.0    0    0    0  ...  NaN
759  760     Walt Powell  NYJ     NaN   23   4   0.0    0    0    0  ...  NaN
760  761     Matt Schaub  OAK      QB   33  11   0.0    5   10   57  ...  NaN

     2PP  FantPt    PPR   DKPt   FDPt    VBD  PosRank  OvRank  Year
0    NaN   294.0  351.1  362.1  322.6  173.0        1     1.0  2014
1    NaN   288.0  370.5  376.5  329.0  167.0        2     2.0  2014
2    NaN   265.0  302.3  310.3  283.8  144.0        3     3.0  2014
3    NaN   258.0  386.9  391.9  322.4  136.0        1     4.0  2014
4    NaN   245.0  346.6  354.6  295.6  124.0        4     5.0  2014
..   ...     ...    ...    ...    ...    ...      ...     ...   ...
756  NaN    -2.0   -2.0   -1.0   -2.0    NaN      289     NaN  2014
757  NaN    -2.0   -2.4   -0.4   -1.4    NaN      103     NaN  2014
758  NaN    -2.0   -2.0   -1.0   -2.0    NaN      199     NaN  2014
759  NaN    -2.0   -2.0   -1.0   -2.0    NaN      288     NaN  2014
760  NaN    -4.0   -3.7   -0.7   -1.7    NaN      104     NaN  2014

[761 rows x 34 columns]


      Rk              Player   Tm FantPos  Age   G  GS  Cmp  Att   Yds  ...  \
0      1      Jamaal Charles  KAN      RB   27  15  15    0    0     0  ...
1      2      Peyton Manning  DEN      QB   37  16  16  450  659  5477  ...
2      3        LeSean McCoy  PHI      RB   25  16  16    0    0     0  ...
3      4          Matt Forte  CHI      RB   28  16  16    0    0     0  ...
4      5        Jimmy Graham  NOR      TE   27  16  12    0    0     0  ...
..   ...                 ...  ...     ...  ...  ..  ..  ...  ...   ...  ...
575  576  Charlie Whitehurst  SDG      QB   31   2   0    0    0     0  ...
576  577        Tyler Clutts  2TM      RB   29   8   0    0    0     0  ...
577  578          Matt Moore  MIA      QB   29   1   0    2    6    53  ...
578  579      Curtis Painter  NYG      QB   28   3   0    8   16    57  ...
579  580         Devon Wylie  TEN     NaN   25   2   0    0    0     0  ...

     2PM  2PP  FantPt    PPR   DKPt   FDPt    VBD  PosRank  OvRank  Year
0    NaN  NaN   308.0  378.0  386.0  343.0  182.0        1     1.0  2013
1    NaN  1.0   412.0  412.0  431.0  422.0  153.0        1     2.0  2013
2    NaN  NaN   279.0  330.6  337.6  304.6  152.0        2     3.0  2013
3    1.0  NaN   263.0  337.3  345.3  300.3  137.0        3     4.0  2013
4    NaN  NaN   218.0  303.5  306.5  260.5  124.0        1     5.0  2013
..   ...  ...     ...    ...    ...    ...    ...      ...     ...   ...
575  NaN  NaN    -1.0   -0.5   -0.5   -0.5    NaN       67     NaN  2013
576  NaN  NaN    -2.0   -0.6    0.4   -1.1    NaN      170     NaN  2013
```

```
577  NaN  NaN    -2.0   -1.9    0.1    0.1    NaN       68     NaN  2013
578  NaN  NaN    -2.0   -1.9    0.1    0.1    NaN       69     NaN  2013
579  NaN  NaN    -2.0   -2.0   -1.0   -2.0    NaN      214     NaN  2013

