

Analysis of Player Offensive Efficiency using Artificial Intelligence

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Introduction

This project finds application in the sports domain. It focuses on analyzing player efficiency for building a successful team. Sporting events generate millions of data points, encompassing player actions, ball movements, team positioning, and event outcomes. Sports organizations are constantly trying to leverage this information to gain insights into the key factors that contribute to the success of individual players and teams. This is especially true for the National Basketball Association (NBA), as these organizations invest millions into research and development in an attempt to gain a competitive advantage.

The goal of this research is to improve an outdated idea that has been around since basketball was invented: “Player offensive efficiency”. Historically, the initial approach to determining a player’s offensive efficiency was to look at field goal percentages (FG%) for all shots, three-pointers (FG3%), and free throws (FT%), which merely divide the number of shots made by the number of attempts. Later, in 2002, statistician Dean Oliver developed “Effective field goal percentage” (eFG%), which is a weighted formula adjusting for the fact that a 3-pointer is worth more than a 2-pointer. While eFG% provides a better idea of a player’s shooting efficiency, it is becoming an increasingly naive approach when considering the vast quantity of data that is now tracked during NBA games.

We are looking to improve the understanding of a player’s offensive efficiency by accounting for new, innovative ideas about the context behind the shots that a player takes throughout the game. Specifically, we plan to engineer features and apply artificial intelligence techniques to model on concepts such as player volume, player movement, shot openness, game time remaining, possession time remaining, the strength of the defense, and more. With these new features being accounted for, we believe we can provide a more accurate representation of a

player's true offensive efficiency. A better understanding of player efficiency will be useful for NBA teams to prepare their gameplay for upcoming seasons.

Techniques

The dataset used for this research comes from Kaggle^[1] and includes in depth information on shots attempted from the 2014-2015 NBA season. This research will focus on the outcomes of shots adjusted for the context around them (players involved, positioning, time remaining, ball movement, etc.) to more accurately determine a player's efficiency. The performance analysis can be done with a comparative analysis of various techniques. These techniques involve using classification analysis and regression. We propose some techniques like Logistic Regression(LR), Naive Bayes(NB), Random Forest(RF), Support Vector Machine(SVM), and Gradient Booster(GB). Doing a comparative study of the predictive ability of these techniques will help in determining the best-suited technique for problems of this type.

References

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