

NBAGameTrackerVis

CS-5630 / CS-6630 Project Proposal



Basic Info

The project is currently titled NBAGameTrackerVis. The two-man team consists of **James Brissette** (u0666493 / brissette@sci.utah.edu) and **Chris DuHadway** (u1027727 / u1027727@utah.edu). The project repository can be found at <https://github.com/James-Brissette/dataviscourse-pr-NBAGameTrackerVis>

Background and Motivation

Discuss your motivations and reasons for choosing this project, especially any background or research interests that may have influenced your decision.

Yes, Chris has been working on research involving the mapping of 2-D RGB images into 3-D space with the intention of transitioning into sports analytics and related visualizations. James in the past has done several projects using publicly posted sports data but has never had the opportunity (or tools necessary) to visualize the computed results. This project presents an opportunity to utilize the D3 library to create an interactive analysis and summary of player data from the 2015/16 NBA season that is targeted towards coaches.

Project Objectives

Provide the primary questions you are trying to answer with your visualization. What would you like to learn and accomplish? List the benefits.

Our project objective is to create a visualization that allows for the exploration of positional player information and summary statistics across professional NBA matches in the 2015/16 season. To date there doesn't exist a quality visualization tool that tracks player location. When taken in concert with other derived metrics including player passing and positional heatmaps, the value exists in the ability to visually interpret and analyze player movement. This is not dissimilar to football coaches who watch game film and track movement and results. This visualization allows for interactivity with the data provided and semantic zooming between varying levels of abstraction.

Data

From where and how are you collecting your data? If appropriate, provide a link to your data sources.

This data was made available through SportVu, a professional sports analytics-tracking company that installs a series of cameras in the rafters at various sports venues. Historically, positional tracking data has been

available publicly, but in the last two years or so there was some technical issue that arose that precluded this information from being made available (<https://stats.nba.com/help/whatsnew/>). The last available season was 2015/16 and was previously downloaded from the company by user linouk23 on github. This can be found here:

<https://github.com/linouk23/NBA-Player-Movements/tree/master/data/2016.NBA.Raw.SportVU.Game.Logs>

We've also downloaded the repository as a .zip file to ensure the information is available moving forward as well.

Data Processing

Do you expect to do substantial data cleanup? What quantities do you plan to derive from your data? How will data processing be implemented?

We will have to do some pre-processing on our dataset. We have several different aggregate visualizations that only require calculation once. The pieces of data that our visualization mainly relies on is positional and passing data. The positional and passing data already exists as-is in our dataset, and aggregating these values will be done in a pre-processing step.

Additionally, we are exploring whether we will need to parse the information into a more compact format as the file size for each game is larger than github can handle without throwing a warning to users.

Visualization Design

*How will you display your data? Provide some general ideas that you have for the visualization design. Develop **three alternative prototype designs for your visualization**. Create **one final design that incorporates the best of your three designs**. Describe your designs and justify your choices of visual encodings. We recommend you use the [Five Design Sheet Methodology](#).*

As seen in our visualizations we came up with several designs that ultimately answered different questions in that they addressed different scopes for the information available. In one visualization we had aggregate player data across games, on another we had aggregate team information in a single game, and yet another showed aggregate player information in a single game. After weighing the pros and cons of each design, we imagined a final visualization that made use of semantic zooming that would allow users to explore all three.

In the data by team/player per season we explore some summary positional information for each game by observing trends in player heatmaps, player passing and player shot maps. Clicking on any game zooms to game specific information at either a team or individual level, and users can zoom back out.

The individual game vis will load with a live vis of the game where the court is encoded similarly to the selection made at the season level (heat/zone map, pass map, shot map). The per player vis will feature a

node-link diagram of passes and possessions where team is categorically encoded using shape (a steal being represented by the opposite teams shape appearing in the possessing teams diagram), and color representing efficacy of the pass where the link value is determined and colored by whether the pass led to a score.

Must-Have Features

List the features without which you would consider your project to be a failure.

Three positional visualizations of the game in time and semantic zoom between season, game, and player specific stats. We want the visualization to allow users to observe trends at multiple levels of abstraction.

Optional Features

List the features which you consider to be nice to have, but not critical.

