Hindawi

Retraction

Retracted: Step-Counting Function of Adolescent Physical Training APP Based on Artificial Intelligence

Mathematical Problems in Engineering

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

In addition, our investigation has also shown that one or more of the following human-subject reporting requirements has not been met in this article: ethical approval by an Institutional Review Board (IRB) committee or equivalent, patient/participant consent to participate, and/or agreement to publish patient/participant details (where relevant).

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] C. Du, "Step-Counting Function of Adolescent Physical Training APP Based on Artificial Intelligence," *Mathematical Problems in Engineering*, vol. 2021, Article ID 5582598, 11 pages, 2021.

Research Article

Step-Counting Function of Adolescent Physical Training APP Based on Artificial Intelligence

Cong Du [ID]

College of Physical Education, Xuchang University, Xuchang 461000, Henan, China

Correspondence should be addressed to Cong Du; 12018001@xcu.edu.cn

With the rapid development of the information age, Internet and other technologies have been making progress, people's fitness awareness has been gradually enhanced, and sports fitness app has emerged as the times require. This paper mainly studies the step-counting function of physical training app for teenagers based on artificial intelligence. This paper uses the modular development method to achieve the functional requirements of the system as the goal, respectively, for parameter management, website configuration, system log, interface security settings, SMS configuration, WeChat template message and several functional modules to achieve system configuration. In this paper, three types of sensors are used to analyze the data changes in the process of walking through three types of data, and different weights are given as the results of step-counting. When the peak value of sensor data is measured, only the peak value of the primary axial data of each sensor is analyzed, which should be determined according to the actual axial value of the sensor. In this paper, the users' evaluation indexes of sports fitness app are divided into two groups: importance and satisfaction, so the obtained data are directly divided into two groups: importance and satisfaction of user experience indexes of sports fitness app, and the two groups of data are matched with the sample t test to ensure the scientific conclusion. Finally, the advantages and disadvantages of the user experience of college students' sports fitness app are analyzed through IPA analysis. Heuristic evaluation is carried out on the step app to score the second-level usability index of the app. The first-level usability index score and the total usability score of the step app are obtained by calculation. There is not much difference between male and female students who use sports apps. Among them, 288 are male students, accounting for 58.2% of the total and 16.4% are female students. The results show that the use of artificial intelligence technology can reduce the overall energy consumption of step-counting algorithm, so as to achieve an energy-saving step-counting algorithm.

1. Introduction

With the increase of the strength of the youth physical confrontation, in order to have a place in the world basketball, it is necessary to make the overall ability of the team outstanding, and the basis of each ability is the good physical quality of the players. Therefore, for teenagers, scientific fitness and reasonable avoidance of competitive risk events are particularly important for the participation, development, and breakthrough of competitive sports.

The virtual technology used by cloud computing technology isolates system resources, allowing users to perform artificial intelligence model training operations in their own unique virtualized systems, so that they can be adjusted for virtual environments with low resource utilization. It can avoid the unavailability of the system environment due to human factors.

Artificial intelligence technology can improve resource utilization. Din et al. believe that, due to the existence of various pollutants produced by human, agricultural, and industrial activities, the quality of surface water has decreased. Therefore, plot the concentration of different surface water quality parameters. He tried to develop an artificial intelligence modeling method for drawing concentration maps of optical and nonoptical SWQP. For the first time, he developed a remote sensing framework based on a back-propagation neural network to quantify the concentration of different SWQP in Landsat8 satellite images. Compared with other methods (such as support vector machine), the developed Landsat8-based BPNN model is

used to obtain an important measurement coefficient between Landsat8 surface reflectivity and SWQP concentration. Although his research is innovative, it lacks certain experimental data [1]. Kulkarni and Padmanabham used the extended waterfall and agile models to model the entire process of software (SW) development. They integrate AI activities such as intelligent decision making, ML, Turing test, search, and optimization into the agile model. They evaluated two indicators in five independent software projects, such as the usability target achievement indicator and the integration index. Once the SW project is developed using these models, feedback queries will be formally collected, and the collected data will be extensively analyzed to identify the various characteristics of the product, thereby determining the product's related behavior in terms of models and indicators. Although their research is relatively comprehensive, the test content is not accurate enough [2]. Goyache et al. developed a method to use artificial intelligence to improve the design and implementation of linear morphological systems for beef cattle. The process they proposed involves an iterative mechanism, in which knowledge engineering methods are used to continuously define and calculate type features, scored by a group of well-trained human experts, and finally performed by four famous machine learning algorithms' analysis. The results obtained in this way can be used as feedback for the next iteration to improve the accuracy and effectiveness of the proposed evaluation system. Although his research sample is relatively complete, it is not innovative enough [3].

In this paper, user demands were obtained through user interviews and analysis of competing products. Then, questionnaire survey was adopted to determine the importance of teenagers' demands for mobile health applications. Then, the weight of demands was calculated through data analysis. In view of the difference in use motivation caused by gender, the users are classified by gender and age from the beginning of registration, and different user groups are pushed with different content of exercise knowledge. Combined with APP, this paper carries out professional evaluation on the exercise ability of users before exercise, quantifies and grades the evaluation results, gives scientific and reasonable exercise suggestions, promotes the formation of exercise habits, and provides a reference for sports and fitness enthusiasts to reasonably choose their own exercise projects.

2. Youth Physical Training

2.1. Artificial Intelligence Technology.
The classic sigmoid-based ESN state update equation is composed of N storage pool units, K input layer units, and L output layer units.

$$x\ (n+1) = f\left(Wx(n) + W^{\text{in}}u\ (n+1) + W^{fb}y(n)\right). \quad (1)$$

Among them, $x(n)$ is an N-dimensional reserve pool [4].

The output result obtained from the extended system can be expressed as

$$y\ (n) = g\left(W^{\text{out}}z\ (n)\right). \quad (2)$$

Among them, g is the activation function of an output layer.

