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Retraction

Retracted: An Extraction System of Ice and Snow for Sports Technical Index Using Internet of Things

Wireless Communications and Mobile Computing

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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.

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] M. Fu, T. Yang, Q. Zhong, and J. Dong, "An Extraction System of Ice and Snow for Sports Technical Index Using Internet of Things," *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 6289931, 12 pages, 2022.

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Research Article

An Extraction System of Ice and Snow for Sports Technical Index Using Internet of Things

Ming Fu,[1] **Tao Yang**,[2] **Qun Zhong**,[3] **and Jixue Dong**[4]

[1]*Department of Physical Education, Heilongjiang Bayi Agricultural University, Daqing, 163319 Heilongjiang, China*
[2]*School of Kinesiology and Health Promotion, Dalian University of Technology, Dalian, 116024 Liaoning, China*
[3]*School of Foreign Languages, Northeast Petroleum University, Daqing, 163000 Heilongjiang, China*
[4]*Faculty of Science, Heilongjiang Bayi Agricultural University, Daqing, 163319 Heilongjiang, China*

Correspondence should be addressed to Ming Fu; fuming139@byau.edu.cn

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With the economic development in recent years and the holding of the 2022 Winter Olympics, ice and snow sports have been widely popularized and promoted around the world. More and more outdoor sportsmen are appearing, and the movement is an extremely intense outdoor sport, so it is very popular among outdoor enthusiasts, but physical injuries can easily occur during exercise. Therefore, aiming at this problem, this paper studies the extraction system of the movement technical indicators. This paper is aimed at studying the extraction system of the movement technical indicators based on the Internet of Things. This paper proposes the development of the Internet of Things and the importance of the movement sports, describes the concepts of the two in detail, and proposes a wireless sensor network method using Internet of Things. The experimental results show that the average opening percentage of Chinese ski resorts in 2016 was around 8.5%. By 2021, the opening percentage of Chinese ski resorts will reach a maximum of around 37%. It can be seen that China is paying more and more attention to the movement sports, and the development of the movement is becoming more and more important. From the data in Table 4, it can be seen that 50 ice and snow sports enthusiasts believe that the favorable influence of ice and snow sports is that people can understand the ice and snow culture and make it inheritable. This can improve people's physical fitness and is conducive to healthy development.

1. Introduction

The movement is a form of sports culture produced in a specific environment. College movement culture is the most extensive and dynamic way of expression in college campuses, and it is accepted by more and more college students. The movement is fitness activities suitable for public participation and an indispensable element in life. However, the technology of the movement is not very mature. Many the movement players are not skilled enough in the technology, which often leads to physical injuries and injuries.

The development and changes of the movement, as well as the inheritance of the movement culture, are the embodiment of people's continuous adaptation to the environment, changes in the environment, and the improvement of their ability to adapt to the environment. It can be known from history that people fought against nature in the movement, experienced the joy of conquering nature, and created a better life. With the development of the times, the inheritance of the movement culture from generation to generation and continuous innovation have promoted the development of the movement and re-formed people's understanding of the movement. IoT is a very advanced, comprehensive, and complex system. Its ultimate goal is to establish a global, to open identification standard for a single product, and to achieve information sharing based on global network connections.

The innovations of this paper are as follows: (1) the theoretical knowledge of the Internet of Things and the movement is introduced, and the Internet of Things is used to analyze how the Internet of Things plays a role in the research of the technical index extraction system of the

movement. (2) This paper conducts a detailed analysis of the wireless sensor network proposed based on the Internet of Things. It is found through experiments that the movement technical index extraction system based on wireless sensors can well extract various parameters of the movement players.

2. Related Work

With the development of the Internet of Things, the use of wireless sensors is becoming more and more important. Bera et al. found that the Internet of Things (IoT) enables billions of devices to collect and exchange real-time information through network connections to provide intelligent services. Thus, IoT allows remote control and access to connected devices where sufficient network infrastructure exists. However, traditional network technologies such as timeout-based transport protocols cannot handle the needs of IoT in an efficient manner [1]. Talari et al. found that with the expansion of smart meters, every smart city is equipped with various electronic devices; therefore, devices and technology make people's lives smarter. His aim is to provide a comprehensive review of smart city concepts and their strengths and weaknesses and to discuss how they can be integrated and applied to smart city development. The potential application of smart cities to future technological developments provides another valuable discussion for his research. Although the scholar realized that the application of the Internet of Things in smart cities is very important, there are no specific experiments and data to illustrate the development of smart cities [2]. Qiu et al. proposed an effective tree-based self-organization protocol, which can be used in the Internet of Things. All nodes are only divided into network nodes and nonnetwork nodes. Experiments have proved that the protocol they proposed can be fast and accurate and build tree-based networks. However, the scholar did not conduct simulation experiments, so the authenticity of his simulation results cannot be demonstrated [3]. Hu et al. found that identification and parsing technology is a prerequisite for realizing identity consistency in the Internet of Things (IoT) and cyberspace mapping. As a unique nonencoded and unstructured identifier, the human face has special advantages in recognition applications. With more and more applications based on face recognition, people's requirements for computing, communication, and storage capabilities are also increasing. To solve this problem, they proposed a face recognition and resolution scheme based on fog computing. Face identifiers are first generated by the recognition system model to identify individuals. Then, they proposed a fog computing-based parsing framework to efficiently resolve individuals' identities. Although the scholar raised the problem and mentioned the solution to the problem, there is no specific experimental process, which makes the method they proposed seem unreal [4]. Munir et al. found that the use of various IoTs will generate a large amount of data, which will increase the complexity of the work and reduce the efficiency, so it is necessary to find an effective solution to these problems. For example, data can be transferred to a cloud data center for processing. But the scholar did not mention the specific method of effectively processing these data [5]. Ma et al. found that the Internet of Things may develop into the core part of the future network. The application of the Internet of Things is very extensive, so it is of great significance to understand the network problems behind the development of the Internet of Things. They first discovered that the key problem of the Internet of Things is how to process and efficiently transmit a large amount of data. However, the scholar only pointed out the key problems of the Internet of Things and did not give a specific description of these problems and how to solve them [6]. Tokognon et al. found that IoT is becoming more and more important in people's lives because it can process complex data. The rapid development of sensing technology and the development of wireless communication have made the Internet of Things increasingly important. So they introduced big data solutions to deal with the complexity of data and increase the speed of data processing. But the scholar did not elaborate on why the IoT can collect complex and large amounts of data [7]. Li et al. found Maximum Margin Clustering (MMC) to be an efficient clustering algorithm that first extended the principle of large margins to unsupervised learning. They revisited the MMC problem and pointed out potential problems encountered with the cutting plane approach. An improved MMC algorithm is proposed by the bundling method (BMMC). Experiments show that it has high scalability. Compared with previous works, the proposed solution is simpler and faster. Experiments were performed on several datasets to demonstrate the effectiveness of their proposed algorithm [8]. Shin et al. applied a recent region-based convolutional neural network (CNN) approach to automatically detect polyps in images and videos obtained from colonoscopy. Use a deep CNN model (Inception Resnet) as a transfer learning scheme in the detection system. To overcome polyp detection barriers and few polyp images, they also studied image augmentation strategies for training deep networks. We further propose two effective postlearning methods, such as automatic false-positive learning and offline learning, both of which can be combined with region-based detection systems for reliable polyp detection. Using a large colonoscopy database, experimental results show that the proposed detection system exhibits better performance than other systems [9].

