

Boston Celtic Data Visualization

Process Book

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PART 1

Introduction

The National Basketball Association, commonly known as NBA, is widely considered as the preeminent men's professional basketball league in the world. It includes 30 teams: 15 in West United States, 14 in East United States and 1 in Canada.

Overview and motivation

NBA/ Celtics

The Boston Celtics are an American professional basketball team based in Boston. The Celtics compete in the NBA as a member club of the league's Eastern Conference Atlantic Division. The team is founded in 1946 as one of eight NBA teams to survive the league's first decade, and their home games is the TD Garden.

We want to do a data visualization for Boston Celtics to help their fans understand their behavior for different opponents. We're going to create a data visualization to analyze the possible 7 teams in eastern conference by contrast with performance of Boston Celtics. By analyzing our data visualization, people will get a full understanding of this team advantages and drawbacks in different level including team, position and personal level.



Objectives

Our final goal is to provide Boston Celtics fans a comprehensive view about their potential playoff opponents data. And figure out the advantage and drawbacks to each opponents. Then fans could have their focus point when they watch playoffs and have a sense of what's going well or wrong with the team.

Our project mainly focus on giving a comprehensively analysis of Boston Celtics basketball team and its player in order to understand the advantages of this team and find out team player's potential in different position. Since data analysis has become an irreplaceable status in estimating each player's ability and decision making, the display of the data turns out to be important. For the people who are interested in specific player, it will also show each team player's ability index and general performance in the whole season.



Domain Task / Analysis Task

Data

Domain Task

Basketball strategies are mainly three types containing attack, guard and reducing turnovers. In addition, users can compare the performance of player in five position which contains PG(point guard), SG(shooting guard), SF(small forward), PF(power forward), C(center).

Analysis Task

- (1) Analysis of team performance according to six attributes;
- (2) Analysis of different positions performance according to six attributes;
- (3) Analysis of the efficiency of each players in the eight teams about performance per 36 minutes.



User

The target user is the general public, fans of Boston Celtics , or simply those who concern about NBA. We wish this visualization tool could help those people get a deep understanding of the team performance and individual performance with potential playoff opponents.