The expression of the hidden layer is as follows:

$$
\begin{aligned}
v_i(t) &= \begin{cases} u_r(t), & i \in A, \\ x_c(t), & i \in B, \end{cases} \\
\omega^i(t) &= \begin{cases} \omega^2, & i \in A, \\ \omega^3, & i \in B, \end{cases} \\
\text{net}_n(t+1) &= \sum_{i \in A \cup B} \omega^i(t)v_i(t), \\
x_n(t+1) &= f\left(\text{net}_n(t+1)\right).
\end{aligned} \quad (3)
$$

Normally, the form of the GARCH model is as follows:

$$
\begin{aligned}
r_t &= \phi_0 + \sum_{i=1}^{R} \phi_i r_{t-i} + \sum_{i=1}^{M} \varphi_i \varepsilon_{t-i} + \varepsilon_t, \\
\varepsilon_t &= u_t \sqrt{h_t}, \\
h_t &= k + \sum_{i=1}^{p} A_i \varepsilon_{t-i}^2 + \sum_{i=1}^{q} G_i h_{t-i}.
\end{aligned} \quad (4)
$$

When the actual output of the network model is inconsistent with the expected output, an output error E will be generated. The expression is as follows:

$$E = \frac{1}{2}(d - O)^2 = \frac{1}{2}\sum_{k=1}^{l}(d_k - o_k)^2. \quad (5)$$

Expand the error to the hidden layer; there are

$$E = \frac{1}{2}\sum_{k=1}^{l}\left[d_k - f\ (\text{net}_k)\right]^2 = \frac{1}{2}\sum_{k=1}^{l}\left[d_k - f\left(\sum_{j=1}^{m} w_{jk}y_j\right)\right]^2. \quad (6)$$

When the weight and threshold iterations corresponding to the neurons in each layer are over, the learning and training phase of the neural network enters the forward propagation link again [5, 6].

$$
\begin{aligned}
P(T(X(t)) = X(t+1)) &= P\{X(t+1) = X'|X(t) = X\} \\
&= \prod_{i=1}^{n} P\{X_i(t+1) = x_i(t+1)|X_i(t) = x_i(t)\}.
\end{aligned} \quad (7)
$$

As a basic platform, in order to overcome the occurrence of the above situation, it must have basic isolation to ensure the independence of the service execution environment and hardware resources of each user. Containerized virtualization technology can provide system isolation for the platform, from the operating system to the software services, which are all defined by users, so as to provide users with a more flexible service execution environment [7]. Since the nodes in the cluster sometimes stop for various reasons, the cluster management tool usually automatically migrates all the containers running on this node to other nodes in the cluster. However, if some containers use local data volumes,

data loss will occur when the containers are migrated. Using network storage disks or distributed storage disks will be a viable choice [8].

The calculation formula of the autocorrelation coefficient of the current period and the previous period data is as follows:

$$p_k = \sum_{i=1}^{n} \frac{1}{n} \left(\frac{\widetilde{a}_i^k - \widetilde{u}_k}{\widetilde{\sigma}_k} \right) \left(\frac{\widetilde{a}_i^{k+1} - \widetilde{u}_{k+1}}{\widetilde{\sigma}_{k+1}} \right). \tag{8}$$

The FFT calculation formula is as follows:

$$X(k) = \sum_{n=0}^{N-1} \omega(n) (W_N)^{nk}, \tag{9}$$
$$W_N = e^{-j(2\pi/N)}.$$

Based on the above analysis, it can be seen that compared with the step-counting algorithm in the frequency domain and the time domain, the calculation cost of the former is obviously higher than that of the latter. Although the step-counting algorithm in the frequency domain has a higher computational cost, compared with most step-counting algorithms in the time domain, the step-counting algorithm in the frequency domain usually achieves higher step-counting accuracy [9, 10].

2.2. Physical Training.

Between functional physical training and traditional physical training, they are interrelated and complement each other. Specialization and integrity are the most prominent features of the former. But in the traditional physical training, it can not achieve these two points. In the physical training system, the traditional physical training is the most important foundation. At the beginning, the traditional physical training can be carried out first, and then the functional training can lay a good foundation for the body, so as to prevent the defects of strength training from causing unnecessary sports injury [11]. Functional physical training is not unitary. It needs to integrate and improve the advantages of traditional physical training. We can not ignore the traditional physical training, nor can we just carry out a kind of functional physical training. The two complement each other and complement each other, so as to make a special targeted and integrated training arrangement, so as to improve the athletes' special technical level and ability [12].

Physical fitness itself is an organic whole, not the mechanical or simple addition of various parts. We should understand physical fitness with the help of system theory. Systematic method has become an important method for people to understand and analyze things in modern science. The core idea of systematic view is the overall concept of system [13]. In general, in order to improve the basic shape of sports, improve the system initiative of athletes' organs, and give full play to the best mode of sports mechanism and effect, the physical fitness index system is taken as an important reference standard in the process of training. It belongs to the basic index of technical training and tactical training and has a positive impact on the technology, tactics, load training, physical condition, and sports life of special sports. The establishment of a reasonable physical fitness index system can be used as a powerful carrier for the selection mechanism of athletes in reality [14].

Physical fitness is the foundation of young athletes and provides strong support for their technical level. Ordinary teenagers are mostly in the system of compulsory education or secondary and higher education, and their training purposes and means are different from those of young athletes. As far as the means of physical training are concerned, athletes will be better than ordinary teenagers in terms of selection, training, competition, and other aspects, but from the perspective of physiological development characteristics, they are in the second peak of development. The stimulation of training means will have a more obvious effect on athletes' training, which can provide training support for ordinary teenagers [15]. This will make the competition time longer and test the physical fitness of athletes. If one side's physical condition is not strong, there will be calf muscle cramps, or even acute sports injury. On the court, long-term muscle contraction and ball extension, such as fast movement, kicking, swinging, and wrist strength, are different from the periodic endurance of other sports. Athletes must have special endurance quality, special strength quality, special speed quality, etc. that change with the change of competition intensity [16].