[580 rows x 34 columns]
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```
      Rk           Player   Tm FantPos  Age     G    GS  Cmp  Att   Yds  ...  \
0      1  Adrian Peterson  MIN      RB   27  16.0  16.0  0.0  0.0   0.0  ...
1      2     Doug Martin  TAM      RB   23  16.0  16.0  0.0  0.0   0.0  ...
2      3    Arian Foster  HOU      RB   26  16.0  16.0  0.0  0.0   0.0  ...
3      4   Marshawn Lynch  SEA      RB   26  16.0  15.0  0.0  0.0   0.0  ...
4      5    Alfred Morris  WAS      RB   24  16.0  16.0  0.0  0.0   0.0  ...
..   ...              ...  ...     ...  ...   ...   ...  ...  ...   ...  ...
682  683   Brock Osweiler  DEN      QB   22   5.0   0.0  2.0  4.0  12.0  ...
683  684   Graham Harrell  GNB      QB   27   4.0   0.0  2.0  4.0  20.0  ...
684  685     Josh Johnson  CLE     NaN   26   1.0   0.0  0.0  0.0   0.0  ...
685  686     Ryan Mallett  NWE      QB   24   4.0   0.0  1.0  4.0  17.0  ...
686  687        Joe Adams  CAR      WR   23   9.0   0.0  0.0  0.0   0.0  ...

     2PM  2PP  FantPt    PPR   DKPt   FDPt    VBD  PosRank  OvRank  Year
0    1.0  NaN   307.0  347.4  355.4  327.4  191.0        1     1.0  2012
1    NaN  NaN   263.0  311.6  318.6  287.1  146.0        2     2.0  2012
2    NaN  NaN   262.0  302.1  310.1  282.1  145.0        3     3.0  2012
3    NaN  NaN   247.0  269.6  277.6  258.1  130.0        4     4.0  2012
4    NaN  NaN   241.0  252.0  258.0  246.5  124.0        5     5.0  2012
..   ...  ...     ...    ...    ...    ...    ...      ...     ...   ...
682  NaN  NaN    -1.0   -0.8   -0.8   -0.8    NaN       85     NaN  2012
683  NaN  NaN    -2.0   -1.5   -0.5   -1.5    NaN       86     NaN  2012
684  NaN  NaN    -2.0   -2.0   -1.0   -2.0    NaN       87     NaN  2012
685  NaN  NaN    -2.0   -2.2   -1.2   -1.2    NaN       88     NaN  2012
686  NaN  NaN    -4.0   -3.0    NaN   -3.5    NaN      254     NaN  2012

[687 rows x 34 columns]
```

```
      Rk           Player   Tm FantPos  Age   G  GS    Cmp    Att     Yds  ...  \
0      1   Aaron Rodgers  GNB      QB   28  15  15  343.0  502.0  4643.0  ...
1      2      Drew Brees  NOR      QB   32  16  16  468.0  657.0  5476.0  ...
2      3        Ray Rice  BAL      RB   24  16  16    1.0    1.0     1.0  ...
3      4  Calvin Johnson  DET      WR   26  16  16    0.0    0.0     0.0  ...
4      5      Cam Newton  CAR      QB   22  16  16  310.0  517.0  4051.0  ...
..   ...              ...  ...     ...  ...  ..  ..    ...    ...     ...  ...
578  579     Kris Wilson  BAL     NaN   30  15   0    0.0    0.0     0.0  ...
579  580    Will Yeatman  MIA     NaN   23   3   2    0.0    0.0     0.0  ...
580  581     Joe Zelenka  ATL     NaN   35  16   0    0.0    0.0     0.0  ...
581  582     Billy Volek  SDG      QB   35   2   0    0.0    0.0     0.0  ...
582  583      David Reed  BAL      WR   24  11   0    0.0    0.0     0.0  ...
```

```
     2PM  2PP  FantPt    PPR   DKPt   FDPt    VBD  PosRank  OvRank  Year
0    NaN  NaN   397.0  397.4  409.4  403.4  175.0         1     1.0  2011
1    NaN  3.0   394.0  393.6  411.6  407.6  171.0         2     2.0  2011
2    NaN  NaN   297.0  372.8  380.8  334.8  149.0         1     3.0  2011
3    NaN  NaN   263.0  359.2  363.2  311.2  148.0         1     4.0  2011
4    NaN  2.0   369.0  370.3  395.3  386.8  147.0         3     5.0  2011
..   ...  ...     ...    ...    ...    ...    ...       ...     ...   ...
578  NaN  NaN     NaN    NaN    NaN    NaN    NaN       108     NaN  2011
579  NaN  NaN     NaN    NaN    NaN    NaN    NaN       104     NaN  2011
580  NaN  NaN     NaN    NaN    NaN    NaN    NaN       115     NaN  2011
581  NaN  NaN    -1.0   -0.5   -0.5   -0.5    NaN        77     NaN  2011
582  NaN  NaN    -2.0   -2.4   -0.4   -2.4    NaN       213     NaN  2011