3. The Concept of IoT and the Movement

In recent years, with the rapid development of China's economy, the life philosophy of the Chinese people has changed from "the satisfaction of material life" to "the pursuit of physical and mental health," people pay more and more attention to the health of the body and the happiness of the mind. More and more people are devoted to various forms of sports activities with great enthusiasm, and mass sports in China has ushered in a golden period of accelerated and vigorous developments [10]. This paper analyzes the development of the movement from 2011 to 2021, as shown in Figure 1.

As shown in Figure 1, generally speaking, the research direction has changed from natural science to social science.

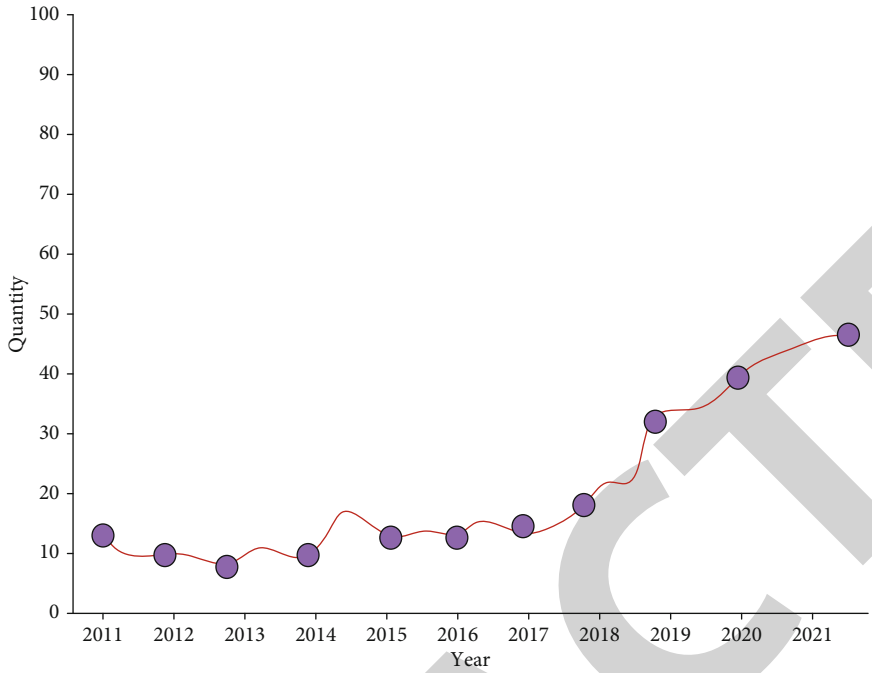


Figure 1: Development of sports 2011-2021.

In 2011, the development trend of ice and snow sports accounted for about 15%, and by 2021; the percentage of ice and snow sports development accounted for about 50%. And the scope of news reports and popular science education has begun to diversify. Related researches on the movement, the movement tourism, the movement art, and the movement culture have begun to receive attention [11].

The movement cultural activities began to be separated from production activities and independently appeared on the stage of social life as cultural activities. In the following two centuries, after a long evolution process, skating has gradually become a popular winter sports activity. It was also during this period that skiing became popular in the world [12]. The movement are shown in Figure 2.

As shown in Figure 2, the movements are also known as winter sports. The definition of winter sports is as follows: winter sports are the main category of sports and are the general term for various sports performed on natural or artificial movement fields, with a variety of equipment. Because it is played in winter, it is called winter sports [13].

The number of ski resorts established in China from 2016 to 2019 is shown in Table 1.

As shown in Table 1, with the continuous strengthening of China's comprehensive strength and the continuous improvement of its international status, it has greatly promoted the development of China's sports industry. Establishing a complete set of sports technical index extraction system is not only the importance of the movement but also the top priority of China's the movement projects in the future. The sports in the movement are shown in Figure 3.

As shown in Figure 3, in this new era of rapid development of science and culture, campus culture is the soul of colleges and universities and the foundation of harmonious campus construction. Strengthening the construction of campus culture in colleges and universities is an inevitable requirement for the prosperity of socialist culture. The movement feast belonging to college students makes the concept of the movement on college campuses deeply rooted in the hearts of the people [14].