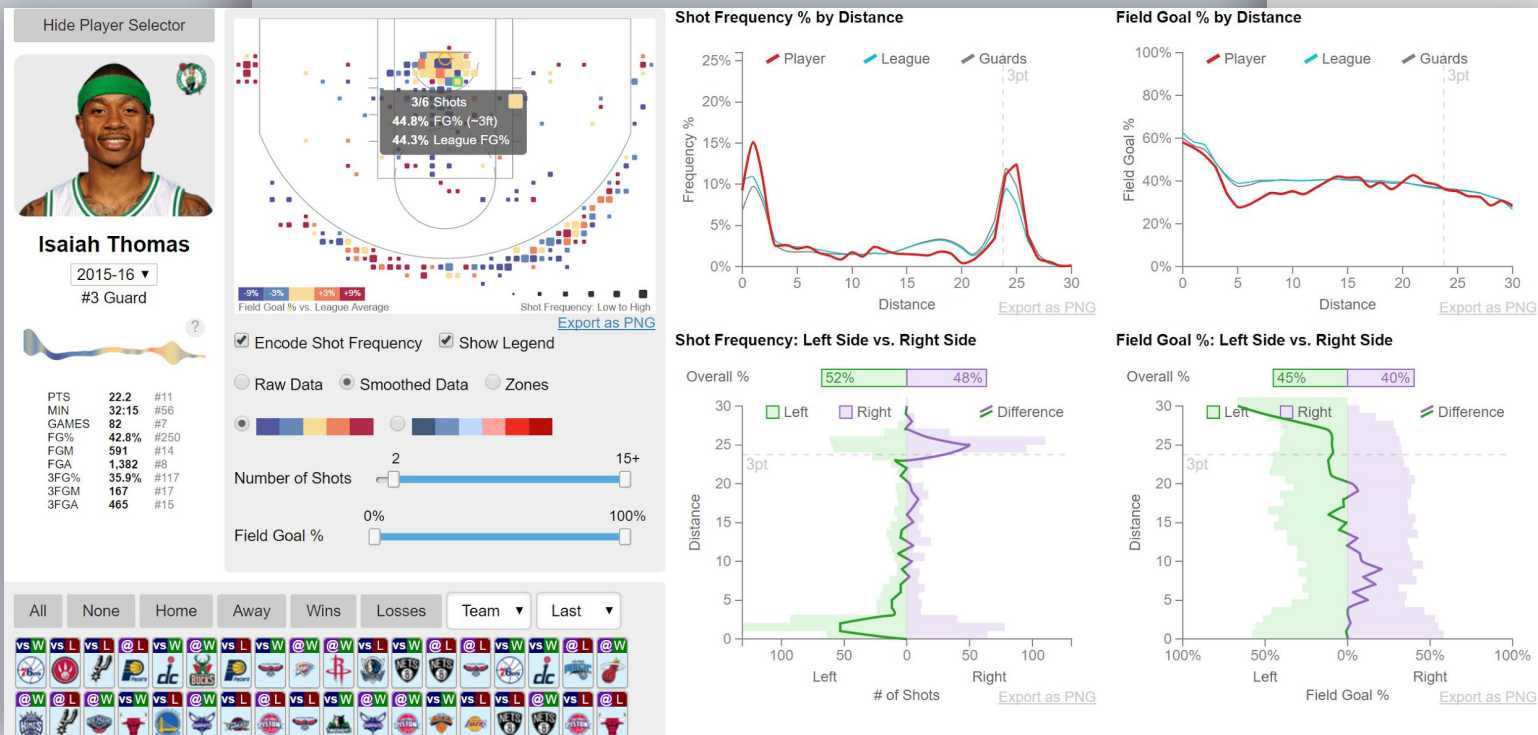
Related Work

As NBA is the most most successful basketball league in the world. Plenty of data visualizations are among websites.

One thing we think it did really good is by Peter Beshai (Link :

http://buckets.peterbeshai.com/app/#/playerView/202738_2015).

In our design, we want to do something new and unique to distinguish us from those related works. We are focusing on Boston Celtics Potential Playoff Opponents Performance which is more important in Playoff.



PART 2

Process

The design process in our visualization is similar to our website design. We have come up some ideas about how to present those idea including bar, radar pie, slope chart or map. We have some discussions and prototype test in this process.



Data Collection

We select 7 teams in Eastern Conference which are potential playoff opponents with Boston Celtics in this season.

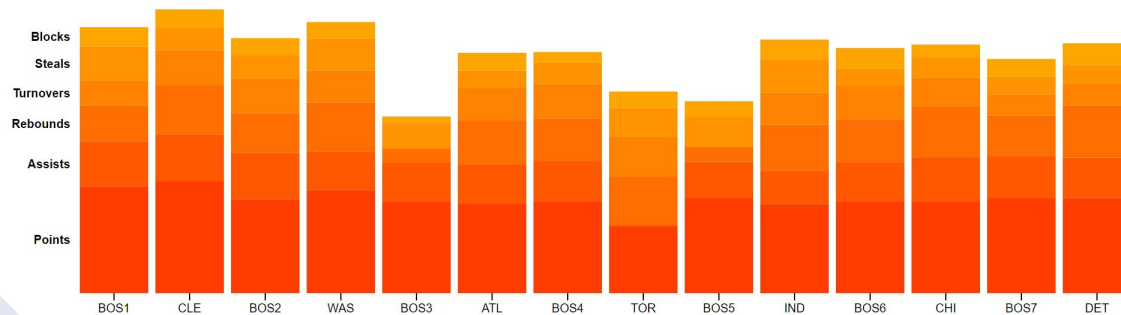
We found many data on the realgm.com (Link : <http://basketball.realgm.com/nba/stats>) , and “Per 36 Minutes Performance” data from (<http://www.basketball-reference.com/teams/BOS/2017.html>) which is enough for us to do the team, position and individual data analysis.