2.3. Pedometer APP.

The primary task of the pedometer algorithm is to obtain the original three-axis acceleration data based on the sensor module and then perform data analysis and algorithm design based on the entire waveform. The actual test shows that there are many interference clutters in the acceleration signal generated by the human body when counting steps in various scenes. Therefore, it is very important to preprocess the original data before formally analyzing the motion waveform [17].

The data collection function of the pedometer is realized by the main controller reading data from the sensor, and its core is the acceleration sensor. The use of analog signal sensors requires additional analog-to-digital converters, which will increase the complexity of the circuit and the space utilization rate; the use of digital signal sensors avoids this problem while using high-precision sensors to ensure the reliability of data. In addition, it is necessary to ensure a higher speed data interface, a certain processing capacity, and lower power consumption in the selection of the main controller and the sensor [18].

The overall architecture of pedometer is shown in Figure 1. According to the function requirement analysis, the acceleration and angular velocity data selected collection of six-axis accelerometer and gyroscope inertial sensor MPU6050, master controller selects 16 ultra-low power consumption microprocessor MSP430G2553. Data transmission can use serial port transmission or wireless module transmission, and the programming of the main controller can be realized through online programmable function [19].

The energy-saving pedometer mainly processes the acceleration sensor data collected by the smart phone using the
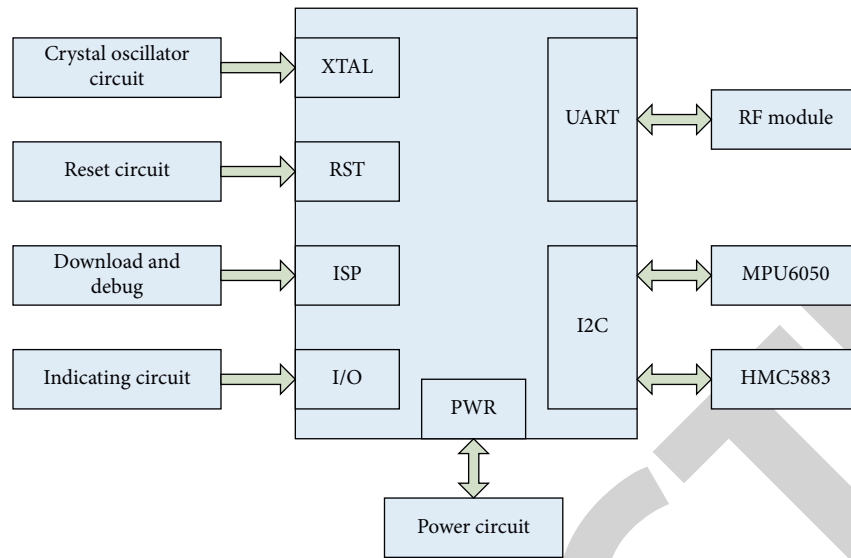
Figure 1: The overall architecture of the pedometer.

energy-saving pedometer algorithm to realize the pedometer function, which is also the core function of the pedometer. In addition, on the premise of meeting the step-counting function, it is also necessary to update the pedestrian walking steps in real time. In addition, in order to reduce the energy consumption of the pedometer, it is also necessary to perform the screen-out operation during pedestrian walking, so at this time, it is necessary to introduce services to realize that the pedometer program can run in the background, so as to ensure that even if the user does not interact with the front end of the pedometer for a long time or the program is switched to the background, it can still run successfully [20].

3. Physical Fitness Training APP Step-Counting Function Experiment

3.1. Operating Environment Configuration.
This article adopts a modular development method to achieve the functional requirements of the system as the goal, based on the principle of science and practicality, and implements the system with several functional modules including parameter management, website configuration, system logs, interface security settings, SMS configuration, and WeChat template messages. Configuration: this system uses PHP dynamic development language, Php5.0–7.0 to build the system framework, MYSQL database management, LINUX, WINDOWS and other mainstream platform operating systems, HTML, CSS, JS, JQUERY, and other technologies to build front-end pages [21]. The experimental equipment parameters are shown in Table 1.

3.2. Establishment of the Human Motion Model.
When the human body is walking normally, the arm swing can be regarded as a simple pendulum movement. According to the characteristics of pendulum, the acceleration changes sinusoidally. Although there are differences in the swing of human walking, the characteristic of sinusoidal variation of acceleration is not affected [22]. A periodic sinusoidal waveform corresponds to a pair of peaks and troughs, and the number of sine waves detected is equivalent to the number of peaks detected. Therefore, the actual step-counting algorithm detects the number of steps through the wave peak of acceleration signal, and a wave peak represents a further advance. Because the human body has a certain rhythm when walking, that is, complete a stepping action as a cycle for circular motion. By calculating the peak or trough formed by the acceleration of gravity, the number of human steps can be detected and the step-counting function of mobile phone can be realized [23].

3.3. Step-Counting Rules.
This article uses three types of sensors to analyze the data changes during walking through three types of data and assigns different weights as the result of step-counting. There is a maximum and minimum acceleration and a minimum and maximum angular velocity in a step cycle. The acceleration is set to $0.2\,g{\sim}2\,g$, and the angular velocity is set to $20°/s{-}200°/s$. When the data exceeds, it is considered as an invalid step. When measuring the peak value of sensor data, only the primary axial data of each sensor is analyzed for peak value, which needs to be determined according to the axial direction of the actual wearing sensor [24].

3.4. Model Evaluation Indicators.
First of all, the BPNN model does not need to make any assumptions about the functional relationship between lagged returns and future returns. Secondly, by orthogonalizing the input space, the possible multicollinearity is eliminated and the uniqueness of hidden nodes is guaranteed. Again, the step-by-step selection process selects the most streamlined model to ensure that the training data will not be overfitted. Finally, it reduces the computational cost required to find the best model structure. Among the methods to achieve this goal, the

TABLE 1: Experimental equipment parameters.

