2024_NBA_Bracket_Prediction

September 28, 2024

1 2024 NBA Bracket Prediction

As seen in the other notebooks, the stat categories we used to predict the champion are: WIN%, +/-, FG%, 3P%, and BLK. This notebook is now putting these to work.

[52]:
```
# Loading in packages
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import statsmodels.api as sm
```

1.1 Loading In The Data

[53]:
```
# Loading in the data set with pandas, and dropping an unnecessary column.
# Data found from https://www.basketball-reference.com/leagues/NBA_2024.html
# We then created our own csv for only the stat categories we needed.
nba2024 = pd.read_csv('2024_stats.csv')
nba2024 = nba2024.drop(['teamstats ', 'PTS', 'ORTG', 'DRTG'], axis = 1)
nba2024.head()
```

[53]:

	TEAM	WIN%	SEASON	+/-	FG%	3P%	BLK
0	Boston Celtics	0.792	2023-24	11.6	48.6	38.8	6.5
1	Minnesota Timberwolves	0.688	2023-24	6.9	48.4	38.8	6.0
2	Denver Nuggets	0.688	2023-24	4.7	49.5	37.4	5.5
3	Oklahoma City Thunder	0.675	2023-24	6.4	49.8	38.7	6.6
4	LA Clippers	0.636	2023-24	3.7	49.1	38.5	5.1

1.2 Prediction Function

[54]:
```
def headtohead(season, team1, team2):
    ''' This function will take in a specific season, and two teams that are␣
 ↪playing each other.'''


    df = nba2024[nba2024['SEASON'] == season] # The data frame will be the␣
 ↪specified season.
```

```
  team1 = nba2024[nba2024['TEAM'] == team1] # The team1 input will pull data␣
↪from that team.
  team2 = nba2024[nba2024['TEAM'] == team2] # The team2 input will pull data␣
↪from that team.


  # The rating functions use the best correlated stats with WIN% to compute a␣
↪rating of the team. These stats are weighted to have values be reasonable.
  rating1 = ((team1['WIN%'] + team1['+/-']/5 + team1['FG%']/50 +
         team1['3P%']/50 + team1['BLK']/10).values[0])

  rating2 = ((team2['WIN%'] + team2['+/-']/5 + team2['FG%']/50 +
         team2['3P%']/50 + team2['BLK']/10).values[0])


  # Determining the number of games in a series based on the ratio of team's␣
↪ratings. The parameters for series lengths were changed, as the values
  # used in the 2014-15 example weren't giving reasonable results here. If␣
↪the same variables were used here, all series would go to seven games,
  # and that is unrealistic.
  if rating1 > rating2:
      if 1 < rating1/rating2 < 17/16:
          print('pick', team1['TEAM'].values[0], 'in 7')
      if 17/16 < rating1/rating2 < 9/8:
          print('pick', team1['TEAM'].values[0], 'in 6')
      if 9/8 < rating1/rating2 < 5/4:
          print('pick', team1['TEAM'].values[0], 'in 5')
      if 5/4 < rating1/rating2:
          print('pick', team1['TEAM'].values[0], 'in 4')

  # Determining the number of games in a series based on the ratio of team's␣
↪ratings.
  if rating2 > rating1:
      if 1 < rating2/rating1 < 17/16:
          print('pick', team2['TEAM'].values[0], 'in 7')
      if 17/16 < rating2/rating1 < 9/8:
          print('pick', team2['TEAM'].values[0], 'in 6')
      if 9/8 < rating2/rating1 < 5/4:
          print('pick', team2['TEAM'].values[0], 'in 5')
      if 5/4 < rating2/rating1:
          print('pick', team2['TEAM'].values[0], 'in 4')

  print(rating1)
  print(rating2)
```

