

# Research On Present Situation and Development Path of Basketball Amateur Training based on Statistical Data Analysis

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**Abstract:** In order to quantify the present situation and development path of amateur basketball training, a model of basketball amateur training status and development path planning based on statistical data analysis is proposed. The statistical data mining model of the present situation and development path of amateur basketball training is constructed, and the statistical data analysis of the present situation and development path of amateur basketball training is carried out by using the method of extracting correlation features. Combined with fuzzy scheduling and clustering methods, the self-adaptive classification and recognition of basketball amateur training status and development path statistics are realized. Adaptive big data classification recognition and attribute partition method are used to realize pattern recognition and fusion of basketball development correlation statistics. Regression analysis and decision statistical analysis are combined to realize the optimal design of basketball amateur training status and development path planning model. The simulation results show that the statistical data analysis ability of this method for basketball amateur training and development path is strong, and the performance of data clustering fusion is better. The basketball amateur training present situation and the development path planning and the quantitative analysis ability is improved.

**Keywords:** Statistical data analysis; Basketball amateur training; Development path planning; Big data mining

## 1. Introduction

Basketball is a team sport based on good people in our country, and it is also popular with teachers and students in colleges and universities. In order to further improve the level of basketball development in China, we should do a good job in basketball amateur training, help and guide students to carry out scientific, reasonable and effective basketball training, and provide favorable conditions for the development of our country's overall fitness. Because of the restriction of traditional basketball concept and training idea, many college teachers and students lack understanding of modern basketball concept and training idea, and they have no chance to contact advanced basketball training concept. It is considered that basketball training is only a means to improve physical function and develop reaction ability. It does not combine basketball training with all kinds of basketball activities and competitive competitions, which leads to the development of advanced basketball training concepts in the world. Therefore, the study of basketball amateur training optimization method is of great significance.

At present, most college basketball amateur training guidance contents are confined to three items: dribble, fixed shooting and running shooting, and in the process of training guidance to students, most of the instructors and coaches only give a general explanation of the main points of the action, and the teaching content of each instructor is almost the same, which can not inspire the students. In the practice of layering and optimizing basketball amateur training, only by defining the basketball amateur training goal, can we provide clear and concrete guidance for the practice of specific basketball amateur training and ensure that the expected results are achieved. In order to provide more scientific and accurate training guidance for students of different levels in different training stages, the corresponding target stratification should be formulated according to different stages of training, so as to ensure stratification optimization. Under the guidance of individualized training goal, it can ensure that each student's comprehensive ability in different aspects can be displayed, and the students' ability can be improved continuously in different levels of group training. In order to quantitatively analyze the present situation and development path of basketball amateur training, a model of basketball amateur training status and devel-

opment path planning is proposed based on statistical data analysis. The statistical data mining model of the present situation and development path of amateur basketball training is constructed, and the statistical data analysis of the present situation and development path of amateur basketball training is carried out by using the method of extracting correlation features. Combined with fuzzy scheduling and clustering methods, the self-adaptive classification and recognition of basketball amateur training status and development path statistics are realized. Adaptive big data classification recognition and attribute partition method are used to realize pattern recognition and fusion of basketball development correlation statistics. Regression analysis and decision statistical analysis are combined to realize the optimal design of basketball amateur training status and development path planning model. Finally, the performance test is carried out through the simulation experiment, which shows the superior performance of this method in optimizing the big data statistical analysis ability and mining ability of the present situation and development path of basketball amateur training.

## 2. Development Path and Countermeasure of Basketball Amateur Training

### 2.1. Take the student as the main body

College basketball amateur training should establish correct training concept, determine the main position of students in basketball training, according to the students' physical quality, basketball basic skills and personality development needs, draw up the training plan according to their own characteristics. The contents and methods of the training shall be chosen by the students according to their preferences and development goals, and the students shall be encouraged to organize all kinds of basketball training and basketball activities spontaneously so that they can improve their basketball skills through training, Teamwork and communication skills. At the same time, teachers should provide guidance and help in the process of guidance, master the general direction of amateur training, and give suggestions on training details so as to effectively improve the students' basketball level.

### 2.2. Cultivation of comprehensive quality

On the basis of improving students' basic basketball skills and comprehensive sports ability, college basketball amateur training should also make students establish good heart rate quality and psychological toughness in the course of training, and make use of long and arduous training process and failure. Summing up the experience and lessons of frustration to help students fully understand and understand the competitive and cruel nature of sports, so as to set up the will quality of perseverance in training, we should further emphasize the team spirit and

cooperation consciousness. A collective sport must be consciously trained in pairs. Group training and other ways to strengthen the cooperation and cooperation between students, so that participants in the training together to improve the level of basketball and cooperation.