Phone name	CPU model	CPU frequency (GHz)	RAM capacity (GB)	Battery capacity (mAh)
Google Nexus 5	Qualcomm Snapdragon 800	2.3	2	2300
Google Nexus 6	Qualcomm Snapdragon 805	2.7	3	3220

cross-validation method can avoid the occurrence of overfitting and ensure the stability of model performance by controlling the variance of model performance [25].

3.5. Pedometer APP Interface Test. The test of APP system is to correct the interface, check whether the interface is complete enough, whether there is content omission, whether the text in the interface is accurate, whether the format is beautiful, whether the interface style is consistent with the requirements, and whether the pictures and instructions are confused in the most intuitive way. In this paper, the users' evaluation indexes of sports fitness app are divided into two groups: importance and satisfaction, so the obtained data are directly divided into two groups: importance and satisfaction of user experience indexes of sports fitness app, and the two groups of data are matched with sample *t* test to ensure the scientific conclusion. Finally, the advantages and disadvantages of the user experience of college students' sports fitness app in the emerging stage are analyzed through IPA analysis method [26].

3.6. Pedometer APP Usability Evaluation. First, the APP user demand expansion table is listed on the left wall of the house of quality, and then the APP usability index expansion table is included on the ceiling of the house of quality, and the APP usability evaluation quality house is established. The second-level index weight is calculated by the percentage within the second-level index and the first-level index weight. Carry out heuristic evaluation of step-counting APP, score the second-level index of APP usability, and obtain the first-level index score of step-counting APP usability and the total usability score through calculation [27].

4. Experimental Results of Step-Counting Function

4.1. Physical Training Results. With the growth of age, degenerative changes of body function and aging appear. Women's aging rate is faster than men's; participating in sports can improve the degenerative changes caused by age, improve immunity, and delay aging. Women put forward higher requirements for their own health. Sports app has relatively perfect guidance on sports content and sports mode, which meets the needs of women to participate in sports. The results of reliability analysis are shown in Table 2. The reliability of each dimension of the questionnaire is greater than 0.70, so the internal consistency of the data measured in the questionnaire is high and the reliability is high.

Figure 2 shows the degree of college students' understanding of the pedometer APP. As can be seen from the figure, those who know very well account for 13.37% of the

total; those who know basics account for 57.90% of the total; those who are unclear account for 12.09% of the total; those who do not know well account for 9.67% of the total; those who do not understand at all account for 6.97% of the total. According to the sample data, less than 10% of college students still do not understand sports fitness APP at all. It can be seen that, on the one hand, the current sports fitness APP has a high degree of recognition among college students and has a certain social influence. Sports fitness APP has not only received the attention of the public, but also received extensive attention from college students. On the other hand, it can be seen that the publicity of sports and fitness apps for college students is still lacking. In a group that accepts emerging things so quickly, there are still many college students who do not understand sports and fitness apps at all. This should cause sports and fitness apps. The attention of managers and publicity still need to be strengthened.

The gender differences in the use of step app by adolescents are shown in Figure 3. According to the data, there is no significant difference in the proportion of male and female college students using sports app, of which 288 are male students, accounting for 58.2% of the total number, and 16.4% are more than female students. There are three possible reasons for this situation: first, boys' interest in sports far exceeds girls' and their curiosity about sports app far exceeds girls' level; second, boys are better than girls in sports talent and physiological function due to differences in body structure at both the student stage and the adult stage; third, boys should be more determined to exercise.

The number of strength trainings for teenagers is shown in Table 3. In the process of strength training, 26 people can train according to the coach's arrangement, accounting for 27.08% of the total number of people; in the process of strength training, 31 people can adjust the training content and intensity according to their own actual situation, accounting for 32.29%; in the process of strength training, 21 people can adjust the training content and intensity according to their own wishes. Accounting for 21.88% of the total number of people, 18 people did not know how to carry out strength training, accounting for 18.75% of the total number. Combined with the data in the table, the results of the male and female subjects in the control group before and after the experiment were tested, and the P values were 0.003 and 0.002, respectively, both <0.01, showing a very significant difference. In the mode of upper limb strength as the basis of basic quality training, dynamic training can ensure the athletes to complete the required actions within the specified time and limit the time to a certain range. It can effectively cultivate the rapid contraction and relaxation ability of athletes' body muscles, adapt to the basic requirements of competitive sports, and assist with flexibility

TABLE 2: Reliability analysis results.

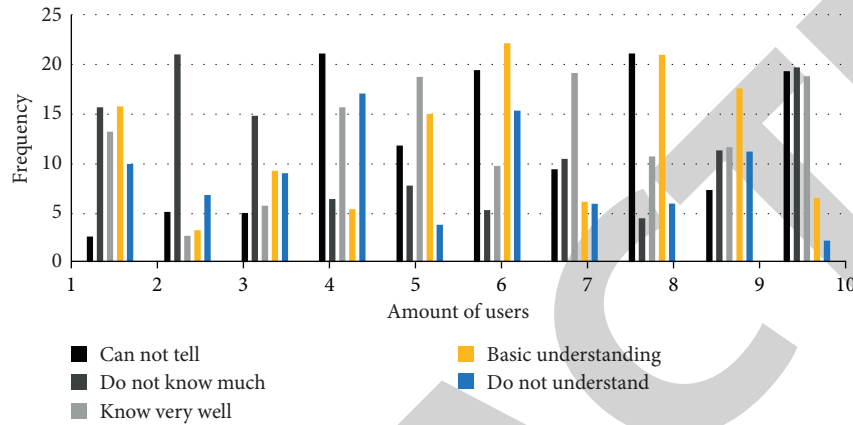|	Cronbach's alpha coefficient	Number of items
Overall data	0.940	23
Health anxiety	0.899	6
Leisure and entertainment	0.830	6
Social needs	0.867	7
Emotional catharsis	0.807	4

