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Optimization Analysis of The Prediction Algorithm for the Success Rate of Personnel Cooperation in Volleyball Matches

Lin Chen
Railway Police College, Zhengzhou, 450000, China

Abstract: The success rate prediction algorithm before optimization is too complex in the coding process. In order to reduce the complexity of the prediction algorithm, the success rate prediction algorithm of personnel cooperation in volleyball matches is optimized. Quadtree coding structure is adopted and error measurement factor is introduced to reduce the error of prediction data. In the process of rendering the prediction data, the hierarchical tree is re-planned and each factor is recursively subdivided until all the factor errors can meet the conditions of the prediction algorithm, so as to realize the optimization of the success rate prediction algorithm. Experimental results show that the data error value of the optimized success rate prediction algorithm is more accurate, and it has obvious advantages over the unoptimized success rate algorithm in various tests.

Keywords: Prediction error; Control range; Forecast data; Index identification

1. Introduction

In volleyball match every technological will influence the result of the game, and pass the ball, ball, spiking and blocking the ball is under the help of his teammates and the interference of other teammates, defensive players need to attack the athletes from the ball stopped, reasonable use of body posture and movement to the ball to his teammates, or hit the ball to the other side of the stadium. In the course of the match only the serve is served by the player alone. Serve technology will directly affect the momentum and results of the game, to issue a better quality of the ball needs to be skilled, and have a good psychological quality, high quality of the ball. Some materials show that the psychological quality of players accounts for 65% of the service errors, while the technical and physical aspects account for 20%. In order to better calculate the success rate of match personnel cooperation, the success rate prediction algorithm is adopted to evaluate the comprehensive strength and tacit understanding of players. The algorithm calculates the success rate of cooperation between players at the beginning of each game or in each round according to their postures and movements. Based on the fast algorithm frame prediction, structure of quadtree encoding, complete the calculation, but this algorithm in the process of encoding is too complex, in order to reduce the complexity of the prediction algorithm, introducing the error metric factor to optimize the success rate prediction algorithm, according to the different scenarios, choose corresponding patterns to achieve the purpose of save the encoding time [1].

2. Optimization Design of Success Rate Prediction Algorithm

2.1. Introduce error measurement factor

The traditional success rate prediction algorithm has too large computational load to accurately switch scenes in 3d rendering. These problems will directly affect the accuracy of the algorithm. In order to improve the accuracy of the algorithm, the quadtree index scheduling algorithm is combined to improve and optimize the setting of quadtree factors. Firstly, error measurement factor was introduced to solve the problem of heavy computing load. By evaluating the physical quality, psychological quality and passing skill of each player, the tacit understanding between players was tested.Use the quadtree specification to represent the personal information of each team member,with the planning grid $(2n+1)\times(2n+1)$,as a symmetrical square, easy to calculate.In according to the features of each team member, to make sure every information stored in a square grid specifications players, players on the awarded new index sign, achieve the purpose of reduce the forecast error, it can be seen that the planning of information in the index signs and quadtree factor is the corresponding relations, each square logo a scheduling quadtree index factor [2].

Quadtree factor is to establish a standard factor evaluation criterion according to the characteristics of each

team member. When the amount of spatial data rendered increases, it is necessary to take the square as the factor of quadtree and construct a huge quadtree. Too much depth increases programming time. The success rate prediction algorithm before optimization takes the original factors as the storage method of unit team members, and each planning square represents a team member information. There are many team members' information in this area, but the lack of identification affects the accuracy of the final calculation. The optimized success rate prediction algorithm is to change the height values of the four corners when dividing the square planning square to ensure that there is no error in the height values of the four corners. If there is an error in the height value of the middle point of the four sides, the predicted value will be affected [3]. Theoretically, the change value of the four vertex heights of the planning square will affect the final predicted value. In order not to affect the predicted value, the determination value formula is used to solve the problem of the change value of the four vertex heights. The determination value formula is shown below.

$$h = \frac{f}{d \bullet \max} n \bullet m \tag{1}$$

In formula (1), h is the moderator, d is the side length of the planning grid, f is the control range, m is the information of each team member, and n is the error value of the prediction data. When h is less than 1, the probability is smaller; when h is greater than 1, the control range of f is larger, and the probability of the planning square being divided is greater [4].

The introduction of error measurement factor is to improve the quadtree scheduling index algorithm to improve the accuracy of prediction data. It should be noted that each member's information corresponds to a factor. In the quadtree index scheduling algorithm, the order of factor access scheduling is correlated with 3d rendering. When a certain team member information is accessed, the corresponding sub-factors will be accessed, and the entire prediction data will be rendered according to this rule. Quaternary tree division mechanism adopts a parallel way of thinking, which is distributed according to data characteristics, fully considering the data sharing of each processing element, and ensuring the authenticity of data between processing elements [5].

2.2. Calculation of success rate prediction

In the process of rendering the prediction data, the selection criteria should be re-planned according to the technical level of the team members. In addition to the selection of team members' characteristics, the classification criteria of the resolution should also be formulated. In this paper, the resolution level evaluation criteria are adopted to evaluate the professional ability of volleyball players. In the process of acquiring the prediction data, the hierarchical tree must be re-planned, and then each factor is recursively subdivided until all the factor errors can meet the conditions of the prediction algorithm. The prediction formula is shown below.

$$\partial = \frac{m}{n}\left(\frac{w}{2\tan}\right) \tag{2}$$

In formula (2), ∂ stands for the prediction error value between team members, m stands for the information of each team member, n stands for the prediction data error value, and w stands for the professional level of team members. The prediction data scheduling process is shown below.

