



NBA PLAYERS STATISTICS VISUALIZATION

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Course: Data Visualization (INFO – I 590) – Fall 2022

Outline

- Introduction
- Project Motivation
- Data Description
- Ideas and Prototypes
- Visualization of data and Insights
- Future Scope



Introduction

- Basketball is one sport that brings people together, regardless of their origin. In the world, there are around 75,000–150,000 professional basketball players. Actually, half of them are semi-professional. The remaining 450 million are novices.
- Numerous notable athletes, including Michael Jordan, Kobe Bryant, Wilt Chamberlain, Stephen Curry and LeBron James inspired later generations to take up the sport and succeed professionally.
- Every basketball fan's dream would be to attend these games in person to witness the fervor and talent of the players along with the devoted support of the fans for their team. Team level rivalries that have existed for the past 50 years include the traditional match between the Los Angeles Lakers and Boston Celtics and more recently between the Golden State Warriors and Cleveland Cavaliers.
- Together, the NBA, European basketball, college and university basketball, National leagues, and the FIBA league have helped the public appreciate this sport, and because it is so competitive, spectators experience a range of emotions throughout a game.



Project Motivation

- We want to use our visualizations to assist managers, players, stakeholders, and draft managers in their daily activities so that the team's performance may be improved, and they can win the championship cup, which is the goal of every team.
- Managers in sports often use data and analytics to evaluate players' performance and identify areas where their team may need to improve. This can help them make informed decisions when it comes to drafting new players or making other changes to the team's roster. Additionally, using data and analytics can help managers identify patterns and trends in players' performance, which can be useful for making tactical decisions during games.
- By analyzing data and identifying patterns and trends in players' performance, scouts can provide evidence-based recommendations and help the team identify areas where they may need to strengthen their squad.
- With the help of the visualizations, players can analyze their gameplay and learn from their weak zones and train in that area accordingly and perform good in the future games.



Data Description

	GRID_TYPE	GAME_ID	GAME_EVENT_ID	PLAYER_ID	PLAYER_NAME	TEAM_ID	TEAM_NAME	PERIOD	MINUTES_REMAINING	SECONDS_REMAINING
0	Shot Chart Detail	0021500405	3	202681	Kyrie Irving	1610612739	Cleveland Cavaliers	1	11	20
1	Shot Chart Detail	0021500405	22	202681	Kyrie Irving	1610612739	Cleveland Cavaliers	1	8	23
2	Shot Chart Detail	0021500405	132	202681	Kyrie Irving	1610612739	Cleveland Cavaliers	2	11	41
3	Shot Chart Detail	0021500405	151	202681	Kyrie Irving	1610612739	Cleveland Cavaliers	2	10	35
4	Shot Chart Detail	0021500405	171	202681	Kyrie Irving	1610612739	Cleveland Cavaliers	2	9	5

- We have imported our dataset from `nba_api` which is an API client package to access the api of NBA.com website.

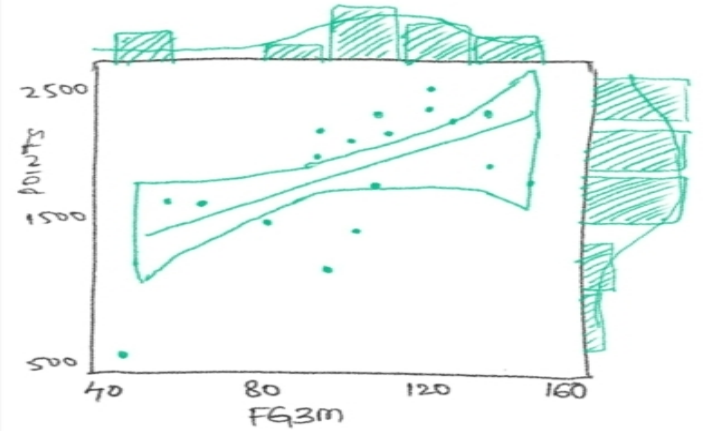
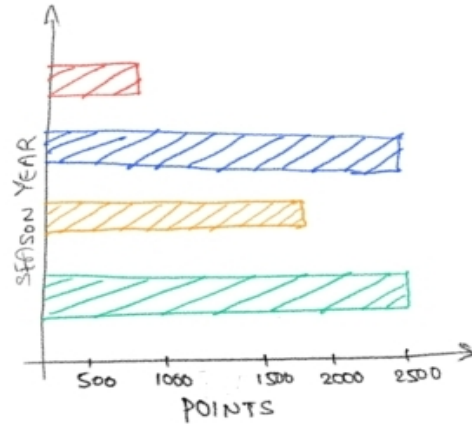
- All the unnecessary columns are eliminated and focussed only on important columns required for visualization.

- Majorly focussed on three types of datasets which are player shot chart, league averages, various shots.

	PLAYER_ID	SEASON_ID	LEAGUE_ID	TEAM_ID	TEAM_ABBREVIATION	PLAYER_AGE	GP	GS	MIN	FGM	FGA	FG_PCT	FG3M	FG3A	FG3_PCT	F
0	202681	2011-12	00	1610612739	CLE	20.0	51	51	1558.0	350	747	0.469	73	183	0.399	
1	202681	2012-13	00	1610612739	CLE	21.0	59	59	2048.0	484	1070	0.452	109	279	0.391	
2	202681	2013-14	00	1610612739	CLE	22.0	71	71	2496.0	532	1237	0.430	123	344	0.358	
3	202681	2014-15	00	1610612739	CLE	23.0	75	75	2730.0	578	1235	0.468	157	378	0.415	
4	202681	2015-16	00	1610612739	CLE	24.0	53	53	1667.0	394	879	0.448	84	262	0.321	
5	202681	2016-17	00	1610612739	CLE	25.0	72	72	2525.0	671	1420	0.473	177	441	0.401	

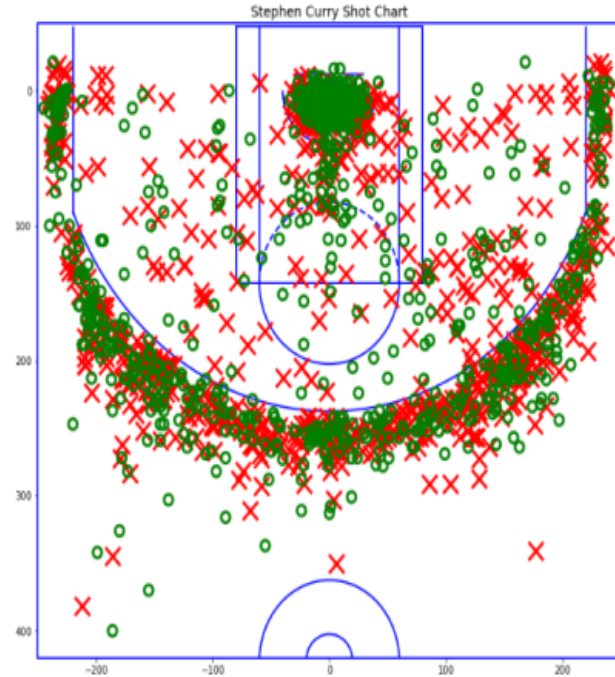


Ideas and Prototypes

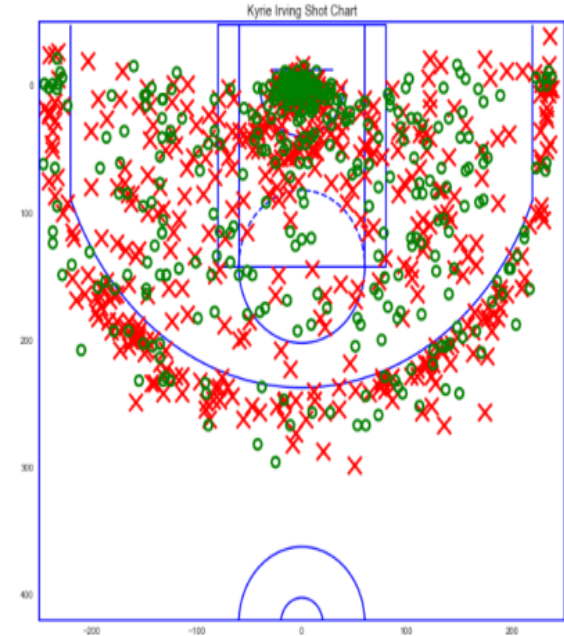


Visualizations of data(1/25) - Stephen Curry vs Kyrie Irving

- Player shot hit and shot miss on the court



Field Goal Percentage: 0.504 (884-1596)

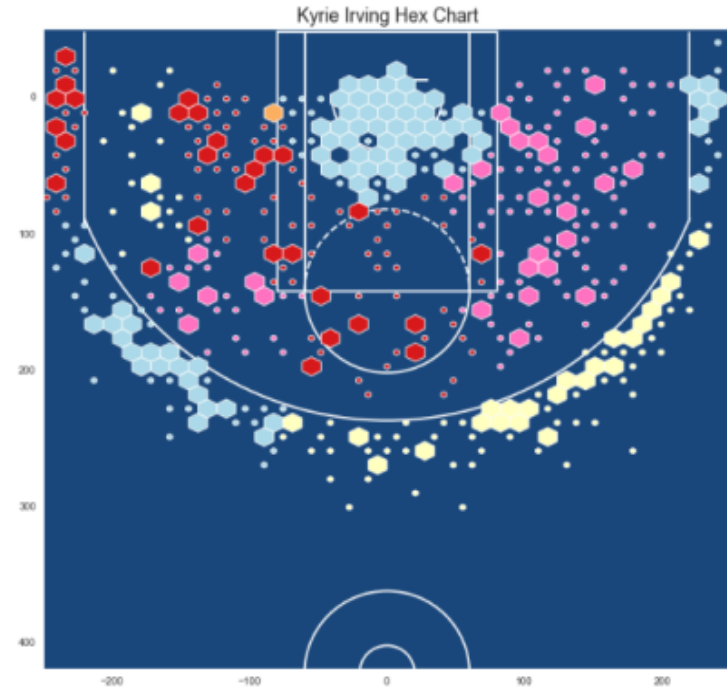
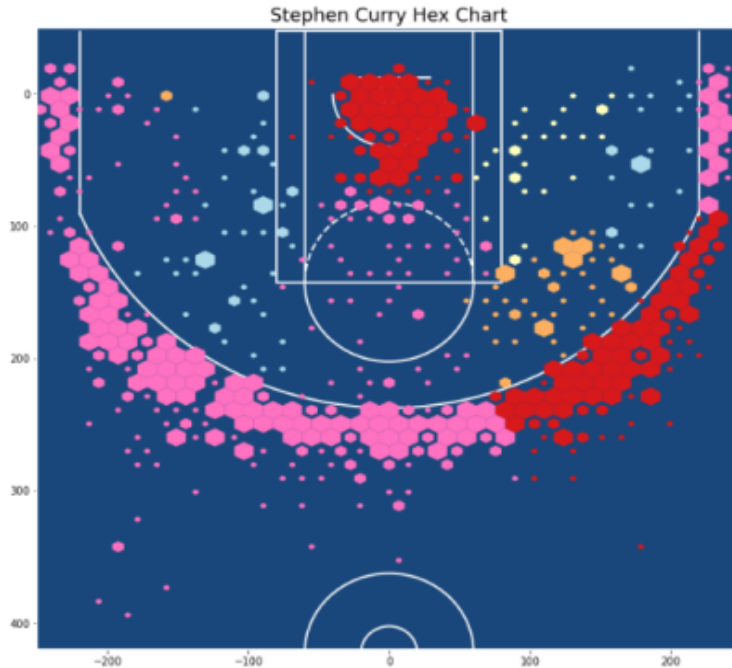


