Player Positions in the NBA

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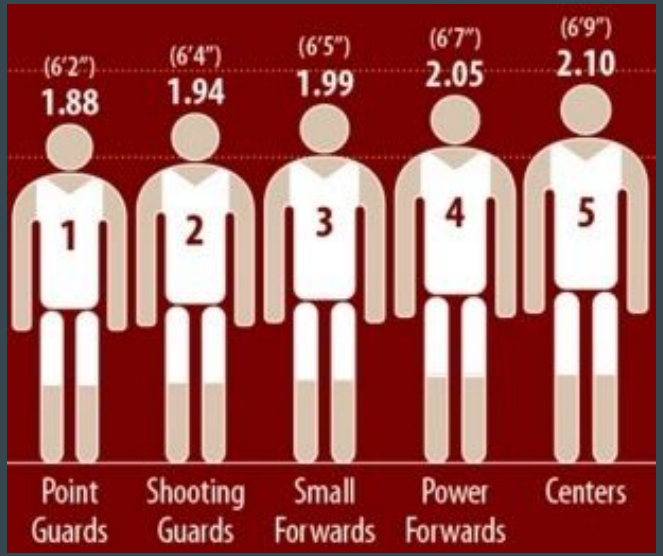
Challenge

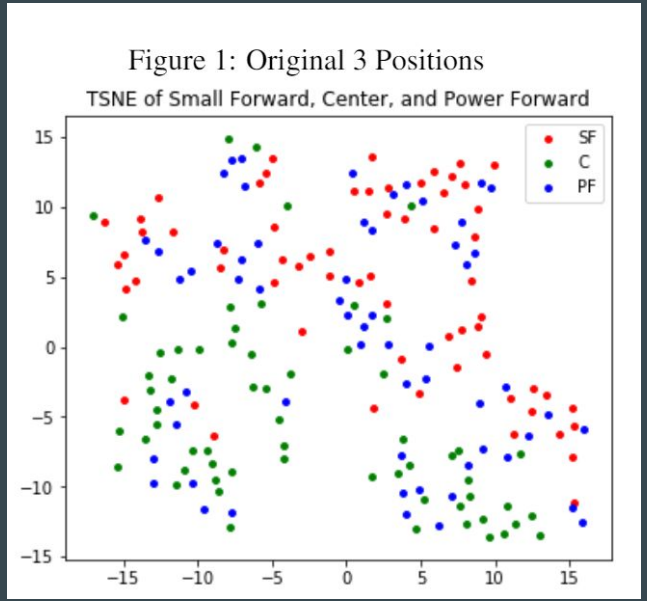
- Attributes vs. Skills
- Old NBA play style:
  - Defined by attributes (linked to skills)
- NBA play style has changed:
  - Defined by skills, unlinked to attributes
- Proposal:
  - Redefine roles based on skill types
  - Unsupervised learning problem

The Five Standard Positions



Dataset

- NBA Players Positions and Per-Game Statistics
- 16 Per-Game Statistic attributes and 1 Position attribute
- 185 Total Players who are labelled as SF, C, PF
- Scraped from NBA Stats and ESPN



NBA Advanced Stats

Stats Home / Player / Kevin Durant

#35 Kevin Durant

F | GOLDEN STATE WARRIORS

Compare Player

HT	WT	PRIOR		PTS	REB	AST	PIE
6-9	240 lbs	Texas/USA		26.4	6.8	5.4	16.8
AGE	BORN	DRAFT	EXP				
29 220d	09/29/1988	2007 Rnd 1 Pick 2	10 yrs				

Profile

SEASON TYPE: Playoffs

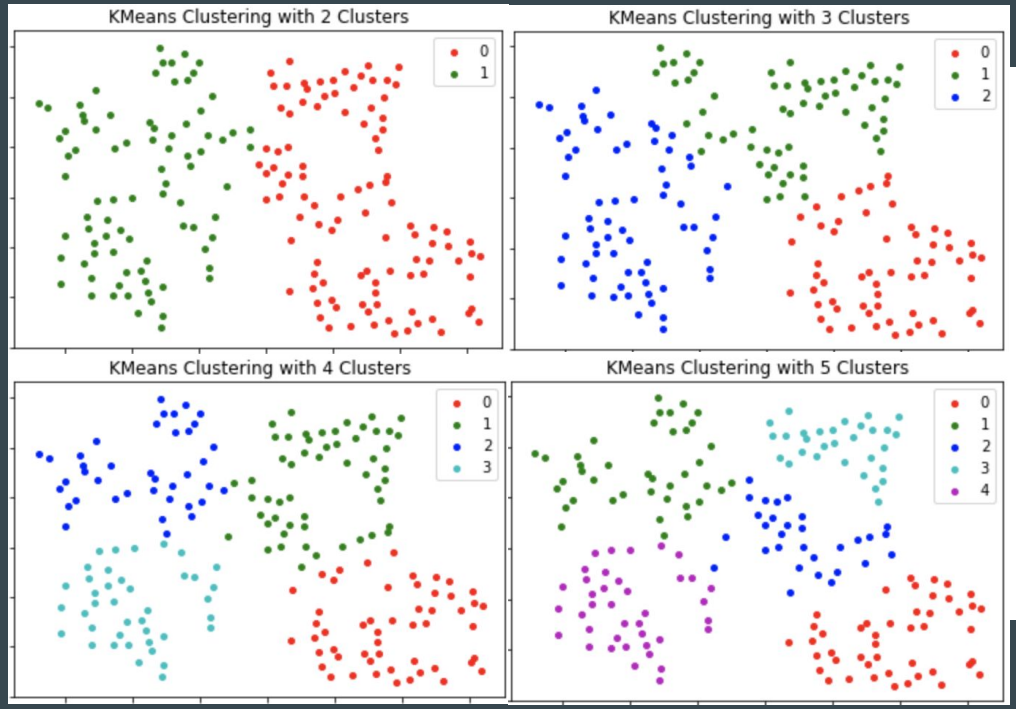
PER MODE: Per Game

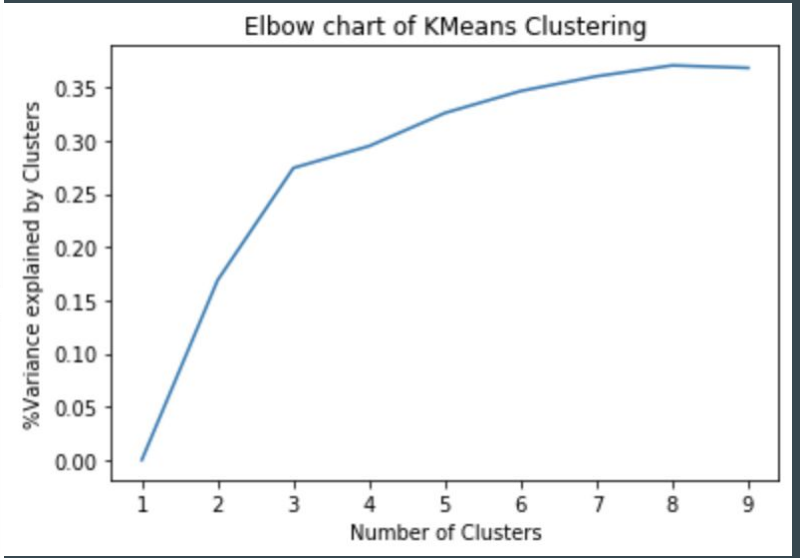
GLOSSARY SHARE

Traditional Splits

BY YEAR	TEAM	GP	MIN	PTS	FGM	FGA	FG%	3PM	3PA	3P%	FTM	FTA	FT%	OREB	DREB	REB	AST	TOV	STL	BLK	PF	FP	DD2	TD3	+/-
2017-18	GSW	9	36.8	28.4	10.2	21.0	48.7	2.0	7.1	28.1	6.0	6.6	91.5	0.6	7.7	8.2	4.8	3.0	0.9	1.1	1.7	48.5	2	0	7.9
2016-17	GSW	15	35.5	28.5	9.9	17.9	55.6	2.5	5.7	44.2	6.1	6.9	89.3	1.1	6.9	7.9	4.3	2.5	0.8	1.3	2.6	48.3	6	0	11.8
2015-16	OKC	18	40.3	28.4	9.7	22.6	43.0	1.7	6.1	28.2	7.2	8.1	89.0	0.7	6.4	7.1	3.3	3.6	1.0	1.0	2.1	44.3	2	0	5.6
2013-14	OKC	19	42.9	29.6	10.2	22.2	46.0	2.3	6.6	34.4	6.9	8.6	81.0	1.3	7.6	8.9	3.9	3.8	1.0	1.3	2.2	49.4	8	0	0.6
2012-13	OKC	11	44.1	30.8	10.2	22.4	45.5	2.0	6.4	31.4	8.5	10.2	83.0	0.6	8.4	9.0	6.3	3.9	1.3	1.1	2.4	54.2	4	0	1.4
2011-12	OKC	20	41.8	28.5	9.9	19.2	51.7	2.1	5.5	37.3	6.7	7.7	86.4	0.7	6.8	7.4	3.7	3.2	1.5	1.2	2.6	47.7	7	0	3.5
2010-11	OKC	17	42.5	28.6	9.1	20.3	44.9	2.2	6.4	33.9	8.2	9.8	83.8	1.1	7.1	8.2	2.8	2.5	0.9	1.1	3.1	46.4	5	0	2.9
2009-10	OKC	6	38.5	25.0	7.2	20.5	35.0	1.7	5.8	28.6	9.0	10.3	87.1	1.3	6.3	7.7	2.3	3.7	0.5	1.3	2.8	39.5	1	0	0.0

Model: K-Means

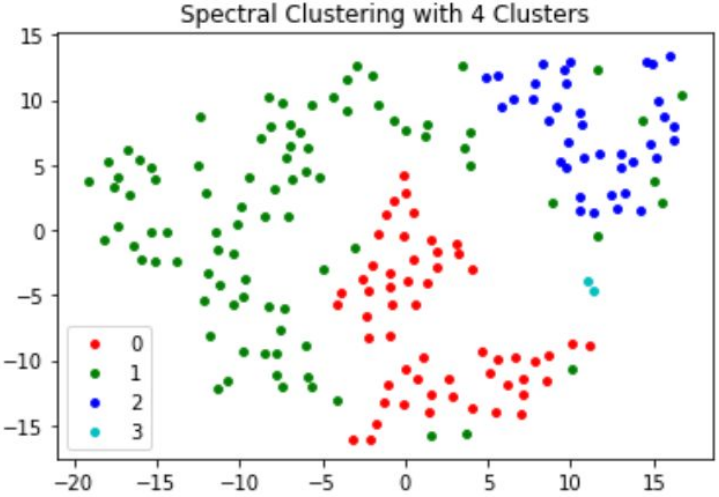




Models: GMM & Spectral Clustering

Figure 7: GMM Clustering with 3 Clusters

Figure 8: Spectral Clustering with 4 Clusters



Results

- ANOVA on K-Means 3 clusters (using player aggregate stats shown previously)
- Significance:
  - Cluster 0:
    - High Steals, More fouls (Defensively minded players)
  - Cluster 1:
    - Low Output Overall (Worse Players)
  - Cluster 2:
    - More Shooting, High Volume (Offensively minded players)

kmeans	FGM	FGA	FG3M	FG3A	FTM	FTA	OREB	DREB	AST	TOV	STL	BLK	BLKA	PF	PFD
0	0.130228	0.269485	0.023075	0.069619	0.048777	0.070670	0.058993	0.164659	0.063088	0.044442	0.036097	0.028197	0.016488	0.106904	0.068111
1	0.137950	0.278375	0.019179	0.057459	0.051151	0.073784	0.069674	0.162281	0.055731	0.054756	0.026841	0.027757	0.017918	0.100597	0.070343
2	0.192744	0.413799	0.049066	0.134404	0.088722	0.113832	0.047482	0.179666	0.077187	0.058445	0.027241	0.026695	0.021539	0.081455	0.099488

Next Steps

- Find ways to evaluate results better
- Further feature engineering to find better class separation
- Integrate College Basketball Statistics