Sports & Performance Analytics

MIS41420

Sports Analytics Tool

Bucket Getter - User Guide

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[Link to the tool on Tableau Public]

We declare that all material in this assessment is our own work except where there is clear acknowledgement and appropriate reference to the work of others.

Introduction

Bucket Getter is a powerful NBA dashboard tool designed to provide comprehensive insights into player performance, shot details, and team analysis. By leveraging shot detail data and player season data, along with advanced statistical techniques such as Monte Carlo simulation, Bucket Getter offers users a deeper understanding of the game and helps teams, analysts, and fans make informed decisions. It offers users the ability to make data-driven decisions, evaluate player contributions, and assess a team's likelihood of winning at any given moment. The tool empowers users to identify strengths, weaknesses, and areas for improvement, leading to enhanced player/team performance. By harnessing the power of analytics, Bucket Getter aims to enhance the understanding and competitiveness of the game of basketball.

Technical Process

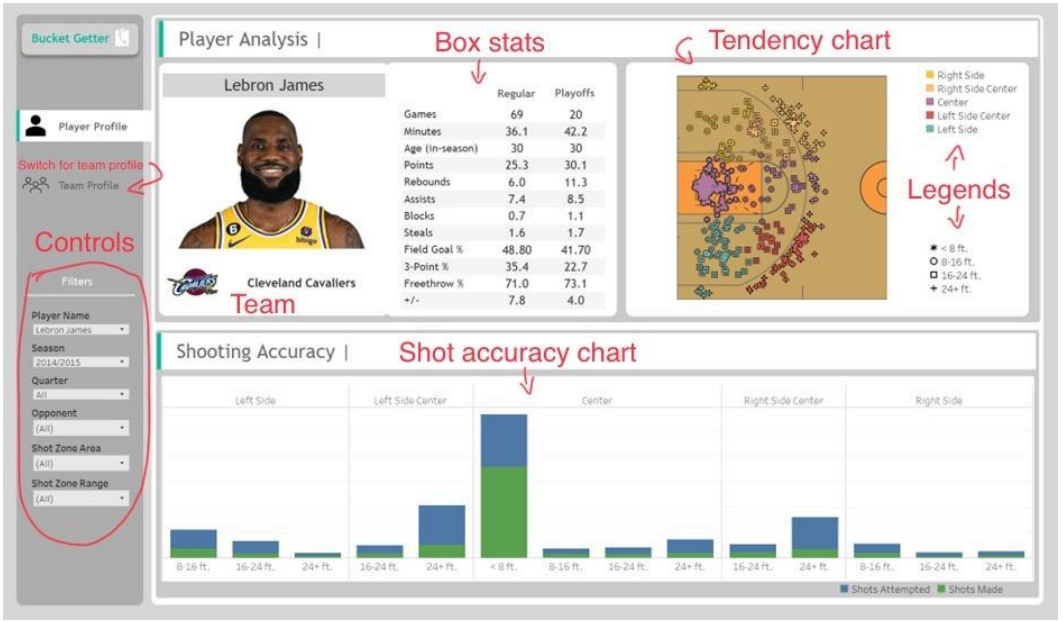
The process of gathering the data, transforming and loading it was utilised in Python, Excel, Tableau Prep and Tableau. The final data that the user sees through the tool is sourced from 4 different sources: Vladislav Shufinskiy's Play-by-Play Dataset on Kaggle, Nathan Lauga's Team Game Results & Performance on Kaggle, NBA's Player Profile Repository and the NBA's Player's Stat Page. Due to the mixed nature of the databases, some discrepancies in shooting numbers may arise. These datasets were formed through scraping with Python code (code included in this folder), Join-Clauses within Tableau Prep, and manual scraping of websites.

The data was stored in CSV files, before being imported into Tableau Desktop where it was processed, and was finally published to Tableau Public where the tool can be accessed in full. The final dashboard can be found at this **link**.

Home page

Once Tableau public was opened, you will be met with the home screen, from there, navigate by clicking one of the two buttons to either see the player insights page or the team insights page.