Field Goal Percentage: 0.448 (394-879)



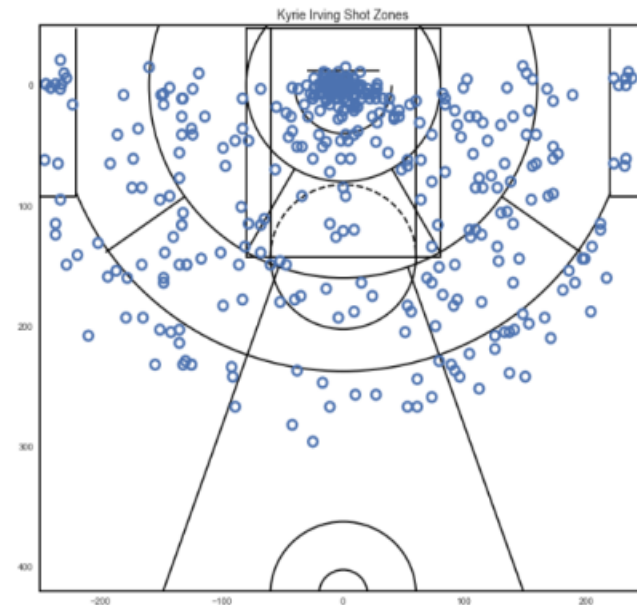
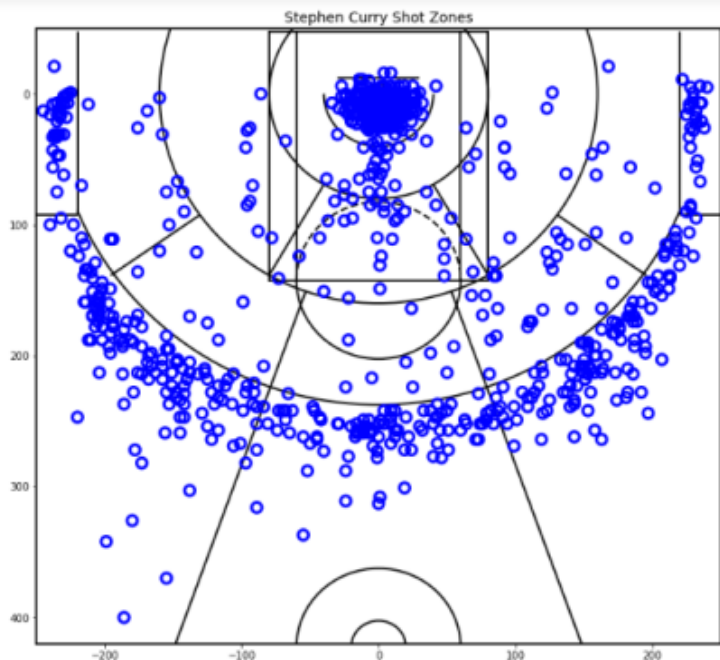
Visualization of Data and Insights (2/25)

- **Players shot analysis in Hex chart**



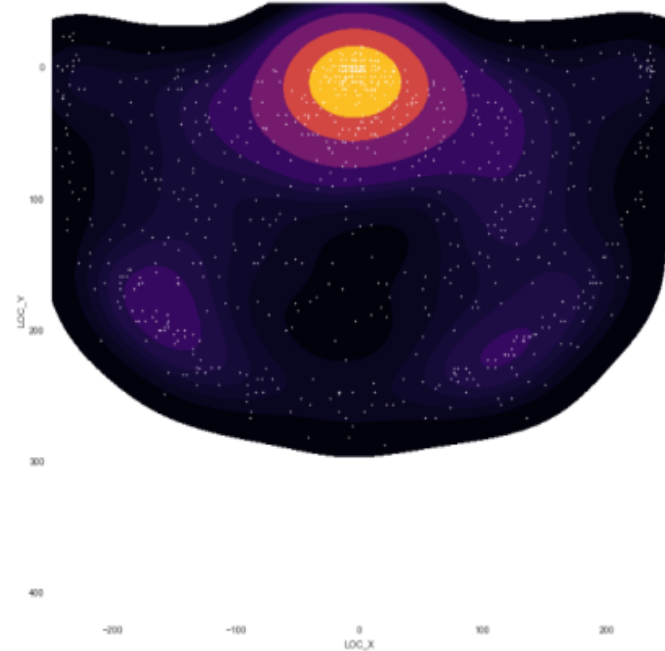
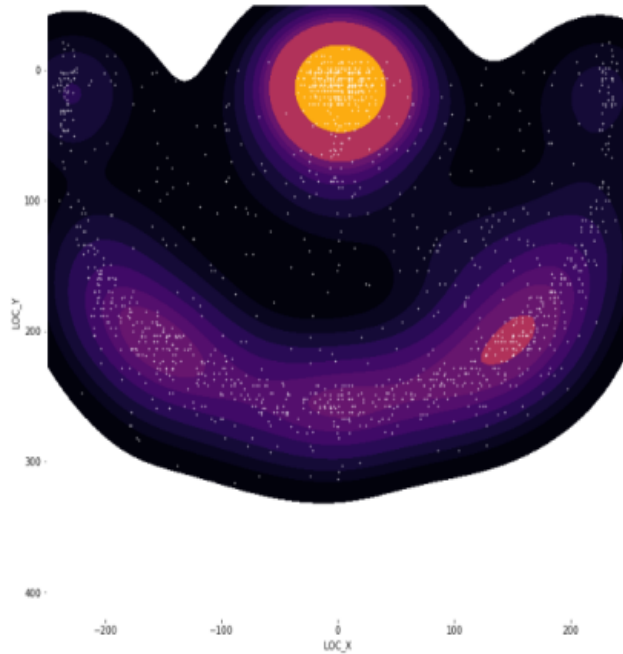
Visualization of Data and Insights (3/25)

- Player's shot chart according to various zones



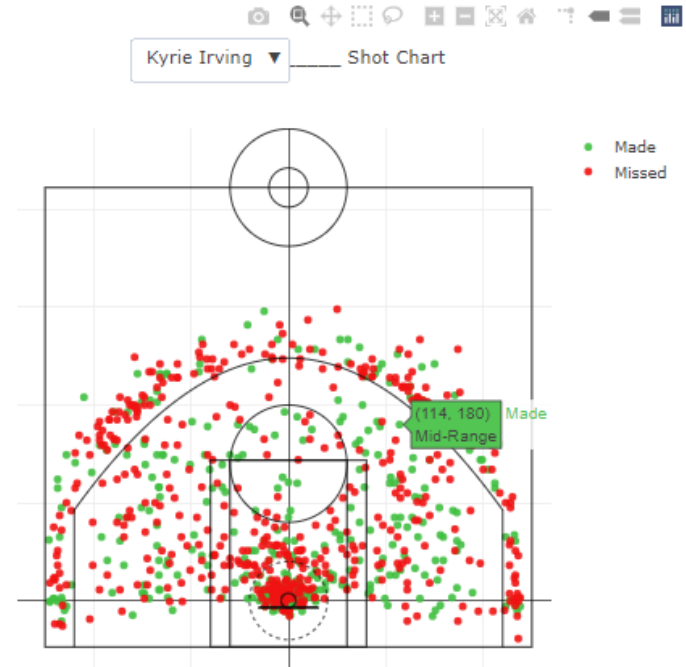
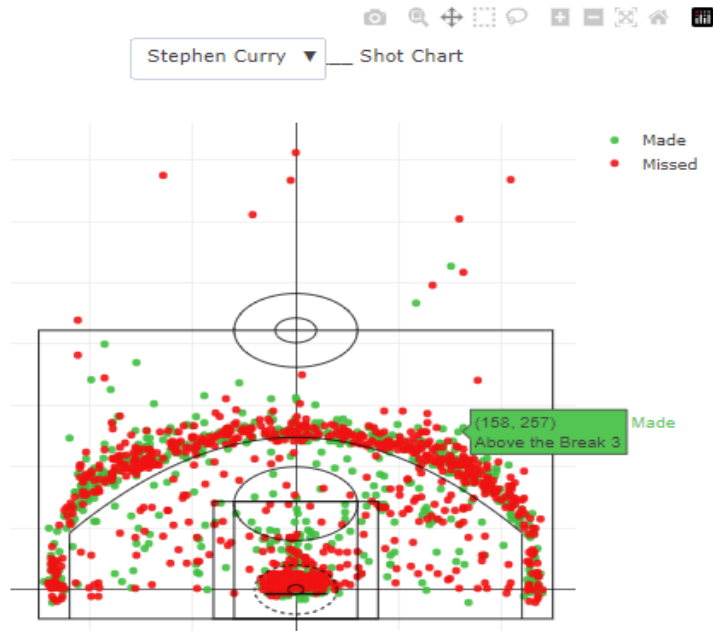
Visualization of Data and Insights (4/25)