Team Analysis

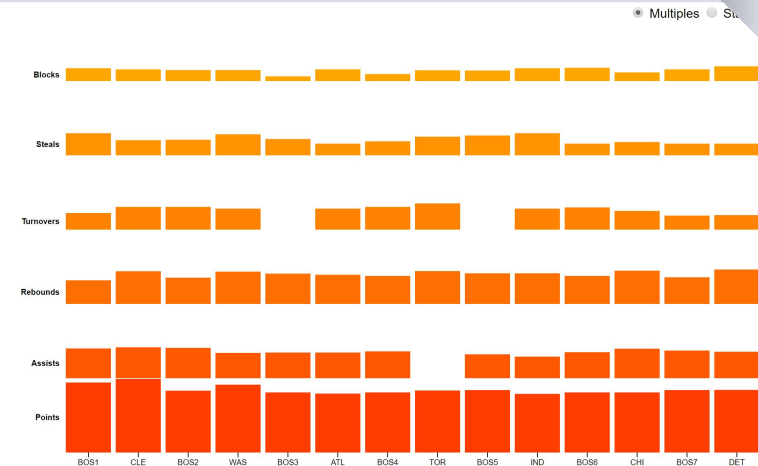
Problems

The whole team performance is crucial to analysis and to determine the strategy of next game in playoff. Thus, we decided to use data of 7 teams from east conference. Since it would be more representative if we choose the top 8 teams, we choose the data from top 8 teams including Celtics and visualize the data in bar chart and stacked bar chart.



Design Evolution

We created very simple bar chart at first. However, it's pointless if we only show the points of every team. Thus, we created a stacked bar chart to show the sum of six attributes we chose so that we can easily know the trend of every team. And we also created a bar chart to show six attributes separately, which will make it more easier to know trend of every attribute of each team.



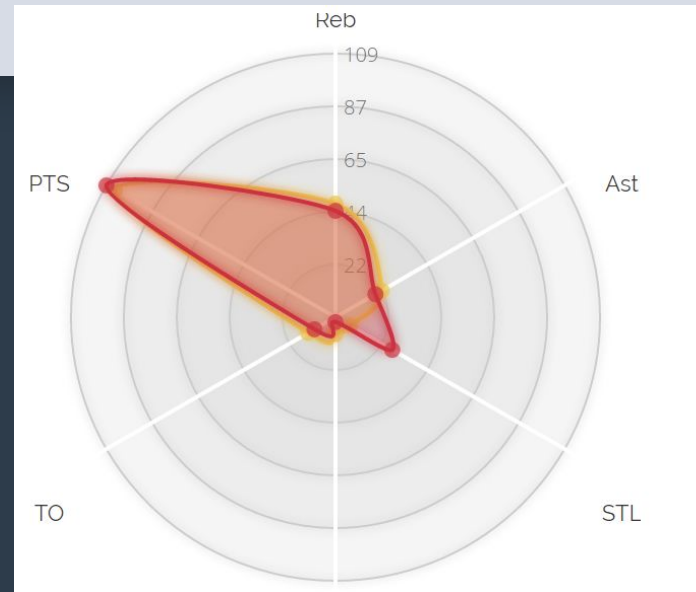
|| Position Analysis

Problems

Usually, users desire to know the performance of each players and figure out their data in a match, however, they may find it difficult to compare performance of two players because player's responsibility may vary according to different position they take. Thus, it is less meaningful to compare players whose position are not the same.

Design Evolution

In one match, one position may be played by several players, thus we decide to figure out the average performance of each position in one match and users can compare each position's performance in one match. Since the player's performance include six attributes, we decide to take advantages of radar chart to display each position's performance.



