

NBA Player Statistics Visualization

CS6630 Final Project Proposal

<https://github.com/wilsonCernWq/NBAstatsVIS.git>

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Background and Motivation

As more and more accurate recording technologies are involved in modern basketball games, analyzing and visualizing basketball's performance based on enormous statistics has become a hot topic for sport analysts and team managers. With the help of a great visualization tool, an analyst/manager/coach can quickly compare and measure players' abilities properly and reduce the chances and costs of making bad decisions. Although there are a great number of basketball data analyzing tools on the internet nowadays, it's still hard to find a suitable tool for a non-programming-expert to make customized visualizations with well-designed styles. As basketball enthusiasts, we want to create a player profiler for non-experts to explore data and create visualizations based on their own demands. In our mind, it should be a visualization tool with user-friendly user-interface and the ability to build visualization with beautiful templated styles.

Project Objectives

There are some primary questions we want to answer for this project.

- What are statistics for properly measuring a player's overall abilities?
- What are the common ways to visualize different kinds of basketball statistics?
- How to classify data and create general visualization templates for customized styling?

To answer all the questions, we will need to first get familiar with what kinds of statistics we can get and classify them. After some investigation, we found there are two different types of datasets we can find in general for a basketball player. One is spatial datasets which describe a player's behaviors play-by-play with coordinate on the basketball court. We can draw spatial distributions for those kinds of dataset. The other type is table datasets which measure a player's average performances within a defined period. For those kinds of data, common visualization methods like a bar-chart will work. Finally, to give user abilities to create customized visualizations, we need to firstly provide a powerful dynamic-query tool for users to profile data, then implement programs that can fit different kinds of data. We should also provide several well-designed styling templates and user-friendly styling tools which gives users abilities to modify the designs and formats.

Data

We will collect data from the API provided by www.nba.stats.com. The API generates JSON files with raw data based on query parameters we provided. We plan to use mainly three kinds of data sets. The first dataset is the list for all active players in each year (The example is given here: <http://stats.nba.com/stats/commonTeamYears?LeagueID=00>). The second kind of dataset is the career summary of any given player (The example is given here: <http://stats.nba.com/stats/playercareerstats?PerMode=PerGame&PlayerID=977>). The third dataset is the performance map for a given player in each year (The example is given here: <http://stats.nba.com/stats/shotchartdetail?ContextFilter=&ContextMeasure=FGA&DateFrom=&DateTo=&GameID=&GameSegment=&LastNGames=0&LeagueID=00&Location=&MeasureType=Base&Month=0&OpponentTeamID=0&Outcome=&PaceAdjust=N&PerMode=PerGame&Period=0&PlayerID=977&PlusMinus=N&Position=&Rank=N&RookieYear=&Season=2012-13&SeasonSegment=&SeasonType=Regular+Season&TeamID=0&VsConference=&VsDivision=&mode=Advanced&showDetails=0&showShots=1&showZones=0>). Such map will be referred as "shot chart" later in this proposal.

Data Processing

Since the spatial datasets we will obtain are in general play-by-play raw records, we will need to do substantial data cleanup for most of our data. We will need to compute some meaningful statistical quantities such as the probability density distributions (PDF), mean performance or even performance variance for each player. The data processing will be done in advance to save rendering time. Common data processing tools such as MATLAB, Excel or Python might be used. The mathematics behind the processing processes should agree with other common data mining techniques, which should not be the main interest of our project.

Must have features

- Filter specific NBA player and show his statistics.
- For each NBA player, his basic information, such as name, image, the number of total games, etc.
- Display some spatial parameters with shot charts and apply interaction between them.
- Bar chart/Line chart/Radar chart to show players' performance data.

Optional features

- Select specific year and show all data based on that season year.
- After select one player, display one map chart with all teams which the player has played highlighted.
- Compare two players' performance based on specific year or based on a period.