People regard the Internet of Things as the most important part of the new generation of information technology. As a new network, the main purpose of IoT is to realize intelligent identification, configuration, monitoring, and management of objects [15]. The working principle of the Internet of Things is through information devices such as RFID, infrared sensors, global positioning systems, and laser scanners. It connects various objects to the existing Internet to realize information exchange and communication [16].

4. Design of Extraction System for Technical Indexes of the Movement

Using the Internet of Things technology, people can use the Internet of Things to exchange a large amount of information with everyone anytime, anywhere, and can also communicate on the network. This high-level technology is considered to be the goal of future development [17]. The IoT technology is shown in Figure 4.

As shown in Figure 4, the Internet of Things has the following characteristics: (1) in strict security and control, the Internet of Things has the function of protecting important information within individuals or groups and preventing network attacks. (2) It requires extensive use of many perceptual techniques. There are many kinds of sensors distributed on the Internet, each of which functions as a data flow message and can transmit the data flow information collected by various sensors in various capacities and forms. Sensors can collect information about the surrounding

Figure 2: The movement.

Table 1: Number of ski resorts established in China from 2016 to 2019.

Years	Quantity	Increase
2016	280	25
2017	321	41
2018	476	155
2019	893	471

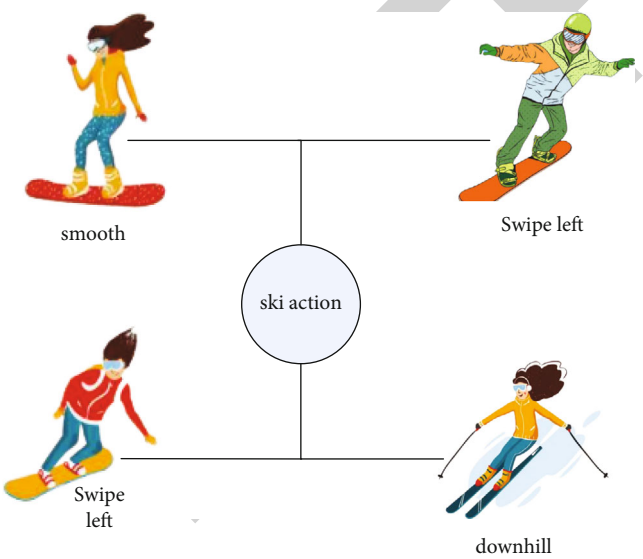


Figure 3: Sports actions in the movement.

environment from each other according to a specially set frequency and update the data at any time, so the collected data is real-time. (3) The Internet of Things is a network formed by the connection between various sensors. The Internet of Things itself has intelligent processing functions and can intelligently monitor various objects [18].

Sensors can be regarded as an extension of human senses [19] and are a very important device in unknown areas or the areas that are not suitable for human exploration. The structure of the sensor is shown in Figure 5.

As shown in Figure 5, the sensor signal is converted into another form of output that can be easily identified, recorded, and analyzed, which can then be processed by various processors [20].

ZigBee technology is a two-way wireless communication technology, which has been widely used in industrial monitoring automation, sensor network, home monitoring, and other fields in recent years [21]. It is suitable for the transmission of data and information between electronic products with short distance, energy saving, and low speed requirements. The design of this system adopts the ZigBee wireless sensor network networking scheme, and the topology of the scheme is shown in Figure 6.

As shown in Figure 6, the system consists of three parts: data acquisition terminal, data base station, and WEB website. The data base station is arranged in the center of the movement field, and the base station is connected to a computer PC, which acts as a server to process the collected information [22].

This paper uses ZigBee technology to design the system because it has many advantages, as shown in Figure 7.

As shown in Figure 7, the advantages of ZigBee are low power consumption: in the working mode, the transmission rate of ZigBee is lower than other communication technologies, so the amount of data transmitted is also very small, and the reception and transmission time of the signal is very short; in the case of nonworking mode, no communication is performed, and the ZigBee node is in sleep mode with lower power consumption [23].

(i) Low cost: it incurs less than one tenth the cost of Bluetooth. In short distances, long-distance transmission can be carried out if relayed by routing and communication between nodes.

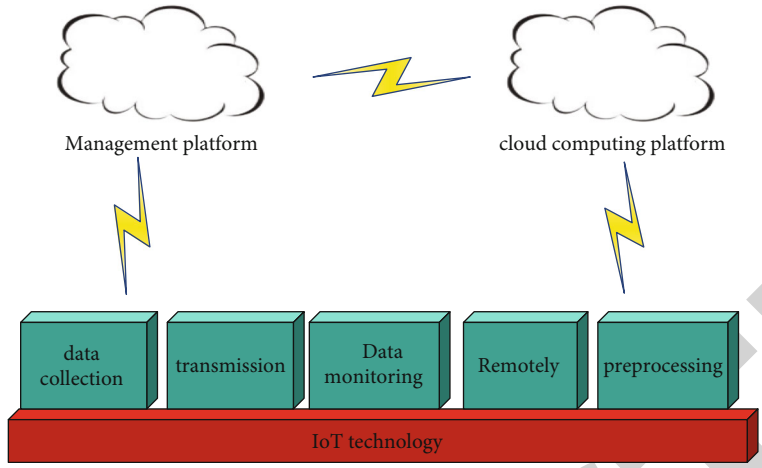


Figure 4: IoT technology.

