

# NBA Awards Prediction



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Project 176

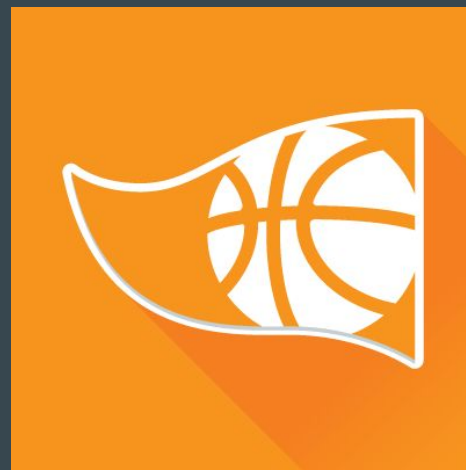
# Introduction

- The NBA is one of the most popular sports leagues in the world, and one of the most exciting parts of the NBA is the race for the end-of-season awards
- There are 5 awards: MVP, DPOY, ROTY, Sixth Man of the Year, and MIP
  - We focused on MVP, DPOY, and Sixth Man
- As advanced stats are becoming more popular, it is interesting to see if it is possible to predict the winner of these awards based on statistics



# Data Source

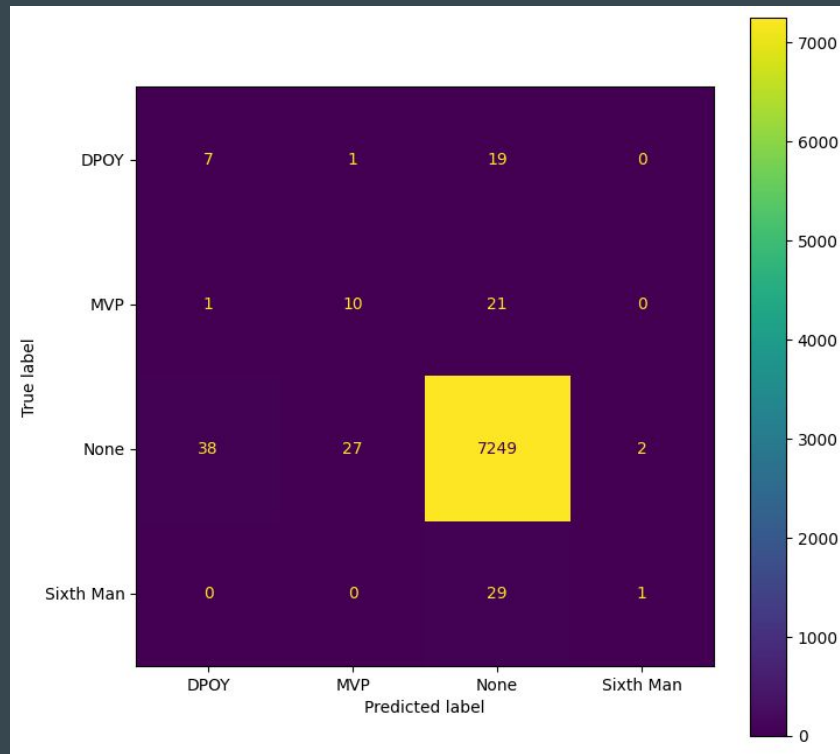
- Basketball Reference
  - For in depth official statistics
  - Provides per game statistics for all players in all seasons
  - Provides end of season awards for all seasons and vote distributions for awards
- Web scraping was attempted, but could not fulfill the data source needs of the project due to the way BR pages are formatted
- So, this was supplemented with manually inputting missing data into CSV files of 2022-23 season statistics, as well as of statistics from the past 30 seasons
- <https://www.basketball-reference.com/>