- Heatmap of shot chart data



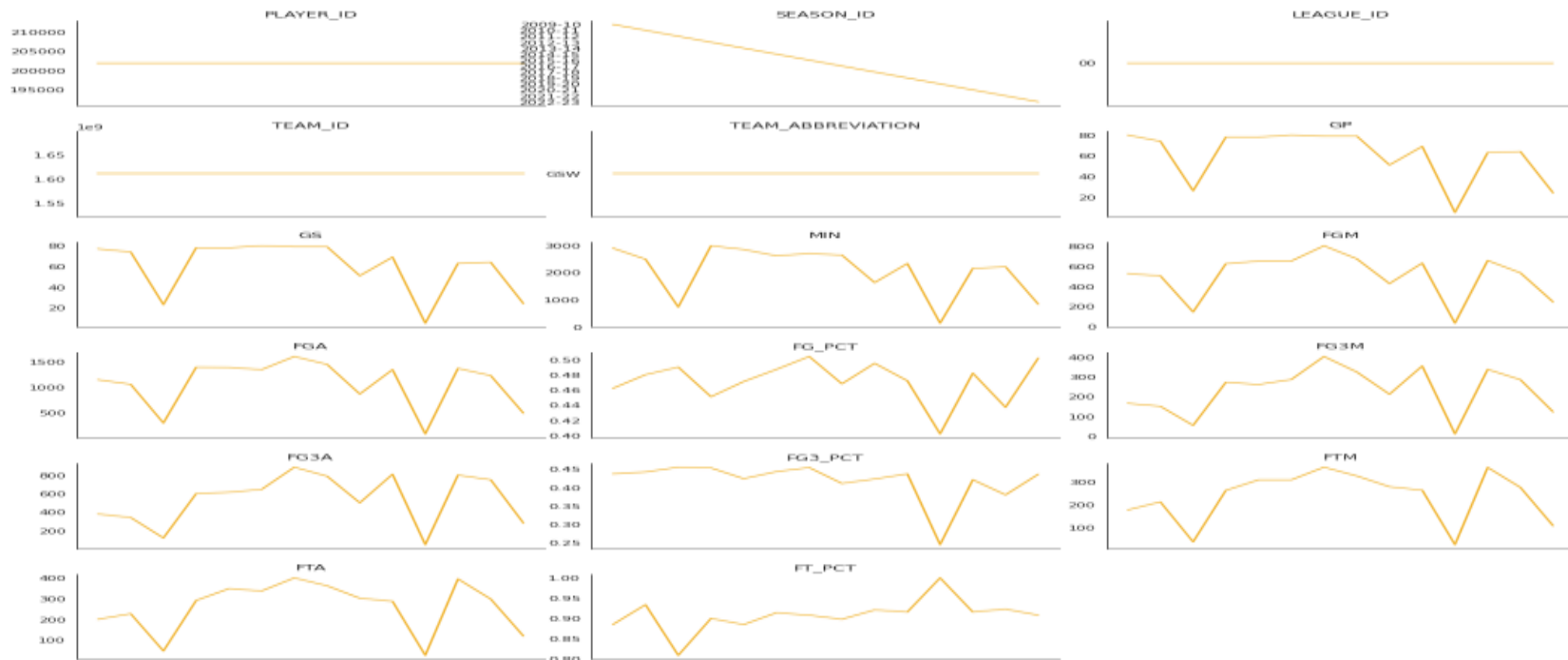
Visualization of Data and Insights (5/25)

- Interactive visualization with dashboard to chose player



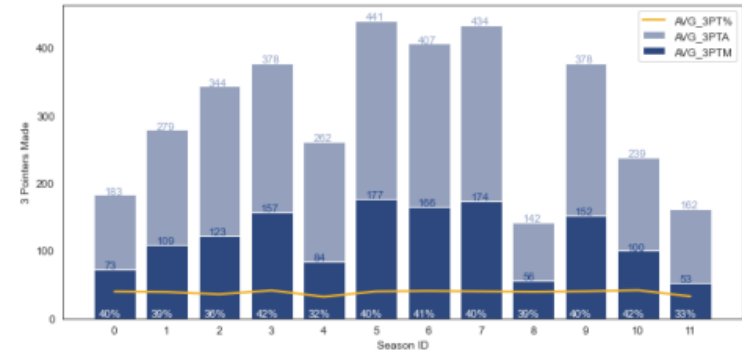
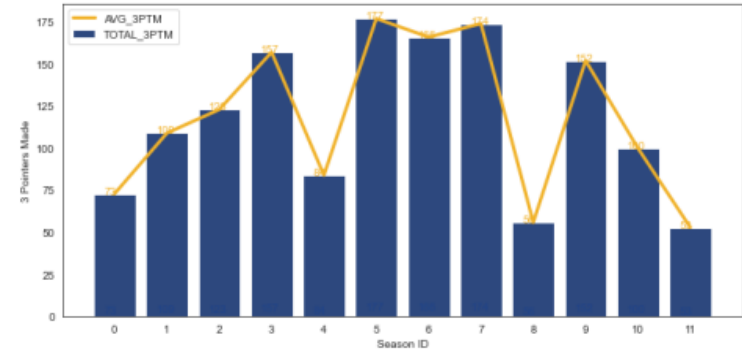
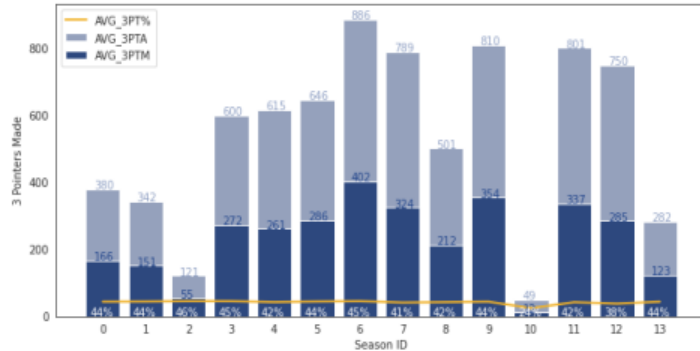
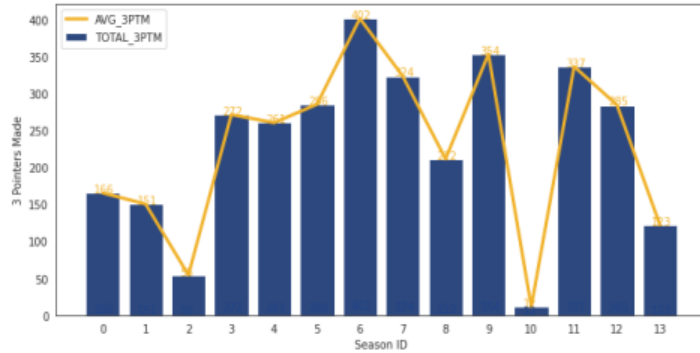
Visualization of Data and Insights (6/25)

- Player's attribute visualization



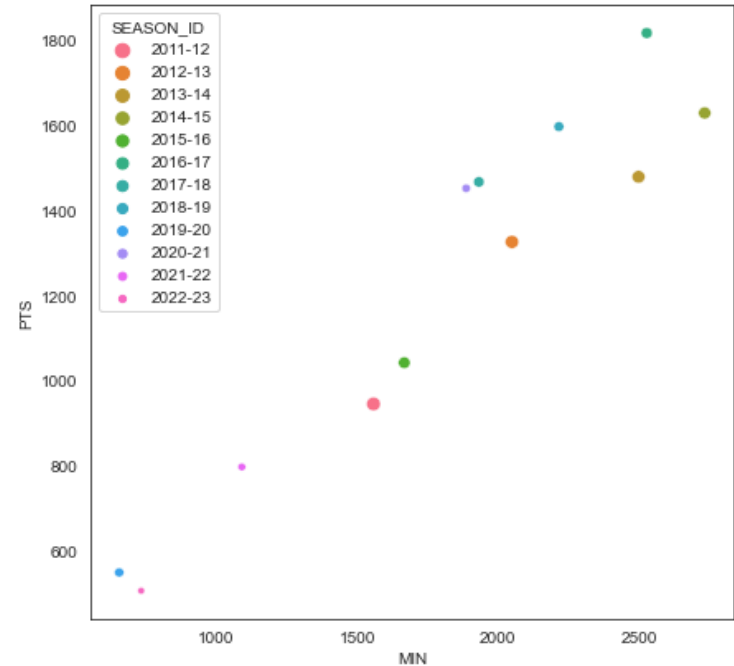
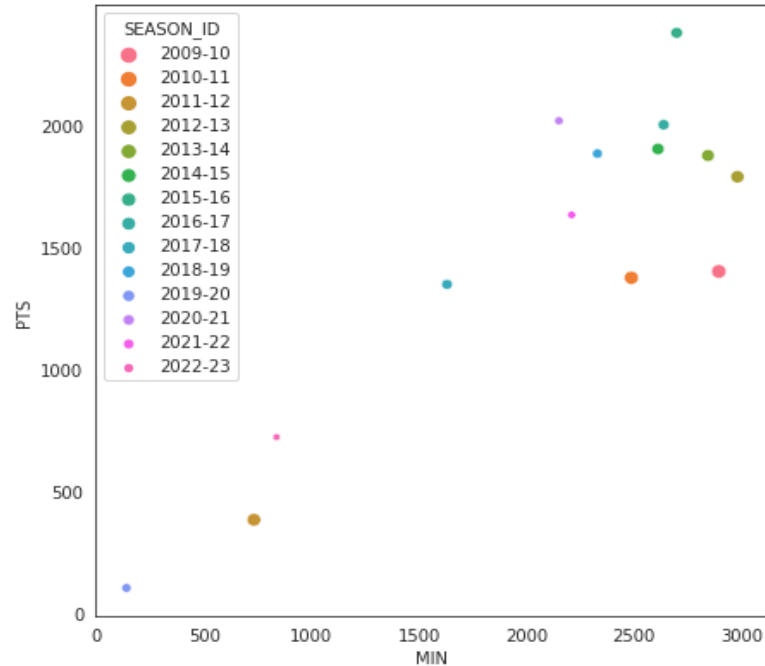
Visualization of Data and Insights (7/25)