Visualization Designs

- Overview

NBA Player Statistics Visualization

Name Team Conference Position



Kobe Bryant

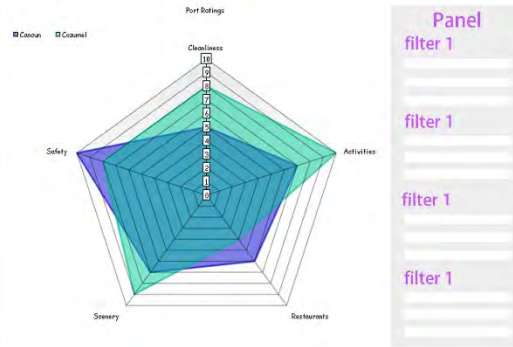
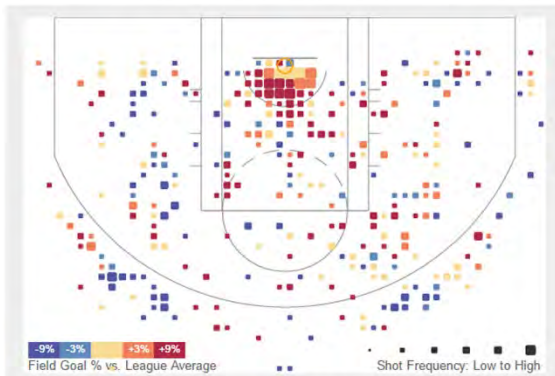
Kobe Bean Bryant • [Twitter: @kobebryant](#)
 (Black Mamba, KB24, Vino)
 Position: Shooting Guard and Small Forward • Shoots: Right
 6-6, 212lb (198cm, 96kg)
 Born: [August 23, 1978](#) (Age: 38-062d) in Philadelphia, Pennsylvania
 Relatives: Father [Joe Bryant](#); Uncle [Chubby Cox](#)
 High School: Lower Merion in Ardmore, [Pennsylvania](#)
 Draft: [Charlotte Hornets](#), 1st round (13th pick, 13th overall), [1996 NBA Draft](#)
 NBA Debut: [November 3, 1996](#)

- 18x All Star
- 5x Lg Champ
- 12x All-Defensive
- 15x All-NBA
- 1996-97 All-Rookie
- 4x AS MVP
- 2x Finals MVP
- 2007-08 MVP

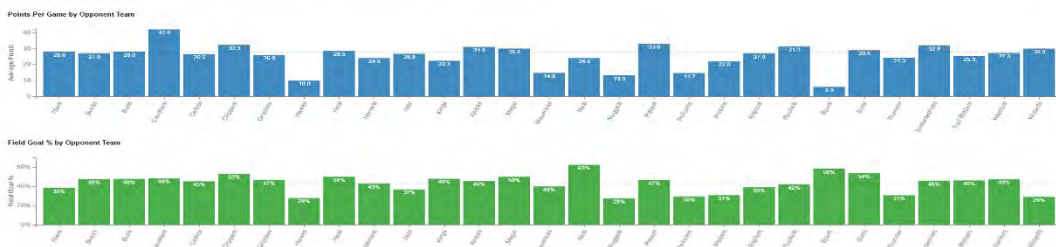
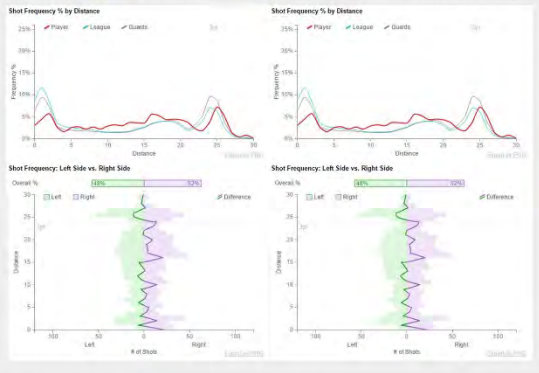


Year From:
Year To:

SUMMARY	G	PTS	TRB	AST	FG%	FG3%	FT%	eFG%	PER	WS
Career	1346	25.0	5.2	4.7	44.7	32.9	83.7	48.2	22.9	172.7
2015-16	66	17.6	3.7	2.8	35.8	28.5	82.6	41.7	14.9	-0.4



