Research Article

Application Research of Internet of Things Technology in the Causes of Dragon Boat Sports Injury

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In recent years, the Internet of Things technology can effectively innovate applications and services. The Internet of Things technology has become more and more popular. It provides an effective and direct bridge between the physical world and virtual objects in cyberspace. With the increase in the intensity of dragon boat training and the increasingly fierce competition, the possibility of injury is increasing. Dragon boat racing is a non-contact team sport based on strength and technology. The purpose of this paper is to solve the problem of people’s lack of understanding of the sports injuries and causes of dragon boat athletes. We used the data fusion algorithm and cluster maintenance optimization algorithm to study the application of Internet of Things technology in the cause of dragon boat sports injury. In order to save energy, extend the network life cycle, shorten service interruption time, and increase data packet transmission, the cluster maintenance optimization algorithm in this paper mainly improves and optimizes the startup time of cluster maintenance, which depends on the maintenance cost. The experiment result shows that the etiological detection system proposed in this paper matches the actual sports injury results well. The experiment result shows that the research on the cause of injury in dragon boat sports based on Internet of Things technology can detect the damage law well and can have a more comprehensive understanding for the cause of injury, which helps to prevent injuries better and take effective treatments. In the analysis part, it can be concluded that the detection system is very accurate in detecting the cause, and the accuracy rate is basically 100%.

1. Introduction

The dragon boat race is a folk activity in ancient China. The dragon boat race is a traditional Chinese folk water entertainment project that has been spreading for more than two thousand years. It is mainly held at the festival and is a multiplayer collective paddle competition. The size of the dragon boat varies from place to place. With the continuous promotion and development of the dragon boat sport and the continuous improvement of the level of sports skills and tactics, the intensity and density of training and competition continue to increase, the dragon boat competition is getting more and more intense, and the incidence of injuries is getting higher and higher. Dragon boat athletes are increasing [1]. As an ancient sport in China, dragon boat has certain advantages in preventing breast cancer in women. With the popularity and development of the dragon boat movement in the world, the traditional dragon boat movement has gradually turned into a competitive dragon boat sport, and various sports injuries will inevitably occur in training or competition. Some people have verified the applicability of the new dragon boat motion method based on the intensity curve method in the late injury of breast cancer survivors and found that dragon boat exercise can be used to reduce late arm injury [2]. From the perspective of cultural anthropology, this paper discusses the historical changes of the dragon boat race and discusses the origin and historical changes of the dragon boat race. Through the analysis of its complex social and cultural phenomena, it reveals that society reflects the integration of culture, cultural...
adaptation, and socialization. Combining intelligent and sensing systems in an IoT environment to form a large-scale distributed network physical system has great potential for introducing intelligent systems into many application areas [3, 4]. Internet of Things technology has become increasingly popular in recent years because it provides an effective and direct bridge between virtual objects in the physical world and cyberspace, achieving effective application of innovative applications and services [5].

In recent years, the emergence of the Internet of Things has expanded the ability to use the existing network infrastructure to perceive the world through connected device networks. The Internet of Things can be seen as an important technological revolution associated with smart cities, smart homes, smart factories, and smart port implementations. With the emergence of port intelligent sensing systems becoming a reality, today’s different operating areas are operating in automatic mode [6]. With the advent of the aging of society, the development of intelligent multifunctional nursing beds for hospitals, nursing homes, families, etc. has a wide range of applications [7]. Not only that, the unmanned technology that has received widespread attention in recent years is also based on the Internet of Things technology in the logistics industry, and the Internet of Things technology is used for traceability and tracking of goods. Print or paste the RFID tag on the product, so that the product has a unique electronic identification code and combines the Internet technology to establish an information file for the product. RF card readers can read product information noncontact and promote the management of commodity information. The Internet of Things is an emerging paradigm that envisions a network infrastructure that allows different types of devices to be connected to each other. It creates different types of artifacts in a variety of applications, such as health monitoring, motion monitoring, animal monitoring, enhanced retail services, and smart home [8]. The Internet of Things provides all the necessary infrastructure to implement the smart city concept, and the various services provided in smart cities are implemented with the help of Web services technology. He discussed a three-file case study to highlight the role of Web services in smart cities and described six learning models for Web services classification [9].