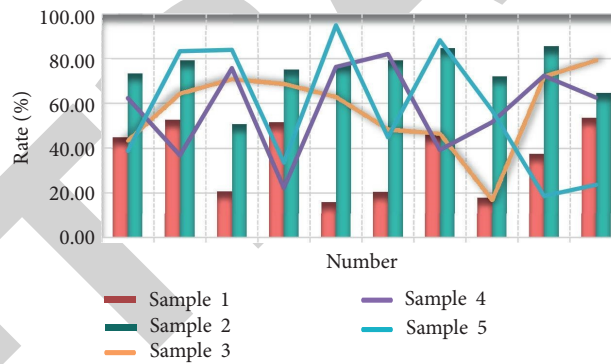FIGURE 2: Undergraduates' understanding of step-counting APP.

FIGURE 3: Gender differences between men and women of teenagers using pedometer apps.

TABLE 3: Number of strength trainings performed by adolescents.

Frequency	Coach		Athlete	
	Number of people	Proportion	Number of people	Proportion (%)
1 time	2	6.67	13	13.54
2 times	24	80	75	78.13
3 times	2	6.67	3	3.13
4 times and above	2	6.67	5	5.21

relaxation training. This can improve the elasticity and extensibility of individual energy parts of the body.

With the continuous improvement of the competitive level of athletes in specialized training, due to the competitive characteristics of competitive sports that explore the limits of the human body, the imbalance of the body caused by specialized training has become more serious. Managers from sports training should establish the concept of rehabilitation physical

training and consider the stages of athletes' training for many years when designing strategic goals. The comparison of pedometer's step accuracy is shown in Figure 4. The accuracies of energy-saving pedometer and autocorrelation pedometer are very similar, and they are better than that of crest detection pedometer. However, under the latter two walking modes, the step-counting accuracy of the three pedometers changed significantly, which may be caused by the obvious changes in the
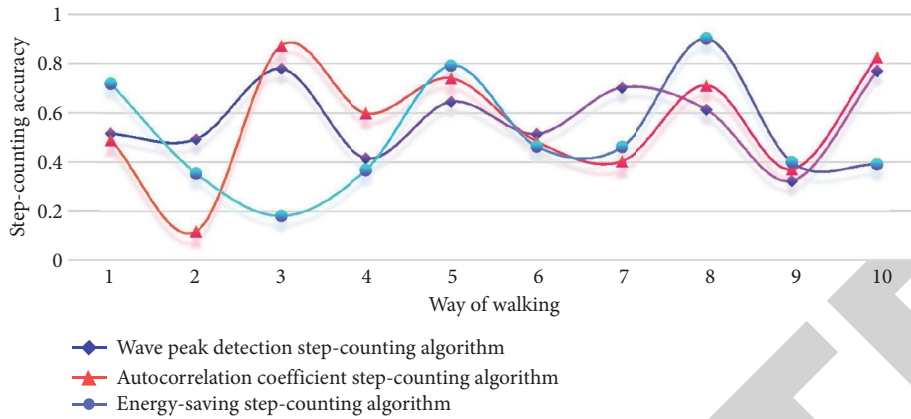
Figure 4: Comparison of step-counting accuracy of pedometer.

walking amplitude of the experimenters during the upstairs process. The experimental results show that the average accuracies of the crest detection step-counting algorithm, the autocorrelation coefficient step-counting algorithm, and the energy-saving step-counting algorithm are 92.4%, 94.4%, and 93.9%, respectively, and the standard deviations of the overall step-counting accuracy of the three step-counting algorithms are 0.045, 0.053, and 0.058, respectively. Through the above experimental results, the average step-accuracy of the three step-counting algorithms can be obtained as 92.7%, 94.7%, and 94.1%, and the average standard deviation of the overall step accuracy is 0.04, 0.045, and 0.055. This result is sufficient to show that the step-counting performance of the energy-saving step-counting algorithm proposed in this paper is approximately the same as the autocorrelation coefficient step-counting algorithm and is better than the step-counting performance of the crest detection step-counting algorithm.

4.2. Analysis of Physical Characteristics.

For athletes, in most cases, physical training is to place people in a more difficult environment for high-intensity, long-term, heavy-load continuous training. The survey results of coaches' awareness of youth physical training are shown in Table 4. 96.7% of the coaches believe that young athletes should be physically trained by age, and they have also considered age characteristics and energy expenditure characteristics.

Figure 5 shows the comparison of the sitting position before and after bending. The data well supports the theory of the sensitive period for the development of flexibility. 6–13 years of age is the best period for children and adolescents to develop flexibility. The high starting point of the pretest data illustrates this point, but there is room for improvement between the experimental group and the control group. The comparison shows that scientific and continuous physical training can accelerate the development of flexibility, but a thorough warm-up should be carried out before the development of flexibility. The experimental group $t = 5.11$, $P = 0 < 0.001$, the difference between the test variables is extremely significant. In the control group, $t = 0.36$, $P = 0.72 > 0.05$, there was no significant difference between the test variables. Analyze the data of the

Table 4: Survey results.

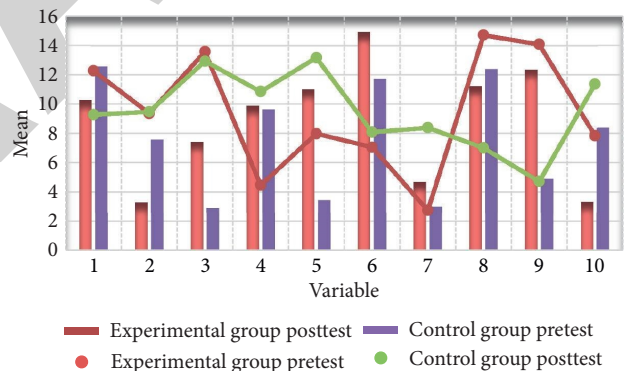| Problem	Yes	Percentage (%)	No	Percentage (%)
1	118	96.7	4	3.3
2	118	96.7	4	3.3
3	4	3.3	118	96.7
4	108	88.5	14	11.5
5	31	25.4	91	74.6

Figure 5: Comparison of sitting position before and after bending.

experimental group and the control group. Although the experimental group has a significant increase in the measured data before and after, the improvement is not large, and the control group data has not improved at all. Not much, but physical training also has a direct impact on the improvement of strength quality.