We are considering additional features that are luxury to the final product and include, among others, a 2-D representation of a 3-D shot, and non positional aggregate team and player stats. Since the hope is to visualize trends in player movement, other non positional player stats like FG percentage aren't necessarily as pertinent though we will make every effort to include them. A visual representation of the player shot and score would additionally help to highlight the potential of player tracking information and would be nice (but not essential) to include.

Project Schedule

A rough timeline we agree on to complete the essential aspects of the project is as follows:

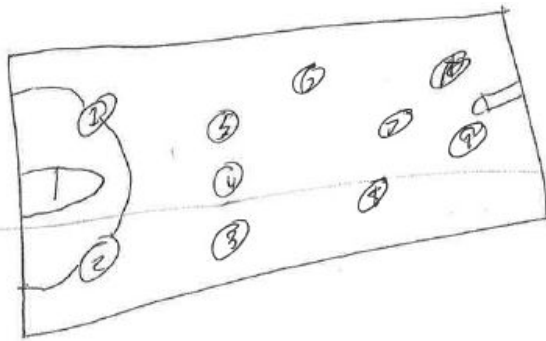
By 28Oct: Project Proposal Submitted

By 31Oct: Build Real-time Vis of Game

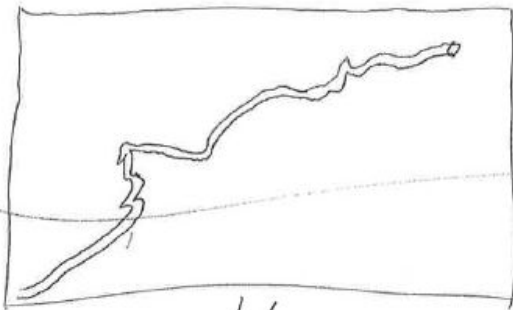
By 2Nov: Build Outlines of each screen

By 4Nov: Preprocessing of game info for summary charts

By 9Nov: Build Vises



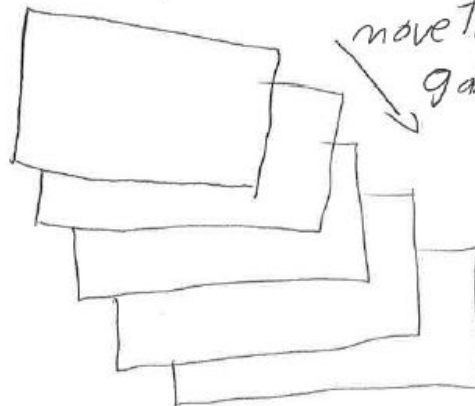
top down game visualization



player heat map

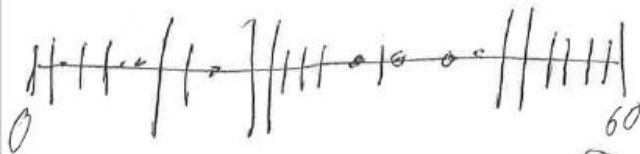


stats



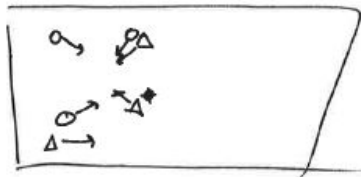
move through different games

Ball handling before - during - after possession

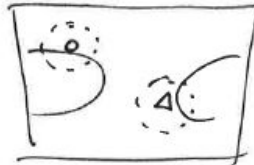


encode events into 2D timeline, event selections let you browse those events only in the vis.

player movement direction



Zone coverage

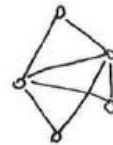


Ball time

00:17

Number passes

	A	B	C	...
From A	-	3	4	
From B	2	-	11	
From C	4	D	-	
...				



Top players by

3pt ~

2pt ~

Dunk ~

Rebound ~

Play time

A ~

B ~

C ~

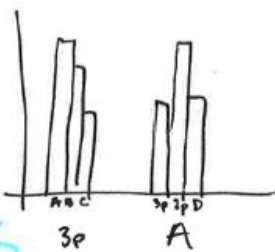
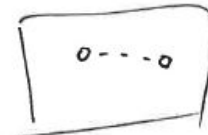
Bench points

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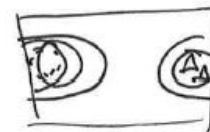
Pass Distance