[583 rows x 34 columns]
```

[5]:
```
# Concat 2011-19 dataframes for the training data set
frames = [df_2019,␣
 ↪df_2018,df_2017,df_2016,df_2015,df_2014,df_2013,df_2012,df_2011]
train_df_2011_2019 = pd.concat(frames,ignore_index = True)
# Test data set will be the 2020 season
test_df = df_2020
```

[6]:
```
# Create Dataframes for each position
RB_df = train_df_2011_2019[train_df_2011_2019['FantPos'] == 'RB']
TE_df = train_df_2011_2019[train_df_2011_2019['FantPos'] == 'TE']
WR_df = train_df_2011_2019[train_df_2011_2019['FantPos'] == 'WR']
QB_df = train_df_2011_2019[train_df_2011_2019['FantPos'] == 'QB']
```

[7]:
```
# Enter a string of the player you want stats for
def player(player):
    player_df = train_df_2011_2019[train_df_2011_2019['Player'] == player]
    return player_df
```

[8]:
```
# Tom Brady Example
Tom_Brady_df = player('Tom Brady')
Tom_Brady_df
```

[8]:
```
       Rk     Player   Tm FantPos  Age     G    GS    Cmp    Att     Yds  … \
78     79  Tom Brady  NWE      QB   42  16.0  16.0  373.0  613.0  4057.0  …
698    80  Tom Brady  NWE      QB   41  16.0  16.0  375.0  570.0  4355.0  …
1254   28  Tom Brady  NWE      QB   40  16.0  16.0  385.0  581.0  4577.0  …
1895   80  Tom Brady  NWE      QB   39  12.0  12.0  291.0  432.0  3554.0  …
2410   21  Tom Brady  NWE      QB   38  16.0  16.0  402.0  624.0  4770.0  …
3025   62  Tom Brady  NWE      QB   37  16.0  16.0  373.0  582.0  4109.0  …
3805   81  Tom Brady  NWE      QB   36  16.0  16.0  380.0  628.0  4343.0  …
```

```
4316  12  Tom Brady  NWE      QB   35  16.0  16.0  401.0  637.0  4827.0  …
4998   7  Tom Brady  NWE      QB   34  16.0  16.0  401.0  611.0  5235.0  …

      2PM  2PP  FantPt    PPR   DKPt   FDPt    VBD  PosRank  OvRank  Year
78    NaN  1.0   264.0  263.7  275.7  271.7    NaN       12     NaN  2019
698   NaN  NaN   280.0  281.3  297.3  291.8    NaN       14     NaN  2018
1254  NaN  2.0   296.0  295.9  309.9  303.9   41.0        3    28.0  2017
1895  NaN  1.0   259.0  258.6  263.6  260.6    NaN       15     NaN  2016
2410  NaN  NaN   344.0  344.7  356.7  351.2   59.0        2    21.0  2015
3025  NaN  NaN   278.0  278.1  293.1  287.1   12.0        9    62.0  2014
3805  NaN  2.0   252.0  251.5  268.5  262.5    NaN       14     NaN  2013
4316  NaN  NaN   340.0  340.3  351.3  348.3   90.0        3    12.0  2012
4998  NaN  NaN   366.0  366.3  386.3  378.3  144.0        4     7.0  2011

