

BIA 660 Final Report

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1. Introduction

Sports are an important part of the culture of the human life. We watch many kinds of games via the TV, smartphone, tablet, and the most important thing is that we enjoy these games. There are lots of websites on the internet where you can find almost every aspect of your team's status such as what's the result of last game, the last statistics about this team or every player's statistics in his career. However, most of these data are in a diagram form and text or pure text. Although some graphs do exist, they just limit in recent one year or one season. You can hardly find such a website which provides an overview and shows the change of the league and also some data analysis in a long period. In this project, we provide an ideal place where you can find all of such things about NBA, Premier League, and La LIGA in recent ten years.

2. Framework

2.1 Back-end

In this part, we built a web service using CherryPy Framework which will handle each http GET request from our website. This service will also provide a way to interact with our database so that users can choose many kinds of attributes to see different charts representing different datasets. In this service, we implemented an interface for database that helps us query data much easier. We chose MongoDB in this project because all of the data we crawled from internet are saved in JSON format. It's very convenient to insert JSON data into MongoDB directly without adjust data's form again. We also built three web crawlers to get each league's data from ESPN.com and basketball-reference.com which stored in our database. We also used an EC2 Ubuntu instance to host both web service and web server (Lighttpd) in this project. The following figure (Figure 1-1) is about the framework of this project:

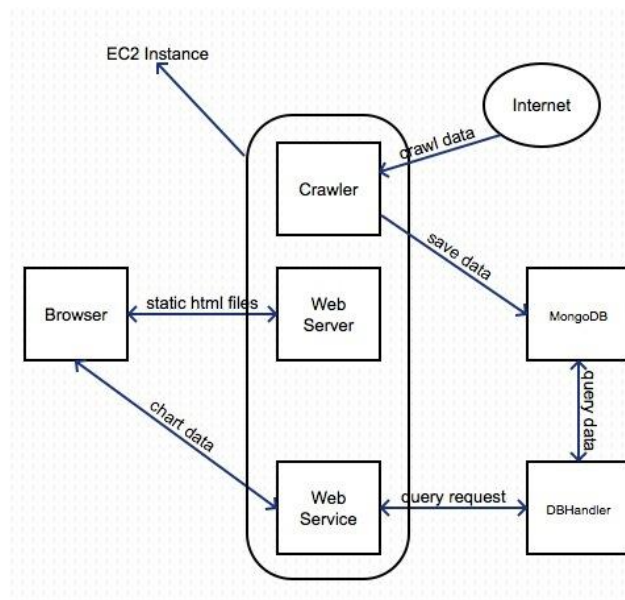


Figure 1-1

2.2 Front-end

For the Front-end, we built a responsive website using Grid Framework which support main stream screen resolution.

Also, we created some simple effects such as dynamic title, autohide menu, button click/hover effect, etc, using JavaScript and CSS3. Our website is designed based on the concept of Flat UI that provide a very simple, beautiful and also powerful website for our users. Another important aspect of our website is about data visualization.

We use Highcharts to draw the graphs which is very easy to configure and use. It could provide various charts such as: curve graphs, basic bar charts and columns with negative value etc. We have built our own web service for the communication between client and server in the form of JSON so that to retrieve the data, the only thing we need to do is to pass the query parameters to such interface. We used jQuery to send the http request and parse the JSON to get the desired content for specific chart through the key and the value of JSON objects. The JSON format provides us with the convenience to process data efficiently. We also implemented our own chart configuration interface which covers the following aspects: chart color, background, shapes, X and Y axes, title, data set, categories etc. The next step is fairly simple, we just provide a div id for the script to generate charts in this area denoted by this “id” and then configured the chart options by JSON including the each options of a chart. Finally, we could build a Chart object with options by the “new” keyword. We also provided a select menu for user to select different dataset from our database. Each time they select the attribute, it sends a http request to the server, gets the data and redraws the charts. So they can get the newest statistics if we update the data in database.

3. Analysis

3.1 The Premier League

The Premier League is contested by 20 clubs; it operates on a system of promotion and relegation with the Football League. Seasons run from August to May, with teams playing 38 matches each, totaling 380 matches in the season. Most games are played in the afternoons of Saturdays and Sundays, the other games during weekday evenings.