- Average 3 pointers made vs Total 3 pointers made



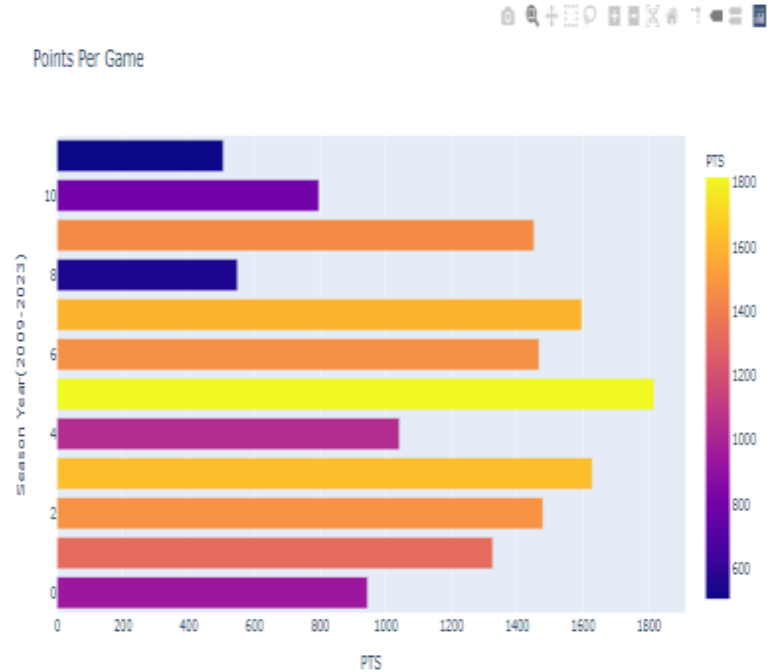
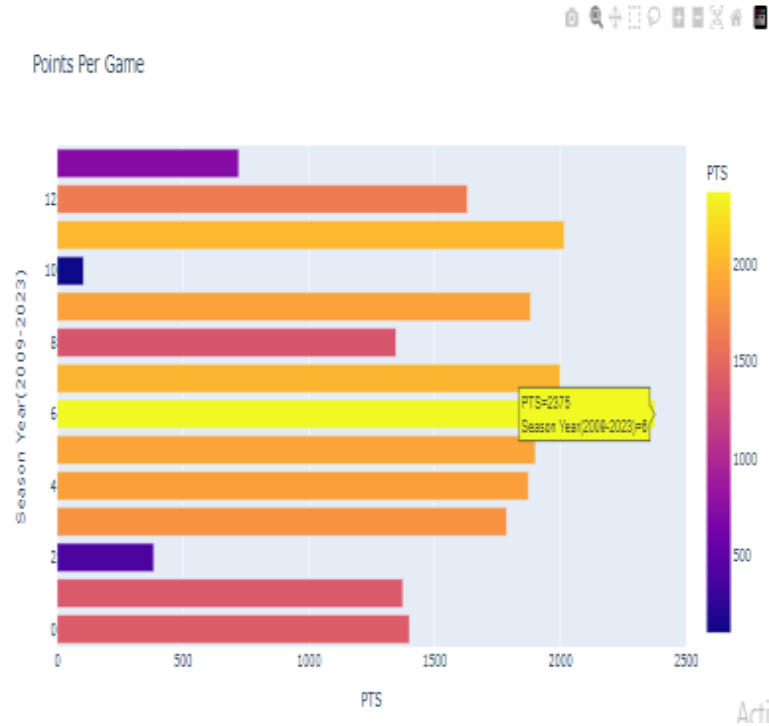
Visualization of Data and Insights (8/25)

- Minutes played vs Points scored



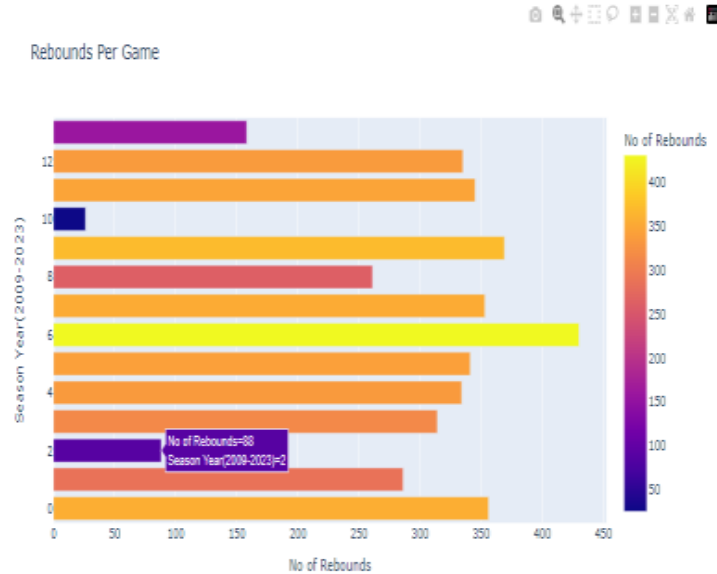
Visualization of Data and Insights (9/25)

- Points per game

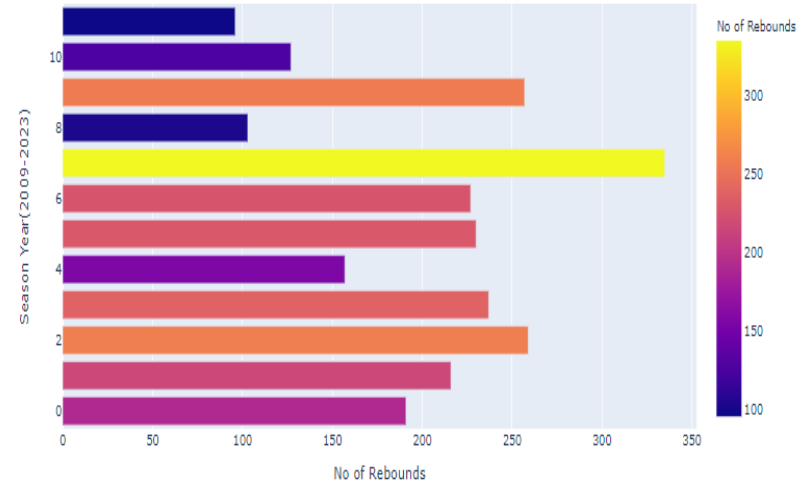


Visualization of Data and Insights (10/25)

- Rebounds per game



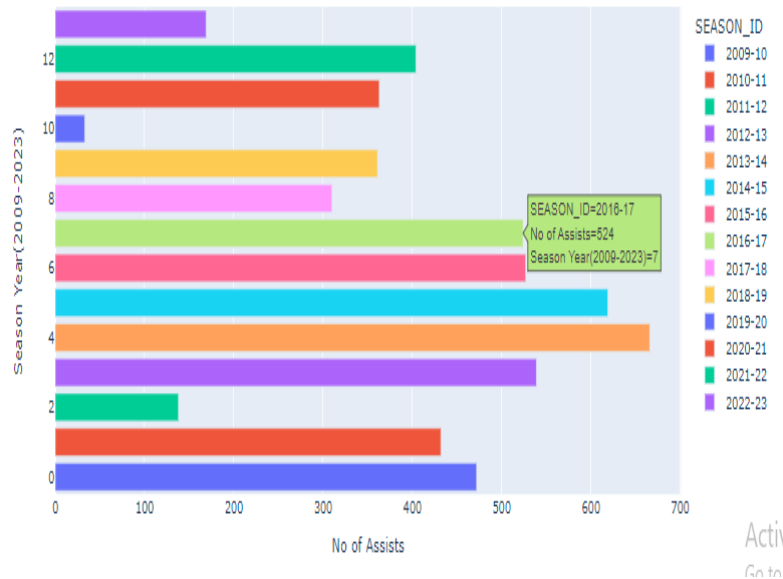
Rebounds Per Game



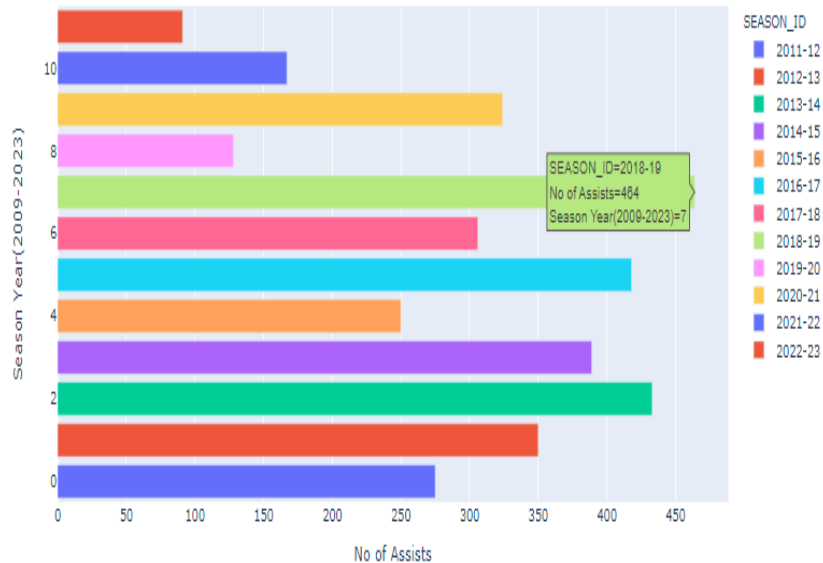
Visualization of Data and Insights (11/25)



Assists Per Game

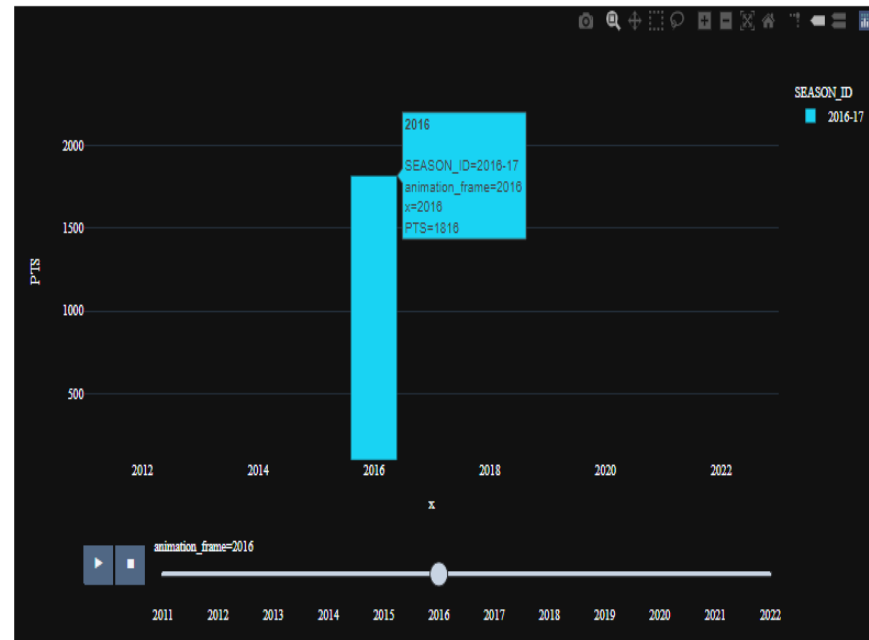
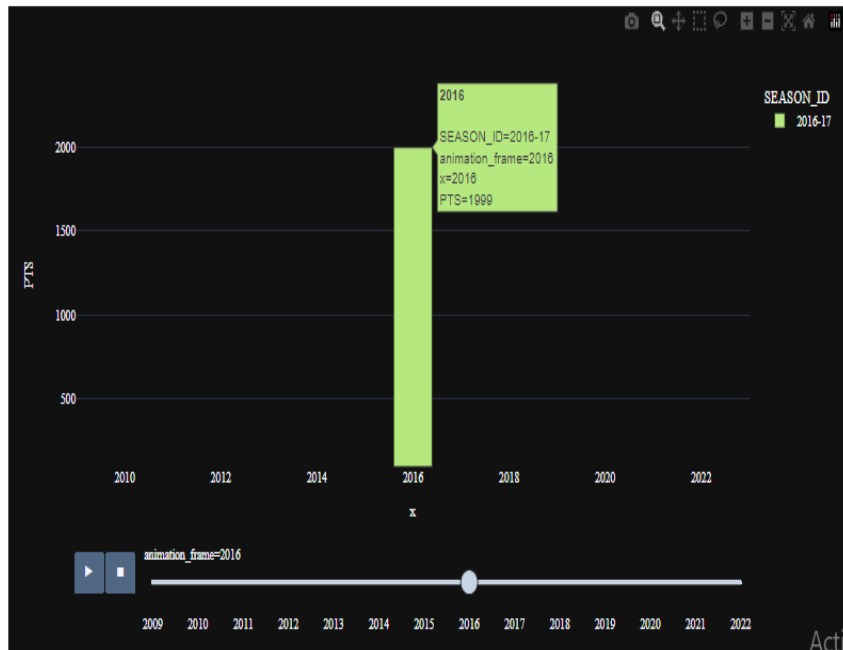