Player Analysis

Problem

Usually, users would like to know who behave better in the regular season and desire to know overall performance of each player. To be more specific, users would like to see players who gain the highest score or behave better in defense. However, we have 150 players in 17 matches, it is difficult to compare them by using bar chart or radar chart since graphics may appear overlaps.

Design Evolution

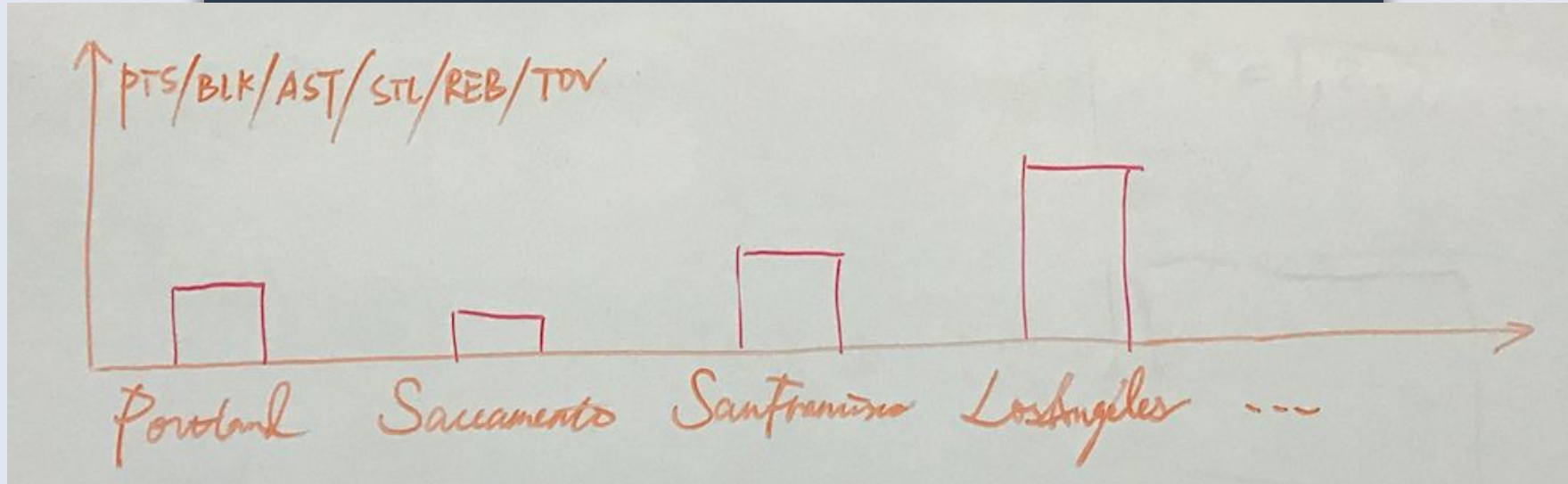
The behaviour of every player may vary significantly, so we design a line chart to record their performance in different teams. We analyze the player's performance by calculating the player's value per 36 minutes. That is, we study every player's attributes by dividing their playing time and multiply 36. It represents how the player is played with most efficiency in one single match.