Team Specific Statistics



- View 1




Player Query

Name Team  Conference  Position 

 Click



Pop Up Menu

Name Team  Conference  Position 

EASTERN CONFERENCE			WESTERN CONFERENCE				
ATLANTIC	CENTRAL		SOUTHEAST	NORTHWEST	PACIFIC		SOUTHWEST
BOSTON CELTICS Profile Roster Stats Lineups Game Logs Tracking	CHICAGO BULLS Profile Roster Stats Lineups Game Logs Tracking	ATLANTA HAWKS Profile Roster Stats Lineups Game Logs Tracking	DENVER NUGGETS Profile Roster Stats Lineups Game Logs Tracking	GOLDEN STATE WARRIORS Profile Roster Stats Lineups Game Logs Tracking	DALLAS MAVERICKS Profile Roster Stats Lineups Game Logs Tracking		
BROOKLYN NETS Profile Roster Stats Lineups Game Logs Tracking	CLEVELAND CAVALIERS Profile Roster Stats Lineups Game Logs Tracking		CHARLOTTE HORNETS Profile Roster Stats Lineups Game Logs Tracking	MINNESOTA TIMBERWOLVES Profile Roster Stats Lineups Game Logs Tracking	LA CLIPPERS Profile Roster Stats Lineups Game Logs Tracking	HOUSTON ROCKETS Profile Roster Stats Lineups Game Logs Tracking	
NEW YORK KNICKS Profile Roster Stats Lineups Game Logs Tracking	DETROIT PISTONS Profile Roster Stats Lineups Game Logs Tracking	MIAMI HEAT Profile Roster Stats Lineups Game Logs Tracking	OKLAHOMA CITY THUNDER Profile Roster Stats Lineups Game Logs Tracking	LOS ANGELES LAKERS Profile Roster Stats Lineups Game Logs Tracking		MEMPHIS GRIZZLIES Profile Roster Stats Lineups Game Logs Tracking	
PHILADELPHIA SIXERS Profile Roster Stats Lineups Game Logs Tracking	INDIANA PACERS Profile Roster Stats Lineups Game Logs Tracking	ORLANDO MAGIC Profile Roster Stats Lineups Game Logs Tracking	PORTLAND TRAIL BLAZERS Profile Roster Stats Lineups Game Logs Tracking	PHOENIX SUNS Profile Roster Stats Lineups Game Logs Tracking	NEW ORLEANS PELICANS Profile Roster Stats Lineups Game Logs Tracking		
TORONTO RAPTORS Profile Roster Stats Lineups Game Logs Tracking	MILWAUKEE BUCKS Profile Roster Stats Lineups Game Logs Tracking	WASHINGTON WIZARDS Profile Roster Stats Lineups Game Logs Tracking	UTAH JAZZ Profile Roster Stats Lineups Game Logs Tracking	SACRAMENTO KINGS Profile Roster Stats Lineups Game Logs Tracking	SAN ANTONIO SPURS Profile Roster Stats Lineups Game Logs Tracking		

- View 2

Basic Player Info

In this panel, the player career summary will be displayed. User can input number in year filter and all the plots below will be synchronized



Kobe Bryant

Kobe Bean Bryant • [Twitter: @kobebryant](#)
 (Black Mamba, KB24, Vino)
 Position: Shooting Guard and Small Forward • Shoots: Right
 6-6, 212lb (198cm, 96kg)
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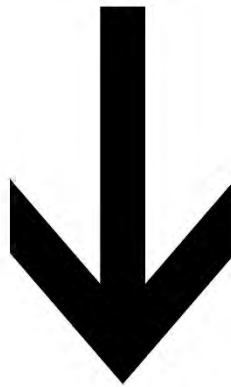
Year From:

Year To:

Input 1

Input 2

SUMMARY	G	PTS	TRB	AST	FG%	FG3%	FT%	eFG%	PER	WS
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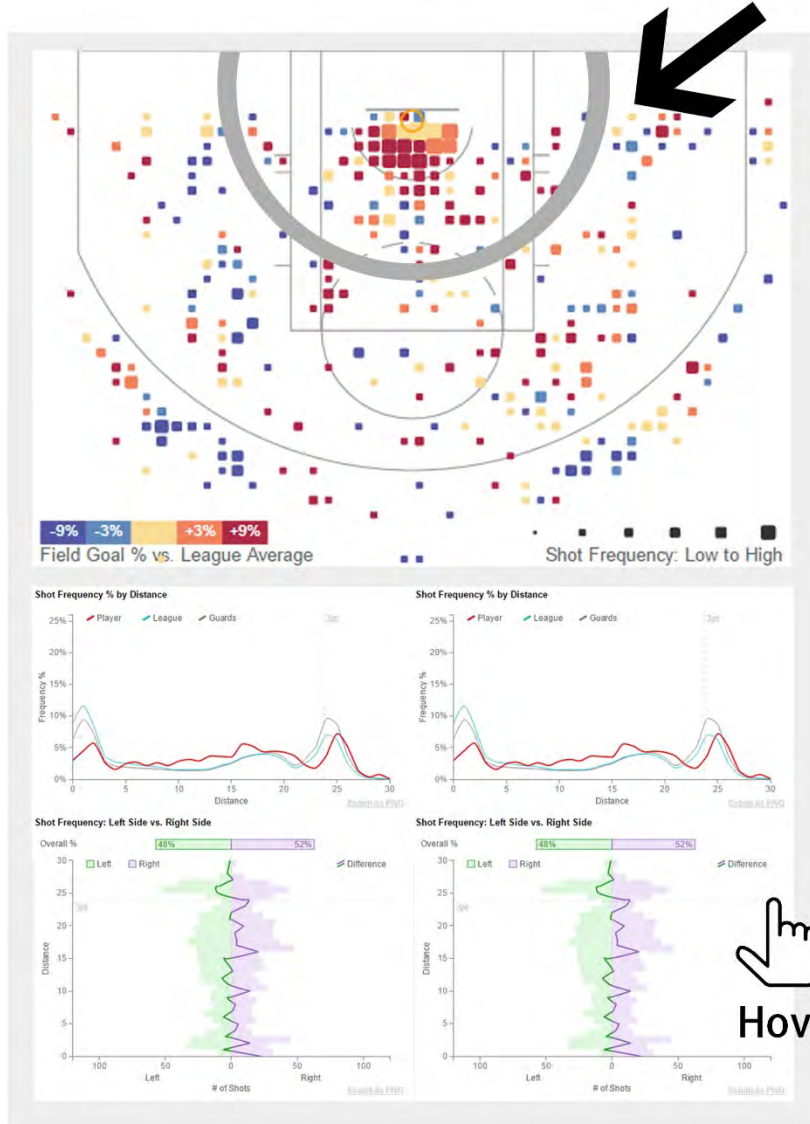


synchronize other plots

- View3

Spatial Data Plot (Shot Chart)

Highlight

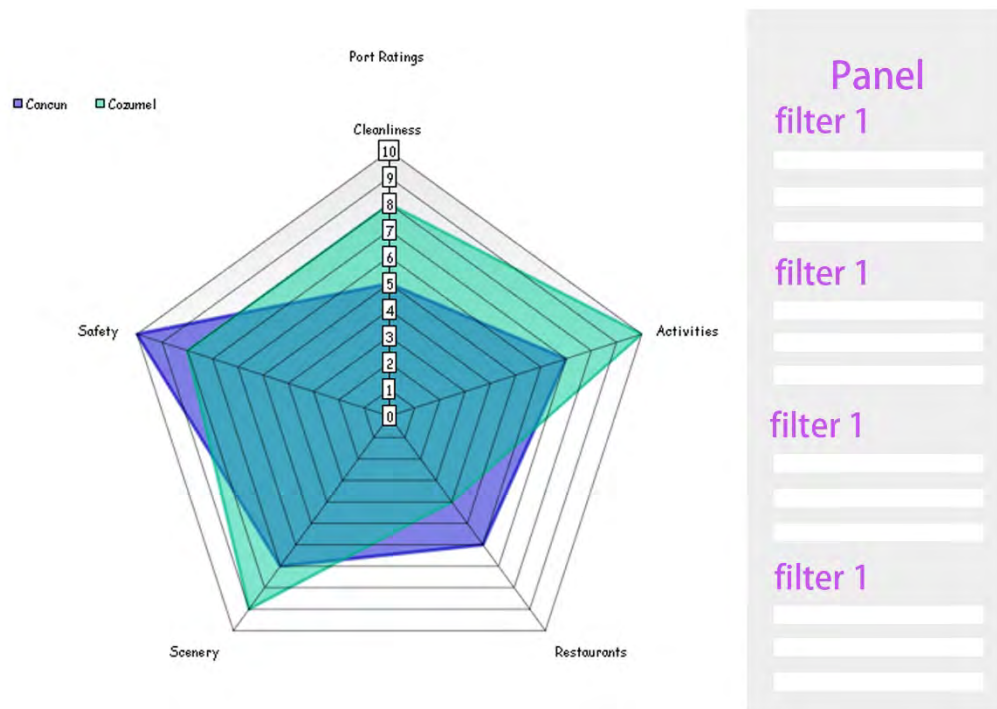


Optional Features:

We might provide styling tool bars for customized visualization designs

- View 4

Radical Plots



Users can use filters to create radical plots

- View 5

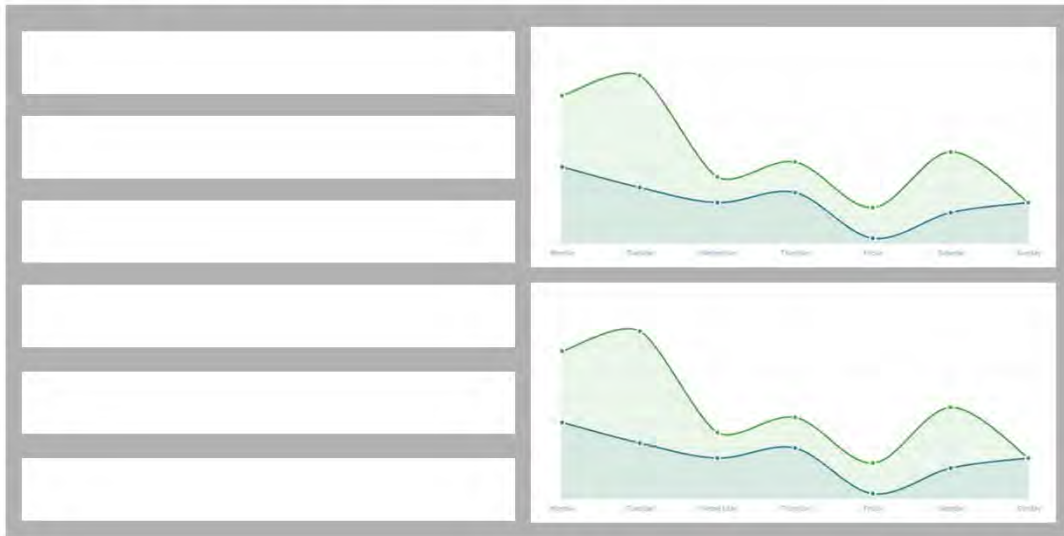
Team Specific Statistics

Display all the teams the player has ever stayed



Click

Pop up detail information



Time Table and Task Schedule

OCTOBER						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
23	24	25	26	27	28	29
	Proposal Due Group Meeting			Group Meeting	Obtain the data	Provide data structure
30	31					
Choose basic visual model						

NOVEMBER-DECEMBER						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
		Group Meeting	Choose must visual model	Group Meeting	Project Check	
6	7	8	9	10	11	12
Improve visual model	Project Check	Group Meeting	Add methods manipulating data	Group Meeting	Project Milestone due	
13	14	15	16	17	18	19
Improve visual model	adds interaction	Group Meeting	further clarify representation	Group Meeting	Project Check	
20	21	22	23	24	25	26
	Iteration and Combination	Group Meeting		Group Meeting	Project Check	
27	28	29	30	1	2	
	Summary	Group Meeting		Group Meeting	Final Project Due	

Reference:

- http://buckets.peterbeshai.com/app/#/playerView/201935_2015
- <http://www.sweetpotintelligence.com/en/2014/08/06/focus-visualizations-spider-chart/>