I am a soccer fan, and from my understanding, to analyze a league or a team comprehensively, we should have some data from all aspects. In this part, I fetched data from the ESPNFC. I analyze teams from both offensive side and defensive side. From offensive side, I fetched how many goals scored each team got, and how many matches they won for the whole season. With only information mentioned above, I think it's not enough, so I separated it into two parts. One is about the performance at Home, and the other is the part at the opponent's

Home. Besides, I also took the points they got in each season and winning percentage of each team per season, which will help fans to forecast whether the team they support will get the championship, or how to be a champion team! From defensive side, I parsed the html code, and get the goals conceded of each team. Additionally, I calculated the Goals Scored and Goals Conceded per match, and also divided into Home and Away, which will help the visitors to get results more efficiently. Here I took some screenshots of the charts:

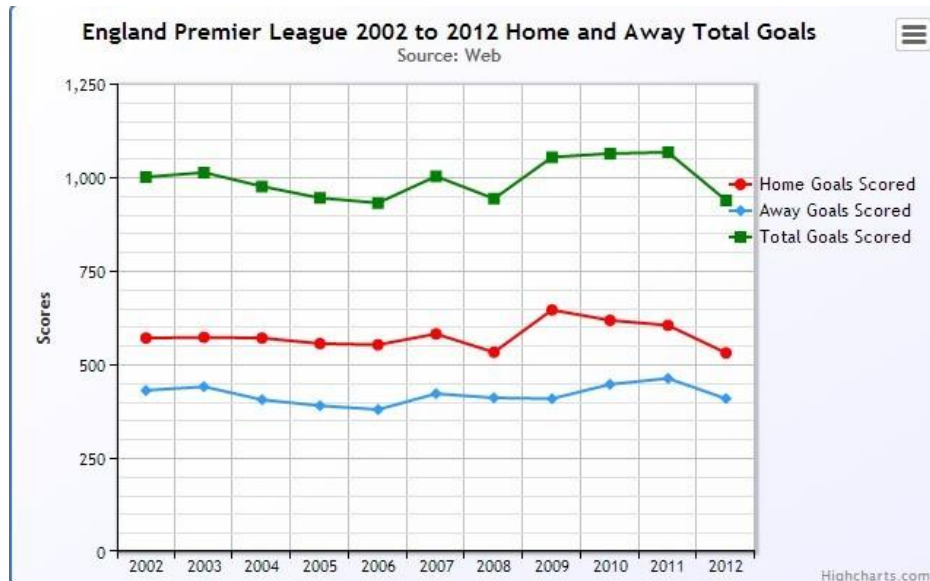


Figure 3-1-1

From this chart (Figure 3-1-1) given above, we can get the result that from 2009, within the four seasons, the total goals scored of Premier League is rising up! It is because more and more super stars sprung up in Premier League and the shareholders of each team, especially the top teams have spent a lot of money in the player transfer. They purchase some excellent players, or in other words, some super stars in the market to enhance the offensive or defensive ability of their teams. In the total goals scored chart, we can also get the information that in Premier League teams play more aggressively at Home, I think, which is quite common in the score games.

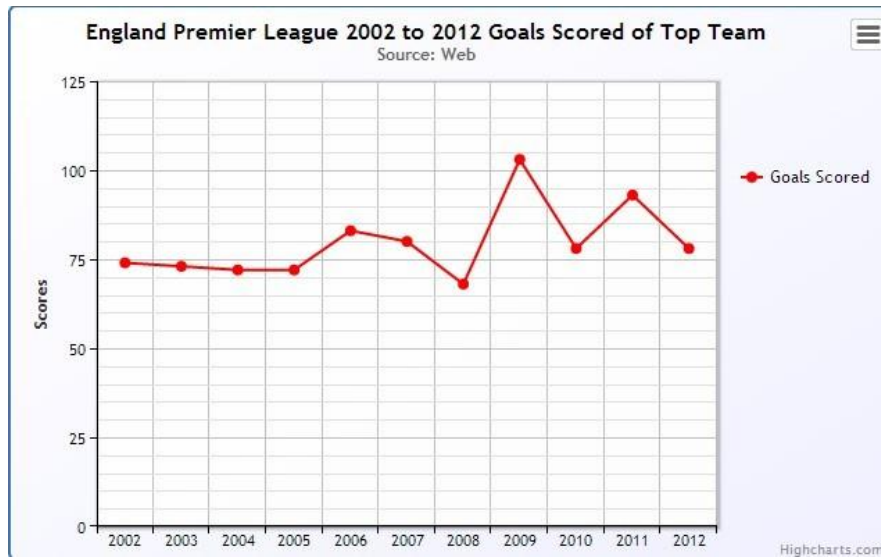


Figure 3-1-2

This is the chart (Figure 3-1-2) of goals scored of top team; we can see that as a top team, they should get at least around 70 goals in the whole season; this means in each match they should get an average goals scored round two, which is a decent number for a team in the offensive side.