At present, there are many applications and researches on the Internet of Things technology. Many domestic and foreign scholars have done detailed research. Rausch believes that cloud-based solutions cannot meet the stringent QoS and privacy requirements of many modern IoT solutions. In contrast, distributed middleware needs to take advantage of the ever-increasing resources at the edge of the network to provide reliable, ultralow latency, and privacy-aware message routing. However, the inherent heterogeneity and volatility of edge resources and the unpredictability of mobile clients make it challenging to provide flexible coordination mechanisms and ensure message delivery. Applying the principle of penetration calculation to message-oriented middleware opens up new opportunities to address these challenges [10]. Zhang proposed a new tensor-based forensic method for virtualizing network functions. An event tensor model was proposed to formalize network events. Then, it was used to effectively update core event tensors. Then, we introduce a similarity tensor model to integrate core event tensors into the orchestration and management of the network function virtualization framework. Finally, he proposed an evidence tensor model for network forensics, showing how to combine evidence tensors [11]. Kolokotronis considered possible use cases and applications for blockchains for the consumer electronics industry and its interaction with the Internet of Things. He is not talking about how the blockchain completely changes the supply chain, but rather how to use it to enhance the security of network CE devices. The motivation for this work is the many recent attacks in which devices that are easy to crack are used as weapons. He also introduced the privacy and data protection aspects of blockchain solutions and linked them to regulatory framework provisions, as well as information on existing blockchain solutions [12]. Li has developed a new wireless power transmission system in which a drone equipped with an RF energy transmitter charges an IoT device. The machine learning framework of the echo state network is used along with the improved clustering algorithm to predict energy consumption and aggregate all sensor nodes in the next time period to automatically determine the charging strategy. The energy that the WPT obtains from the UAV supports the IoT devices to communicate with each other. In order to improve the energy efficiency of the WP-IoT system, the interference mitigation problem is modeled as an average field game [13]. Rakovic elaborated on BC-Internet of Things-related issues and conducted a comprehensive survey of current literature and related launch deployments, identified major research and development challenges, and discussed possible aspects of future research [14]. Mukherjee proposed the requirement to ignore certain seemingly critical identifier fields in packets arriving from various sensor nodes in an agricultural IoT deployment. The proposed method reduces packet size, thereby reducing channel traffic and energy consumption, and retains the ability to identify these originating nodes. He proposed a blind agricultural IoT node and sensor identification method that can be acquired and operated from the primary node and remote servers. In addition, the scheme has the ability to detect the quality of the radio link between the master node and the slave node in primary form and to identify the sensor nodes [15]. Finally, a number of simulations were performed to evaluate his proposed algorithm compared to some of the most advanced schemes [16]. Hamidi proposes an ontology-based automatic design method for intelligent rehabilitation systems in the Internet of Things. In order to provide fast and effective rehabilitation for different patients, the Internet of Things is combined with ontology. The experimental results show that the IoT-based rehabilitation system works normally, and the ontology-based approach can help to create an effective rehabilitation strategy, configure and quickly deploy all available resources, and meet the requirements [17]. Lacerda identified the Internet of Things as part of the system’s social technology system and part of the information circle. It introduces a principle-based, human-centered approach to
designing IoT artifacts that links the Internet of Things to the conceptualization of cross-channel ecosystems in current information architecture theory and practice. According to the metamodel methodology, it is necessary to establish an interdisciplinary theoretical framework to promote a human-centered comprehensible understanding of the Internet of Things phenomenon and its consequences [18]. Durao proposes a model for selecting IoT technology. The research design combines a literature review of the system, applying bibliometrics and content analysis, case applications, and improvements. The model applies an analytical hierarchy process based on the following criteria. The results also show that IoT selection and a combination of different standards related to system and technology selection are related to the ability to install IoT solutions [19]. In order to more accurately control the rice field environment, Min monitors the growth of rice and rice ducks in real time and applies the Internet of Things technology to accurate data collection in farmland farming and animal husbandry. By monitoring the growth information of rice and rice ducks, the environment and the use of automatic control technology, intelligent decision-making, and agricultural biotechnology knowledge, a rice ecosystem model was constructed suitable for rice and rice-duck life to monitor the management of rearing and environmental protection [20]. However, the research points of this study are not enough, and the data is not sufficient.