Problem/ Design Evolution

PART 3

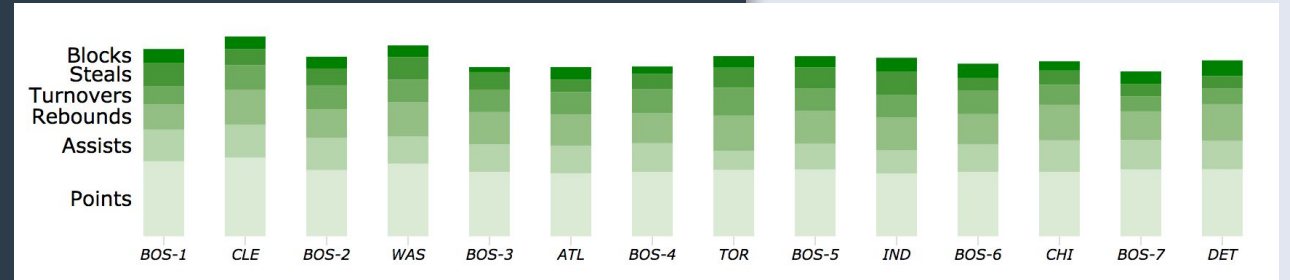
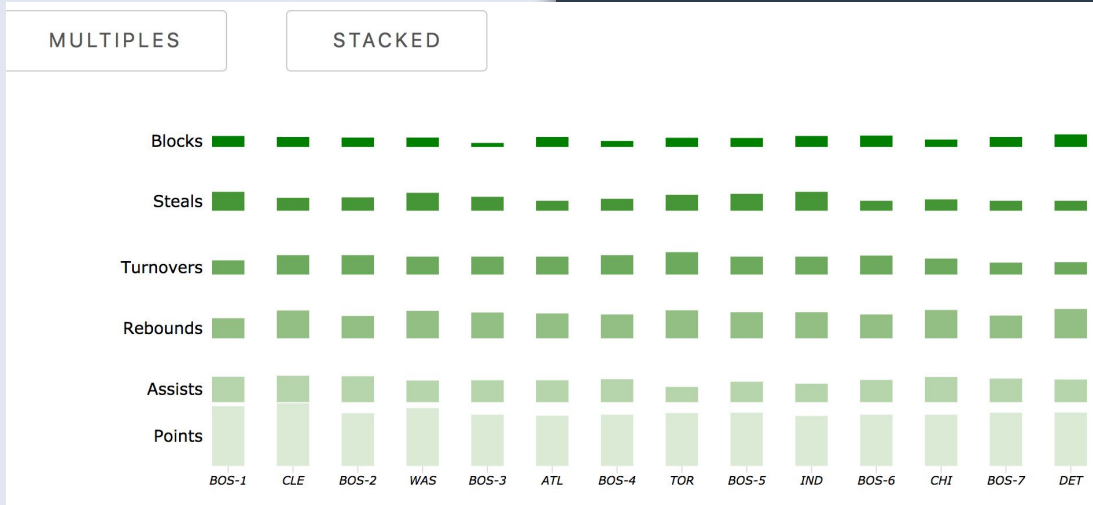
Visual Design

In this part, we will give an explanation of reasons why we choose these kind of visualization as well as the challenges and difficulties we face when we visualize our prototype.



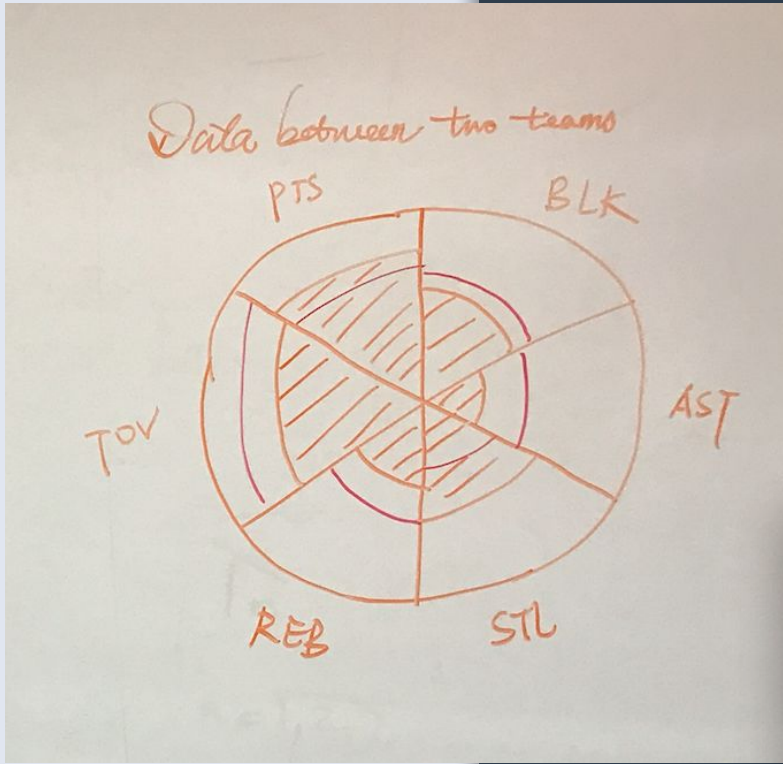
Team Performance Prototype

At first, we desire to use bar chart to show the performance of each team. We want to include six attribute in one bar. However, we find it hard for us to compare one attribute in different teams.