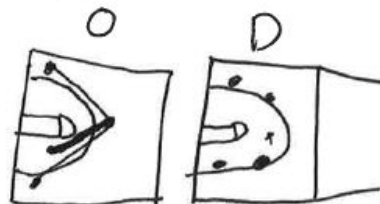
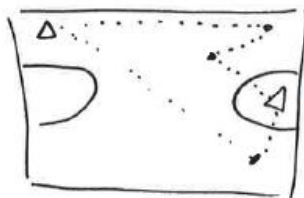
Improvement by game



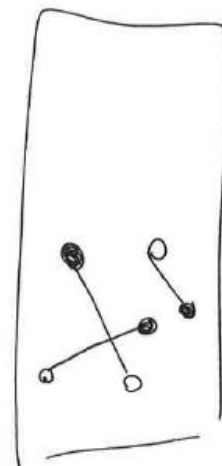
Time in the point
P. game



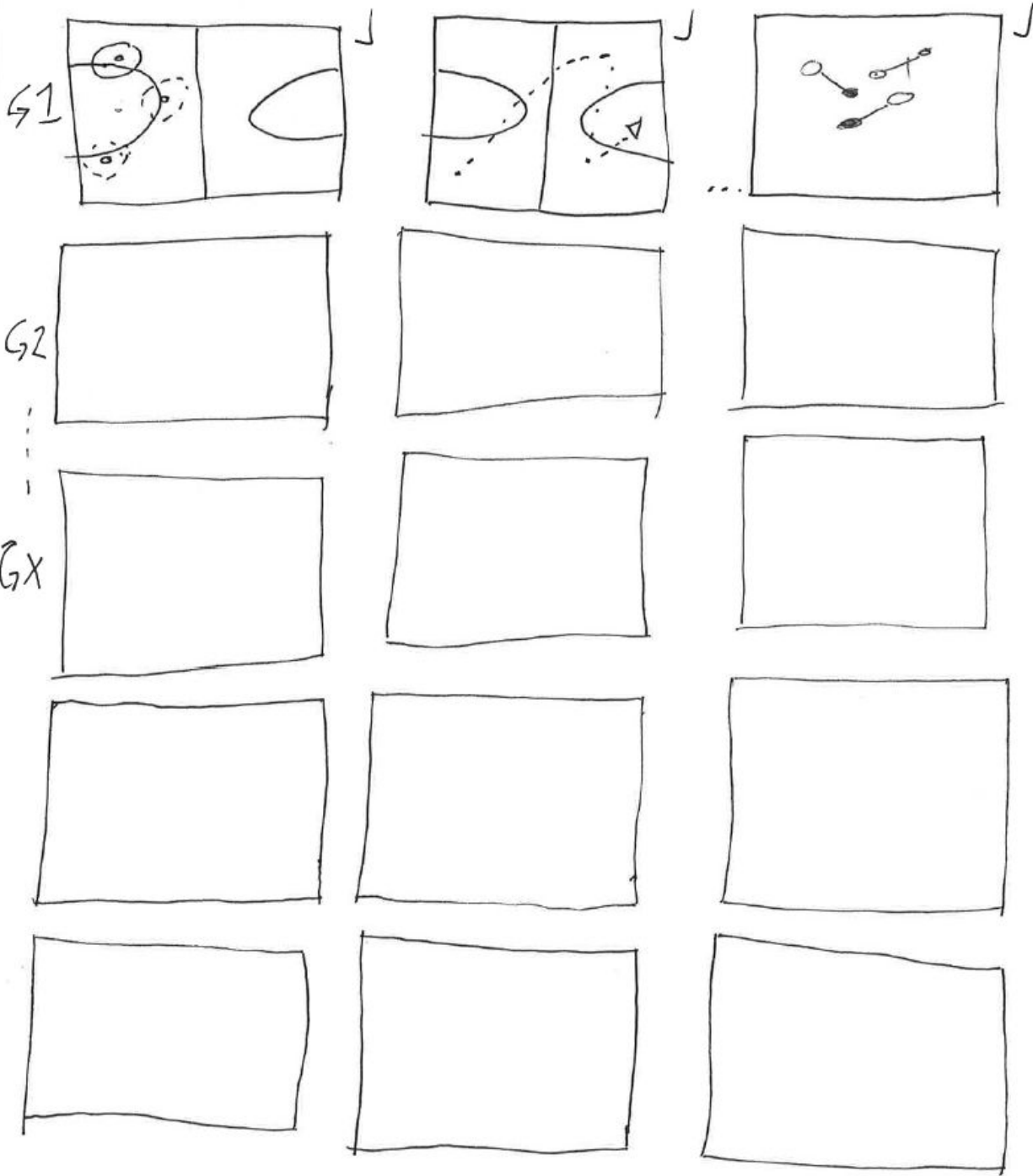
Most used corridors /
position heat maps



