An Analysis of Sports News in the Era of Big Data - Visual Data News with NBA Coverage as an Example

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Abstract. With the rapid development of information and communication technology, the sports industry's use of big data is not only manifested on the field of play, but also closely integrated with big data. The ever-expanding data information has made the process of data screening to data utilization more and more critical, and the creation of data journalism has caused the sports journalism industry to undergo significant changes from news sources to news writing methods. This paper analyzes the 2013–2014 Western Conference champion San Antonio Spurs and NBA Eastern Conference champion Miami Heat's meeting in the Finals as an example, using Sport VU technology to summarize and summarize all the actions of each player on the court by dynamically tracking them through multiple cameras. Big Data visualization technology transforms symbolic descriptions into geometric descriptions, thus enabling researchers to observe the desired simulation and computational results. Data visualization presents data in a more intuitive way than the traditional way of presenting data in tables or documents, making the data more objective and convincing.

Keywords: big data · news reporting · visualization · Sport VU technology

1 Introduction

With the rapid development of information and communication technology, the use of big data in the sports industry is not only shown on the field of play, but also closely combined with big data. From a global perspective, sports analytics is mainly working in three major directions: athletic level improvement, sports injury prevention and digital entertainment. [1] With the advent of the big data era, big data has started to be commonly applied among various disciplines. The ever-expanding data information makes the process of data screening to data utilization more and more critical, and the creation of data journalism has caused the sports journalism industry to undergo significant changes from news sources to news writing methods. For sports people, from coaches to athletes, from staff to fans, the effective use of data plays a crucial role in winning the game; from a business perspective, after the involvement of big data in the sports industry, many new business opportunities have been explored and a "window of heaven" is opening in the sports world. [2–4] The main manifestation is that big data is changing the sports industry and

the investment in sports industry is booming. Li Dongjian, a researcher at the Institute of Sports Science of the State General Administration of Sports, believes that the future integration of sports and technology will be a new growth point for industrial upgrading, and in the new round of sports investment boom, sports big data is worth paying attention to.

Of course, compared with foreign data companies, Chinese sports big data companies still need further improvement in all aspects. It is worth mentioning that the British sports industry, the gaming industry occupies a large part of the output value, which also benefits from the application of sports big data. [3–5] Therefore, the domestic sports market has not yet fully realized the use of personal data, in this context, how to develop more data channels and enhance its accurate control and reporting of data will be the urgent problem to be solved by sports big data enterprises.

2   NBA Data News Analysis - Sport VU Technology as an Example

Sportradar - Sports Data Services is a global sports data company covering more than 40 sports and 800 leagues worldwide. Through partnerships with professional leagues such as the NFL, NBA and NHL, SportRadar provides real-time daily and historical data for a wide range of sports applications, websites and sports analytics platforms. The NBA's increasingly powerful stats are dependent on one technology - Sport VU technology. Around 2013, the NBA began introducing the powerful Sport VU, which is simply multi-camera dynamic tracking technology - initially used in military applications such as missile tracking technology. Unlike the traditional manual statistics based on game footage, SportVU uses a player tracking and analysis system, which is actually computer software that automatically generates data and then manually organizes and analyzes it on demand. The dugouts that utilize this technology have six computer-connected cameras hanging from the ceiling, three in each half of the court. [6] These cameras are synchronized with a complex formula for extracting data from the XYZ positioning system and are capable of capturing 25 images per second. These images are recorded and handed over to the computer for automatic processing. The computer correlates with the Play By Play data and produces a report about every 90 s. Sport VU technology tracks every player's movement, every pass, every shot, every touch, and everything else on the court.

With this data it is possible to.

3   Analyze the Playing Habits of the Opposing Team

The author analyzes in this 2013–2014 Western Conference champion San Antonio Spurs and NBA Eastern Conference champion Miami Heat's meeting in the finals as an example. At that time before the game everyone was more optimistic about the Heat, after all, the Spurs are "old" another year. But the final result was the Heat were swept by the "aging" Spurs gentlemen [7].

Through professional statistical analysis, the running situation of the two teams was summarized in the Table 1.

Table 1. Player running of both teams (Self-drawn)

Players	Teams	Appearances (times)	Running distance (miles)
Tony Parker	SAS	5	13.4
Boris Dlaw	SAS	5	12.4
LeBron James	MIA	5	12.4
Kawh Leonard	SAS	5	12.1
Chris Bosh	MIA	5	11.8
Dwyane Wade	MIA	5	11.4
Ray Allen	MIA	5	11.2
Tim Duncan	SAS	5	10.8
Manu Ginobili	SAS	5	9.7
Rashard Lewis	MIA	5	8.3
Mario Chalmers	MIA	5	8.1
Danny Green	SAS	5	8
Chris Andersen	MIA	5	6.2
Norris Cole	MIA	5	6.2
Patty Mills	SAS	5	6.2
Tiaqo Splitter	SAS	5	5.9
Marco Belinelli	SAS	5	4.7
Shane Battier	MIA	4	2.5
Matt Bonner	SAS	4	2.1
Udoms Haslem	MIA	4	1.5
Michael Beasley	MIA	1	1.2
James Jones	MIA	4	1
Toney Douqlas	MIA	3	0.8
Cory Joseph	SAS	3	0.6
Jeff Ayres	SAS	3	0.5
Aron Baynes	SAS	3	0.4
Grog Oden	MIA	2	0.2