Assists Per Game



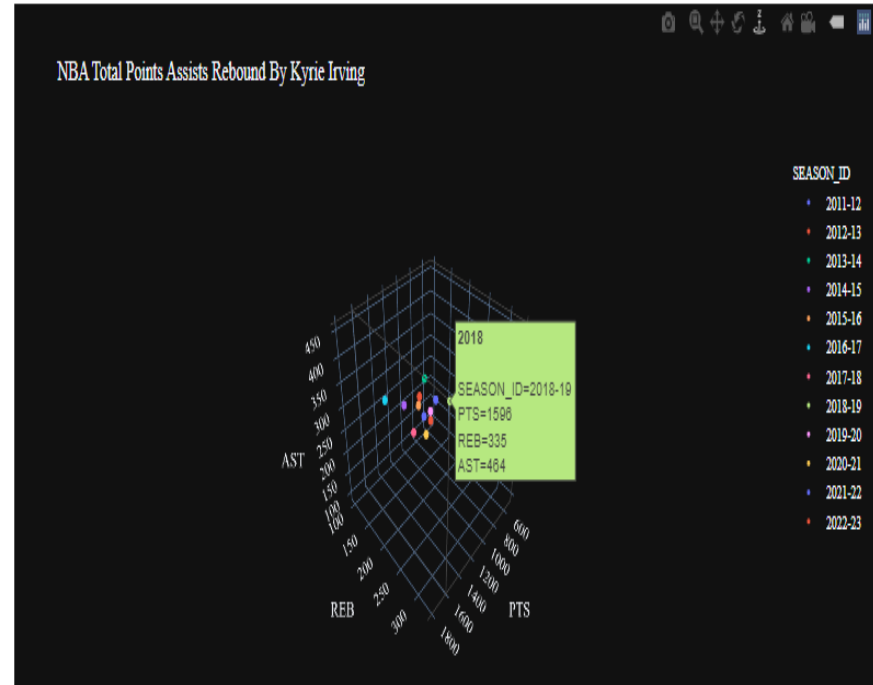
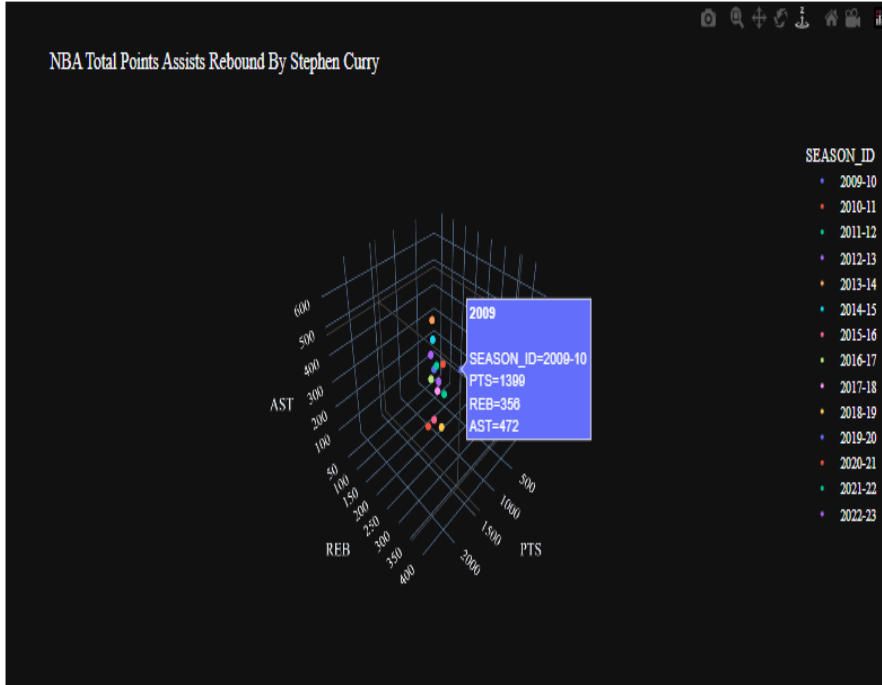
Visualization of Data and Insights (12/25)

- Animated and Interactive visualization



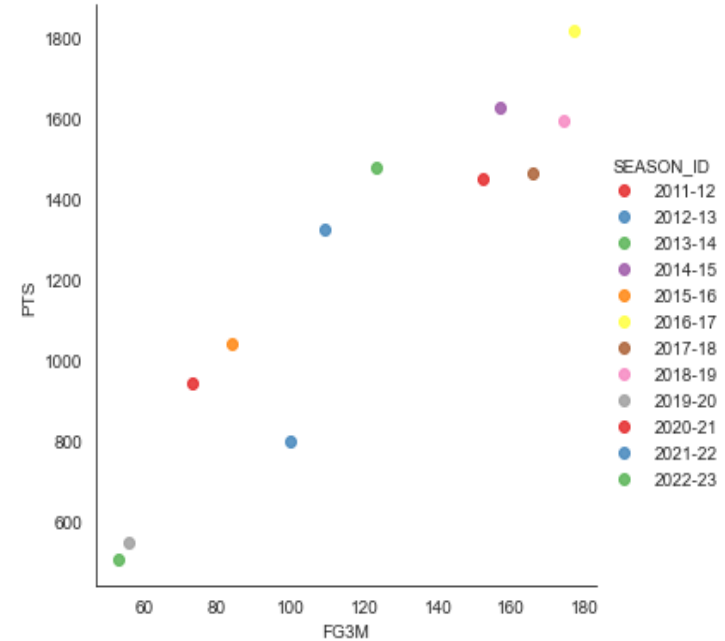
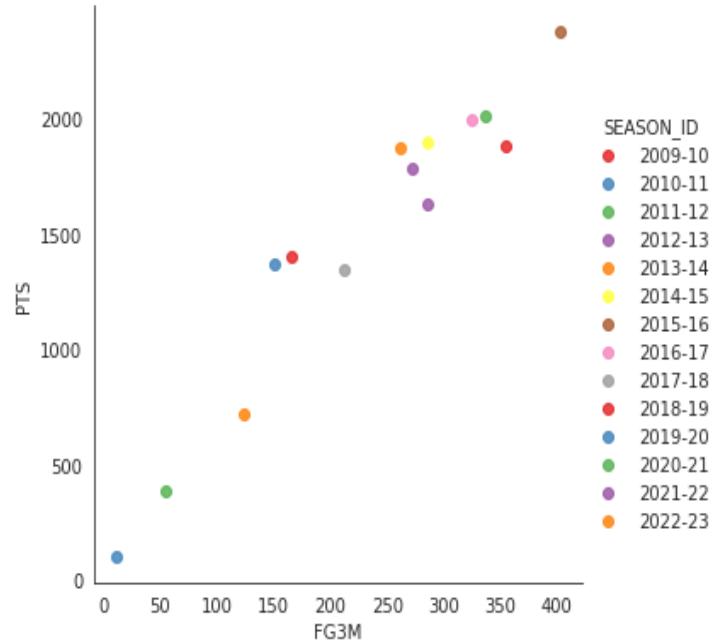
Visualization of Data and Insights (13/25)

- 3D visualization



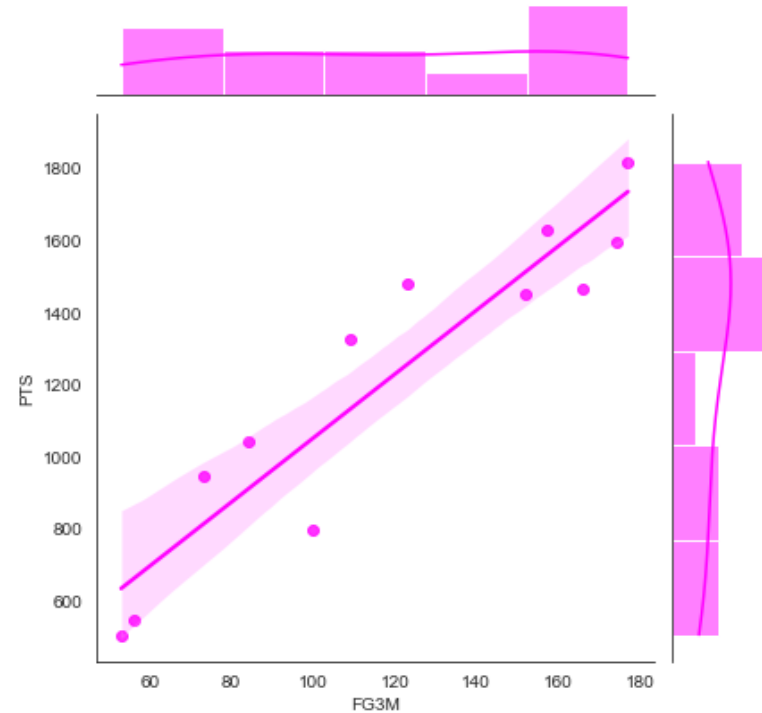
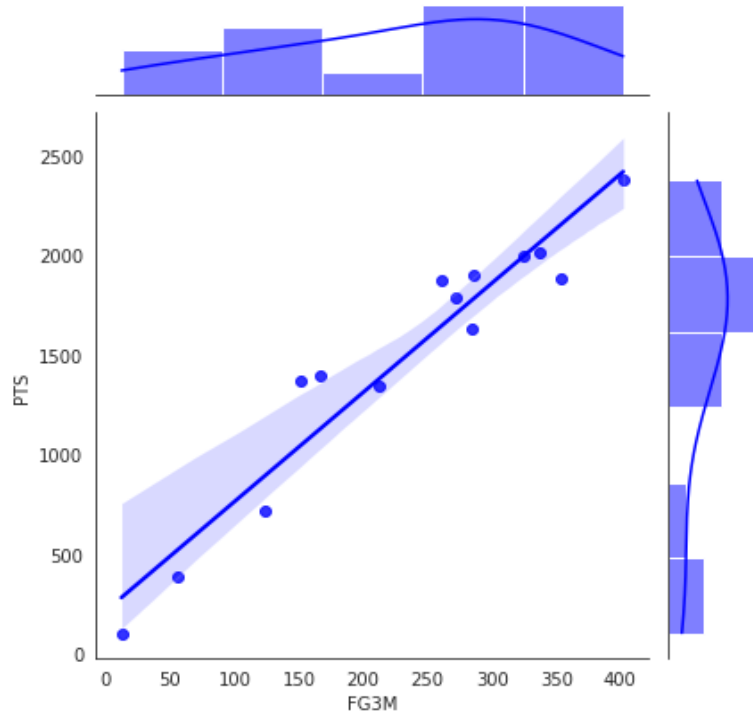
Visualization of Data and Insights (14/25)

