Team Dynamic Structure and Strategy Evaluation: Mathematic Model based on Decision Trees

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Summary

In this paper, we developed some models to reflect the dynamic configuration of an anonymous soccer team (Huskies team) and evaluate team performance indicators.

First, a ball passing network is built by analyzing the exchanges between players. We counted the passing events and positions of players and looked at their passing preferences and positions. Each soccer player is treated as a node and the number of passes is the link between any two players. In this way, we can establish weighted and unidirectional football delivery networks.

Then, using the ball passing network team dynamic model analysis, including the team defense and attack chain configuration, binary and ternary configuration to build our models.They will be more flexible, being the core of the offensive or defensive team. They will be more flexible, being the core of the offensive or defensive team. In addition, we also analyzed the performance of Huskies from individuals to teams, and established five indicators to evaluate individuals, forming five-dimensional ability diagrams. Analyze the favorable factors for the team from the team position and side.

Next, a Comprehensive Evaluation Index model is designed. By using PCA analysis method to reduce the dimension of five individual indexes, the individual comprehensive evaluation indexes are obtained. For the configuration teams at different positions (Forward, Midfield and Defense), the contribution coefficients of the players to the position were calculated respectively, and the comprehensive evaluation data were obtained. Based on the individual comprehensive score and the contribution distribution of teams in different locations, we can get the comprehensive evaluation index of the team.

In order to verify the accuracy of the model, we established three types of decision trees for prediction, and the accuracy is close to 80%.Since our strategy is based on a sample of data from the season, the winning strategy for the Huskies is a universal strategy,

Finally, based on the above research, we proposed the changes of huskies in the next season from the aspects of team configuration, individual contribution index, decision tree model and passing chain position. Combined with the actual situation of society, the model is generalized. Besides, 5W1H analysis method is used to analyze the interaction and cooperation process within the team, so as to build an efficient team.

Keyword: Soccer, Team Strategy, Mathematic Model, Decision Tree

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