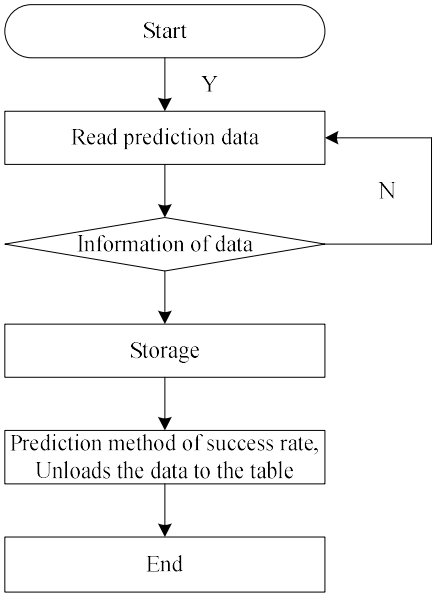

Figure 1. Forecast data scheduling process

Figure 1 is the scheduling process of predicted data. The scheduling steps of specific team data blocks of the success rate prediction algorithm are shown below. First, the information of the players participating in the competition is counted and divided according to the characteristics of the players. The index number of the block data is used to compile it into the algorithm. Facilitate the subsequent calculation of the success rate of the match personnel cooperation. Secondly, the calman filtering method is adopted to predict the physical quality and sports status of the team members, obtain the predicted data, identify the team members with similar characteristics, and list them in the table. Thirdly, team information with similar characteristics is found in the list, and these data blocks are transferred into the computer to complete the scheduling of predicted data [6]. In order to reduce the error value of the prediction data, it is necessary to set the range of the data memory pool. At the same time, the prediction data suitable for unloading conditions should be compiled into the unloading list for real-time unload-

ing operation. Finally, data blocks are optimized according to the error measurement function, corresponding data blocks are found in the loading list, and these data blocks are optimized.

The success rate prediction algorithm is mainly based on quadtree, and quadtree scheduling index algorithm is to divide the team information. The algorithm programming is relatively simple, which can effectively reduce the error value of the algorithm. The error measurement factor introduced this time is to reduce the error value of the predicted data. Because the traditional factor storage method is too simple and repeated, which is easy to cause the redundant storage of data, the error measurement factor is introduced this time to solve the problem of redundant storage of data. The success rate prediction algorithm is based on the difference algorithm, and the prediction is carried out according to the movement trajectory of the team members, so as to improve the accuracy of the success rate prediction algorithm. At this point, the optimization of the success rate prediction algorithm is realized [7].

3. Experimental Demonstration

According to the above introduction, the optimized success rate prediction algorithm can solve the problem of the error value of the prediction data. In order to verify the rationality of the optimization design of the success rate prediction algorithm, the unoptimized success rate prediction algorithm and the optimized success rate prediction algorithm are compared and tested. The information of players is selected from the experimental database, which mainly includes players' serving Angle and professional level. The experimental data are shown below.

Table 1. Experimental data

Neutral Angle	Clock period	Acceleration ratio
Vertical mode	1156	9.36
Level pattern	1235	8.56
Perpendicular to the left 45°	1563	8.46
Perpendicular to the left 30°	1566	8.97
Perpendicular to the left 60°	1544	8.64
Level up 45°	1536	8.64
Level up 30°	1845	7.59
Level up 60°	1563	7.88

Table 1 is the data of this experiment. The experimental results of the unoptimized success rate prediction algorithm and the optimized success rate prediction algorithm are shown below.

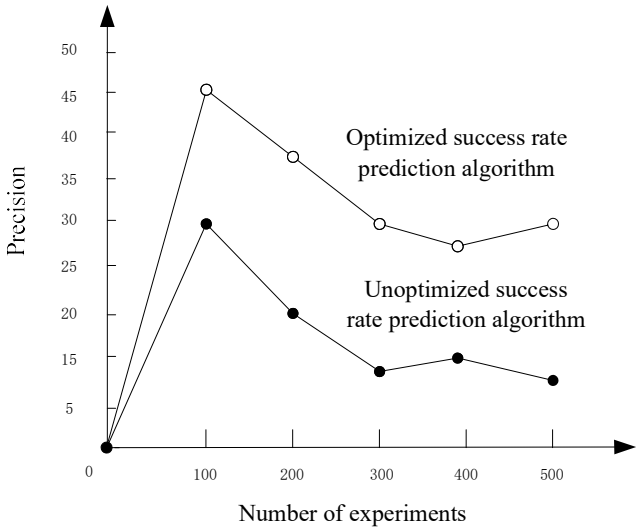

Figure 2. Experimental results

As can be seen from figure 2, the data error value predicted by the optimized success rate prediction algorithm is relatively accurate, and it has obvious advantages over the unoptimized success rate algorithm in various tests. In the process of the experiment, it can be found that each data is relatively independent in the prediction, and

there is no problem of sequence, but according to the state of the data block, increase the prediction coding time. The test results show that the data calculated by the optimized success rate prediction algorithm is accurate.

4. Conclusion

The optimization analysis of the success rate prediction algorithm is based on the technique of receiving the ball, the position of receiving the ball, the center of gravity of receiving the ball, the position of serving and the position of wrist pad. By analyzing the personal information of each player, the success rate of cooperation among team members is calculated. The prediction algorithm of success rate before optimization is too complicated in the programming process. The optimized prediction algorithm of success rate can reduce the error of prediction data by introducing error measurement factor and ensure the reliability of calculation results. It is hoped that the optimization of the prediction algorithm for the success rate of personnel cooperation in volleyball matches analyzed in this paper can provide theoretical basis for the subsequent research.

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