Player Insights



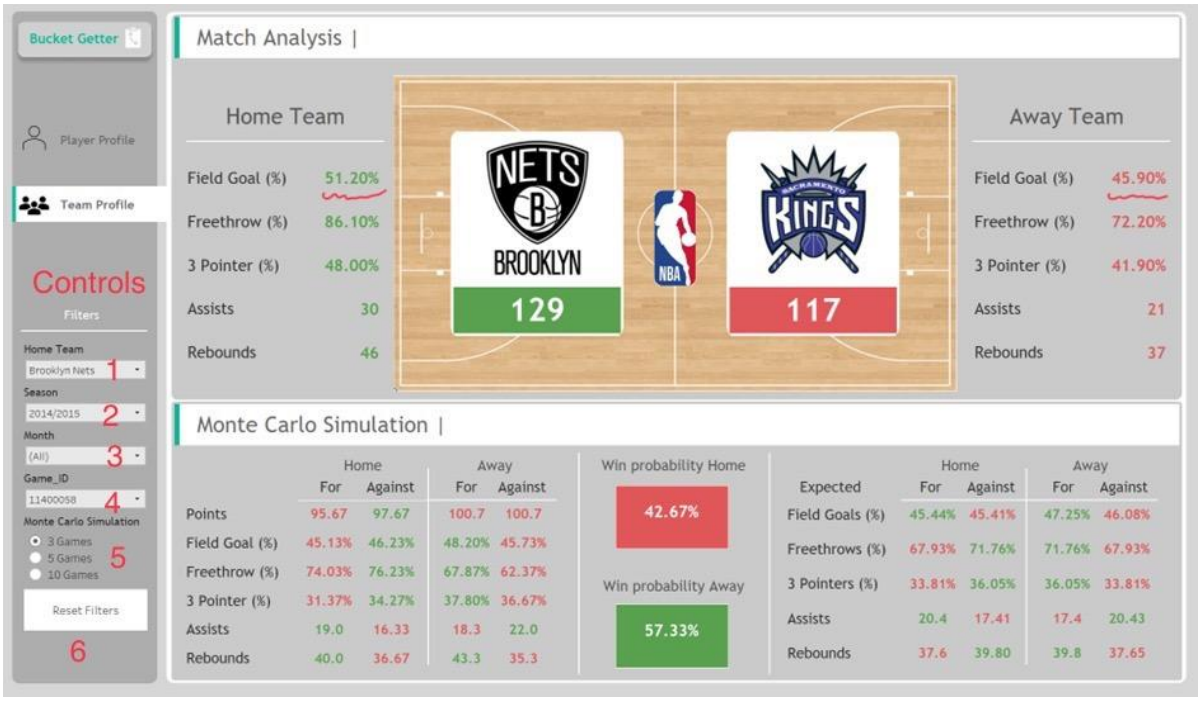
The player insights page in Bucket Getter incorporates detailed shot data and tendency information, including: shot location, shot range (e.g., layup, mid-range, three-pointer), shot outcomes (made or missed), and region of the court. When you first open the player insights page, you will be greeted with a set of controls to the left, charts in the middle and legends that explain these charts next to each chart. The controls allow you to select the player you want detailed information on from a list of all the players in the database. You can select one of 8 seasons of data available (2013/14 to 2020/21) and can even see individual shooting information per quarter of the game (Due to its outlier nature, overtime data was removed from this tool and as such, quarters are only limited to 1-4). You can also customise shooting information per opponent, as well as to the range of the shot or the area the shot was taken from.

The top-right chart is a shot-tendency chart: it showcases a players' successful shots, the area they're taken from, and the distance from the hoop. Based on the distance and location, the colour and icon of the shot changes on the shot map. If you hover over an individual shot, you can see more information on it: opponent, season, quarter, range, area, and date. And if you click on the shot, you can see a hyperlink that takes you to a video snippet of the actual game event to the corresponding record of data. You can control and focus on specific opponents, seasons, quarters … etc through the controls on the left.

The bottom chart is a player shot accuracy chart, which showcases how well a player shoots from specific areas and ranges on the court. By hovering your mouse on any specific column, you can see how many shots a player has taken from a specific range or area, both in volume date (shots taken and shots made) and the players' successful conversion rate. You can control and focus on specific opponents, seasons, quarters through the controls on the left.

The tool also integrates player box statistics data in the middle of the page, allowing users to analyse individual player performance for an entire season. It includes various statistical metrics such as points per game, field goal percentage, three-point percentage, free throw percentage, rebounds, assists, and more. With this information, users can evaluate player contributions, track progress, and identify trends.

Team Insights



Bucket Getter offers a dedicated team-focused page that focuses on team performance and analysis. This feature utilises a Monte Carlo simulation, which is a statistical technique that calculates probabilities through repeated random sampling. By applying 10, 5, and 3 game rolling averages, the tool estimates a team's likelihood of winning a game at any given moment. Due to the fact that the data starts in 2003, the 10, 5 and 3 rolling average for the first 10, 5 and 3 games of the 2003/2004 season don't exist. This analysis provides valuable insights into a team's momentum, recent performance, and overall competitiveness.

For a user to utilise this tool they should begin with selecting the home team (#1 in screenshot the) they want to analyse from the controls on the left-hand side, then selecting the season (#2 in the screenshot) and then the month (#3 in the screenshot). This will allow them to see the game_ID of all the games that occurred in that particular month, and then select one (#4 in the screenshot). The final step is picking the size of the rolling average in the Monte Carlo simulation between 3, 5 or 10 games (#5 in the screenshot). Once all the controls have been selected, you will be met with the match analysis and the Monte Carlo simulation screen.

The match analysis provides information on what *already* happened, the result of the game, some basic statistics including shooting percentages, assists and rebounds of the game. The team with the better metric will show that metric in green, whereas the team that did worse in the metric will show up in red.

The Monte Carlo simulation follows the same colour coding scheme; green for the team with the better metric, red for the team with the worse metric. However, this simulates

the results of what *should* have happened based on the selected rolling average. To view a different rolling average, you can just select one of the other 2 radio buttons to see, for example, what the simulation looks like for 3 or 10 games instead of 5.

To view a new game, make sure to click on “Reset filters” and start a fresh selection of controls (#6 in the screenshot).

Individual Contributions of Team Members

The work submitted here is the work of Kevin Sheahen, Murhaf Abdalqader, and Sudeep Tandon. Each team member contributed to the project in an area that they excel in. The contributions are as follows: Kevin worked on collecting, joining and scraping player data, team data and player images. In addition he created the Monte Carlo simulation that is seen in the teams section of the dashboard. Murhaf created the player insights screen, establishing the necessary layout to visualise player shots on a basketball court and the relevant statistics. Lastly, Sudeep worked on the team page of the dashboard creating a friendly interactive page. He also contributed by merging Murhaf’s work with his own and beautifying the process. All team members helped contribute to the original PowerPoint presentation and tasks throughout the project.