As seen in Table 1 above, the entire Spurs team ran 6.44 km (4 miles) more than the Heat in the five finals, and the Spurs ran 1.24 km more per capita than the Heat (the data on the far right side of the graph are miles). And more specific average running distance, running speed, and even movement speed on the defensive end and movement speed on the offensive end are also available on the NBA's official website. All of these come from Sportradar's professional data collection and data news reports.

4 It Can Side by Side Reflect the Player's Motivation to Some Extent

Table 2 shows that the top ten in total distance run are CJ McCollum 218 mph (350.9 km), Jrue Holiday 211.4 mph (340.2 km), Bradley Beal 205.8 mph (331.1 km), Ben Simmons, Paul George, Tobias Harris (Clippers), Middleton, Wiggins, Josh Richardson, West Westbrook. The top ten fastest average speed are Imelda Smith, Cory Joseph, Redick, Murray, Curry, Dragic, Kuzma, McCollum, Ben Simmons, Justin Holliday.

Also, the Table 3 shows the top 20 players on the offensive side of the ball with the most total yards run this season (distances are in miles).

Table 3 shows that these 20 people are not necessarily as effective on the offensive end, but they are indeed the ones who are selling the most. Combining the defensive running distance of these 20 players with the offensive end of Table 3, we can find that the difference between the offensive end and the defensive end of the Blazers is a bit large, so we cannot say that they are not active on defense, but only that they are more "active" on the offensive end.

Table 2. Top 10 average speed (Self-drawn)

Players	Teams	Running distance (miles)
Ish Smith	DET	4.88
Cory Joseph	IND	4.64
JJ Redick	PHI	4.61
Jamal Murray	DEN	4.6
Stephen Curry	GSW	4.55
Goran Dragic	MIA	4.54
Kyle Kuzma	LAL	4.52
CJ McCollum	POR	4.51
Ben Simmons	PHI	4.51
Justin Holiday	CHI	4.5

Table 3. The 20 players who ran the most total yards this season (Self-drawn)

Players	Teams	Appearances (times)	Offensive End Runs (miles)	Defensive End Runs (miles)	Offensive Defensive Distance Difference (miles)
Cj Mccollum	POR	81	122.8	95.2	27.6
Jrue Hohday	NOP	80	112.3	99.1	13.2

Table 3. (*continued*)

Players	Teams	Appearances (times)	Offensive End Runs (miles)	Defensive End Runs (miles)	Offensive Defensive Distance Difference (miles)
Ben Simmons	PHI	80	110.5	92	18.5
Bradley Beal	WAS	82	110	95.8	14,2
Tobias Harris	LAC	80	109.6	88.2	21.4
Harrison Bames	DAL	77	106.8	85.4	21.4
DeMar DeRozan	IQR	80	106.6	84.6	22
Kemba Walker	CHA	80	106.4	84.6	21.8
Jamal Murw	DEN	80	106.3	84.5	2L8
Josh Richardson	MIA	80	106.2	89.4	16.8
Paul Gearge	OKC	78	105.4	94.3	11.1
Russell Westbrook	OKC	78	104.8	90.7	14.1
Andrew Wiqqins	MIN	81	103.7	92.8	10.9
Damian Lillard	POR	73	103.2	80.9	223
Kar-Amhony Towns	MIN	81	103	92.4	10.6
LeBron James	CLE	82	102.8	92	10.8
Donovan Mitchell	UTA	79	101.8	827	19.1
Joe Ingles	UTA	82	101.3	83.5	17.8
Khris Middleton	MIL	80	101.2	95.9	5.3
Taj Gibson	MIN	81	100.7	87.4	13.3

The Table 4 shows the top 20 players in terms of total distance run on the defensive side of the ball this season.

As can be seen from Table 4, convincing conclusions can be drawn from the difference between the distance moved by the offense and the defense, and the difference between the running speed on the offensive end and the running speed on the defensive end.