### 2.3. Full integration with the game

The best way of basketball training is to practice in a competitive way. The ultimate goal of basketball training is to improve the personal level and the results of the competition. Colleges and universities should seize every opportunity to organize various kinds of schools. It also encourages students to participate actively in basketball games and basketball activities outside school, and helps students to improve their basketball comprehensive ability, psychological comprehensive quality and team cooperation spirit in the practice of fierce basketball competitions. Athletes in the field, unity and cooperation, with superb skills and good style of dedication to a wonderful event, an all-round improvement of their own competitive level. In the daily basketball amateur training, we should pay more attention to the actual combat of the training, through the game field simulation, tactics application explanation, tactics cooperation training and so on, the student's tactics accomplishment and the basketball athletics ability can be further improved.

## 3. Statistical Data Analysis Model of the Present Situation and Development Path of Basketball Amateur Training

### 3.1. Feature extraction of statistical data flow of present situation and development path of basketball amateur training

For the training sequence,  $x(t)$ ,  $t = 0, 1, \dots, n-1$ , set up the initialized pointer count in the course of statistical data mining of basketball amateur training status and development path  $t = 0$ , adjust the basketball amateur training status and the development path of the statistical data clustering center vector and output. The differential evolution sequence of node  $N_{j^*}$  is matched with the dynamic feature of  $NE_{j^*}(t)$  geometry neighborhood  $N_{j^*}$ , in which the adaptive weighted weights are:

$$\omega_{ij}(t+1) = \omega_{ij}(t) + \alpha(t)(x_i(t) - \omega_{ij}(t)) \quad (1)$$

Where,  $N_j \in E_{j^*}(t)$ ,  $0 \leq i \leq k-1$   $0 \leq \alpha(t) \leq 1$  is the learning speed in the course of neuron evolution of the current situation and development path of basketball amateur training. It has the ability of homomorphism matching with  $NE_{j^*}(t)$ .

The optimal solution of the statistical data mining of basketball amateur training status and development path is solved on the time interval  $T_1, T_2, \dots, T_K, \dots$ , and the distur-

tion sensitive parameter  $\{S_j^{(n)}, j=0,1,\dots,N-1\}$  is constructed, and the statistical data of basketball amateur training status and development path are obtained by adaptive training. The distortion measure of the characteristic space is:

$$d_j^{(n)} = (S_j^{(n)})^r \times \sum_{i=0}^{k-1} (x_i(t) - \omega_{ij}(t))^2 \quad (2)$$

Where,  $j=0,1,\dots,N-1$ ,  $\omega_j = (\omega_{0,j}, \omega_{1,j}, \dots, \omega_{k-1,j})^T$ ,  $r$  is the iterative error of the adaptive search, the global optimal vector  $S_j^{(n)}$  increases monotonically with the increase of  $c_j$ , the present situation of basketball amateur training and the statistical fuzzy C-means distortion of the development path increase, and the adaptive feature decomposition is carried out by using the neural network training to achieve man made folding. The  $B = \{b_1, b_2, \dots, a_n\}$  is an attribute set of the training set of the data optimization clustering characteristic sequence in the basketball amateur training current situation and the development path statistical database, and the  $A = \{a_1, a_2, \dots, a_n\}$  is a basketball amateur training current situation and a development path statistical characteristic query attribute category set, and the basketball amateur training current situation and the development path statistical data classification mining optimization objective function of the node collection of the cloud computing device feature mining area  $W$  are obtained as follows:

$$Q_w(\omega) = \frac{\sum K_{wpg}(W_{pg})}{p \times q} \quad (3)$$

Where,  $\omega$  is the classification weight,  $p$  is the convergent crossover of adjacent points, thus the feature extraction of statistical data flow and data mining are realized.

### 3.2. Analysis of association rules for statistical data of basketball amateur training and development path

The distribution function of the statistical data characteristics of basketball amateur training and development path is defined as:

$$F(G_j, i) = w_1 \cdot R(G_j, i) + w_2 \cdot (1 - dis(G_j, i)) \quad (4)$$

Where,  $i$  is the number of sampled time series nodes of the statistical data of present situation and development path of basketball amateur training,  $w_1$  is the adaptive weighted weight of cluster head broadcast node,  $R(G_j, i)$

is the weight parameter of data classification node,  $w_2$  is basketball industry. The recursive feature of statistical data storage of surplus training and development path,  $dis(G_j, i)$  represents the distance between two storage nodes, the present situation of basketball amateur training and the statistical data of development path. The distance is defined as Euclidean distance.