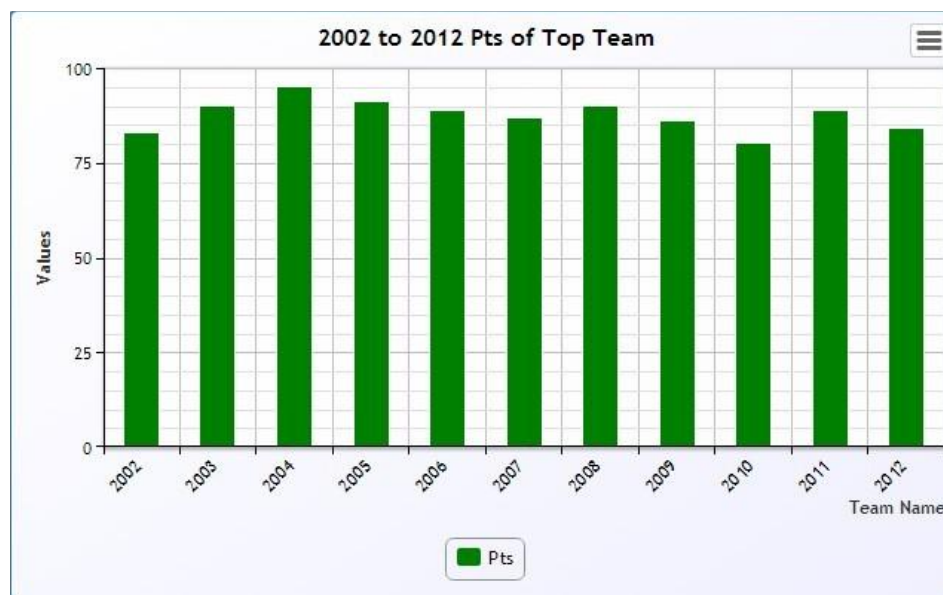


Figure 3-1-3

Taking an overview of the Chart of Points (Figure 3-1-3), we can conclude that a top should get at least 80 points in the whole season to assure a champion. While look into the following two charts (Figure 3-1-4 and Figure 3-1-5), we can also learn that a champion team should win more than 25 games at least, and especially at home they should play well. With 25

games won, that means this team can get at least 75 points, which looks very competitive, which proves what we get from the Chart of Points.