- Correlation between Points and 3 points scored



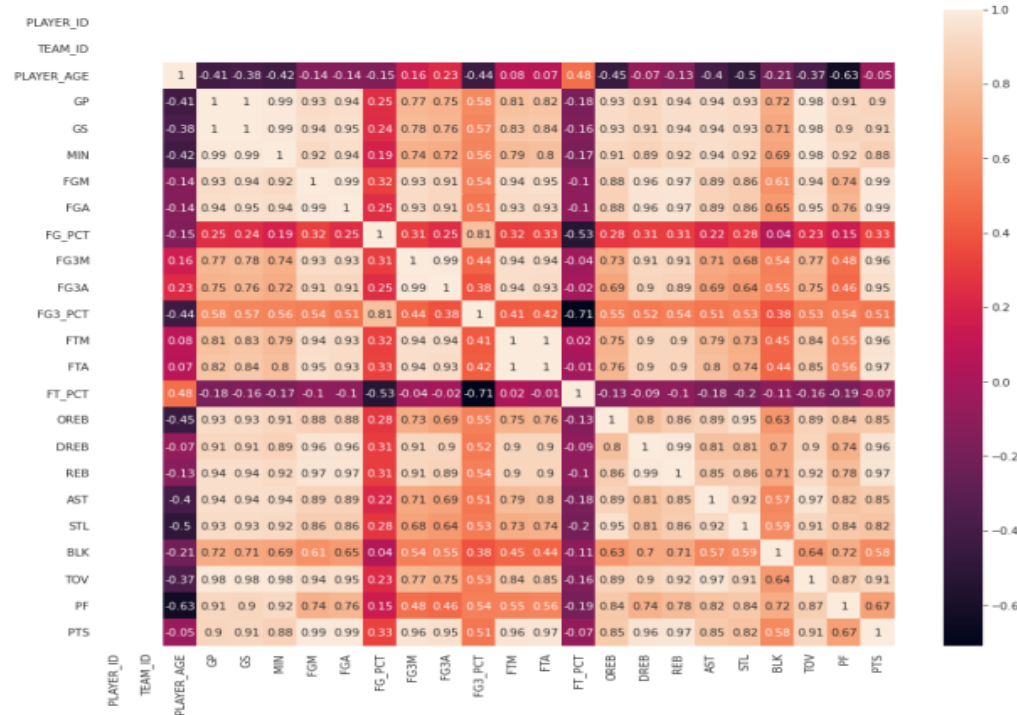
Visualization of Data and Insights (15/25)

- Joint plot



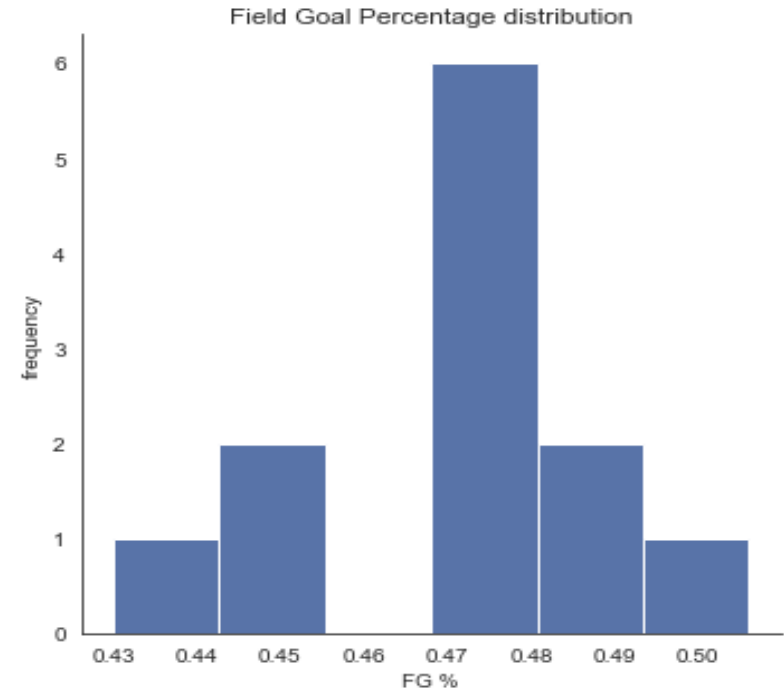
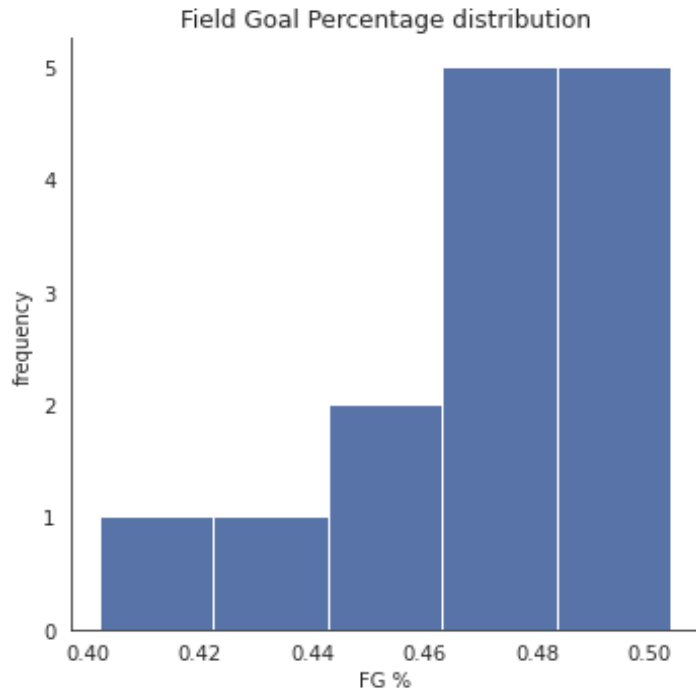
Visualization of Data and Insights (16/25)

- Heatmap of correlation matrix



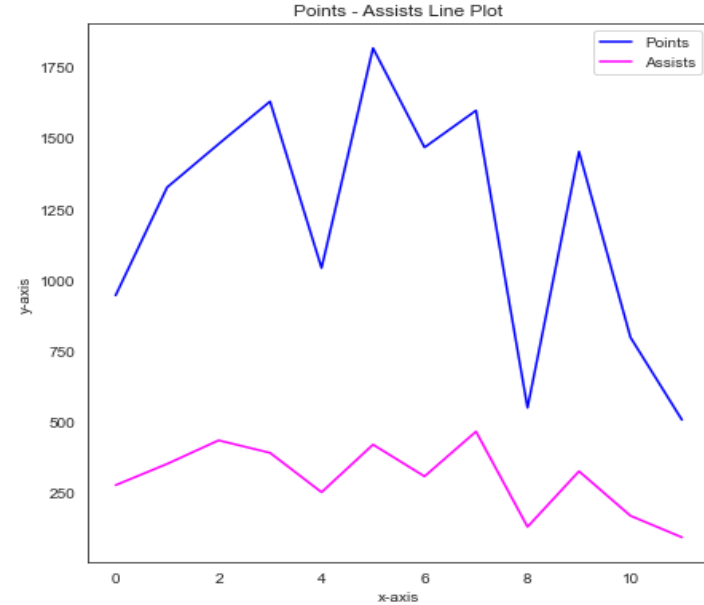
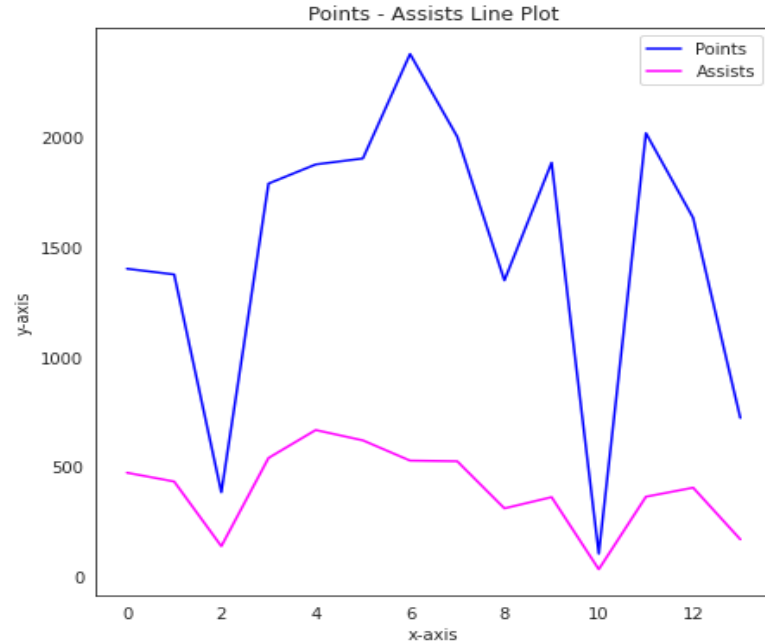
Visualization of Data and Insights (17/25)