$$dis(G_j, i) = [x(t_0), x(t_0 + \Delta t), \dots, x(t_0 + (K-1)\Delta t)] \\ = \begin{bmatrix} x(t_0) & x(t_0 + \Delta t) & \dots & x(t_0 + (K-1)\Delta t) \\ x(t_0 + J\Delta t) & x(t_0 + (J+1)\Delta t) & \dots & x(t_0 + (K-1)\Delta t + J\Delta t) \\ \vdots & \dots & \ddots & \dots \\ x(t_0 + (m-1)J\Delta t) & x(t_0 + (1+(m-1)J)\Delta t) & \dots & x(t_0 + (N-1)\Delta t) \end{bmatrix} \quad (5)$$

Therefore, the statistical data of the present situation and development path of amateur training in basketball are sampled in the time series of the statistical data of the present situation and the development path of basketball amateur training,  $\{x(t_0 + i\Delta t)\}$ ,  $i=0,1,\dots,N-1$ , and the correlation feature extraction method is used to carry out the basketball amateur training. Based on the statistical data analysis of the current situation and development path of basketball amateur training, the characteristic mining of the present situation of basketball amateur training and the statistical data of development path are expressed as follows:

$$E[\bar{V}(k)] = 0, E[\bar{V}(k)\bar{V}^T(k)] = \mathbf{R}(k) \quad (6)$$

As the above processing, the optimal individual is searched by the global parallel mode, and the global optimization solution of the present situation and development path of basketball amateur training is obtained.

## 4. Pattern Recognition and Fusion Processing of Correlation Statistical Data for Basketball Development

Combined with fuzzy scheduling and clustering methods, adaptive classification and recognition of basketball amateur training status and development path statistical data are realized, and adaptive big data classification recognition and attribute partition method are adopted to realize the correlation of basketball development. The pattern recognition and fusion of statistical data, according to the present situation of basketball amateur training and the characteristics of missing information flow of the statistical data of the development path, are decomposed to realize the statistical data of the present situation and the development path of the amateur training of basketball. Based on the analysis of the present situation of amateur training and the construction of fractional Fourier domain of the statistical data flow of the development path, the simplified expression of Fourier transform is obtained as:

$$X_p(u) = \begin{cases} \sqrt{\frac{1-j\cot\alpha}{2\pi}} e^{j\frac{u^2}{2}\cot\alpha} \int_{-\infty}^{+\infty} x(t) e^{j\frac{t^2}{2}\cot\alpha - jtu\csc\alpha} dt, & \alpha \neq n\pi \\ x(u), & \alpha = 2n\pi \\ x(-u), & \alpha = (2n \pm 1)\pi \end{cases} \quad (7)$$

By using the rotation additivity of basketball amateur training status and development path statistical data characteristic information function  $f(t)$  in fractional Fourier preprocessing, the match between basketball amateur training status and development path statistical data based on fractional Fourier transform is realized, and the results are expressed as follows:

$$F^p F^q = F^{p+q} \quad (8)$$

Where, the frequency domain knowledge rules of basketball amateur training status and development path statistical data matching are expressed as follows:

$$F^p [c_1 f(t) + c_2 g(t)] = c_1 F^p [f(t)] + c_2 F^p [g(t)] \quad (9)$$

By combining forward transformation of positive order with reverse transformation of negative order, K-L transformation is realized, and the K-L transformation of statistical data classification of basketball amateur training and development path is defined as:

$$(F^p)^{-1} = F^{-p} \quad (10)$$

$$F^{c_1 p_1 + 4} [f(t)] = F^{c_1 p_1} F^4 [f(t)] = F^{c_1 p_1} [f(t)] \quad (11)$$

In the analysis of the current situation of basketball amateur training and the statistical data of the development path, combined with massive data to classify mining, select the best path to guide the classification space. The statistical feature sample of basketball training development path planning is obtained, and the characteristic vector of  $x_i, i = 1, 2, \dots, n$  is obtained as follows:

$$F^p [x(t)e^{j\omega t}] = X_p(u - v \sin a) \exp(-j \frac{v^2}{2} \sin a \cos a - juv \sin a) \quad (12)$$

The K-L classification method is used to construct the statistical data classification model, and the information fusion model for the statistical data analysis of the present situation and development path of amateur basketball training is obtained as follows:

$$X_p(u) = F^a [x(t)] = \int_{-\infty}^{\infty} K_p(t, u) x(t) dt \quad (13)$$

By introducing a data stream clustering similarity function, the upper formula can be interpreted as the energy distribution between different frequency  $e^{j\omega t}$  of the statistical data of present situation and development path of basketball amateur training, and the proportion of time overhead and task scale through cloud storage. In order to improve the precision of data classification and mining, the classification and optimization design of basketball amateur training status and development path statistical data characteristics are carried out.