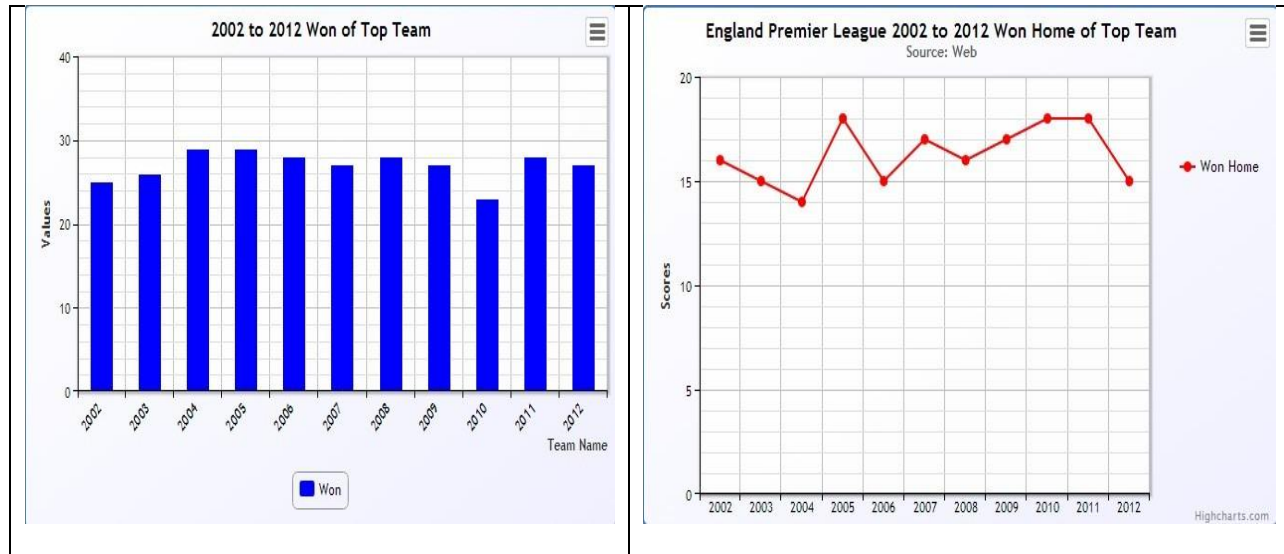


Figure 3-1-4 and Figure 3-1-5

There are some other charts of the performance of top team in each season. Like the Goal Different Chart, we can get the information that if a team wants to be more competitive, the goal different should at least be a positive number, of course with a larger number like forty or something. To do the best, they should get goals scored at least twice as many as goals conceded. From this chart we can generally learn that if a team with a larger number of goals different that means the team does well in both offensive and defensive side. Except for some specialties, like the team gets a large number of goals conceded in one or two games. In that case, we can just say that the players are tired, and not be able to concentrate, so they play a bad game.

Besides, I find something interesting to say. By calculating the total goals of these two leagues, Premier League owns 10948 totally within the 11 seasons, while La LIGA gets 11047 in total in this period. We can say La LIGA performs more active or aggressive than Premier League, but from other side, we can regard that Premier League plays more defensively. From my understanding, a soccer fan is more excited to see more goals in each match.

From these charts displayed on our Webpage, we can learn what the requirements for success are. A good team should be excellent in offensive side and defensive side.

3.2 La LIGA

La LIGA is the top professional association football division of the Spanish football league system. La LIGA is the strongest league in Europe over the past five years, according to UEFA's league coefficient. La LIGA is one of the most popular professional sports leagues in the world, with an average attendance of 28,286 for league matches in the 2009–10 season. This is the sixth-highest of any domestic professional sports league in the world and the third-highest

of any professional association football league in Europe, behind the German Bundesliga and English Premier League. Our website gives an insight to La LIGA.

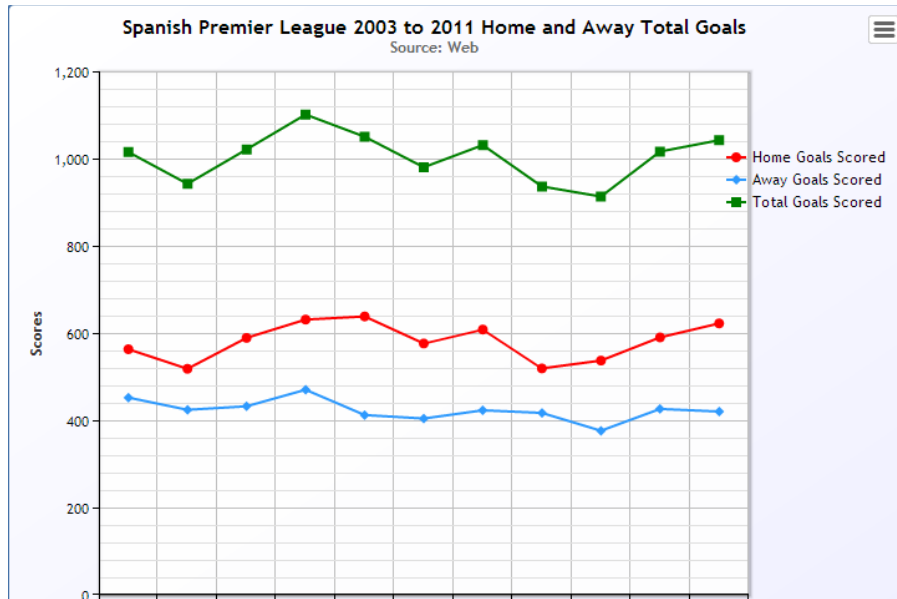


Figure 3-2-1

The first chart of La LIGA (Figure 3-2-1) shows the total goals scored each season from 2003 to 2011. From this chart it can be seen that away goals scored are around 400, home goals scored are around 600 and total goals are about 1000. As compared to English Premier, they are very similar, which indicates these two leagues are at the same level.

