STAT 345 Midterm Project

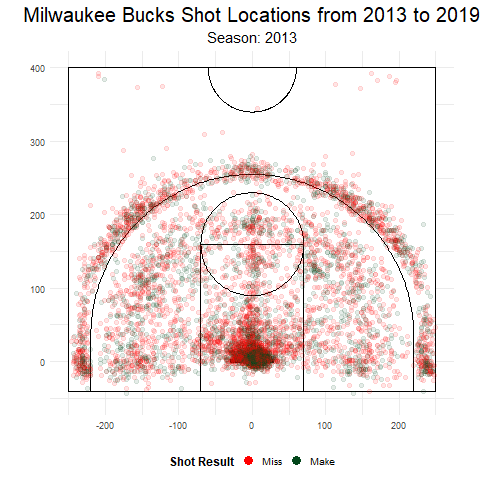
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## Intro

This report provides a detailed analysis of the Milwaukee Bucks basketball team and their shooting trends over the years. Below is an animation that visualizes the Milwaukee Bucks shot chart from 2013 to 2019. This can be easily modified to fit any valid range of years where data is available.

knitr::include\_graphics("bucks\_animation.gif")



## Key Analysis

Analyzing the animation above we can identify a few key trends -(1) Percentage of shots that are three-pointers have increased greatly -(2) Percentage of shots that are “layups” or are close to the basket have increased slightly as well have the percentage of these shots -(3) Percettage of shots that are “mid-ranged” have decreased dramatically

## Further Analysis

Diving into each of our key points above we can provide a greater insight into why this change is occuring

-(1) The increase in three-pointers can be attributed to the strategic shift in todays game. With the development of better three point shooters, teams are more keen to settle for an open three-point shot than a contested layup or midrange. This strategy of having more people on the three point line also requires the defense to be more spread out and gaurd more of the court. This allows teams with above average ball movement to be able to find the open man at the three point line.

-(2) The consistent percentage of close range attempts will allow teams to continuously rely on these shots. But the evolution of the game in other areas has had an indirect affect on the number of these shots being taken. The spreading of the defense because of the threat of the three point shot has allowed for more high percentage shots in the paint.

-(3) The affects of points (1) and (2) have had a direct impact on the decline of the mid-range shot. Teams are more inclined to take an open three-pointer or a layup than an off the dribble mid-range shot. This is again due to the efficiency of the three-point shot and close shots compared to a mid-range shot. The effect of having the ball in the mid-range compared to on the three point line collapses the defense and influences this mid-range shot to be not as efficient.

## 4-point-shot

To answer the question “Where should the four-point line hypothetically be drawn an NBA court?”, I examined shooting data from the 2019 Bucks season. I chose this data because it is more recent and it gives a more accurate three-point shooting percentage given the NBA’s trend of mass three-point shooting. To determine where the line should be drawn I performed expected value calculations by examining the shooting percentages from two and three point. I noted that they were both around 1 point per shot. I wanted the four point line to be at least 1 so it can compete with both other options. But I wanted it to be slightly higher to persuade players to take these difficult shots. After continuously manipulating the distance of the four-point line and calculating its expected value I landed on 29 feet from the basket. This allows for an expected value slightly higher than a two or three pointer while also keeping the shooting percentage at a low 30%, making this a “risky” shot to take.