Team Performance Implementation

We discover that we can take advantages of multiple bar to display six attributes in one team. At the same time,by stacking six bar, it is easy for us to identify overall performance between celtics and its opponent.



Position Performance Prototype

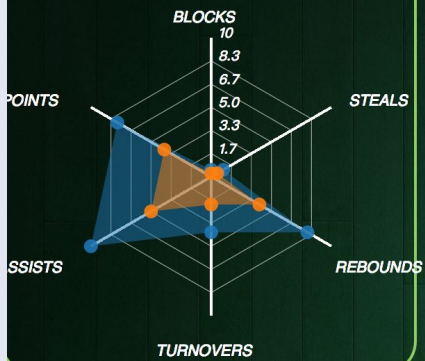
At first, we decide to use pie chart to show the performance of starter player and compare it with other player who at the same position. However, it fails to reflect real situation in a match since bench players' data have not been recorded.

BOS VS TOR

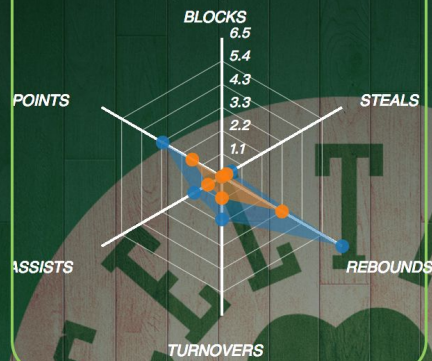
TOR

BOS

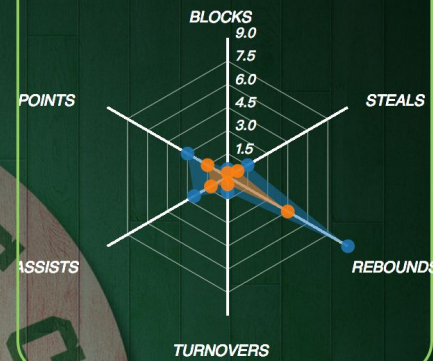
Point Guard



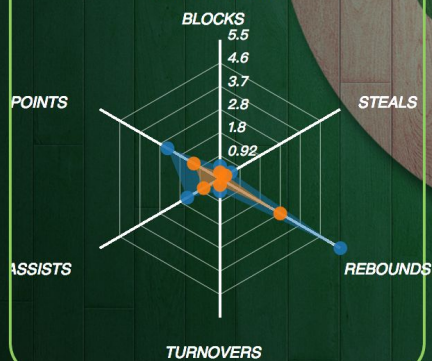
Shooting Guard



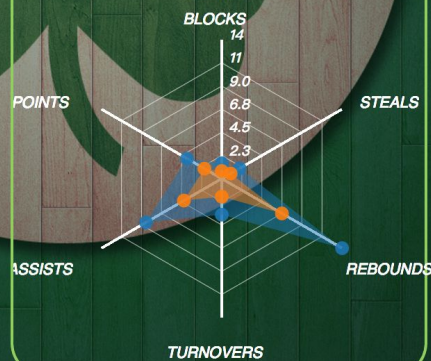
Small Forward



Power Forward



Center

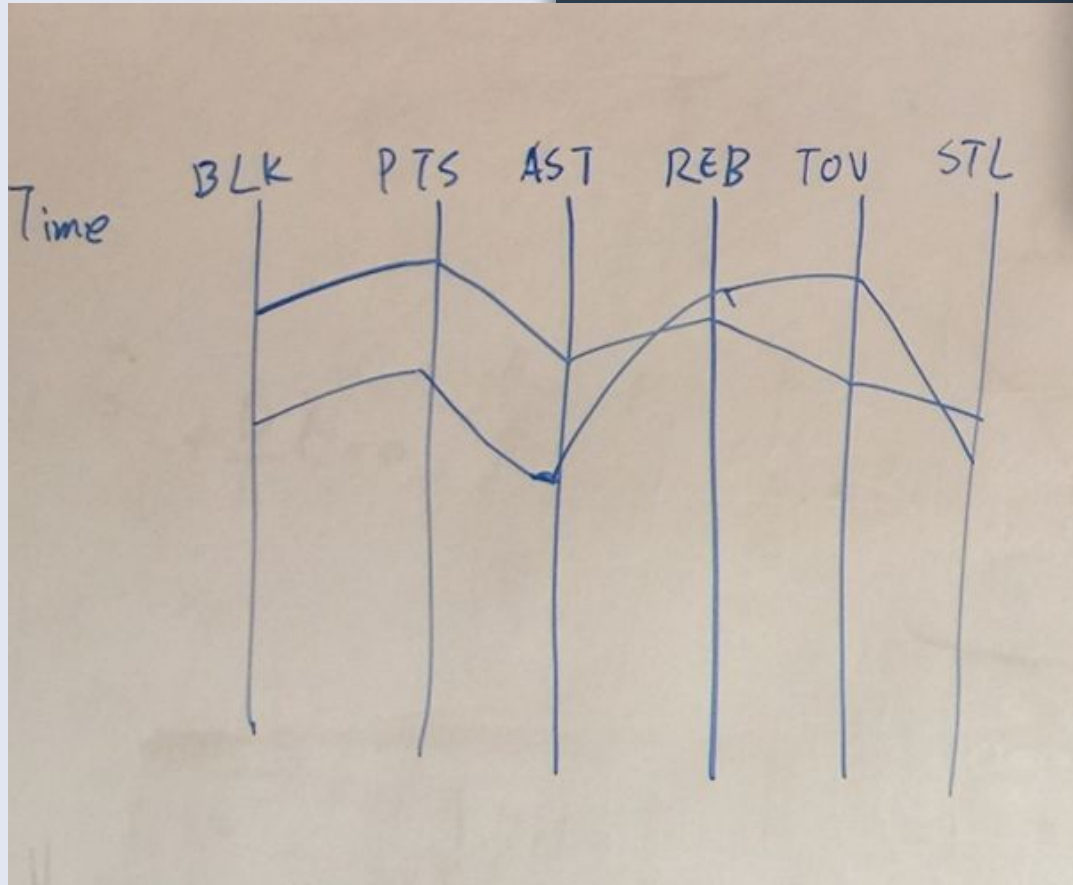


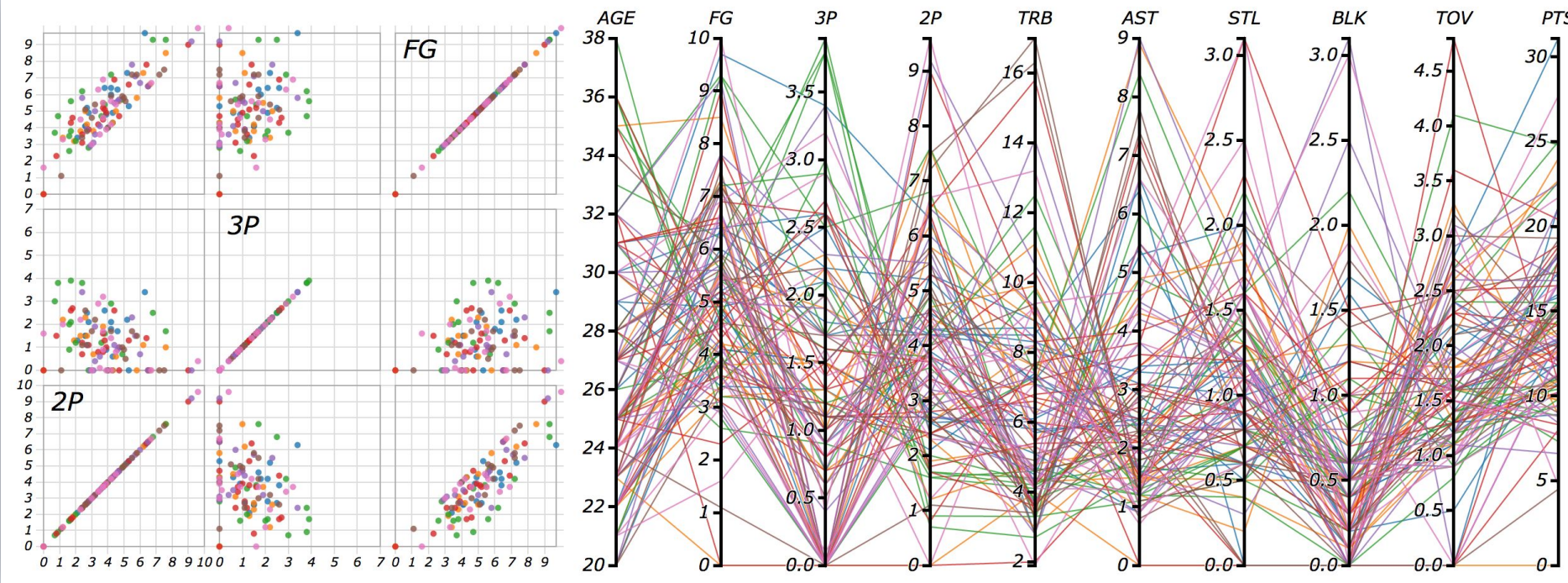
Position Performance Implementation

We take advantages of drop down list to select the team and discover team performance in each position. Fans are likely to identify the advantages and drawbacks of each team.