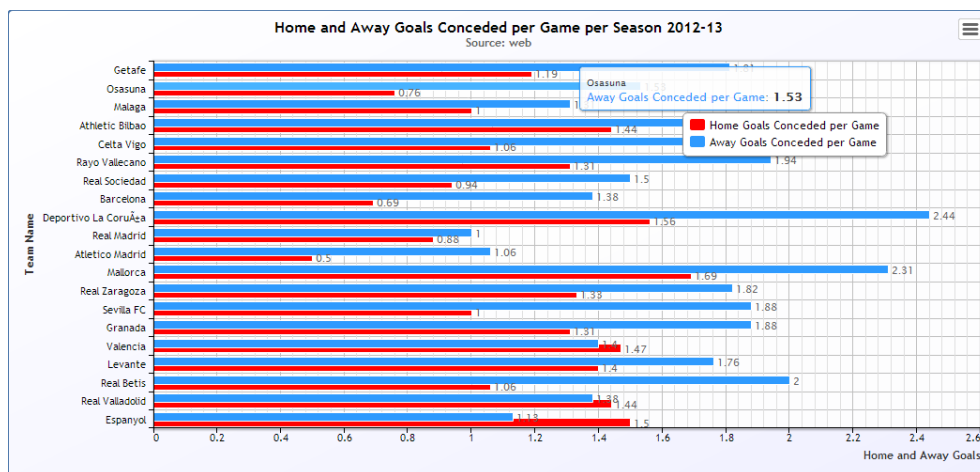


Figure 3-2-2

If people are interested in the defense ability of the team they like, our second chart can give people this information. This chart (Figure 3-2-2) provides home and away goals conceded

per game per season. The lower value of a team in the chart means this team has stronger defense ability.

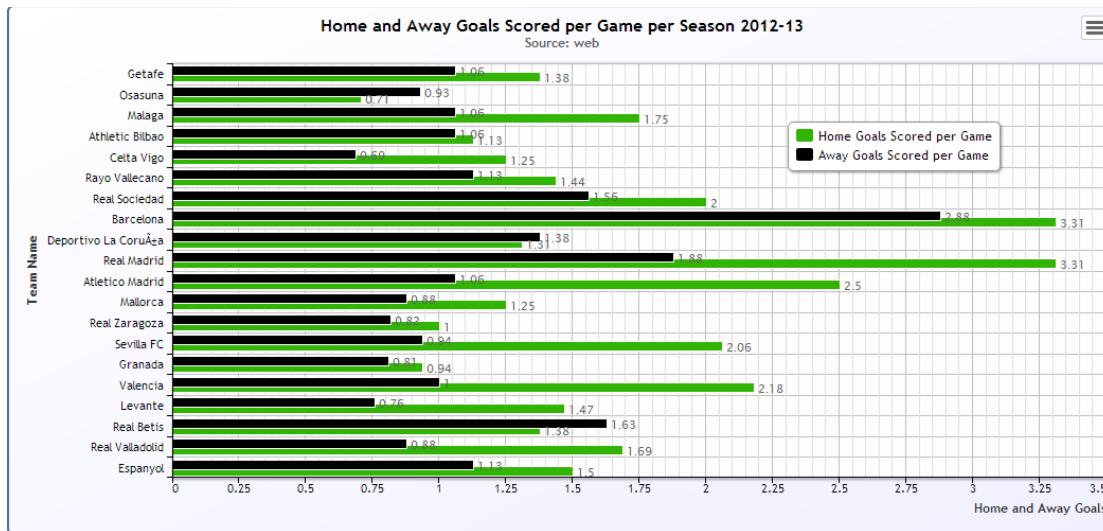


Figure 3-2-3

Some people may not care much about defense. They like teams who are more aggressive. Then they can find those teams they like in our third chart. This chart (Figure 3-2-3) provides home and away goals conceded per game per season. The higher value of a team in the chart means this team is more aggressive.