The score of the first-level index of youth special physical training is shown in Figure 6. The K-S values of each sports quality index are 0.781, 0.344, 0.391, 0.912, 0.135, 0.935, 0.169, 0.914, 0.517, 0.352, 0.807, and 0.694, which are all greater than 0.05. The index data obey the normal distribution, and the standard percentage method can be used to establish a single score table. Through the first-level index score and comprehensive score, we can easily determine the score of any one of the 30 young male badminton players at all levels. However, this has not yet achieved the purpose of comprehensive evaluation. If we do not establish the first-
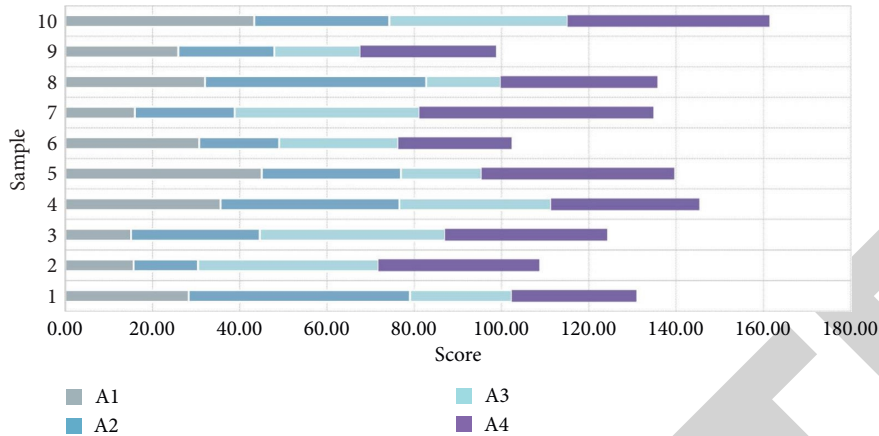
FIGURE 6: The first-level index scores of youth special physical training.

level index and comprehensive quality evaluation standard of athletes, we can not scientifically judge the level and level of athletes in the first-level index and comprehensive quality.

The comparison of FMS test results is shown in Figure 7. This is because the two-point movement is easy to complete, and it can reach the standard in the initial test. The three-point movement is difficult, and only one guard can complete it in the posttest. The three-point movement requires the athletes to complete the balance movement under the condition of the same knee support, which is very difficult for the basketball players with high average height. The average score of the third test is 2.86 higher than that of the first test, and the total score of the three tests shows a very significant difference ($P < 0.01$), which indicates that the formulation and implementation of the plan for the athletes' action mode and prerehabilitation training are successful.

4.3. Impact of Artificial Intelligence Technology.

The results of the core group endurance test for adolescents are shown in Figure 8. The average duration of the whole team's plate support is 103 s, and the duration of the back bridge is 108.14 s. Compared with the two events, the duration of the back bridge is shorter. This is because the force environment of the back bridge is obviously better than that of the plate support no matter from the force arm or the strength of the active muscle. Theoretically, there should be a large gap between the maximum duration of the two movements. Through training, the gluteal muscle activation was higher, and the ability of back bridge was also greatly improved. There was a very significant difference between the results of the first back bridge test and that of the first back bridge test ($P < 0.01$). In basketball, the completion of technical action is mostly in the form of explosive force, so the explosive force directly affects the technical effect of athletes. Especially for young athletes, under the premise of lack of muscle and absolute strength, giving priority to the development of explosive force is the key to this stage of training.

The growth and development of adolescents are characterized by persistence and stages. Body shape and motor function are the two dimensions of physical fitness. The characteristics of adolescents aged 13 to 15 are the basis for the construction of physical training content. The physical activity characteristics of children, adolescents, and adults are also reflected in these two aspects. For example, the height and weight of training equipment should be reduced for teenagers before their height suddenly increases, so as to adapt to the adaptability of their training. The sensitivity of different types of strength quality of adolescents is shown in Figure 9. Through the results, we can see that, in the process of describing each strength, its weight and proportion are also different. In this way, in the process of evaluation, we can classify and analyze different strength elements and qualities according to different types, which is also helpful for us to grasp the core index connotation in the training process, and avoid blindness and ineffectiveness in training.

The experimental results of the pedometer method are shown in Table 5. It can be seen from the table that even though the proposed method does not always perform the best for each walking activity considered, its accuracy is close to the optimal, with an average accuracy of 95.74%, which is at least 3.81% higher than the commonly used algorithm, which is at least 3.39% higher than the comparative step-counting software. From the maximum and minimum values, it can be known that the accuracy of this method is in the range of 77.97%–100%. Compared with other methods and step-counting software in the table, the difference between the maximum and minimum value of this method is the smallest, which indicates that the performance of FG method is relatively stable. This method is less affected by personal factors, and there is no case that the step-counting method has a high accuracy rate for one volunteer, but the other is very poor. Through observation, it can be found that, for RBF neural network, the more the number of hidden layer nodes, the higher the prediction accuracy. For the four models with hard ridge penalty, when the number of hidden layer nodes is reduced from 50 to 16, they also have the highest prediction accuracy; that is, the optimal hidden layer node is 16.