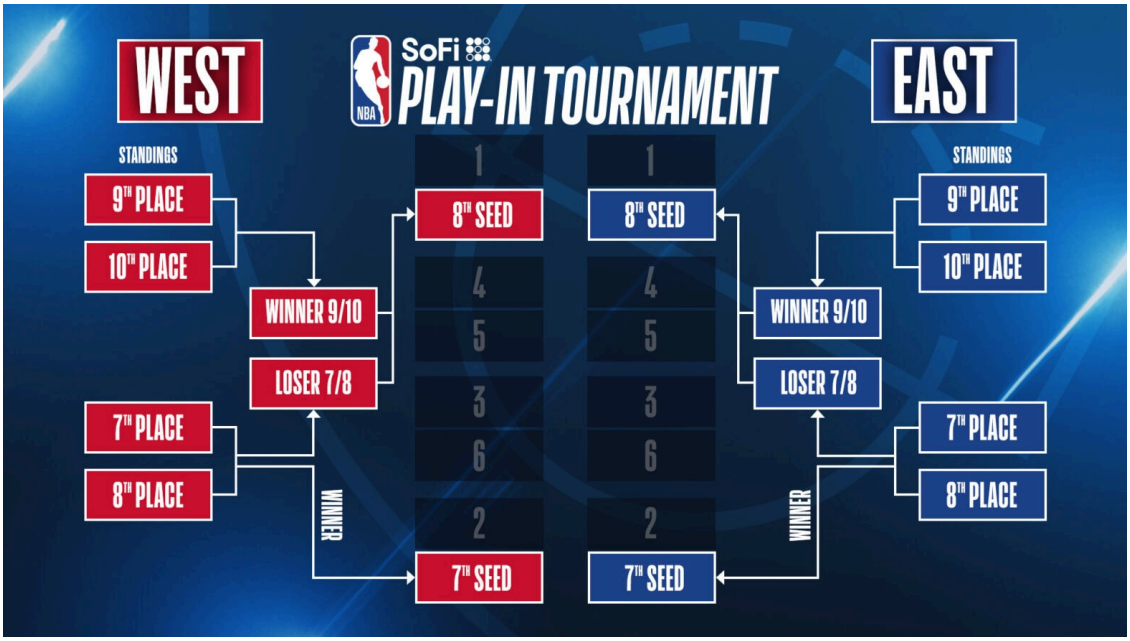
1.3 2024 NBA Playoff Prediction

We will now use our function to predict the 2024 NBA Playoffs. The standings and statistics from the 2024 NBA season are from 4/7/2024, before the regular season has ended. The NBA playoffs has 16 teams, 8 from the Western Conference, and 8 from the Eastern. There are also Play-In games, where the 7,8,9, and 10 seeds compete for the 7 and 8 seeds in single-elimination games. The Play-In bracket is shown below.

[55]:
```
from IPython.display import Image

Image(filename = 'PlayInTournament.jpg', width = 700)
```

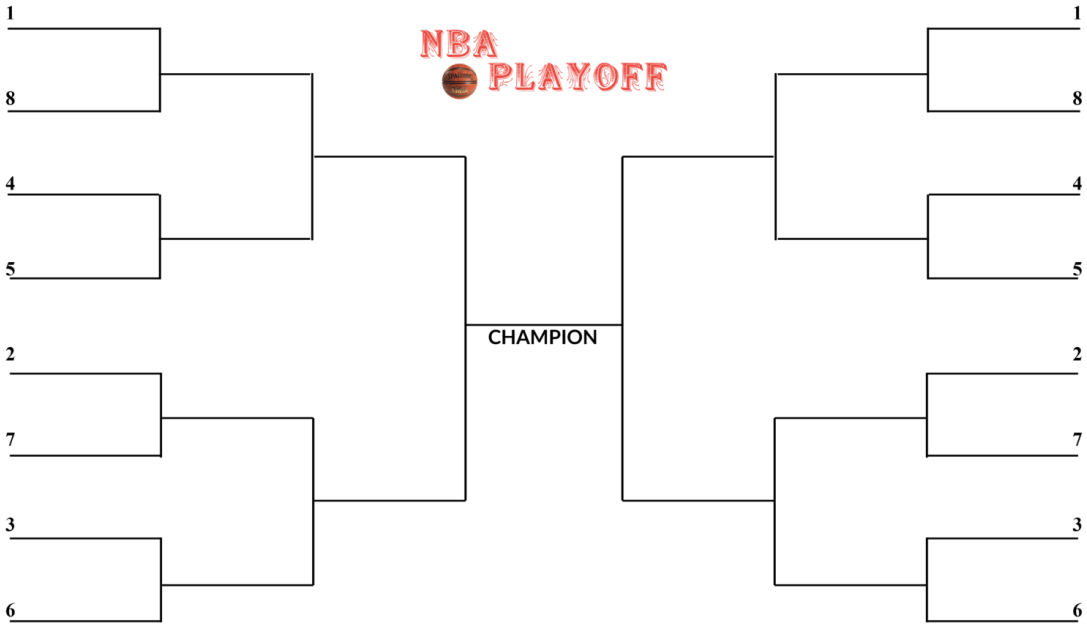
[55]:



1.4 The Playoff Bracket is shown below:

[56]:
```
Image(filename = 'nba_playoff_bracket.png', width = 700)
```

[56]:



[57]:
```
# EAST PLAY-IN GAMES (single game eliminations, ignore the 'in 6', 'in 7', etc,␣
 ↪for these)
headtohead('2023-24', 'Philadelphia 76ers', 'Miami Heat ')
headtohead('2023-24', 'Atlanta Hawks ', 'Chicago Bulls ')
headtohead('2023-24', 'Atlanta Hawks ', 'Miami Heat ')

# WEST PLAY-IN GAMES (single game eliminations, ignore the 'in 6', 'in 7', etc,␣
 ↪for these)
headtohead('2023-24', 'Golden State Warriors ', 'Sacremento Kings')
headtohead('2023-24', 'Los Angeles Lakers', 'New Orleans Pelicans ')
headtohead('2023-24', 'Golden State Warriors ', 'Sacremento Kings')
```

```
pick Philadelphia 76ers in 6
3.241
2.9159999999999995
pick Atlanta Hawks  in 7
2.3520000000000003
2.311
pick Miami Heat  in 5
2.3520000000000003
2.9159999999999995
pick Golden State Warriors  in 6
3.1590000000000003
2.911
pick New Orleans Pelicans  in 5
```

```
2.985
3.684
pick Golden State Warriors  in 6
3.1590000000000003
2.911
```

[58]:
```
# EAST ROUND 1
headtohead('2023-24', 'Boston Celtics', 'Miami Heat ')
headtohead('2023-24', 'Philadelphia 76ers', 'Milwaukee Bucks')
headtohead('2023-24', 'Orlando Magic', 'New York Knicks ')
headtohead('2023-24', 'Indiana Pacers ', 'Cleveland Cavaliers ')

# WEST ROUND 1
headtohead('2023-24', 'Denver Nuggets', 'Golden State Warriors ')
headtohead('2023-24', 'Minnesota Timberwolves', 'New Orleans Pelicans ')
headtohead('2023-24', 'LA Clippers', 'Dallas Mavericks ')
headtohead('2023-24', 'Phoenix Suns ', 'Oklahoma City Thunder')
```

```
pick Boston Celtics in 4
5.51
2.9159999999999995
pick Milwaukee Bucks in 6
3.241
3.4619999999999997
pick New York Knicks  in 6
3.206
3.53
pick Indiana Pacers  in 7
3.4139999999999997
3.295
pick Denver Nuggets in 5
3.9160000000000004
3.1590000000000003
pick Minnesota Timberwolves in 5
4.412
3.684
pick LA Clippers in 6
3.638
3.31
pick Oklahoma City Thunder in 5
3.573
4.385
```

[59]:
```
# EAST ROUND 2
headtohead('2023-24', 'Boston Celtics', 'New York Knicks ')
headtohead('2023-24', 'Milwaukee Bucks', 'Indiana Pacers ')
```

```
# WEST ROUND 2
headtohead('2023-24', 'Denver Nuggets', 'LA Clippers')
headtohead('2023-24', 'Minnesota Timberwolves', 'Oklahoma City Thunder')
```

```
pick Boston Celtics in 4
5.51
3.53
pick Milwaukee Bucks in 7
3.4619999999999997
3.4139999999999997
pick Denver Nuggets in 6
3.9160000000000004
3.638
pick Minnesota Timberwolves in 7
4.412
4.385
```

[60]:
```
# EASTERN FINALS
headtohead('2023-24', 'Boston Celtics', 'Milwaukee Bucks')

# WESTERN FINALS
headtohead('2023-24', 'Denver Nuggets', 'Minnesota Timberwolves')
```

```
pick Boston Celtics in 4
5.51
3.4619999999999997
pick Minnesota Timberwolves in 5
3.9160000000000004
4.412
```

[61]:
```
# NBA FINALS
headtohead('2023-24', 'Boston Celtics', 'Minnesota Timberwolves')
```

```
pick Boston Celtics in 5
5.51
4.412
```

1.5 Results

Our model predicts that the Boston Celtics win the 2024 NBA Playoffs, winning the NBA Finals in 5 games. This a very reasonable result, as the Celtics have the highest WIN% and +/- in the 2023-24 season.

[46]:
```
BostonCeltics = nba2024[nba2024['TEAM'] == 'Boston Celtics']
BostonCeltics
```

[46]:

	TEAM	WIN%	SEASON	+/-	FG%	3P%	BLK
0	Boston Celtics	0.792	2023-24	11.6	48.6	38.8	6.5

[51]:
```
print(max(nba2024['WIN%']) == BostonCeltics['WIN%'])
print(max(nba2024['+/-']) == BostonCeltics['+/-'])
```

```
0    True
Name: WIN%, dtype: bool
0    True
Name: +/-, dtype: bool
```