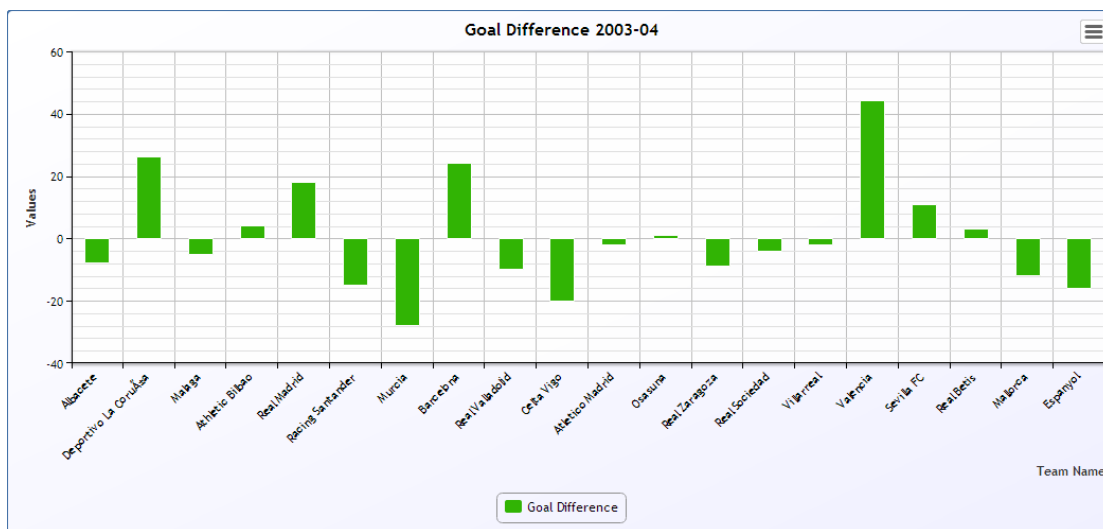


Figure 3-2-4

Defense ability and attack ability are both important to a team. Goal difference is the best way to indicate these two abilities. The fourth chart (Figure 3-2-4) shows the goal difference of each team per season. The higher value of a team means attack and defense are much better.

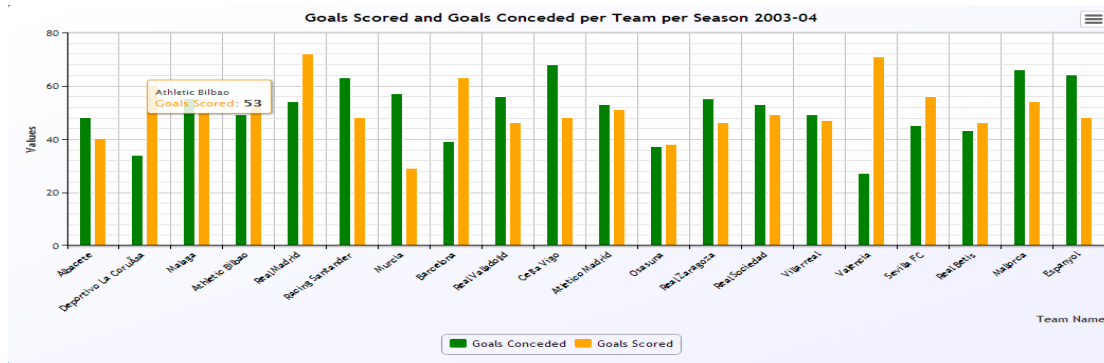


Figure 3-2-5

Last chart is the goals scored and goals conceded per team per season. This chart (Figure 3-2-5) is easy to find the best scored team and best defense team. And we can use this chart to compare the best team of Spanish premier league with the beat team of English premier league.

La LIGA is one of the famous premier leagues. Our charts provide different kinds of statistics on La LIGA. Therefore, our website is a good place for sports lovers, especially La LIGA lovers.

3.3 NBA-How game changed over the last decade

A decade ago, George W. Bush was in his first term as president, gas was much cheaper; the NBA was a different league. I still remember Allen Iverson, Tracy McGrady, Stephon Marbury, Brad Miller, Steve Francis and even Michael Jordan were still All-Stars at that time. But now most of them have retired. Yes, player turnover is a fact of life in all kinds of sport. But here, what we have found is the change of the game itself. We includes some aspects as follows:

3.3.1 Size

I still remember 2003 All-Star Game which nearly featured the zenith of size in the NBA. West coach Rick Adelman had Shaq, Yao, KG and Duncan on the floor at the same time and could've gone for the full Seven-Foot Five if he'd put one Dallas Mavericks All-Star (Dirk Nowitzki) on the floor instead of another (Steve Nash). However, it's very hard to find such kind of traditional big man in this league. The 2012-13 All-NBA teams featured four bigs in all, but only one (Dwight Howard) on the first team. We can apparently observe the change in the following charts.