[9 rows x 34 columns]
```

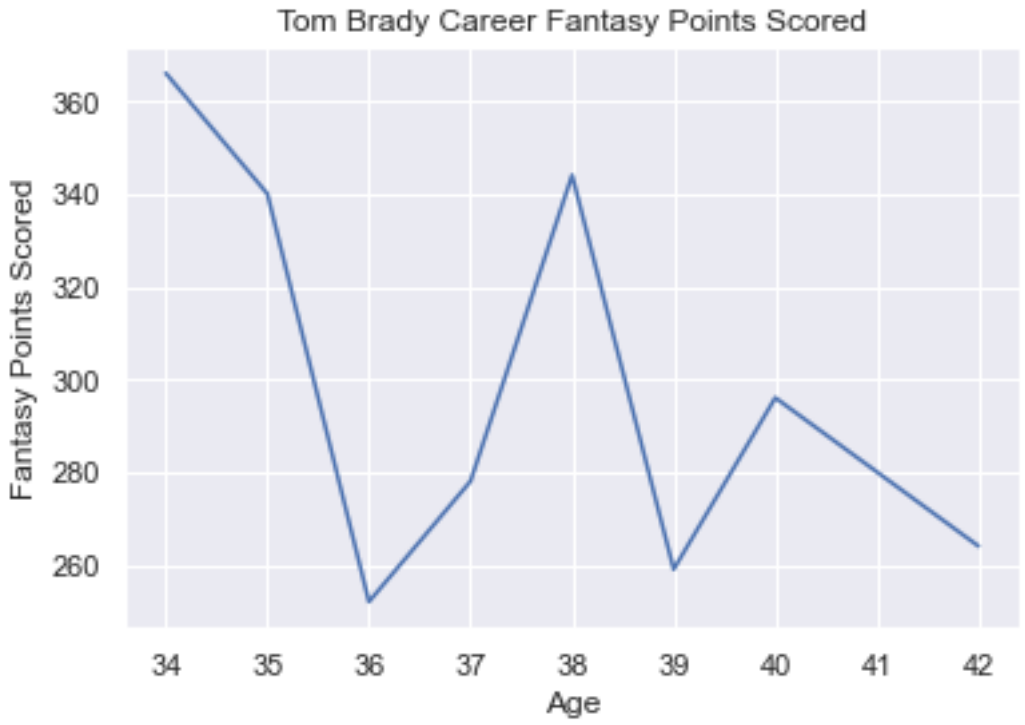
[9]:
```python
# Plot Function
def plot_f(player_name):

    df = player(player_name)

    Age = df['Age']
    Points = df['FantPt']

    plt.plot(Age, Points)
    plt.xlabel('Age')
    plt.ylabel('Fantasy Points Scored')
    plt.title(player_name + ' Career Fantasy Points Scored')
```

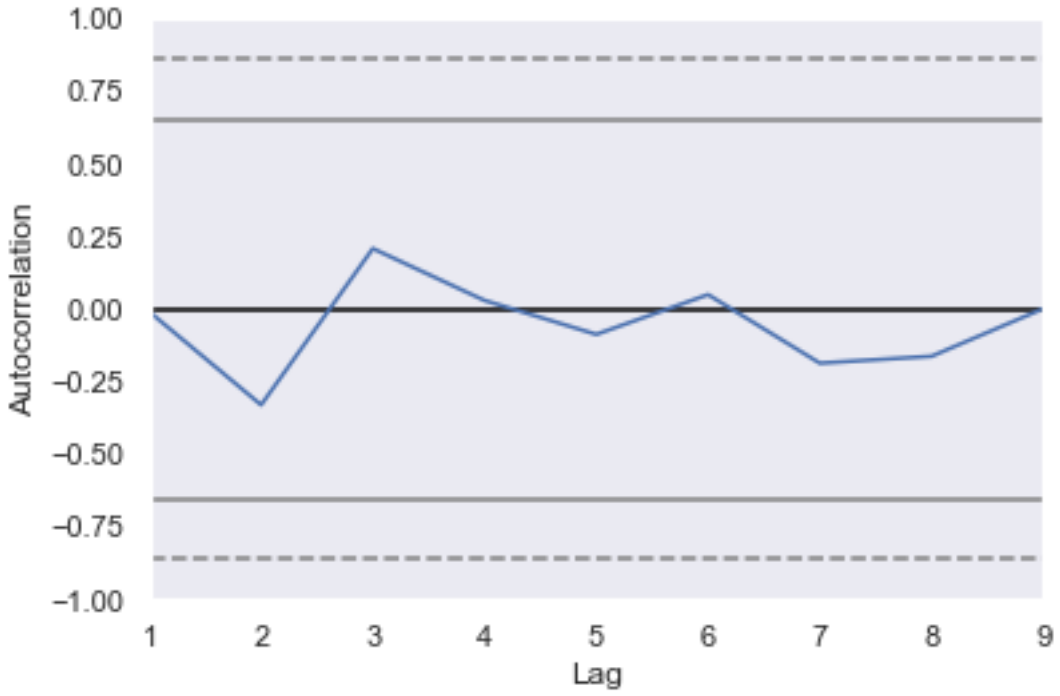
[10]:
```python
plot_f('Tom Brady')
```



[11]:
```
from statsmodels.tsa.arima.model import ARIMA
from sklearn.metrics import mean_squared_error
from pandas.plotting import autocorrelation_plot