5. Conclusions

This article first selects NFS files and CEPH files as the object of the system performance test, selects the distributed file system as the basic storage, selects the CEPH file system as
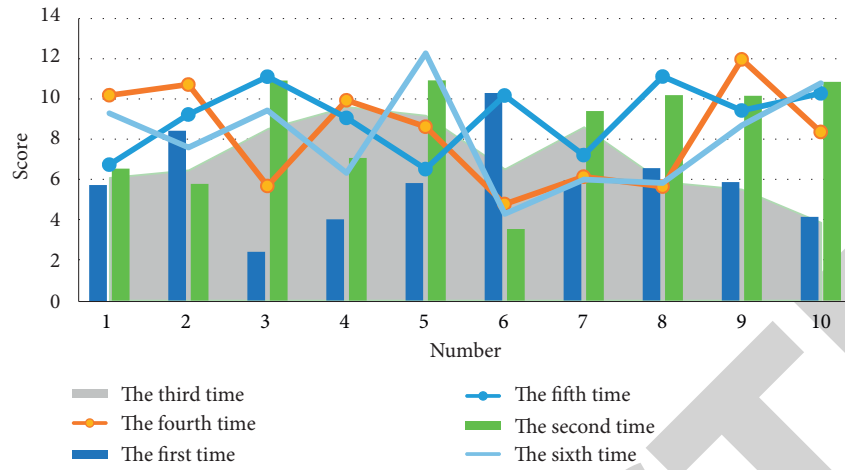
Figure 7: Comparison of FMS test results.

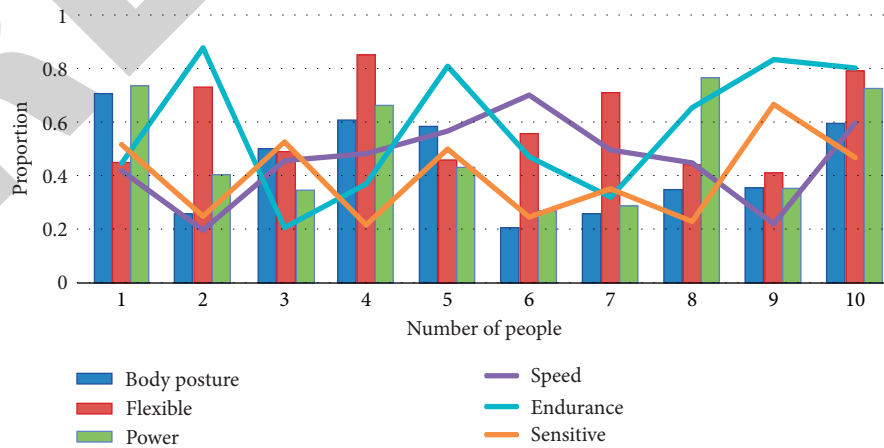Figure 8: Endurance test results of adolescent core muscles.

Figure 9: The sensitivity of adolescents to different types of strength qualities.

TABLE 5: Experimental results of step-counting method.

Method		J A (%)	K A (%)	L A (%)	M A (%)	N A (%)	O A (%)
FG	Minimum	96.54	91.55	93.42	90.35	87.32	77.97
	Max	100	98	99.57	99.57	100	100
	Average	98.55	95.83	96.47	96.76	94.9	91.95
FA	Minimum	87.67	67.83	58.55	67.37	89.83	47.46
	Max	98.5	98	98.25	98.22	98.59	80
	Average	93.49	86.67	86.47	86.15	95.86	69.32
AC	Minimum	89.43	82.63	90.83	72.73	54.24	47.46
	Max	100	97.39	98.7	99.58	96.72	88.14
	Average	95.83	88.84	95.55	88.06	78.76	70.2

the storage medium, and selects files based on the network layer. The traditional analysis method based on correlation coefficient can no longer deal with the relationship between dependent variables and multiple groups of independent variables, but the data mining algorithm can find the independent variables with strong correlation with the dependent variables from the massive data, so as to take them as the input set of the model.

Pedometers can not only play a certain medical role in aging and obesity patients, but also are increasingly used in people's daily exercise and fitness. It is accepted by the public and pays attention to the health of today's fast social life. It will be beneficial to the improvement of the overall health of the society and the development of pedometer design. The step-counting method uses peak detection method to obtain the fusion result of step-counting by taking different weights for different and quality data.

Through actual measurement and evaluation, the data shows that the pedometer designed in this paper has a step accuracy of 95%, stable performance, and strong anti-interference ability. Different from other mobile phone step-counting algorithms that only use acceleration sensor data, this paper combines acceleration and distance sensor data to realize step-counting, using acceleration sensor data for gait feature analysis, using distance sensor data to determine the location of the mobile phone, and improving the accuracy of human hand-held mobile phone step-counting, especially when walking without swinging arms.

Data Availability

No data were used to support this study.

Conflicts of Interest

The author declares that there are no conflicts of interest regarding the publication of this paper.

References

[1] E. S. E. Din, Y. Zhang, and A. Suliman, "Mapping concentrations of surface water quality parameters using a novel remote sensing and artificial intelligence framework," *International Journal of Remote Sensing*, vol. 38, no. 4, pp. 1023–1042, 2017.

[2] R. H. Kulkarni and P. Padmanabham, "Integration of artificial intelligence activities in software development processes and measuring effectiveness of integration," *IET Software*, vol. 11, no. 1, pp. 18–26, 2017.

[3] F. Goyache, J. J. Del Coz, J. R. Quevedo et al., "Using artificial intelligence to design and implement a morphological assessment system in beef cattle," *Animal Science*, vol. 73, no. 1, pp. 49–60, 2016.

[4] D. Norman, "Design, business models, and human-technology teamwork as automation and artificial intelligence technologies develop, we need to think less about human-machine interfaces and more about human-machine teamwork," *Research-Technology Management*, vol. 60, no. 1, pp. 26–30, 2017.

[5] B. K. Bose, "Artificial intelligence techniques in smart grid and renewable energy systems-some example applications," *Proceedings of the IEEE*, vol. 105, no. 11, pp. 2262–2273, 2017.