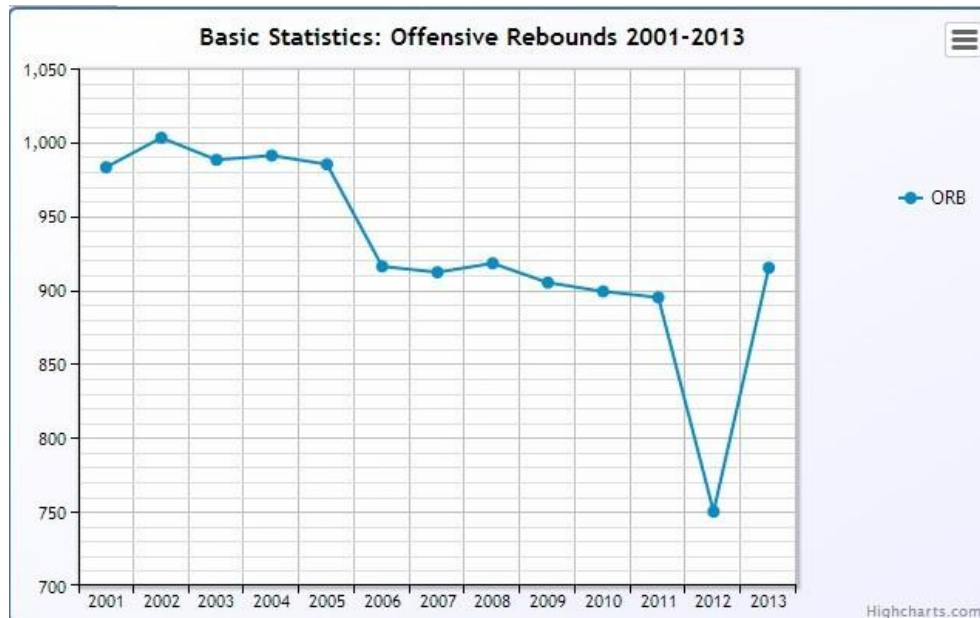


Figure 3-3-1



Figure 3-3-2

It is apparently that the number of rebounds has been reduced because of the shrink of the players.

3.3.2 Style

Ten years ago, the speed of NBA games are relatively slow compares to these days run-and-gun style. Most of the team focuses on defense and the paint area, so that in the following

chart, you can see the curves of three-point goals and field goals are rising up, and the same situation happens in the curve of three-point goal attempts and field goal attempts.