Currently, the development of the Internet of Things and mobile communication technologies is very rapid. On this basis, this topic has carried out research based on Internet of Things technology and mobile communication technology, aiming to apply the Internet of Things technology to the cause of dragon boat sports injury. The test equipment, the tester, and the system are linked by intelligent terminal devices such as mobile phones to realize real-time data collection and uploading and implemented in smart hands. They display, analyze, and calculate the customer, expert system, and backend management system to provide an effective assessment and guidance solution. Due to the rapid development of microsensor chips and Internet of Things technology, the data of test equipment can be sensed, identified, and calculated. The integrated model strongly promoted the further development of the dragon boat sport. The intelligence of the detection system is reflected in the integration and application of modern information science and technology such as the Internet of Things, and it has the basic conditions to popularize and promote the civilized lifestyle of the public. By establishing an Internet of Things standard system, it is possible to collect, integrate, and transform test data, establish uniform standards, and form an open and shared unified test database. Existing test data and expert teams can be organically combined to form a diversified, long-gradient test and guidance. Eco-chain can be tested.

2. Proposed Method

2.1. Internet of Things Sensor Data Fusion Algorithm. When an emergency occurs in the network, some nodes in the monitoring area of the network configuration will be stimulated by a certain intensity, and these nodes will turn into active nodes, that is, from the dormant state to the active state, and the data will start to be processed. Perceive and Transmit. When the stimulus intensity of the emergency event is reduced, the discrete event generated is over, and the node will return to the dormant state again, which will save the energy consumption of the network [21].

Definition (1): Standard Hard Threshold (SHT), this value is used to describe the value used by the node when it is in a sleep state to compete for the sink node. At the same time, the SHT can also be used to determine whether similar transmissions are repeated during transmission to the sink node. Information. The standard hard threshold at initialization is expressed as

\[ \text{SHT}_{\text{INITIAL}} = \text{HT} - \text{ST}. \]  

(1)

Among them, HT stands for hard threshold and ST stands for soft threshold.

When initializing, all nodes in the network are in a dormant state. Only when the monitoring data meets condition (1) can the node be active, enter the state of receiving and sending data, and update the SHT value to the monitored data value. Among them, the monitoring data is represented by DATE.

\[ \text{DATE} > \text{HT} \& \& |\text{DATE} - \text{SHT}| > = \text{ST}. \]  

(2)

For nodes that have been activated, they can send and receive data. When the condition of (3) is met, the value is updated to DATE, and then the data value is transmitted to the upper-level node.

\[ \text{DATE} > \text{HT} \& \& |\text{DATE} - \text{SHT}| > = \text{ST}. \]  

(3)

Relative Active Time Threshold (RATH): the threshold is a description of the active time of the generated family. Among them, the value of RATH is proportional to the threshold of the node being stimulated by an emergency event, and A represents the active time coefficient. The value of RATH can be expressed as

\[ \text{RATH} = A|\text{DATE} - \text{HT}|. \]  

(4)

Absolute active time threshold (AATH): this threshold is used by nodes in the cluster to determine the survival time of the generated cluster. T is used to represent the current time, and the value of AATH can be expressed as

\[ \text{AATH} = T + \text{DATH}. \]  

(5)

When \( T > \text{DATH} \), the nodes in the network switch from the state of sending and receiving data to the dormant state. After introducing the concept of IoT data fusion algorithm, we can get the IoT heterogeneous data fusion process of intelligent optimization algorithm as shown in Figure 1:

2.2. Improved Cluster Maintenance Optimization Algorithm. Cluster maintenance startup time will directly affect maintenance and nonmaintenance costs, namely, node energy consumption and network life cycle, service interruption time, and packet transmission. In order to save
Figure 1: IoT heterogeneous data fusion process based on intelligent optimization algorithm.

energy, extend the network life cycle, shorten service interruption time, and increase data packet transmission, the cluster maintenance optimization algorithm in this paper mainly improves and optimizes the startup time of cluster maintenance, which depends on maintenance cost.

When an event occurs in the network, the maintenance cost and the nonmaintenance cost are first calculated to determine whether the setting conditions for starting the cluster maintenance are met. If the boot condition is not met, the network damage cluster caused by the event will not be temporarily maintained, and the undamaged portion of the network will remain in its normal working state. When there is another event in the network, the conditional judgment will be repeated. If the conditions for the launch dimension are met, they will be executed within the scope of the previous event. Otherwise, it will not be maintained, waiting for the next event to occur, so loop. Local on-demand cluster maintenance algorithms are event-driven and require immediate maintenance when cluster corruption occurs in the network, regardless of the differences and trade-offs between maintenance costs and nonmaintenance costs due to different maintenance costs. The improved optimization algorithm proposed in this paper comprehensively weighs the impact of the two on the network. Cluster maintenance can only be started when maintenance costs are lower than maintenance costs. This will help improve the quality of network services in terms of power consumption, service interruption time, and packet delivery.

