Executive Report - NBA Lineup Optimization

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Background

In the 2023 NBA Playoffs, the Miami Heat found themselves in a precarious position. During their very first game of the playoffs, starting guard and key player Tyler Herro broke his hand and was ruled out for an extended period of time. Two games later, Victor Oladipo tore his patellar tendon, further setting the team back. This led to an interesting situation: the good news is that the Miami Heat have plenty of bench depth and capable athletes. But, based on the regular season data available, who should be the one to get more playing time?

Putting ourselves in the shoes of the Miami Heat analytics team, we are tasked with answering this question and making suggestions to the coaching staff. To do this, we employ robust statistical methods and machine learning algorithms. Through using all of our available resources we aim to make the most educated decisions possible. Through investigation of lineup data, individual statistics, advanced statistics, and per 36 minute statistics we are able to identify individual players who we believe will step up in specific game-scenarios.

Methods

- ***Decision trees*** - Our simple but solid case decision tree gives us two significant advanced statistics that differentiate quality lineups for the Miami Heat: true shooting percentage and rebound percentage. We use net rating (NETRTG) as our response variable.
- ***Density-Based Spatial Clustering of Applications with Noise*** - We apply a nonparametric clustering algorithm to group players by win shares and factors directly related to true shooting percentage and rebounding to identify players who will excel given a larger role in the Miami Heat system.
- ***Random Forests*** - By investigating feature importance, we can find key individual statistics related to success, using VORP as the response. The model explains approximately 30% of the variance in VORP, which is reasonable given our one season's worth of data for one team.

Results & Suggestions

Using regular season data, our initial suggestion of Victor Oladipo is in line with the Heat's decision prior to Oladipo's injury (with Oladipo playing 26 minutes the game after Herro's injury). After Oladipo's injury, three key players emerge based on the specific game scenario. Duncan Robinson is clearly the best three-point shooter on the team and can help spark the Heat's offense when needed. Kevin Love is a player who can rebound and is also very experienced in the playoffs, which are both key considerations. Finally, Caleb Martin excels at both assists and steals and could be an all-around facilitator for the Heat when needed. Although these methods were applied to specifically the heat for this scenario, the methods and ideas could be used for **any** performance review in athletics.