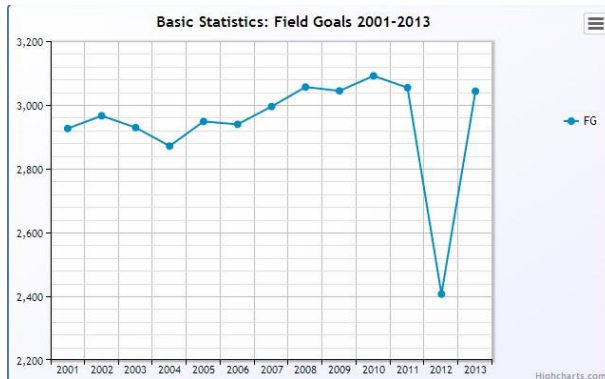


Figure 3-3-3

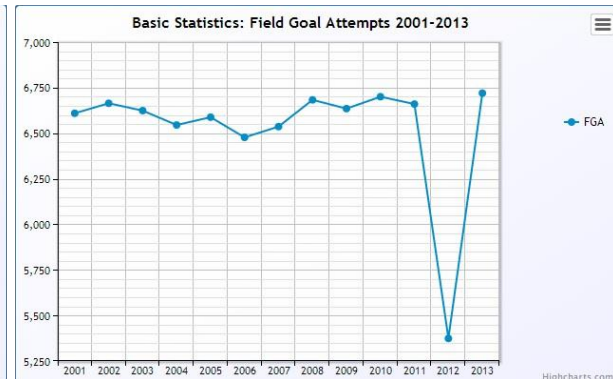


Figure 3-3-4

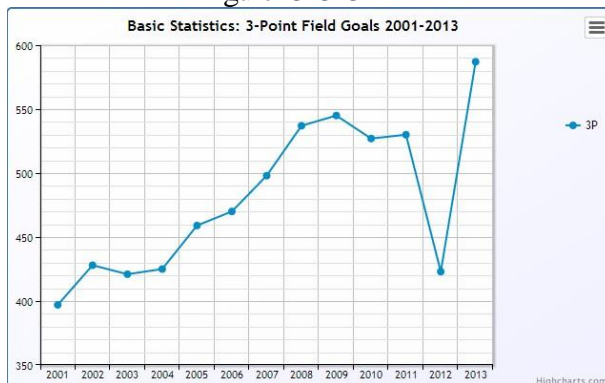


Figure 3-3-5

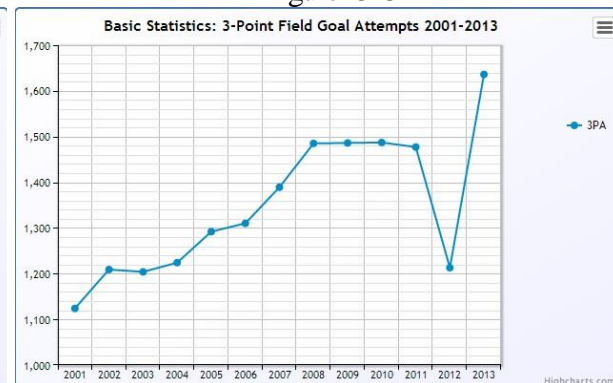


Figure 3-3-6

We can see the same situation happens in the Final Games.

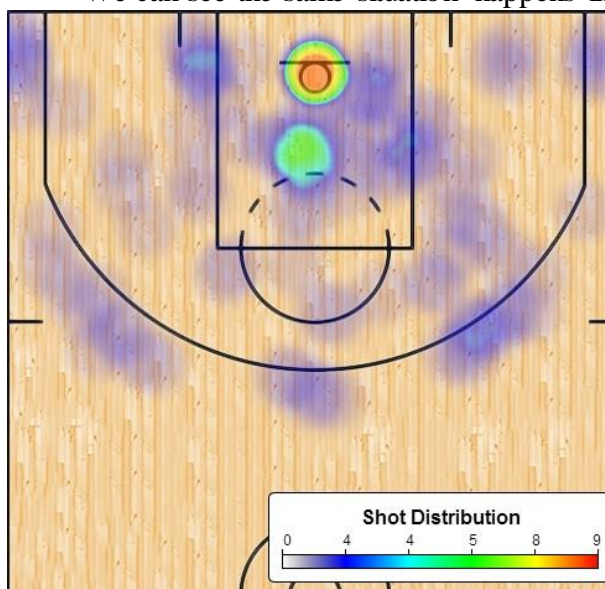


Figure 3-3-7

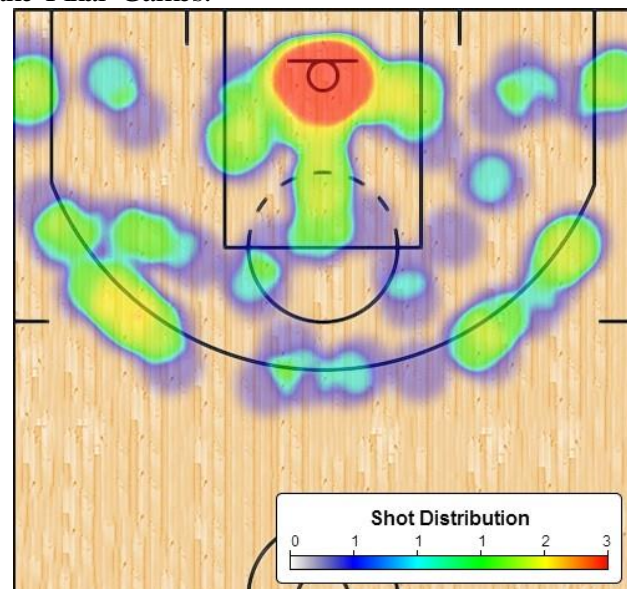


Figure 3-3-8

In the Final Game of 2001-2002 Season, shot area of Lakers focuses in the paint area, while in 2012-2013 Season, it's not the case. What we analyzed above might be partial, and users can find more information according to their own interest.

4. Conclusion

From our introduction and analysis above, we have already provided an ideal platform for users to get a comprehensive understanding of sports. They can do various analyses via our Website.