### 5. Simulation Experiment and Result Analysis

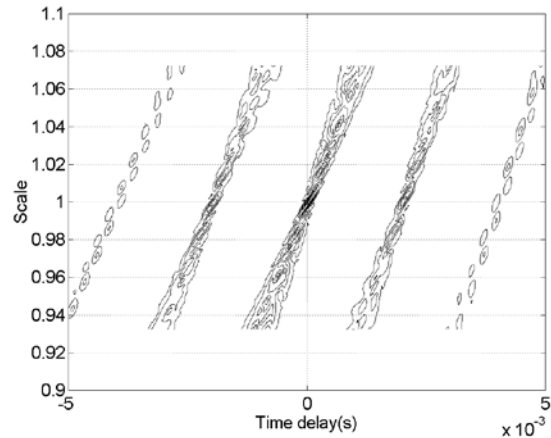
In order to test the application performance of this method in the analysis of the status of basketball amateur training and the statistical data analysis of the development path, the simulation experiment is carried out. The coverage area of the status and development path of basketball amateur training is  $200 \times 200$ , the data collection is from the basketball amateur training status and the development path statistical database B400C20D40, the basketball current situation and development path data is increased from 30 MB to 2 GB, with 50 MB, the correlation parameter is configured as:

$$c1 = \begin{bmatrix} 1 & 7 & 7 & 7 \\ 0.143 & 1 & 1 & 1 \\ 0.143 & 1 & 1 & 1 \\ 0.143 & 1 & 1 & 1 \end{bmatrix} \quad (14)$$

While weight vector then:

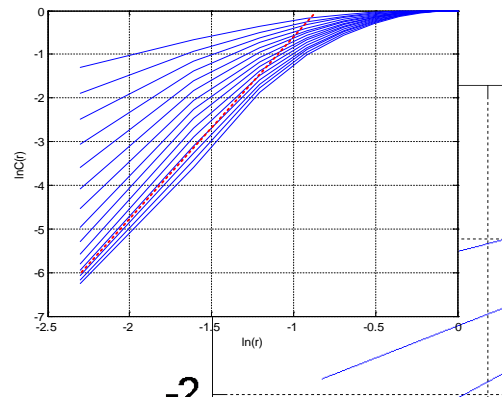
$$c2 = \begin{bmatrix} 1 & 1 & 0.143 & 3 \\ 1 & 1 & 0.111 & 3 \\ 7 & 9 & 1 & 7 \\ 0.333 & 0.333 & 0.143 & 1 \end{bmatrix} \quad (15)$$

Based on the above simulation environment and parameter setting, the present situation and development path of basketball amateur training are analyzed and mined, and the result of data mining is shown in figure 1.



**Figure 1. Classification results of the present situation of basketball amateur training and development path statistics**

The analysis shows that the accuracy of this method is better. The convergence of the status of basketball amateur training and the analysis of the statistical data of the development path are analyzed. The prediction results of the statistical data analysis of basketball training are shown in Figure 2.



**Figure 2. Prediction of statistical data**

Figure 2 shows that the statistical data analysis ability of using this method for basketball amateur training and development path is strong, the clustering and fusion performance of data is better, and the prediction performance is better, which effectively guides the amateur basketball training and development planning.

## 6. Conclusions

In this paper, the present situation and development path planning model of basketball amateur training based on statistical data analysis are proposed. The statistical data mining model of the present situation and development path of amateur basketball training is constructed, and the statistical data analysis of the present situation and development path of amateur basketball training is carried out by using the method of extracting correlation features. Combined with fuzzy scheduling and clustering methods, the self-adaptive classification and recognition of basketball amateur training status and development path statistics are realized. Adaptive big data classification recognition and attribute partition method are used to realize pattern recognition and fusion of basketball development correlation statistics. The simulation results show that the statistical data analysis ability of this method for basketball amateur training and development path is strong, and the clustering and fusion performance of data is better, which improves the present situation of basketball amateur training and the planning of development path. And quantitative analysis ability. In a word, basketball training and basketball games are taken as to improve the students' physical function. In order to cultivate students' mental health, colleges and universities should attach great importance to amateur basketball training, take all kinds of effective measures and actively provide manpower for basketball training, and material resources help, so that the development of college basketball in China can obtain greater progress.

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