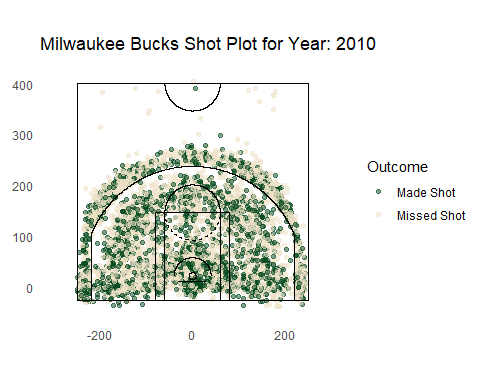
Stat 345 Midterm

Gracie Funk

2025-03-30

### Overview:

* The shot charts I have created for my project show the 2010 to 2020 shot locations for the Milwaukee Bucks
* Each dot on the animation represents a shot taken by a player
  + Each green dot is a made shot
  + Each beige dot is a missed shot
* I have also added a court to the animation to help understand exactly where each shot was taken
  + The dimensions of the court has been scaled to align to the dimensions of each shot taken



### Key Findings:

* Overall, less shots are being taken over time
* More shots are being made right next to the basket
* Three point shots are more concentrated at the top of the arc rather than the sides
* Less shots are being taken inside the arc and are moving outside the arc

### More Details:

* Looking at the total amount of shots being taken each season, we can see that the number has decreased for both inside and outside of the three point line
  + This is shown by the decreasing amount of dots (both green and beige)
  + This is probably due to the Milwaukee Bucks focusing more on accuracy than total number of shots taken
* Looking near the hoop, we can see more shots being taken right near it as well as more being made which can be seen by the growing number of green dots over the years
* Looking at specifically 3-point shots, we can see that the Milwaukee Bucks over time have started to focus these types of shots near the top of the 3-point arc, rather than the sides -We also see more attempts at these types of shots over time
* Looking at the overall location of the shots, we see a movement from the inside of the arc towards the outside of the arc, showing that over time the Milwaukee Bucks has taken focus away from 2-point shots and putting more effort into taking 3-point shots

### 4-Point Line

I decided to explore where the NBA should draw a 4-point line. I did this by creating a function which allows you to input a distance for the line and see how the expected value of at the proposed distance, and how certain Milwaukee Bucks players would perform with your proposed line distance. Using my function you can look at how a player’s point total for the season would change. Therefore, with my function you can evaluate if you think the line distance is fair or not based on the expected value and changes in player’s point totals.

## [1] "Expected value with proposed 4-point line at 30 feet: 1.88153417298266"

## [1] "Brook Lopez 's season point total would increase by 0.44 %"

Looking at this output from my function, I can see that a 4-point line at 30 feet we have an expected value of 1.88. This means that a player is expect to score 1.9 points per shot at this line distance. The reason this number is below 4 is because expected value takes into account the actual probability of making a shot from 30 feet. I think having a 4-point line at 30 feet would be a fair spot because it’s expected value is around 2 points per shot and that would force players to weigh the pros and cons of shooting from this 30 foot line or going in closer to the hoop and get a normal 2-points. Using my example of Brook Lopez from the Milwaukee Bucks, we can expect that his season point total would increase by .44% with this 30 foot 4-point line.