Table 4. Top 20 players with the most total running distance (Self-drawn)

Players	Teams	Appearances (times)	Offensive End Runs (miles)	Defensive End Runs (miles)	Offensive Defensive Distance Difference (miles)
Jrue Hohday	NOP	80	112.3	99.1	13.2
Khris Middleton	MIL	80	101.2	95.9	5.3
Bradley Beal	WAS	82	110	95.8	14.2
CJ McCollum	POR	81	122.8	95.2	27.6
Paul Gearge	OKC	78	105.4	94.3	11.1
Andrew Wiqqins	MIN	81	103.7	92.8	10.9
Kar-Amhony Towns	MIN	81	103	82.4	10.6
LeBron James	CLE	82	102.8	92	10.8
Ejwaln Moses	NOP	80	110.5	92	18.5
Russell Westbrook	OKC	81	98.9	91	7.9
Thacdeles Voung	IND	78	104.8	90.7	14.1
Josh Richardson	MIA	80	95.9	90.8	5.3
Victor Oiagco	IND	80	106.2	89.4	16.8
Tobias Harris	LAC	74	97.3	88.7	8.6
Taj Gibson	MIN	80	109.6	88.2	21.4
Andre Drummgnd	DET	81	100.7	87.4	13.3
Gianns Antatokounmpo	MIL	78	89.6	87	2.6
Gianns Antatokoummp	MIL	73	97	86.5	10.5
Klay Thompson	GSW	73	95.9	86.2	9.7
Harrison Bames	DAL	77	106.8	85.4	21.4

5   Injury Prevention

STATS SportVU measures running distance, average speed and acceleration to assess the muscle tension and stamina of each player. If muscles are under tension for an extended period of time, this monitoring can alert the team that the player needs to rest to avoid possible injury. In addition, during a player's recovery from injury, coaches can use STATS SportVU data to verify that a player's performance is returning to pre-injury levels, thus reducing the chance of injury reoccurring.

6 Help Players and Coaches Make Better Decisions

Coaches use STATS SportVU data to make better decisions and win more games. STATS SportVU's proprietary, accurate and quality offensive and defensive data provides a new bright spot in the game. Unlike any other tool, SportVU can quantify a number of metrics to measure defensive effectiveness during defensive matchups, pressure on the ball-handler, and small crushing step-ups. STATS SportVU can quickly and easily analyze physical performance metrics as well as tactical, basketball-related technical statistics (such as breakdowns and jump shots). Thanks to this technology, a lot of manual time is saved.

7 For Player-to-Player Comparisons

Every time there is a post about player comparisons, the heat is always on. This technology helps us to provide more aspects that can be compared, such as comparing such abstract concepts as players' physical strength.

In a nutshell, Sport VU provides an extremely rich set of data to the sports news audience. In the past, boxscores were the basis of the equation, which was essentially manual, and even the more advanced synergysports and xRAPM were based on what can only be described as the more advanced boxscore.

But these data are not very helpful for people studying NBA professionals, these mere points, rebounds, assists, etc., can not tell us all the facts. In contrast SportVU system can track every movement, every pass, every shot, every touch of every player, etc. Traditional statistic methods can basically only restore one result, while SportVU system can restore the whole process.

The significance of SportVU system is to tell us that the major trend of data development in the future is the refinement and quantification of data.

8 Conclusion

Taken together, the big data visualization technology transforms symbolic descriptions into geometric descriptions, thus enabling researchers to observe the desired simulation and computational results. Compared with the traditional way of presenting data in tables or documents, data visualization can present data in a more intuitive way, making them more objective and convincing. In addition, visualization techniques provide ways to transform the invisible into the visible, enriching the process of scientific discovery and facilitating the comprehension of the unknown. Visualization is useful in several ways, such as revealing patterns and relationships, forming arguments or subjective opinions, observing trends in the evolution of things, summarizing or accumulating data, understanding the truth, pursuing truth, disseminating knowledge, and exploratory data analysis. From a macro perspective, visualization includes three major functions, namely, information recording, supporting reasoning and analysis of information, and information dissemination and collaboration. The role of data visualization is to move from seeing objects to acquiring knowledge. For complex, large-scale data, existing statistical analysis or data mining methods often simplify and abstract the data, hiding

the true structure of the data set, while data visualization restores and even enhances the global structure and specific details in the data [8, 9].

Prediction is the most core value of big data, so sports news predicted by big data occupies an important place in sports news coverage. Generally speaking, the most attention-grabbing and fascinating aspect of a sports event is that there is no way for anyone to predict the final outcome of the game until the last second of the game. For the sports news audience, the final outcome is what they want from the beginning of a game. This happens to drive predictive journalism to a large part of the sports coverage field. And all of this, as big data continues to evolve, the news media involved are more accessible and more truthful about accessing data - both of which contribute to more accurate predictions of event outcomes in data journalism. There is no doubt that, in addition to this, big data can also analyze important factors such as athletes' movements, abilities and skills, which is a major selling point for big data applications in the sports industry. [10] In a word, the application of data visualization in sports news reporting can present all these in a complete, clear and accurate way to the audience, and the excellent reading experience and highly valuable news content will promote the new development of predictive sports news.

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