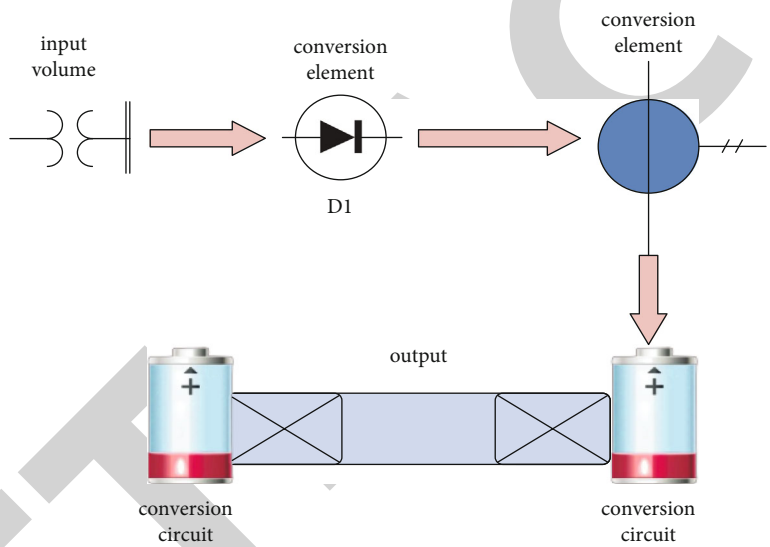


Figure 5: Structure of the sensor.

(ii) Short delay: delay sensitivity is a drawback of wireless communication, and ZigBee has been optimized for this situation. It shortens the communication delay and also reduces the activation delay from the dormant state, further saving power.

(iii) High reliability: ZigBee adopts a collision avoidance mechanism. Once the reply of confirmation message is not received, it means that a collision has occurred and will be transmitted again. This ensures the successful transmission of information and improves the reliability of system communication.

The design goal of the data acquisition terminal of this system is as follows: multiple data acquisition terminals are distributed around the data base station or at the designated location, which can collect the physical parameters of the exerciser, such as heart rate and blood pressure. It can also capture the movement speed, position, and whether the ski slope is suitable for the athlete. Its appearance design is shown in Figure 8.

As shown in Figure 8, the system adopts a big data intelligent background analysis platform to realize real-time online intelligent analysis and real-time release of large-scale sports test data. It can automatically calculate the distance, speed, and other information of the athlete.

The protagonists of ice and snow sports are athletes. With the smart athlete management system, managers can know the regular physiological indicators of athletes at any time and analyze the strengths and weaknesses of athletes, to put forward a targeted training plan for athletes, so as to manage them effectively.

5. Location Algorithm for Wireless Sensor Networks

5.1. Centroid Algorithm. The most important part of the centroid positioning algorithm is that the unknown node

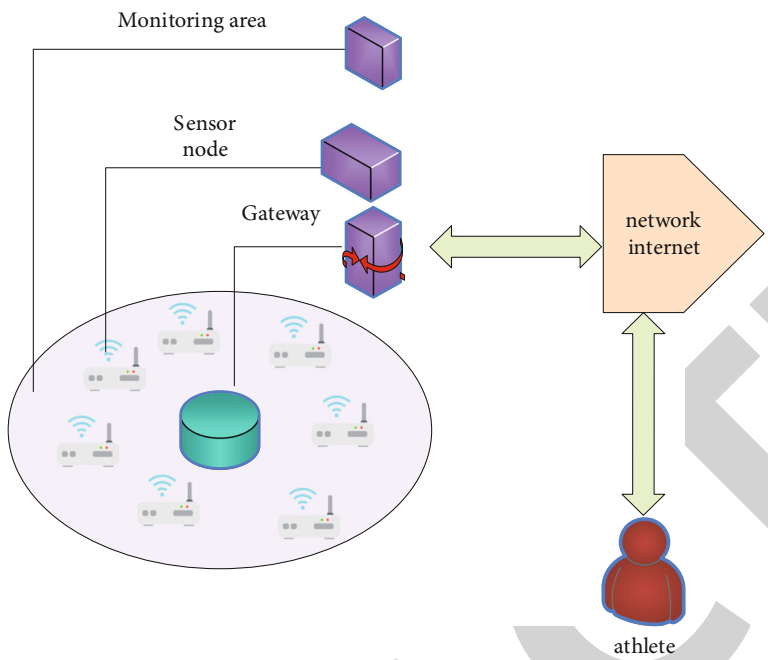


Figure 6: ZigBee wireless sensor network networking scheme.