Player Performance Prototype

At first, we desire to use line chart to show performance of each team. We are wondering ways to include more than 100 player from 7 teams in one line chart.





Player Performance Implementation

We figure out that we can take advantages of filter function so that users can search condition by using the mouse to brush the parallel axis to filter the players you want to see.

PART 4

Data Analysis

In this part, we will discuss our data process including how we choose and collect data, and how we analyze data.



Data Process

Combine multiple
piece of data

Aggregation

Filter unnecessary
data attributes

Data Filter



Calculation

Calculate average
performance between
celtics and its opponent

Adjustment

Adjust the data format and
document format



Summary

We conclude from the visualization that Celtics behave better in defense which can be revealed by its rebounds, steals as well as block data when comparing to its opponent.

We can also figure out the best player in different aspects. Such as LeBron James who behaves better in field goal and assists as well as points.

PART 5

Appendix

In this appendix, we introduce our team members and their project contribution. And link to our visualization website.

OUR TEAM

Feng Zheng

- Data Collection
- Stack Bar Chart Design
- Layout Design
- UI Design
- Website Debug
- Art Guidance

Jiaxin Lyu

- Data Collection
- Data Filter
- Radar Chart Design
- Website Testing
- Video Filming

Zhixiang Yang

- Storyline Making
- Data Collection
- Data Filter
- Slope Chart Chart Design
- Website Testing

Sishi Hao

- Idea Contribue
- Data Collection
- Data Filter
- Template Contribution

Links

Link to Project Demo:

https://oliver2121.github.io/17S_DataVisFinal/

Link to Project Introduction Video:

<https://youtu.be/OM1RsoDAskM>

Reference

<https://bl.ocks.org/mbostock/4679202>

<https://graves.cl/radar-chart-d3/>

<https://html5up.net/>

http://www.columbia.edu/~cme2126/datavisuals/bigdata_parallelcoordinates.html

THANKS