# ACF Plot Function
def acf_plot_f(player_name):
    autocorrelation_plot(player(player_name).FantPt)
    plt.show()
```

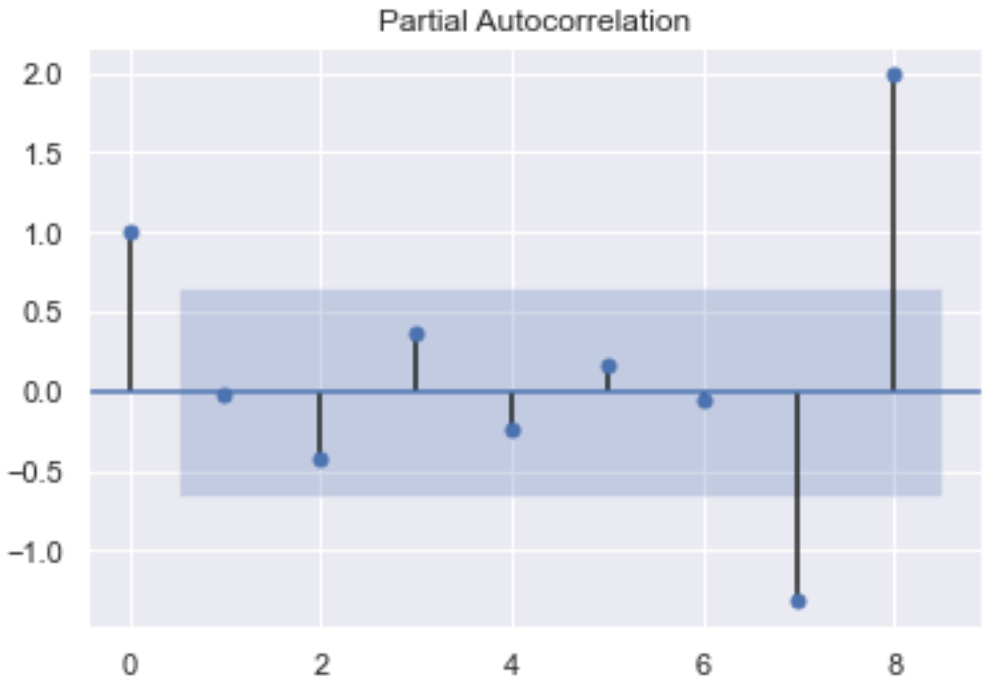
[12]:
```
acf_plot_f('Tom Brady')
```



[13]:
```
from statsmodels.graphics.tsaplots import plot_pacf
# Partial Autocorrelation Function
def pacf_plot_f(player_name):
    plot_pacf(player(player_name).FantPt)
    plt.show()
```

[14]:
```
pacf_plot_f('Tom Brady')
```

```
/Users/nickseah/Desktop/PythonAddOns/anaconda3/lib/python3.8/site-
packages/statsmodels/regression/linear_model.py:1406: RuntimeWarning: invalid
value encountered in sqrt
  return rho, np.sqrt(sigmasq)
```



[15]:
```
# ARIMA Model
# import warnings

# # Function to forecast number of fantasy points in a standard fantasy league

def forecast_f(player_name):
    qb_model = ARIMA(player(player_name).FantPt, order = (2,1,0))
    model_fit = qb_model.fit()
    forecast = model_fit.forecast(steps = 1)


    return print(forecast)
```

[16]:
```
# # ARIMA Model
# import warnings

# Function to forecast number of fantasy points in a standard fantasy league

# def rb_forecast_f(player_name):
#     rb_model = ARIMA(player(player_name).FantPt, order = (2,1,0))
#     model_fit = rb_model.fit()
#     forecast = model_fit.forecast(steps = 1)
```