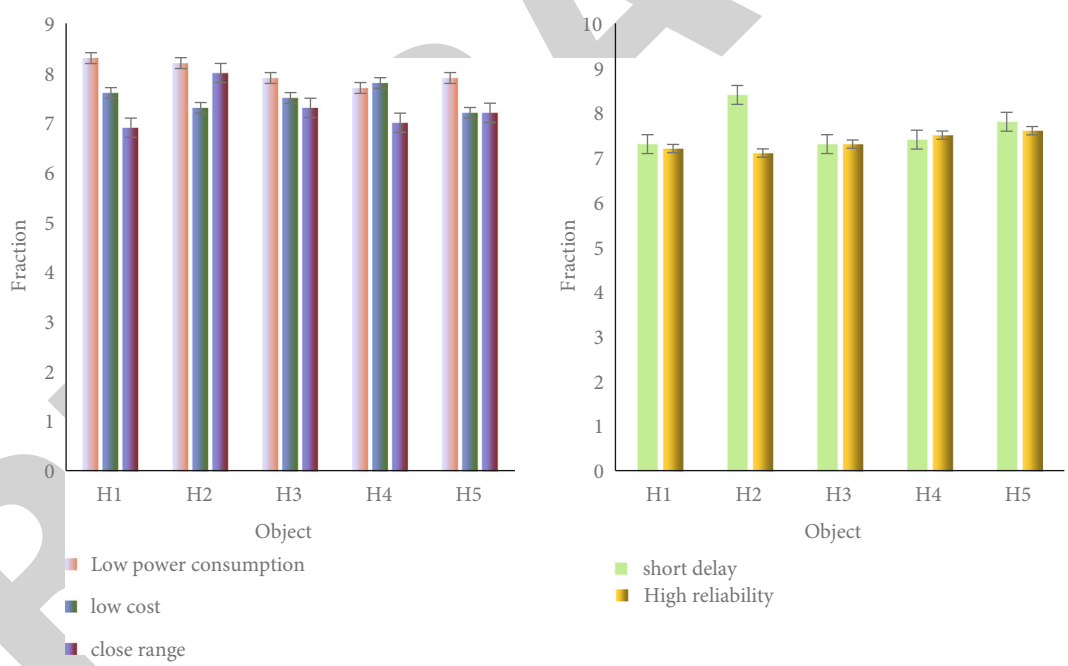


Figure 7: Advantages of ZigBee technology.

obtains the location information of the nearby beacon nodes. Node localization is one of the key technologies in wireless sensor networks. The centroid location algorithm completely depends on the density and distribution of anchor nodes. The density of anchor nodes is small and randomly distributed, so the location accuracy of the centroid location algorithm is relatively low. Considering the geometric centroid of the polygon as the estimated coordinate (A, B) of the unknown node, as in

$$(A, B) = \left(\frac{a_{i1}+\cdots+a_{ik}}{k}, \frac{b_{i1}+\cdots+b_{ik}}{k}\right). \quad (1)$$

Among them, there are k beacon nodes connected to the unknown node, and the location information $(a_{i1}+\cdots+a_{ik})/k$ is expressed as the location coordinates of these beacon nodes.

The algorithm proposed in this section mainly calculates the positioning node according to the strength of the

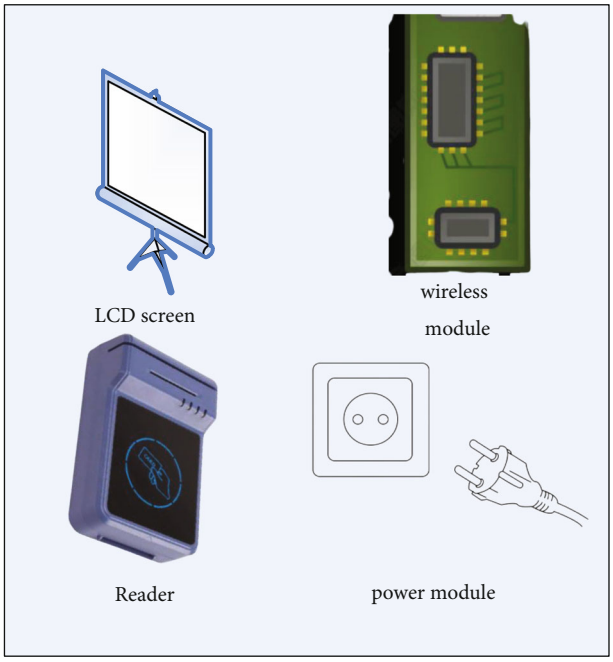


Figure 8: Appearance design of the movement technical index extraction system.

received signal energy as the weight. The relationship between them is as

$$r_i = \frac{\alpha}{|A - S_i|} + n. \tag{2}$$

Among them, r_i represents the energy intensity that the i th node can receive, while α represents the initial energy emitted by the node target, and A is the coordinate position of the target. S_i is the coordinate of the ith node, and the coordinate of the target unknown node at known time t is (a_i, b_i), so the position information of the unknown node at time t is as

$$\begin{aligned} A_t &= \frac{\sum_{i=1}^{m} w_i a_i}{\sum_{i=1}^{m} w_i}, \\ B_t &= \frac{\sum_{i=1}^{m} w_i b_i}{\sum_{i=1}^{m} w_i}. \end{aligned} \tag{3}$$

The positioning accuracy is usually expressed by the relative error value, that is, the ratio of the average absolute error of the positioning node to the communication radius, such as

$$\mathrm{ERR} = \sum_{i=1}^{N} (a_{ei} - a_{oi})^2 - (b_{ei} - b_{oi})^2. \tag{4}$$

Among them, (a_{ei}, b_{ei}) is the estimated coordinate of the unknown node, and (a_{oi}, b_{oi}) is the coordinate of the original unknown node. Formula (4) shows that the smaller the error value, the higher the positioning accuracy.

The positioning accuracy obtained by the positioning algorithm before and after the improvement is shown in Figure 9.

As shown in Figure 9, since the improved positioning algorithm uses the signal energy strength of the node as the weight for positioning, the obtained positioning accuracy is significantly higher than that of the traditional positioning algorithm.

5.2. DV-Hop Algorithm. The DV-Hop positioning algorithm is the most widely used positioning method in the APS algorithm series. Its positioning process does not depend on the ranging method but uses the multihop beacon node information to participate in the node positioning, and the positioning coverage is large. The DV-Hop algorithm is a positioning method without ranging. The average distance per hop is calculated according to the location information of the beacon node and the number of hops between other beacon nodes and broadcast to other nodes in the wireless network, as shown in

$$\mathrm{hop}_i = \frac{\sum_{i \neq j} (a_i - a_j)^2 + (b_i - b_j)^2}{\sum_{i \neq j} h_{ij}}. \tag{5}$$

In the formula, (a_i, b_i) and (a_j, b_j) represent the positions of the beacon nodes i and j, respectively, and the coordinate h_{ij} represents the minimum number of hops, and the distance from each beacon node is obtained as

$$d_{iq} = \mathrm{hop}_i \times h_{iq}. \tag{6}$$

hop_i represents the average hop distance of the nearest beacon node, and h_{iq} represents the minimum number of hops between the unknown node and the beacon node.