[6] A. Ema, N. Akiya, H. Osawa et al., "Future relations between humans and artificial intelligence: a stakeholder opinion survey in Japan," *IEEE Technology and Society Magazine*, vol. 35, no. 4, pp. 68–75, 2016.

[7] M. Nasr, A. E. D. Mahmoud, M. Fawzy, and A. Radwan, "Artificial intelligence modeling of cadmium(II) biosorption using rice straw," *Applied Water Science*, vol. 7, no. 2, pp. 823–831, 2017.

[8] A. H. Mazinan and A. R. Khalaji, "A comparative study on applications of artificial intelligence-based multiple models predictive control schemes to a class of industrial complicated systems," *Energy Systems*, vol. 7, no. 2, pp. 237–269, 2016.

[9] I. I. Baskin, T. I. Madzhidov, I. S. Antipin, and A. A. Varnek, "Artificial intelligence in synthetic chemistry: achievements and prospects," *Russian Chemical Reviews*, vol. 86, no. 11, pp. 1127–1156, 2017.

[10] M. A. Ali, "Artificial intelligence and natural language processing: the Arabic corpora in online translation software," *International Journal of Advanced and Applied Sciences*, vol. 3, no. 9, pp. 59–66, 2016.

[11] S. Narita, N. Ohtani, C. Waga, M. Ohta, J. Ishigooka, and K. Iwahashi, "A pet-type robot Artificial Intelligence Robot-assisted therapy for a patient with schizophrenia," *Asia-Pacific Psychiatry*, vol. 8, no. 4, pp. 312-313, 2016.

[12] M. Taheri, M. R. A. Moghaddam, and M. Arami, "Improvement of the/Taguchi/design optimization using artificial intelligence in three acid azo dyes removal by electrocoagulation," *Environmental Progress & Sustainable Energy*, vol. 34, no. 6, pp. 1568–1575, 2016.

[13] S. Tkatek, S. Bahti, and J. Abouchabaka, "Artificial intelligence for improving the optimization of NP-hard problems: a review," *International Journal of Advanced Trends in Computer Science and Engineering*, vol. 9, no. 5, pp. 7411–7420, 2020.

[14] R. C. Adams and B. Rashidieh, "Can computers conceive the complexity of cancer to cure it? Using artificial intelligence technology in cancer modelling and drug discovery," *Mathematical Biosciences and Engineering*, vol. 17, no. 6, pp. 6515–6530, 2020.

[15] M. Y. Zub, "Transformation of labor market infrastructure under the influence of artificial intelligence," *Business Inform*, vol. 8, no. 511, pp. 146–153, 2020.

[16] L. Hudasi and L. Ady, "Artificial intelligence usage opportunities in smart city data management," *Interdisciplinary Description of Complex Systems*, vol. 18, no. 3, pp. 391–397, 2020.

[17] S. Jha and E. J. Topol, "Adapting to artificial intelligence: radiologists and pathologists as information specialists," *JAMA*, vol. 316, no. 22, pp. 2353-2354, 2016.

[18] L. D. Raedt, K. Kersting, S. Natarajan, and D. Poole, "Statistical relational artificial intelligence: logic, probability, and computation," *Synthesis Lectures on Artificial Intelligence and Machine Learning*, vol. 10, no. 2, pp. 1–189, 2016.

[19] R. Liu, B. Yang, E. Zio, and X. Chen, "Artificial intelligence for fault diagnosis of rotating machinery: a review," *Mechanical Systems and Signal Processing*, vol. 108, no. 8, pp. 33–47, 2018.

[20] J. H. Thrall, X. Li, Q. Li et al., "Artificial intelligence and machine learning in radiology: opportunities, challenges, pitfalls, and criteria for success," *Journal of the American College of Radiology*, vol. 15, no. 3, pp. 504–508, 2018.

[21] P. Glauner, J. A. Meira, P. Valtchev, R. State, and F. Bettinger, "The challenge of non-technical loss detection using artificial intelligence: a survey," *International Journal of Computational Intelligence Systems*, vol. 10, no. 1, pp. 760–775, 2017.

[22] M. Seyedmahmoudian, B. Horan, T. K. Soon et al., "State of the art artificial intelligence-based MPPT techniques for mitigating partial shading effects on PV systems—a review," *Renewable and Sustainable Energy Reviews*, vol. 64, no. 10, pp. 435–455, 2016.

[23] R. Barzegar, J. Adamowski, and A. A. Moghaddam, "Application of wavelet-artificial intelligence hybrid models for water quality prediction: a case study in Aji-Chay river, Iran," *Stochastic Environmental Research and Risk Assessment*, vol. 30, no. 7, pp. 1797–1819, 2016.

[24] Z. Wang and R. S. Srinivasan, "A review of artificial intelligence based building energy use prediction: contrasting the capabilities of single and ensemble prediction models," *Renewable and Sustainable Energy Reviews*, vol. 75, no. 8, pp. 796–808, 2016.

[25] L. Caviglione, M. Gaggero, J. F. Lalande et al., "Seeing the unseen: revealing mobile malware hidden communications via energy consumption and artificial intelligence," *IEEE Transactions on Information Forensics & Security*, vol. 11, no. 4, pp. 799–810, 2017.

[26] T. Yang, A. A. Asanjan, E. Welles, X. Gao, S. Sorooshian, and X. Liu, "Developing reservoir monthly inflow forecasts using artificial intelligence and climate phenomenon information," *Water Resources Research*, vol. 53, no. 4, pp. 2786–2812, 2017.

[27] C. Modongo, J. G. Pasipanodya, B. T. Magazi et al., "Artificial intelligence and amikacin exposures predictive of outcomes in multidrug-resistant tuberculosis patients," *Antimicrobial Agents and Chemotherapy*, vol. 60, no. 10, pp. 5928–5932, 2016.