```
#     return print(forecast)
```

[17]:
```
# ARIMA Model
# import warnings

# # Function to forecast number of fantasy points in a standard fantasy league

# def wr_forecast_f(player_name):
#     wr_model = ARIMA(player(player_name).FantPt, order = (2,1,0))
#     model_fit = wr_model.fit()
#     forecast = model_fit.forecast(steps = 1)


#     return print(forecast)
```

[18]:
```
import warnings

warnings.filterwarnings('ignore')

forecast_f('Tom Brady')
```

```
9    295.490167
dtype: float64
```

[19]:
```
# Function to return players 2020 fantasy points
def actual_f(player_name):
    df = test_df[test_df['Player'] == player_name]
    actual = df['FantPt'].iloc[0]
    return actual
```

[20]:
```
# Function to evaluate the ARIMA model using mean absolute error as our error␣
 ↪statistic
def evaluate_arima_model(player_name, arima_order):

    model = ARIMA(player(player_name).FantPt, order = arima_order)
    model_fit = model.fit()
    forecast = model_fit.forecast(steps = 1)




    mean_absolute_error = np.mean(abs((actual_f(player_name) - forecast.
 ↪iloc[0])))


    return mean_absolute_error
```

[21]:
```
order = (10,1,1)

evaluate_arima_model('DeAndre Hopkins',order)
```

[21]:
```
40.94534203196821
```

[22]:
```
# Grid Search Function to find parameters for ARIMA that minimize the Mean␣
↪Absolute Error
def evaluate_models(player_name, p_values, d_values, q_values):

    best_score, best_cfg = float("inf"), None

    for p in p_values:
        for d in d_values:
            for q in q_values:
                order = (p,d,q)
                try:
                    mae = evaluate_arima_model(player_name, order)
                    if mae < best_score:
                        best_score, best_cfg = mae, order
                    print('ARIMA%s MAE=%.3f' % (order,mae))
                except:
                    continue
    print('Best ARIMA%s MAE=%.3f' % (best_cfg, best_score))
```

[23]:
```
# Function we use to build a pipeline
def evaluate_models1(player_name, p_values, d_values, q_values):
    #dataset = dataset[:1420]
    best_score, best_cfg = float("inf"), None

    for p in p_values:
        for d in d_values:
            for q in q_values:
                order = (p,d,q)
                try:
                    mae = evaluate_arima_model(player_name, order)
                    if mae < best_score:
                        best_score, best_cfg = mae, order
                    #print('ARIMA%s MAE=%.3f' % (order,mae))
                except:
                    continue
    print('Player:%s MAE=%.3f' % (player_name, best_score))
    return best_cfg
```

2 Player Forecast Function. enter player name and it will return the project fantasy points for the 2021 season. Optimizes ARIMA for each player as a QB's career trajectory is vastly different from a Running Back

[30]:
```
def forecast_f_2021(player_name):
    p_values = [0, 1, 2,3, 4,5]
    d_values = range(0, 3)
    q_values = range(0, 10)

    best_cfg = evaluate_models1(player_name, p_values, d_values, q_values)
    rb_model = ARIMA(player(player_name).FantPt, order = best_cfg)
    model_fit = rb_model.fit()
    forecast = model_fit.forecast(steps = 2).iloc[1].round(decimals = 2)


    return print(player_name + ' Is projected: ' + str(forecast) +  ' Fantasy␣
 ↪points for the 2021 season. ')
```

[25]:
```
# Forecast Function for the pipeline

def forecast_f_2021_actual(player_name):
    p_values = [0, 1, 2,3, 4,5]
    d_values = range(0, 3)
    q_values = range(0, 5)

    best_cfg = evaluate_models1(player_name, p_values, d_values, q_values)
    rb_model = ARIMA(player(player_name).FantPt, order = best_cfg)
    model_fit = rb_model.fit()
    forecast = model_fit.forecast(steps = 2).iloc[1].round(decimals = 2)


    return forecast
```

[26]:
```
# Projected top 8 picks according to FantasyPros.com
projected_top_8 = ['Christian McCaffrey','Dalvin Cook','Derrick Henry','Saquon␣
 ↪Barkley','Alvin Kamara','Ezekiel Elliott','Aaron Jones','Nick Chubb']