In this paper, the node density of the beacon node is defined by the deviation of the average distance per hop of the node from the communication radius, and its formula is

$$\rho_i = (R - \mathrm{hop}_i) R. \tag{7}$$

The smaller hop_i is, the greater the node density. The compensation formula C_i of the beacon node is

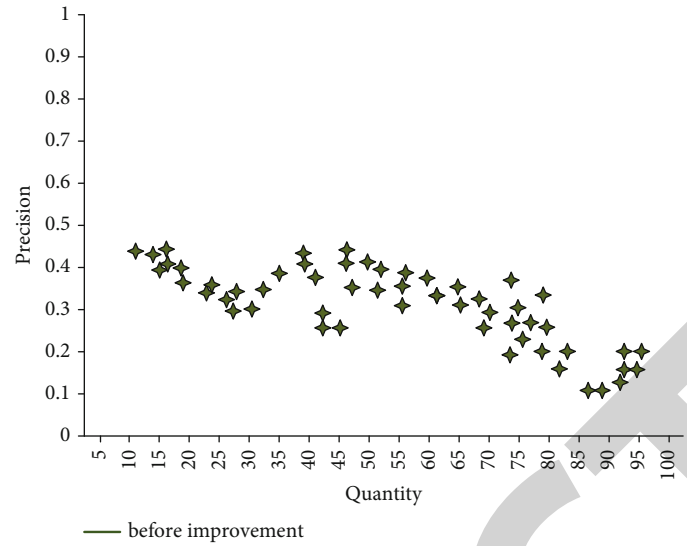
$$C_i = 1 + \rho_i^k. \tag{8}$$

The average per-hop distance Chop_i of the beacon node after correction and compensation is

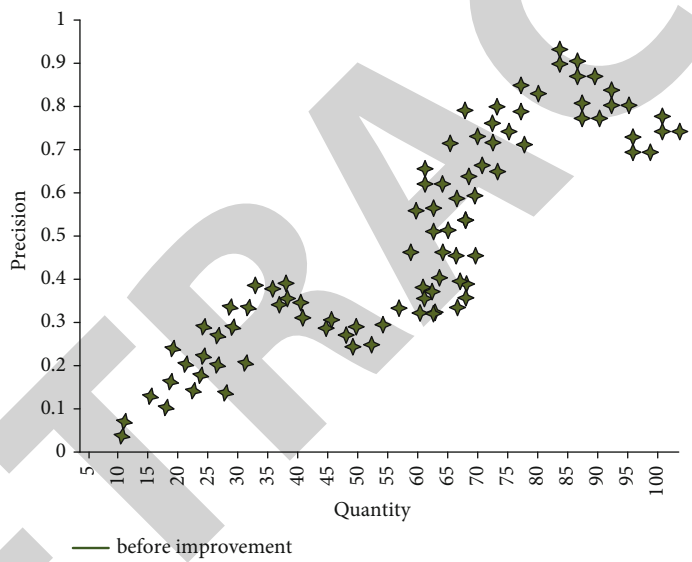
$$\mathrm{Chop}_i = \mathrm{hop}_i \times c_i. \tag{9}$$

Among them, hop_i is the average distance per hop of the i-th beacon node, and c_i is the compensation factor. The average distance per hop of a beacon node is

$$\mathrm{Chop}_i = \mathrm{hop}_i \times \left(1 + \rho_i^2\right). \tag{10}$$



(a) Accuracy of traditional localization algorithms



(b) The accuracy of the improved localization algorithm

Figure 9: The accuracy of the positioning algorithm before and after improvement.

The corrected coordinate of ρ_i^2 in the direction a is

$$A_\alpha = (a_\alpha - a_i) \times (1 - \rho_i) + a_i. \tag{11}$$

A particle filter is widely used in target tracking that requires high precision and stability, but its computational complexity is large, and the computational complexity increases rapidly with the increase of state quantity and particle number. In transforming target tracking into a coarse-to-fine search process, it proposes an accurate motion model. The realization of the target tracking task based on a wireless sensor network is based on the support of the underlying services. However, it is difficult to obtain the accurate motion model of the target in the real environment, and the motion relationship of the target is also random and uncertain. The commonly used model expression is as

$$A_{k+1} - A_k = A_k - A_{k+1} + v_k. \tag{12}$$

This model is called a second-order autoregressive model, and the measurement formula of the target is shown in

$$z_k = \arctan(a_k) + n_k. \tag{13}$$

Among them, a_k represents the position coordinates of the target in the a direction, and n_k represents the position coordinates of the target in the n direction, which is the transpose matrix of the coordinates.

Assuming that the size of the monitoring area of the tracking target remains unchanged and that there are k nodes uniformly distributed in the monitoring area and the sensing radius of each node is known, the signal strength of node j at a certain moment can be obtained, as shown in

$$z_k^j = \frac{A}{\|A_k - P(j)\|^\alpha} + \delta_k^j. \tag{14}$$

Among them, z_k^j represents the received signal strength, A represents the tracking signal strength at a unit distance from the tracking target, and δ_k^j represents the coordinates of the tracking target at time k.

It can be seen from formula (14) that in this model, the magnitude of the received signal energy obtained by the sensor node is inversely proportional to the distance between the node and the target. The smaller the distance, the greater the obtained signal strength.

The target tracking index of wireless sensor network is restricted by various aspects. An ideal sensor network tracking system has the advantages of scalability, asymptotic accuracy, real-time, reliability, self-adaptability, and high energy-saving efficiency. In the target tracking based on a wireless sensor network, there may be such a phenomenon that at every moment, there will be multiple working sensor nodes monitoring the effective information of the target. Therefore, multiple monitoring values will be received in the computing center. Here will be the problem of weight calculation; the weight of the i-th particle is as in

$$w_k^i = \prod_{\alpha=1}^{n} w_{k,\alpha}^i. \tag{15}$$

Among them, $w_{k,\alpha}^i$ means using a single sensor node to measure the particle weights obtained by calculating the measured values, and $\prod_{\alpha=1}^{n} w_{k,\alpha}^i$ means multiplying these weights.

5.3. Particle Filter Algorithm. The application field of particle filter in the field of modern target tracking, due to the complexity of practical problems, faces more nonlinear non-Gaussian problems. Like the Kalman filter algorithm, the state formula and measurement formula of the estimated system must be clearly estimated before using the particle filter algorithm to estimate. These formulas are expressed as

$$A_k = f\left(A_{0|k-1}, v_{k-1}\right), \tag{16}$$

$$z_k = h(A_k, n_k). \tag{17}$$

Among them, A_k represents the state vector of the system, z_k represents the measured value vector of the system; v_{k-1} represents the process noise of the system, and n_k represents the measurement noise of the system.

The key of the particle filter algorithm is to approximate the posterior probability density of the estimated state by using the known sample set. In general, the posterior probability density at time k is expressed as

$$p(A_k|Z_k) \approx w_k^i \delta\left(A_k - A_k^i\right). \tag{18}$$

Among them, Z_k represents the measurement sequence obtained from the start of measurement to the end of time k.

In the traditional particle filter algorithm, simply copying particles with larger weights will lead to more and more such particles, while those with smaller weights will become fewer and fewer particles. The most direct result of this is the phenomenon of sample depletion.

Aiming at the problem of particle diversity loss in the process of particle filter resampling, this paper proposes an improved resampling particle filter algorithm. It classifies the particles according to the local resampling algorithm, and the particles of medium weight remain unchanged. The algorithm can reduce the computational complexity without losing particle diversity, which improves the filtering performance. The principle of selecting the number of particles in the improved resampling particle filter algorithm, its core idea is to compare the weight of each sampled particle with an integer multiple of N, and the multiple can be regarded as the number of times the particle is selected, as in

$$n_k^i = \left[w_k^i \cdot N + \delta_i\right]. \tag{19}$$

Among them, n_k^i represents the selection times of particle i, w_k^i represents the weight after adjustment and modification, and δ_i is the rounding operation.

In the simulation algorithm, set the sampling interval $T = 5$ s and the total number of particles $N = 100$. In the target tracking problem, the system resampling particle filter algorithm (SRPF) and the improved resampling particle filter algorithm (IRPF) are used to simulate the comparison table between the tracking trajectory and the real motion trajectory of the target, as shown in Tables 2 and 3.

As shown in Tables 2 and 3, the error interval between the simulated tracking trajectory and the real trajectory of the SRPF algorithm is 21-35, while the error interval between the simulated tracking trajectory and the real trajectory of the IRPF filtering algorithm is 1-7. The IRPF filtering algorithm shows better tracking accuracy than the SRPF algorithm in the tracking of maneuvering targets, and the tracking error is also lower than that of the SRPF algorithm.

In the problem of target tracking algorithm based on wireless sensor network, the performance of the algorithm is mainly reflected in the tracking accuracy, real-time performance, and loss of tracking rate of the target. The tracking accuracy is the main parameter to measure the quality of an algorithm. Usually, the root mean square error generated by the algorithm is used to measure the tracking accuracy, as the main calculation value to reflect the tracking accuracy. The root mean square error expression of a single filter in the particle filter algorithm is as shown in

$$R = \sqrt{\frac{1}{h}\sum_{k=1}^{h} \|A_k - A_h\|^2}. \tag{20}$$

Among them, A_k represents the coordinate position of the tracking target at time k, A_h represents the estimated position of the tracking target at time k, and t represents the number of iteration steps in the algorithm. Using the

Table 2: Simulation of system resampling particle filter algorithm and real tracking trajectory.

Sampling interval (s)	Total number of particles	Simulation tracking trajectory (m)	Real trajectory (m)	Error (m)
5	20	65	40	25
10	40	78	47	31
15	60	80	59	21
20	80	97	62	35
25	100	120	88	32

Table 3: Simulation of improved resampling particle filter algorithm and real tracking trajectory.

Sampling interval (s)	Total number of particles	Simulation tracking trajectory (m)	Real trajectory (m)	Error (m)
5	20	76	70	6
10	40	85	81	4
15	60	89	82	7
20	80	95	93	2
25	100	150	149	1

improved filtering algorithm after resampling will significantly improve the effectiveness of the entire algorithm.

6. Experiment and Analysis of the Movement

6.1. Influence of the Movement. The growth of China's ski market is amazing, and at this rate, China will soon become one of the largest ski markets in the world. The percentage of ski resorts in China from 2015 to 2021 is shown in Figure 10.

As shown in Figure 10, the percentage range of Chinese ski resorts in 2016-2018 is between 6% and 24%, while the percentage range of Chinese ski resorts in 2019-2021 is between 15% and 38%. From this, it can be seen that people who participate in skiing are very enthusiastic, especially those who like adventure and explorers. They will never miss this opportunity and enjoy the unlimited fun brought by sports in the movement.

The movement itself has the characteristics of thrilling and exciting. It not only leads the new fashion of sports but also promotes its own personality and self-expression. It can also become a challenging project to highlight people's happiness and personality charm.

This paper analyzes the beneficial effects of the movement considered by 50 the movement enthusiasts, as shown in Table 4.

As shown in Table 4, first, the movement is beneficial to let people understand the movement culture and enrich people's knowledge of the movement culture. Second, it is conducive to enhancing physical fitness. While enhancing physical fitness and mastering the movement skills, it focuses on cultivating people's lifelong sports concepts and behavior habits. Third, it is conducive to driving economic development. As an outdoor sport, the movement is very popular among outdoor sports enthusiasts. The development of the movement tourism is also conducive to the economic development of the region.

6.2. How to Promote the Development of the Movement. On the basis of cultivating students' sports awareness and interest in sports, sports training is carried out. Taking the movement as a focus, organize students to carry out various forms of teaching and training, encouraging schools to unite with social forces, such as the creation of youth sports clubs, joint sports teams between sports schools, and campus alliances.

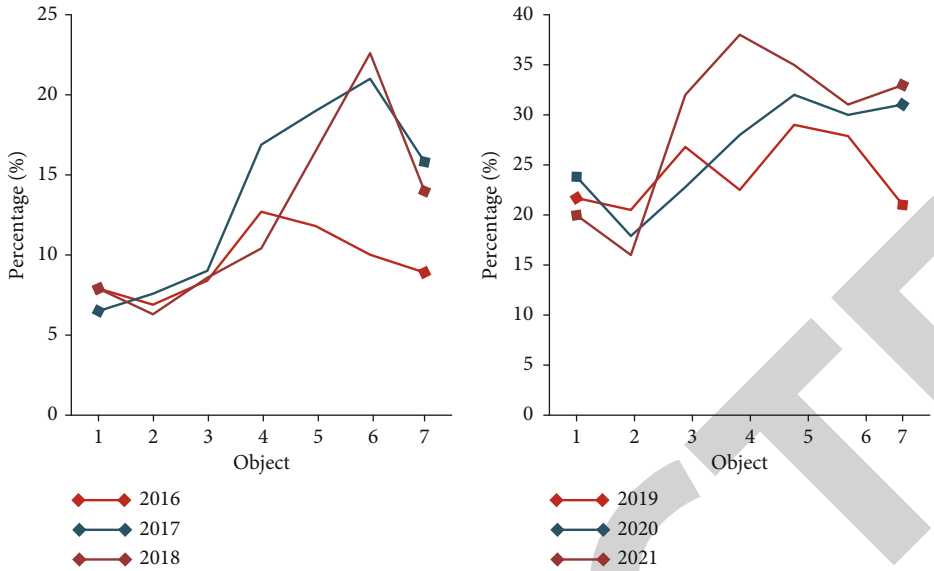
Putting the movement projects into primary schools, increase the group of students who cultivate their interests and hobbies from an early age, strengthen school teachers' understanding and training of the movement projects, and integrate the "combination of sports and education" model from primary schools. And then use the sports achievement plus academic achievement model to cultivate students' educational level while not burying their athletic talent.

The popular education of the movement projects in university classrooms, under limited conditions, brings out the advantages of the movement projects. Establishing a professional team for the movement projects, infiltrate professional training and competitions into the university gates, carry out special admissions for the movement projects, and set up policy protection for reserve talents in the movement projects.

Establishing a higher education model that expands from small to medium to large, carry out policy protection for the way of reserve talents in the movement events, and use the advantages of combining sports and education to improve the cultural quality and sports level of athletes.

7. Discussion

This paper analyzes how to design the movement technical index extraction system based on the Internet of Things, expounds the related concepts of the Internet of Things and the movement technical index extraction system, and studies the related theory of wireless sensors [24]. This paper explores the method of using wireless sensors to design the



(a) Percentage of ski resorts in China, 2016-2018 (b) Percentage of ski resorts in China, 2019-2021

Figure 10: Percentage of ski resorts in China, 2015-2021.

Table 4: 50 movement enthusiasts believe the beneficial effects of the movement.

Research object	Understand culture	Enhance physical fitness	Promote economic development
50 snow sports personnel	6	5	3
	8	4	1
	5	5	2
	7	2	2

movement technical index extraction system and investigates the importance of the movement technical index extraction system. Finally, the Internet of Things is integrated into the design of the movement technical index extraction system to explore the correlation between the two.

This paper also makes reasonable use of ZigBee technology. With the increasing application scope of ZigBee technology and its importance gradually becoming prominent, many scholars have begun to apply ZigBee technology to various designs. ZigBee technology is not only very low cost, but also the functions it consumes are very low. Most importantly, its communication transmission is very reliable [25], which is conducive to improving the utilization rate of the movement technical index extraction system.

Through the experimental analysis in this paper, it can be seen that as people are more and more interested in the movement the design of the extraction system for the movement technical indicators is very necessary. However, the design of the movement technical index extraction system requires strong reliability and safety, so in order to achieve this purpose, this paper proposes a wireless sensor.

8. Conclusions

With the vigorous development of sports in recent years, people have become more and more interested in sports, especially more and more athletes devote themselves to outdoor sports, love to seek excitement and challenge limits, which adds a lot of color to their lives. Therefore, in view of the development of the movement sports, based on the Internet of Things, this paper studies the development of the movement technical index extraction system, which is beneficial to the development of the movement sports. The movement technical index extraction system can not only collect the physiological parameters of the athletes but also identify the movement behavior of the human body, so as to guide the movement of the athletes and improve their movement accuracy. This paper first describes the basic concepts of the Internet of Things and the movement sports, and then in the method part, based on the Internet of Things, a wireless sensor is proposed, and the wireless sensor is used to design a technical index extraction system for the movement sports. However, due to the limited ability of the author, the designed system is not perfect. The experimental part at the end of this paper analyzes the impact of the movement sports, and finds that the movement can not only enhance the physical fitness of athletes but also promote the economic development of the region. Finally, suggestions on how to develop the movement are given, and it is hoped that the movement culture can also continue to develop.

Data Availability

The experimental data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

There are no potential competing interests in our paper.

Authors' Contributions

All authors have seen the manuscript and approved to submit to your journal.

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