- Field Goal percentage distribution



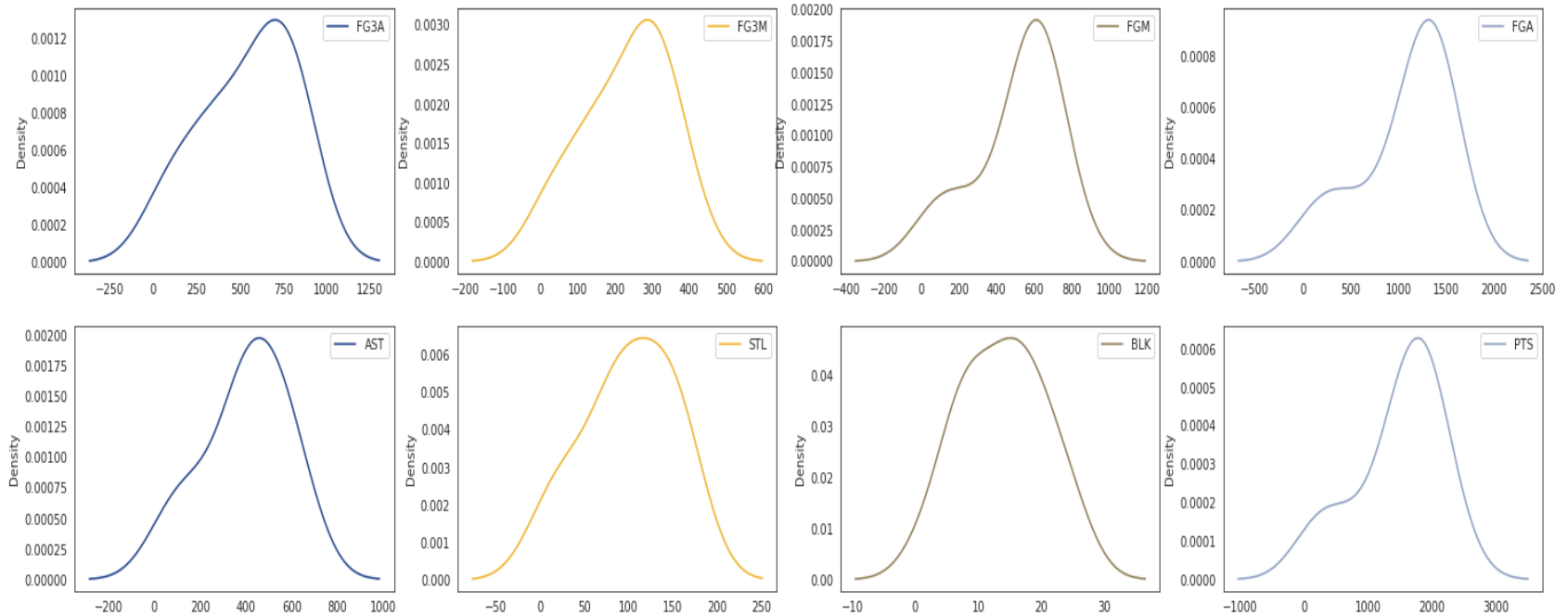
Visualization of Data and Insights (18/25)

- Points and Assists Line plot



Visualization of Data and Insights (19/25)

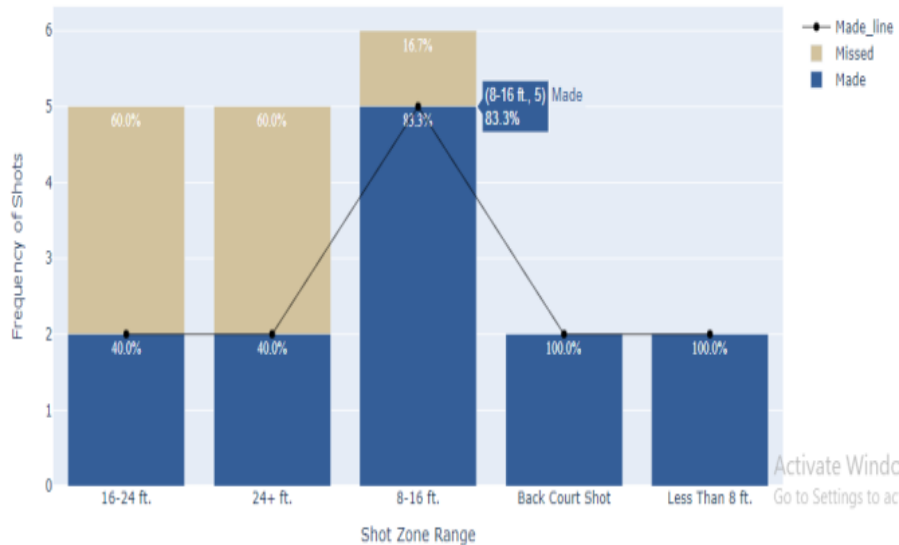
- **Density plot**



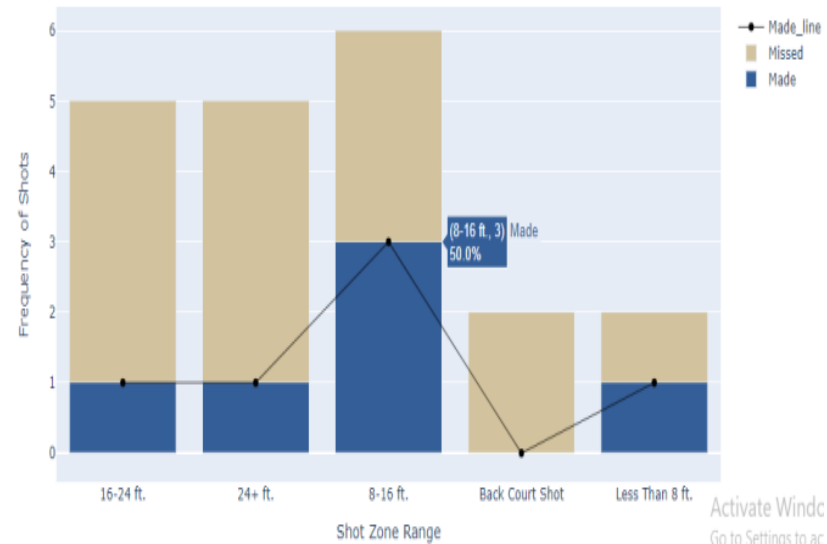
Visualization of Data and Insights (20/25)

- Field Goal percentage by shot zone range

Field Goal percentage by Shot Zone Range



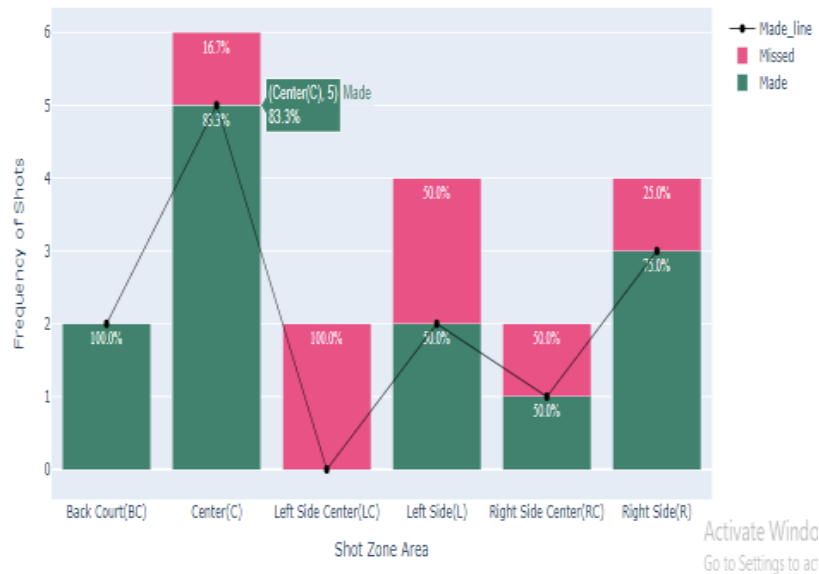
Field Goal percentage by Shot Zone Range



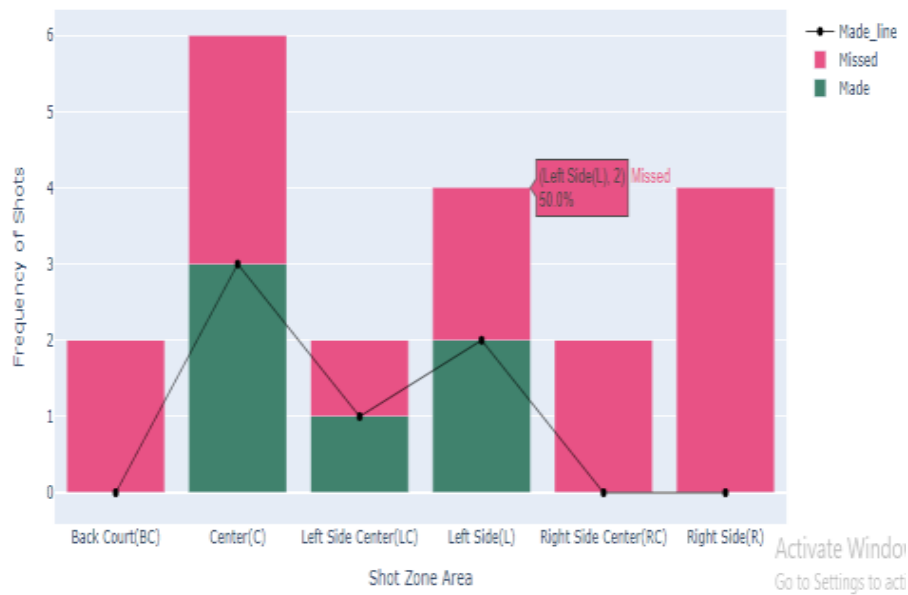
Visualization of Data and Insights (21/25)

- Field Goal percentage by shot zone area

Field Goal percentage by Shot Zone Area

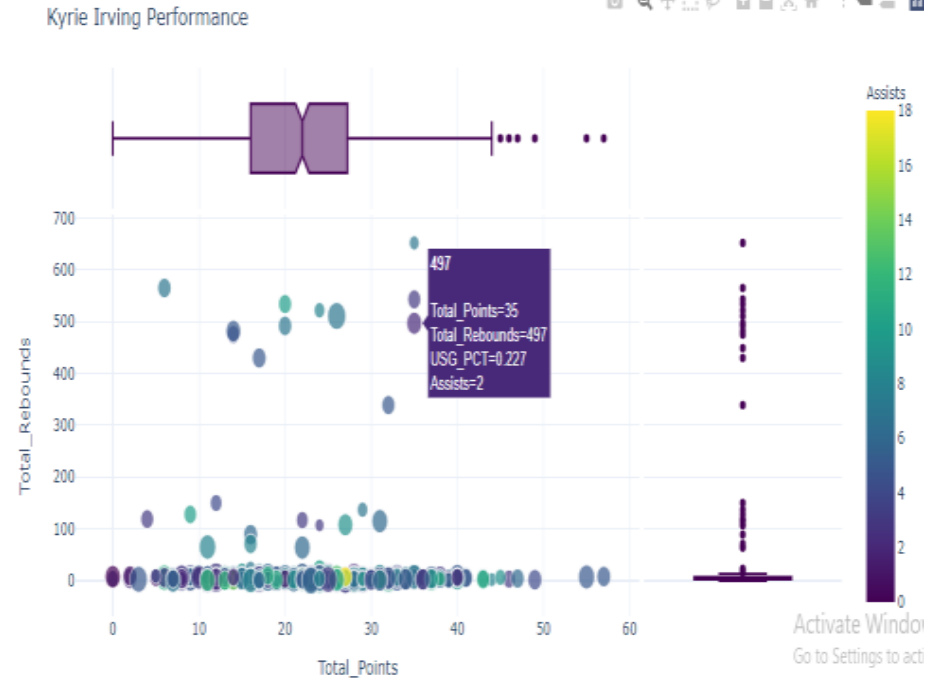
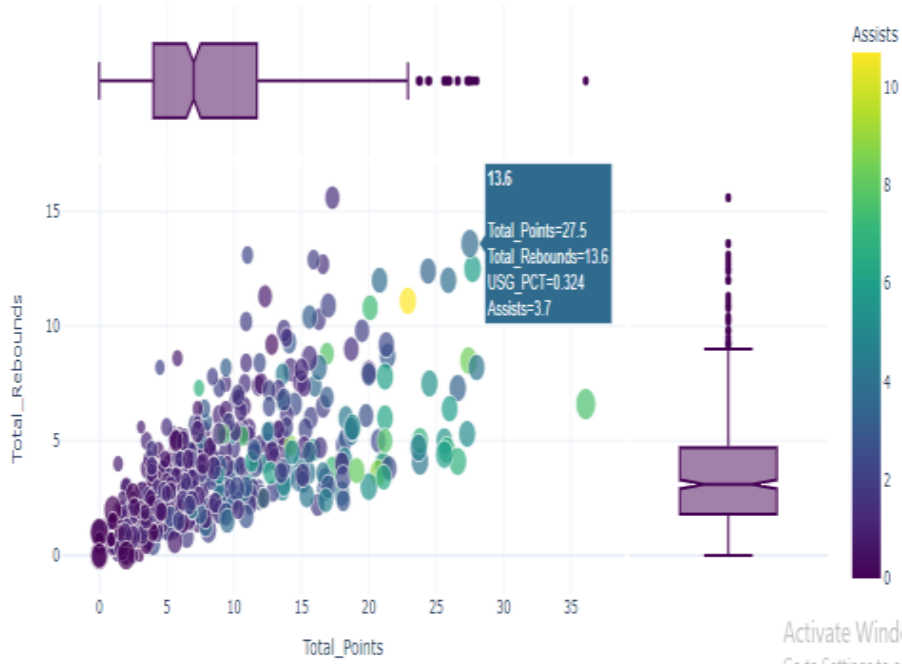


Field Goal percentage by Shot Zone Area



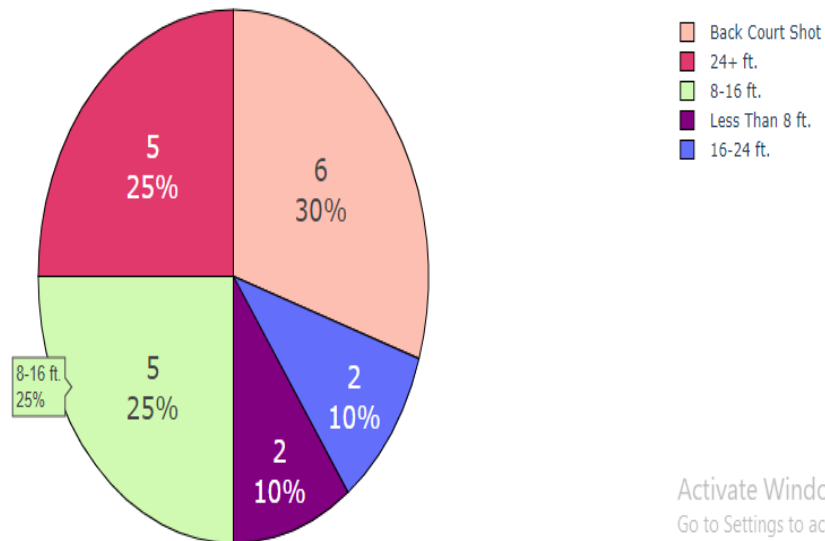
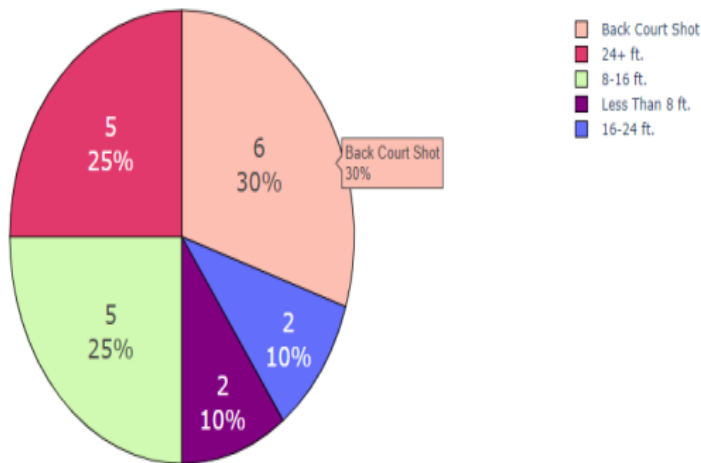
Visualization of Data and Insights (22/25)

- Interactive Box and Scatter plot



Visualization of Data and Insights (23/25)

- Pie chart of percentage of shot zone distances



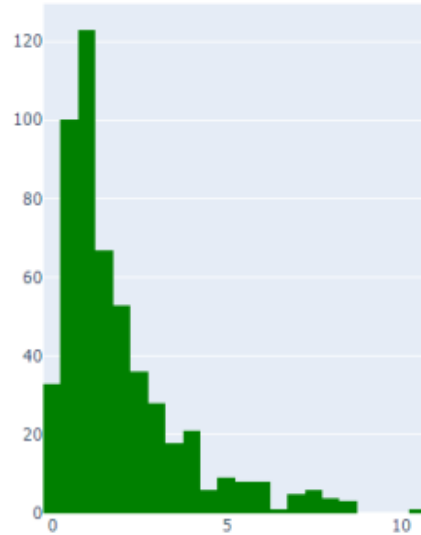
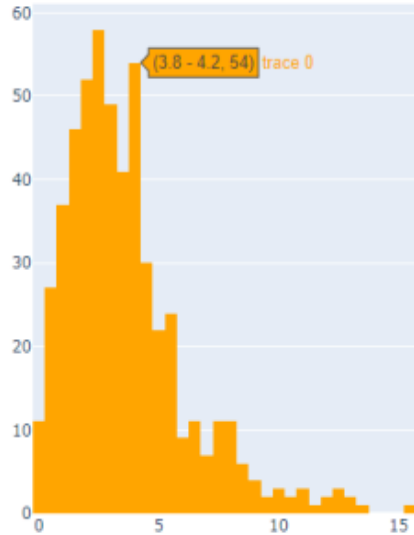
Activate Window
Go to Settings to act



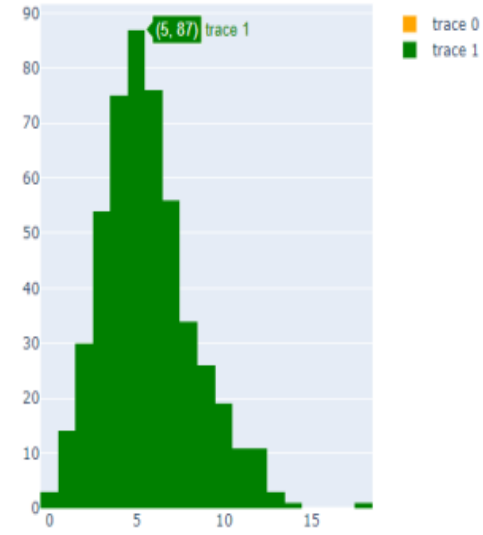
Visualization of Data and Insights (24/25)

- Rebounds and points Histogram plot (failed experiment)

Rebound and Points Histogram plots

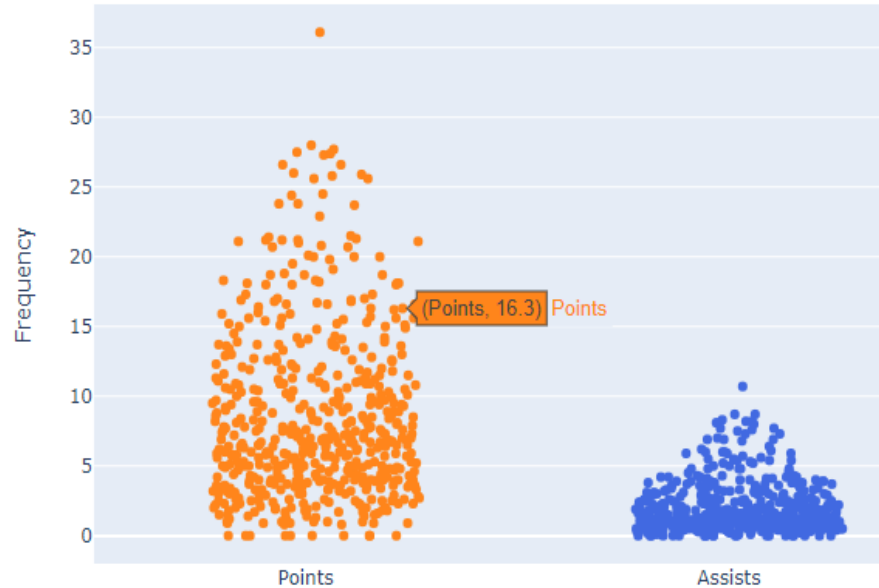


Rebound and Points Histogram plots



Visualization of Data and Insights (25/25)

- Beeswarm plot of points and assists



We have implemented all the 25 above mentioned visualizations for LeBron James and Carmelo Anthony in order to compare them.



Future Scope

- The same visualization techniques can be further implemented for various sports such as cricket, American Soccer, FIFA etc.
- The same visualizations could be generated while the match is going on and can be helpful to improve the performance of players in the second half of the game.
- Also, player movement tracking visualization on the court would be helpful to know the game style of the player
- These visualization techniques could also be applied to Olympic and European basketball games



THANK YOU YOU



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