# Empty DF
forecast_df = pd.DataFrame()
# Empty Forecast List we will use in the loop belw
forecast_list = []

#def rank_players(player_list):
for players in projected_top_8:
```

```
    # Obtain Forecast and Append to list
    player_forecast_2021 = forecast_f_2021_actual(players)
    forecast_list.append(player_forecast_2021)



# Create name and Projected Fantasy Points DataFrame
forecast_df['Name'] = projected_top_8
forecast_df['Projected 2021 Fantasy Points'] = forecast_list
```

```
Player:Christian McCaffrey MAE=15.180
Player:Dalvin Cook MAE=55.717
Player:Derrick Henry MAE=98.393
Player:Saquon Barkley MAE=182.995
Player:Alvin Kamara MAE=9.394
Player:Ezekiel Elliott MAE=18.833
Player:Aaron Jones MAE=2.512
Player:Nick Chubb MAE=5.000
```

[27]:
```
# View the DataFrame
forecast_df
```

[27]:

	Name	Projected 2021 Fantasy Points
0	Christian McCaffrey	88.18
1	Dalvin Cook	114.09
2	Derrick Henry	245.73
3	Saquon Barkley	295.00
4	Alvin Kamara	233.23
5	Ezekiel Elliott	234.64
6	Aaron Jones	250.75
7	Nick Chubb	197.00

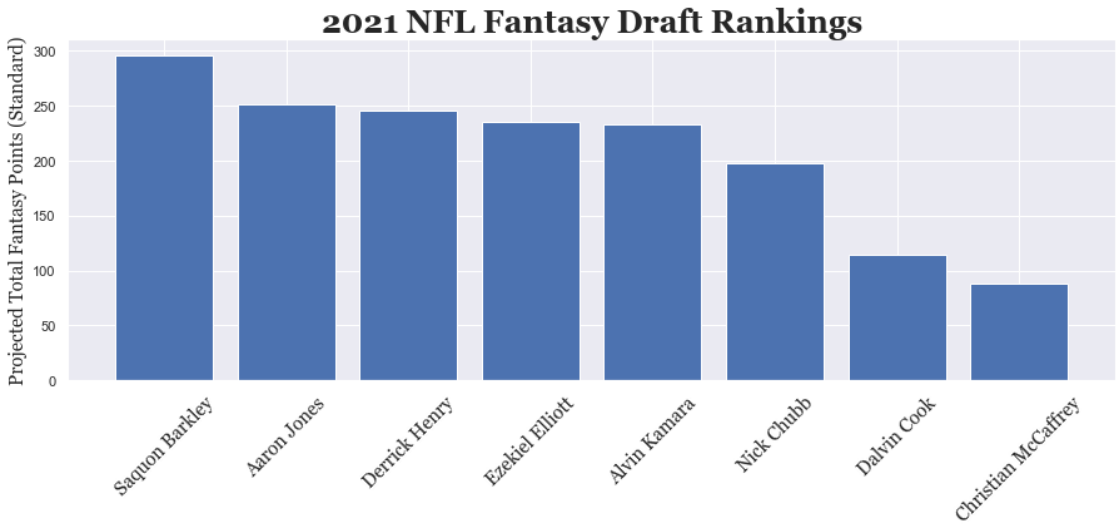
[28]:
```
# Sort DataFrame by Projected Fantasy Points
forecast_df = forecast_df.sort_values('Projected 2021 Fantasy Points',␣
↪ascending = False)
```

[29]:
```
# Final Bar Plot showing project fantasy points
font = {'fontname': 'Georgia'}

plt.figure(figsize = (15,5))
```

```
plt.bar(forecast_df['Name'], forecast_df['Projected 2021 Fantasy Points'] )
plt.xticks(rotation = 45, fontsize = 15, **font)
plt.title('2021 NFL Fantasy Draft Rankings',fontsize = 25, fontweight =␣
↪'bold',**font)
plt.ylabel('Projected Total Fantasy Points (Standard)',fontsize = 15,**font)
```

[29]: Text(0, 0.5, 'Projected Total Fantasy Points (Standard)')



[ ]: