Different faces of defense: Studying the National Basketball Association's (NBA) defensive positions

João Vítor Rocha da Silva[1], Paulo Canas Rodrigues [1]

[1] Department of Statistics, Federal University of Bahia, Salvador, Brasil.

Abstract: Basketball's classical positions have always been well defined, from an offensive standpoint. It is well known what role a point guard or a center performs, in theory, offensively. Although, many times, the offensive side of the game is neglected by teams, fans, and even players, past research by Bianchi et al. (2017) and Silva & Rodrigues (2022) show that definitions of the basketball's classical positions do not represent the complexity and modernity of today's gameplay style anymore.

Hence, this study aims to analyze the game-related defensive statistics of all active players on the 2020-21 NBA season, grouping players by their common characteristics, and creating exclusively defensive labels, which added to the classical definitions translate in a simple and objective manner the defensive role that players are performing.

References:

– Silva, J.V.R.d. & Rodrigues, P.C. (2022). All-NBA Teams' Selection Based on Unsupervised Learning. Stats, 5, 154-171.
– Bianchi, F.; Facchinetti, T. & Zuccolotto, P. (2017). Role revolution: Towards a new meaning of positions in basketball. Electron J. Appl. Stat. Anal., 10, 712–734.

rochajoaovitor1@yahoo.com, paulocanas@gmail.com,
https://www.paulocanas.org/my-lab-sally - 1

4th Conference on
Statistics and
Data Science
Salvador, Brazil (online)
December 1-3, 2022

Material and Methods

This study considers the complete average game-related statistics from all 2020-21 season's active players, obtaining it directly from NBA's website (NBA.com). However, aiming to prevent an inflation of zeros and multiple players with no significant average playing time, a player selection criterion was determined, leading to consider the eight top players, determined by minutes per game, from each team in the analysis. Consequently, a representative dataset of 240 players was analyzed via Self-Organizing Maps (SOM), intending to find patterns and similar characteristics between athletes and their defensive roles.

The studied variables were (averages per game): defensive rebounds (**DREB**), steals (**STL**), blocks (**BLK**), personal fouls (**PF**), two-point shots contested (**C2P**), three-point shots contested (**C3P**), offensive fouls drawn (**CHA**) and balls deflected (**DEF**).

Table 1 – Six rows of the final dataset of the 240 active players with most minutes

PLAYER	DREB	STL	BLK	PF	C2P	C3P	CHA	DEF
DRAYMOND GREEN	6.2	1.7	0.8	3.1	6.8	3.2	0.27	2.9
DOMANTAS SABONIS	9.5	1.2	0.5	3.3	8	2.6	0.03	2.3
BAM ADEBAYO	6.7	1.2	1	2.3	6.2	3.7	0.08	2.3
DAMIAN LILLARD	3.7	0.9	0.3	1.5	1.4	2.6	0.13	1.7
RUDY GOBERT	10.1	0.6	2.7	2.3	12.1	2.8	0.06	1.4
RUSSELL WESTBROOK	9.9	1.4	0.4	2.9	1.6	1.9	0.11	2.6

After obtaining the SOM, a cluster analysis was performed via the K-Means Algorithm to group multiple players and, by doing so, creating the defensive labels to the classical positions that help to better understand and translate their roles in court.

rochajoaovitor1@yahoo.com, paulocanas@gmail.com,
https://www.paulocanas.org/my-lab-sally

4th Conference on
Statistics and Data Science
Salvador, Brazil (online)
December 1-3, 2022

Results

Figure 1 shows the resulting self-organized map with all analyzed players organized in cells. Each cell represents a particular cluster of players, and each colored dot represent a player and its respective classical position. In addition, in Figure 2 shows the influence of each variable in each cell of the SOM.

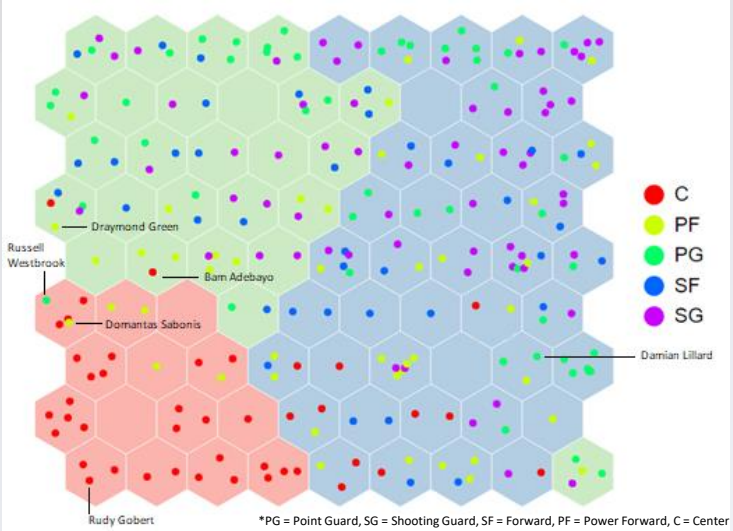

Figure 1 – K-Means performed on the Self-Organized Map

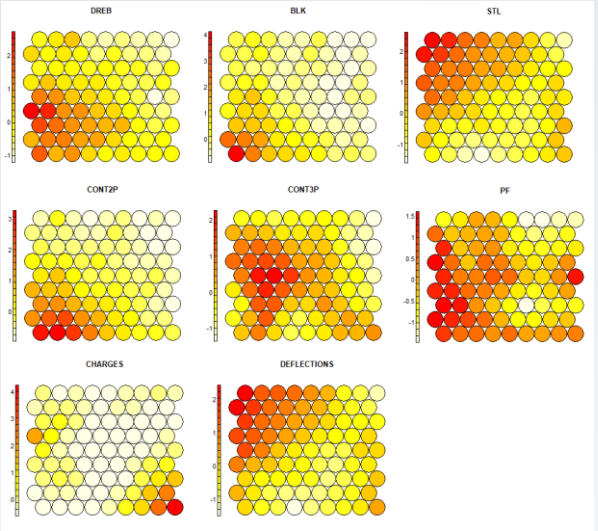

Figure 2 – Heatmap of the influence of the variables

Combining Figures 1 and 2, the differences between players of same classical positions is clear. And some patters are clearly visible, as highlighted in the blue, red and green cells. Theses colored cells represent the 3 clusters obtained by the K-Means cluster analysis with an optimal cluster number determined by the Gap Statistic Method.

To highlight even more the defensive difference between players of the same classical position, some players were highlighted in Figure 1 as study cases, and theses are the same players that are shown in Table 1: Lillard and Westbrook (Point Guards), Green and Sabonis (Power Forwards), and Gobert and Adebayo (Centers).

rochajoaovitor1@yahoo.com, paulocanas@gmail.com,
https://www.paulocanas.org/my-lab-sally - 3

4th Conference on
Statistics and
Data Science
Salvador, Brazil (online)
December 1-3, 2022

Conclusions

Finally, it was possible to create four new labels for the classical basketball positions, that can be seen in Figure 1: rim protectors (red cluster), perimeter defenders (green cluster), multi-position defenders (blue cluster near red and green), and functional defenders (blue cluster near right-wing side). Their definitions and characteristics can be found in Table 2.

From these definitions it is possible to comprehend, in a more detailed and complete manner, the roles that players perform defensively in their teams. In addition, Figure 3 shows the radial plots for the same players highlighted in Figure 1 and Table 1, where it is possible to label them more accurately:

Table 2 – Labels created for the classical positions and their different roles

LABEL	ROLE DEFINITION
RIM PROTECTOR	Players which key role is to protect the rim, contesting a high number of two-point attempts, blocking shots, and gathering defensive rebounds.
PERIMETER DEFENDER	Players which key role is to protect the team from three-point menaces, contesting a high number of three-point attempts, stealing possessions, and deflecting passes.
MULTIPOSITION DEFENDER	Players that possess versatility to protect both the rim and the three-point line in a solid manner.
FUNCTIONAL DEFENDER	Players which are complementing the defensive scheme, not necessarily having an exclusive function to perform. Usually are players more focused on offensive production.

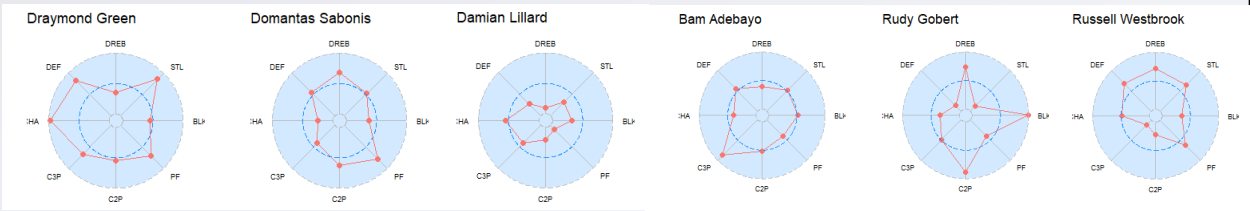

Figure 3 – Radial plots of highlighted players

- Russel Westbrook (Rim Protector Point Guard);
- Damian Lillard (Functional Defender Point Guard);
- Draymond Green (Perimeter Defender Power Forward);
- Domantas Sabonis (Rim Protector Power Forward);
- Rudy Gobert (Rim Protector Center);
- Bam Adebayo (Perimeter Defender Center).

rochajoaovitor1@yahoo.com, paulocanas@gmail.com,
https://www.paulocanas.org/my-lab-sally

4th Conference on Statistics and Data Science
Salvador, Brazil (online)
December 1-3, 2022