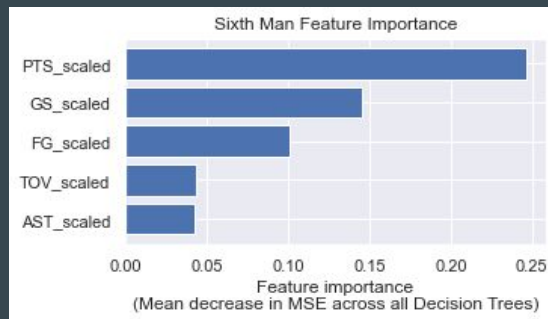
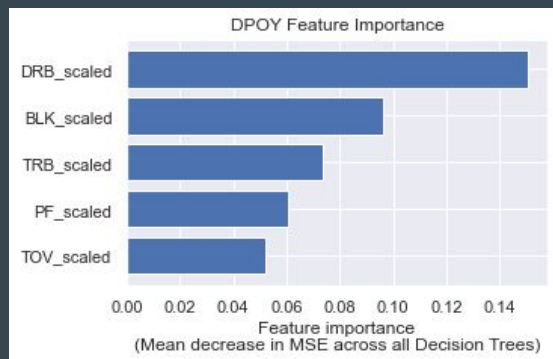
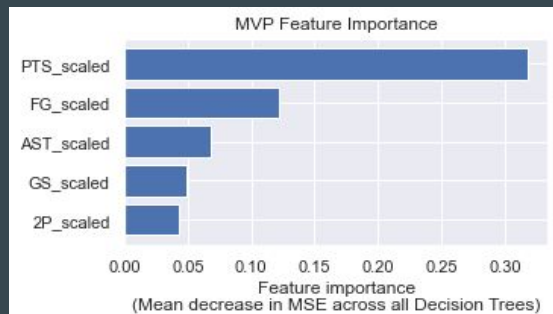
Player Per Game		Share & Export <input type="checkbox"/> When table is sorted, hide non-qualifiers for rate stats														Glossary		Hide Partial Rows													
Rk	Player	Pos	Age	Tm	G	GS	MP	FG	FGA	FG%	3P	3PA	3P%	2P	2PA	2P%	eFG%	FT	FTA	FT%	ORB	DRB	TRB	AST	STL	BLK	TOV	PF	PTS		
1	Precious Achiuwa	C	23	TOR	55	12	20.7	3.6	7.3	.485	0.5	2.0	.269	3.0	5.4	.564	.521	1.6	2.3	.702	1.8	4.1	6.0	0.9	0.6	0.5	1.1	1.9	9.2		
2	Steven Adams	C	29	MEM	42	42	27.0	3.7	6.3	.597	0.0	0.0	.000	3.7	6.2	.599	.597	1.1	3.1	.364	5.1	6.5	11.5	2.3	0.9	1.1	1.9	2.3	8.6		
3	Bam Adebayo	C	25	MIA	75	75	34.6	8.0	14.9	.540	0.0	0.2	.083	8.0	14.7	.545	.541	4.3	5.4	.806	2.5	6.7	9.2	3.2	1.2	0.8	2.5	2.8	20.4		
4	Ochai Agbaji	SG	22	UTA	59	22	20.5	2.8	6.5	.427	1.4	3.9	.355	1.4	2.7	.532	.532	0.9	1.2	.812	0.7	1.3	2.1	1.1	0.3	0.3	0.7	1.7	7.9		
5	Santi Aldama	PF	22	MEM	77	20	21.8	3.2	6.8	.470	1.2	3.5	.353	2.0	3.4	.591	.560	1.4	1.9	.750	1.1	3.7	4.8	1.3	0.6	0.6	0.8	1.9	9.0		
6	Nickell Alexander-Walker	SG	24	TOT	59	3	15.0	2.2	5.0	.444	1.0	2.7	.384	1.2	2.3	.515	.547	0.7	1.0	.667	0.3	1.5	1.7	1.8	0.5	0.4	0.9	1.5	6.2		
6	Nickell Alexander-Walker	SG	24	UTA	36	3	14.7	2.3	4.7	.488	1.0	2.4	.402	1.3	2.3	.578	.591	0.8	1.1	.692	0.2	1.4	1.6	2.1	0.7	0.4	1.3	1.6	6.3		
6	Nickell Alexander-Walker	SG	24	MIN	23	0	15.5	2.1	5.4	.384	1.1	3.1	.361	1.0	2.3	.415	.488	0.6	0.9	.619	0.3	1.5	1.8	1.4	0.3	0.3	0.4	1.3	5.9		
7	Grayson Allen	SG	27	MIL	72	70	27.4	3.4	7.7	.440	2.0	5.1	.399	1.4	2.7	.518	.571	1.6	1.8	.905	0.8	2.4	3.3	2.3	0.9	0.2	1.0	1.6	10.4		
8	Jarrett Allen	C	24	CLE	68	68	32.6	5.9	9.2	.644	0.0	0.1	.100	5.9	9.1	.653	.645	2.4	3.3	.733	3.3	6.5	9.8	1.7	0.8	1.2	1.4	2.3	14.3		
9	Jose Alvarado	PG	24	NOP	61	10	21.5	3.3	8.0	.411	1.4	4.0	.336	1.9	4.0	.488	.496	1.1	1.3	.813	0.5	1.9	2.3	3.0	1.1	0.2	1.3	2.0	9.0		
10	Kyle Anderson	PF	29	MIN	69	46	28.4	3.7	7.2	.509	0.6	1.5	.410	3.0	5.7	.536	.553	1.4	2.0	.735	1.0	4.4	5.3	4.9	1.1	0.9	1.5	2.1	9.4		
11	Giannis Antetokounmpo	PF	28	MIL	63	63	32.1	11.2	20.3	.553	0.7	2.7	.275	10.5	17.6	.596	.572	7.9	12.3	.645	2.2	9.6	11.8	5.7	0.8	0.8	3.9	3.1	31.1		
12	Thanasis Antetokounmpo	SF	30	MIL	37	0	5.6	0.5	1.2	.435	0.0	0.2	.000	0.5	1.0	.526	.435	0.3	0.6	.500	0.4	0.8	1.2	0.4	0.1	0.1	0.3	0.6	1.4		
13	Cole Anthony	PG	22	ORL	60	4	25.9	4.6	10.2	.454	1.3	3.4	.364	3.4	6.7	.500	.516	2.5	2.8	.894	0.8	4.0	4.8	3.9	0.6	0.5	1.5	2.6	13.0		
14	OG Anunoby	SF	25	TOR	67	67	35.6	6.3	13.2	.476	2.1	5.5	.387	4.2	7.7	.539	.556	2.1	2.5	.838	1.4	3.5	5.0	2.0	1.9	0.7	2.0	3.0	16.8		
15	Ryan Arcidiacono	PG	28	TOT	20	4	8.6	0.5	1.9	.243	0.4	1.2	.348	0.1	0.7	.071	.351	0.0	0.0		0.0	0.8	1.2	0.3	0.0	0.4	0.9	1.3			
15	Ryan Arcidiacono	PG	28	NYK	11	0	2.4	0.1	0.5	.200	0.1	0.3	.333	0.0	0.2	.000	.300	0.0	0.0		0.0	0.4	0.4	0.2	0.2	0.0	0.1	0.3	0.3		
15	Ryan Arcidiacono	PG	28	POR	9	4	16.2	0.9	3.6	.250	0.8	2.2	.350	0.1	1.3	.083	.359	0.0	0.0		0.0	1.2	1.2	2.3	0.3	0.0	0.7	1.6	2.6		

# ML Methods

- K-NN Classifier
  - Classified all players' seasons from 1992-2022 as an award worthy or non-award worthy season
  - Used to predict the award winners for this year
  - Not very effective
- Random Forest Regression
  - Used to predict the votes for each award
  - Predicts winners for 2023
- Both trained and cross validated on 30 years of normalized data

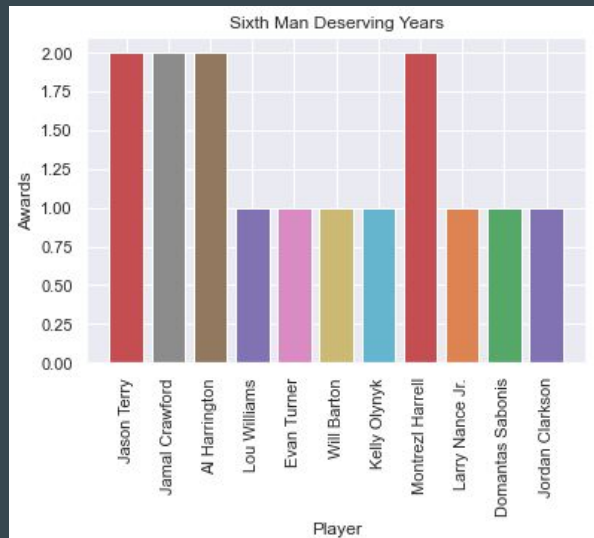
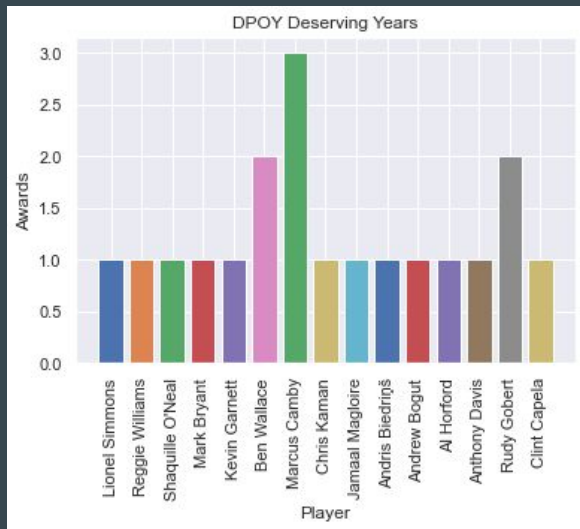
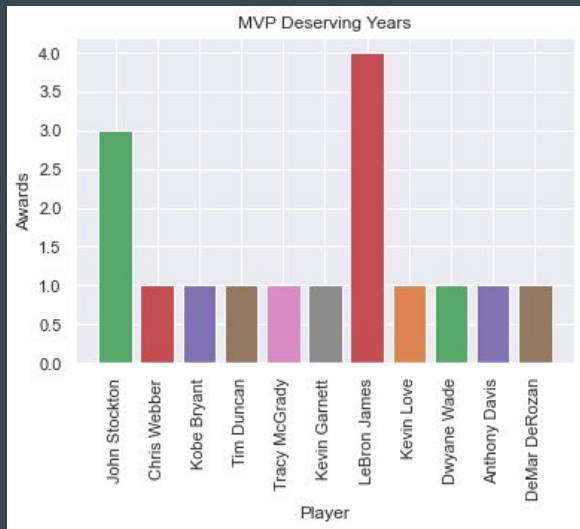


# Feature Importance



- Calculated with Random Forest Regression
- Most make sense, but some are out of place
- For the classifier, used all the features that appeared on these graphs

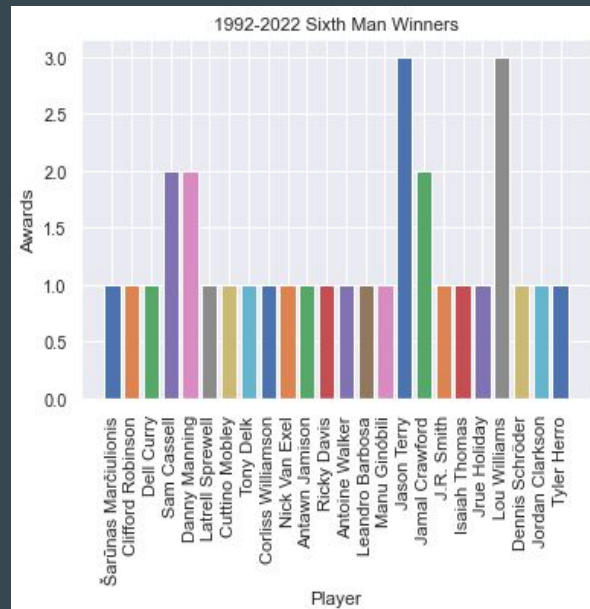
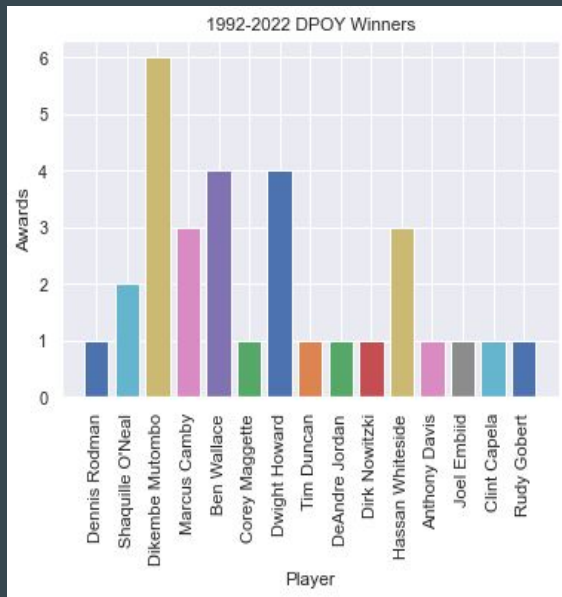
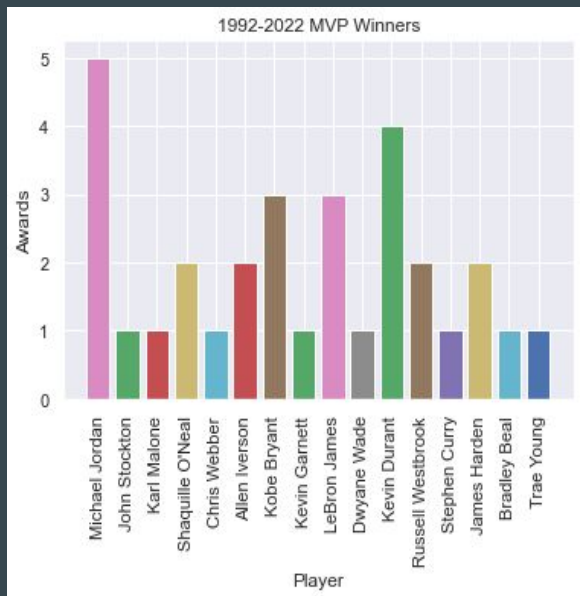
# K-NN Classifier



- The classifier predicted:
  - MVP: Giannis Antetokounmpo
  - DPOY: Nobody
  - Sixth Man: Nobody

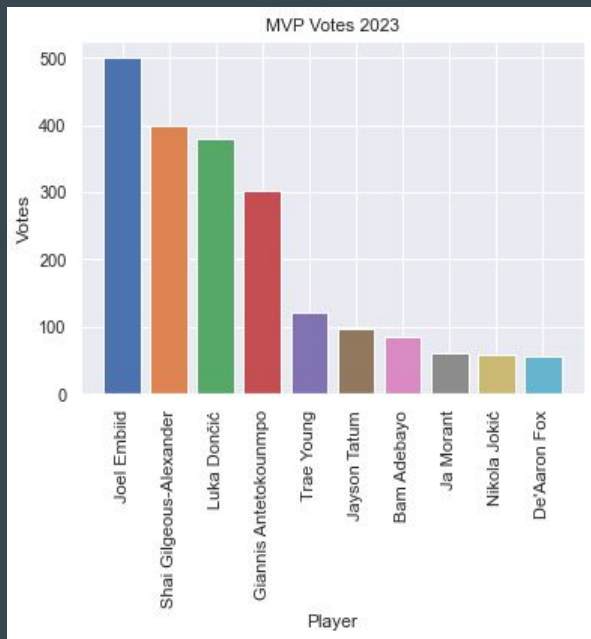
- $k = 2$ 
  - Different  $k$  values give different results
  - Selected Arbitrarily
  - Best  $k$  value graph has a range of 0.007 not very helpful

# Random Forest Regression

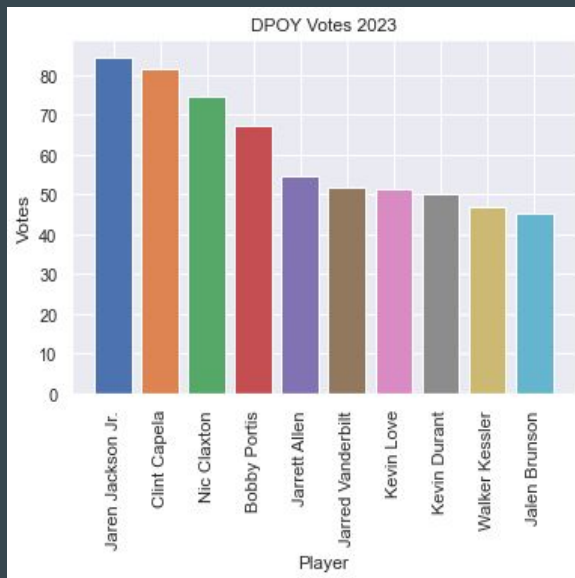


- The RF Regression predicts MJ to win 5 MVPs, actually won 6
- Not good at predicting the most recent MVPs
- DPOY predictions are accurate, with Mutombo, Howard and Ben Wallace taking home the most
- 6MOY predicts Jason Terry and Lou Williams to win 3 awards each; Williams has 3 and Terry has 1 but was in top voting consistently

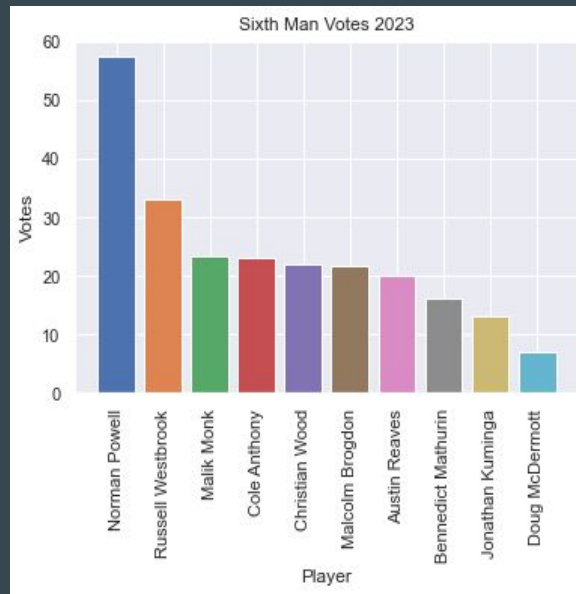
# 2023 Award Votes Prediction (Random Forest Regression)



- Joel Embiid is the media frontrunner for the award and is predicted to win it



- Jackson Jr won the DPOY yesterday
- Some of the results are inaccurate: Kevin Love, KD, Brunson



- None of the favorites for 6MOY are predicted to win, but Powell and Westbrook still make sense



# Conclusion: The NBA Script Is Too Strong

- Machine learning methods, at least the ones at our disposal, are not a frequently accurate enough tool to consistently predict NBA awards
- In the real world, statistics are not everything
  - Team record, “empty stats”
  - Narratives, voter fatigue, The Media, fans
  - Small market vs big market
- While our model predicted multiple historical MVPs correctly, and Embiid MVP and JJJ DPOY this season, it also classified Beal, Derozan, and Young as prior MVPs, while none were in contention by the end of those seasons