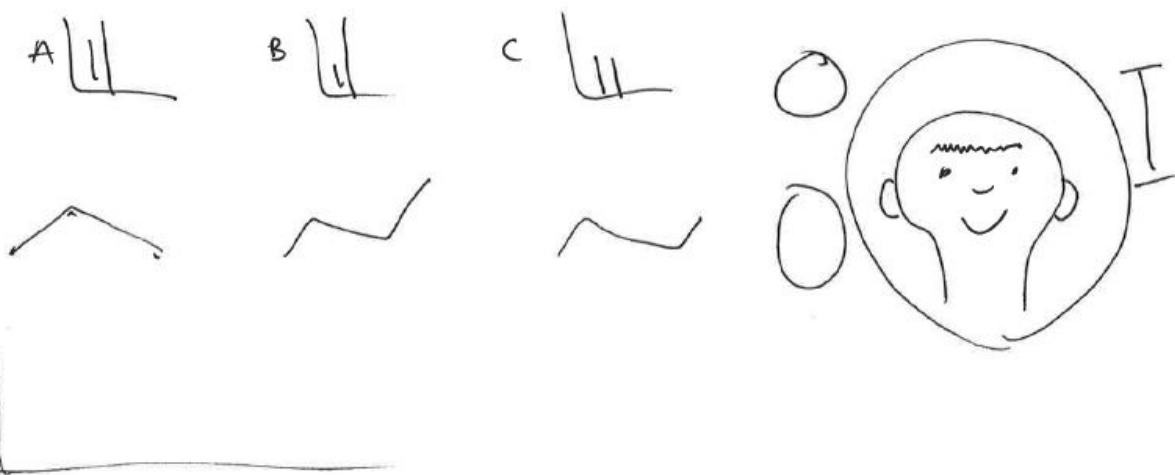
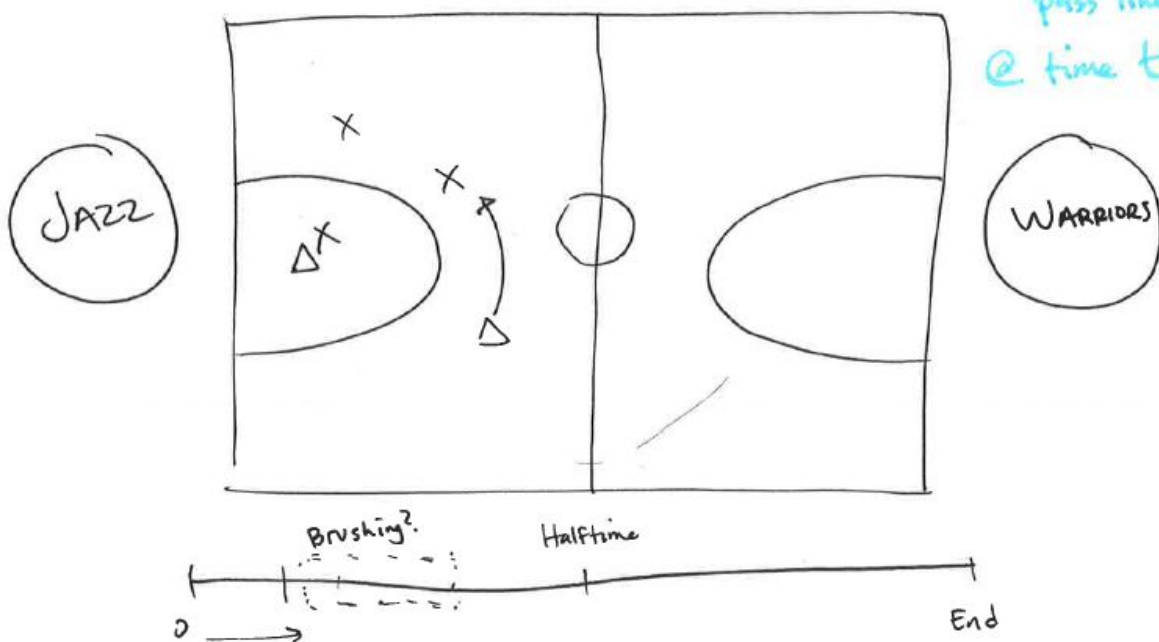
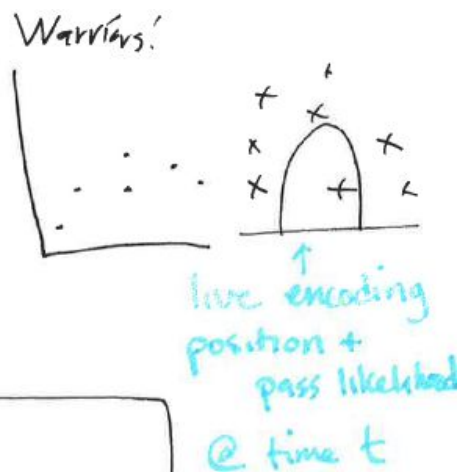
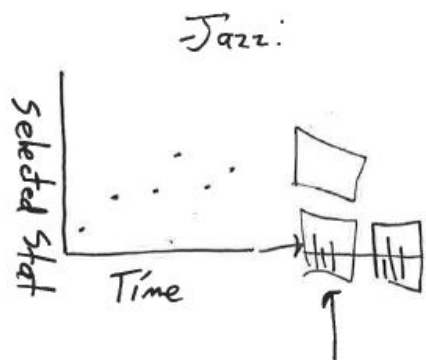
Typical Attack / Defensive
positions / likelihood of
passing to X encoded by
size

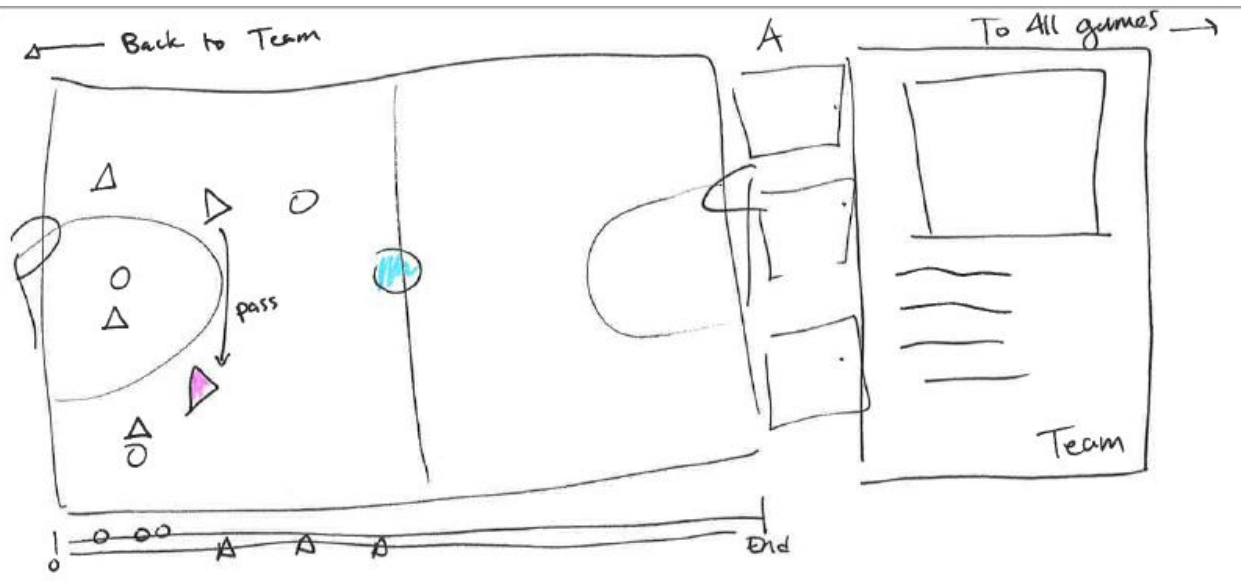


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Heatmap, Zone Coverage, Pass Map, speed, shot map,
Aggregate functions per player





@ t = 3.00 →

