

## Lineup Optimization Model of Basketball Players Based on the Prediction of Recursive Neural Networks

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**Abstract :** In recent years, in the field of sports, decision making such as member in the game and strategy of the game based on then analysis of the accumulated sports data are widely attempted. In fact, in the NBA basketball league where the world's highest level players gather, to win the games, teams analyze the data using various statistical techniques. However, it is difficult to analyze the game data for each play such as the ball tracking or motion of the players in the game, because the situation of the game changes rapidly, and the structure of the data should be complicated. Therefore, it is considered that the analysis method for real time game play data is proposed. In this research, we propose an analytical model for "determining the optimal lineup composition" using the real time play data, which is considered to be difficult for all coaches. In this study, because replacing the entire lineup is too complicated, and the actual question for the replacement of players is "whether or not the lineup should be changed", and "whether or not Small Ball lineup is adopted". Therefore, we propose an analytical model for the optimal player selection problem based on Small Ball lineups. In basketball, we can accumulate scoring data for each play, which indicates a player's contribution to the game, and the scoring data can be considered as a time series data. In order to compare the importance of players in different situations and lineups, we combine RNN (Recurrent Neural Network) model, which can analyze time series data, and NN (Neural Network) model, which can analyze the situation on the field, to build the prediction model of score. This model is capable to identify the current optimal lineup for different situations. In this research, we collected all the data of accumulated data of NBA from 2019-2020. Then we apply the method to the actual basketball play data to verify the reliability of the proposed model.

**Keywords :** recurrent neural network, players lineup, basketball data, decision making model

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