In general, the number of cluster heads $K$ participating in maintenance is 1. When the number of cluster nodes is destroyed and the number of cluster nodes exceeds the maximum number of $N_{\text{max}}$ allowed by the cluster, the $K$ value is determined by calculating the average number and node. The cluster and neighbors lose the clustered AVG:

$$\text{avg} = \frac{\sum_{i=1}^{k} \text{mem}_i}{k}. \quad (6)$$

In the formula, mem$_i$ represents the node of the first adjacent cluster. By adjusting the $K$ value to ensure that the AVG is not less than $N_{\text{max}}$, the $K$ value is the number of new cluster heads in the damaged adjacent cluster. As can be seen from the above analysis, there are two kinds of energy consumption when calculating energy consumption: energy consumption of member nodes and energy consumption of cluster heads. The energy consumption of the member nodes includes receiving broadcast signals, transmitting cluster requests, and receiving energy consumption of the time division multiple access signals.

$$E_{\text{CM-ADV}} = k \times m \times E_{\text{elect}},$$

$$E_{\text{CM-JOIN}} = m \times \epsilon_{fs} \times d^2,$$

$$E_{\text{CM-TDMA}} = m \times E_{\text{elect}}. \quad (7)$$

Therefore, the total energy consumption $E_{\text{CM}}$ of the member nodes is

$$E_{\text{CM}} = (n - k) \times \left( E_{\text{CM-ADV}} + E_{\text{CM-JOIN}} + E_{\text{CM-TDMA}} \right)$$

$$= (n - k) \times m \times \left( (k + 1) \times E_{\text{elect}} + \epsilon_{fs} \times d^2 \right), \quad (8)$$

where $d$ is the distance from the member node to the respective cluster head; $n$ is the number of nodes that need to participate in reclustering in this event; $E_{\text{elect}}$ is the energy consumed by transmitting the 1-byte control instruction; the value of $k$ is the cluster maintenance action according to the need to perform determine. The total energy consumption is

$$E_{\Gamma(i)} = m \times \left[ (n - k) \times (2k + 1) \times E_{\text{elect}} + n \times \epsilon_{fs} \times d^2 \right.$$  

$$+ k \times \epsilon_{\text{amp}} \times d_0^2 \right]. \quad (9)$$

The above energy consumption calculation method assumes that only one event occurs at a certain time in the network. When two or more events occur simultaneously in the same area of the network, the energy consumption of each event should be calculated separately according to the above formula and then accumulated. If two or more events occur simultaneously in different areas of the network, we have the following. When more than two events occur, only one event occurs at a particular time in each damaged area. The maintenance of the sensor layer group in the Internet of Things mainly involves the energy consumption of communication, regardless of the energy consumption of node calculation and storage. Therefore, when a normal node dies, the cluster head deletes it directly from the slot and does not involve communication energy consumption. Therefore, the main energy consumption for cluster maintenance is cluster head rotation, joining adjacent clusters, multicluster recluster, cluster splitting (cluster consolidation), and so on. Depending on the setup, the maintenance operations that require cluster maintenance for the damaged cluster are essentially recluster. Since the maintenance action of joining adjacent clusters does not require cluster head election, the cluster head does not need to send cluster head
broadcast messages, which saves total energy consumption and reduces network interruption time. Therefore, when calculating energy consumption and interruption time is long, there are two cases: merging into adjacent clusters and reclustering.

The energy consumption model calculates the energy consumption of the cluster maintenance process because the exchange of information between nodes inevitably leads to energy consumption. To simplify the description, assume that all nodes transmit signals at maximum power during cluster head selection. In the maintenance event, the number of cluster heads to be reselected is \( K \), and the control instruction is \( m \) bytes. Determine the optimal startup time for cluster maintenance by calculating the maintenance and nonmaintenance costs of the event. Cluster maintenance startup time will directly affect maintenance and nonmaintenance costs, that is, node energy consumption and network life cycle, service interruption time, and data packet transmission.

3. Experiments

3.1. Algorithm Implementation Process and Steps. Because the startup time of cluster maintenance directly affects the life cycle of the network, the conditions for starting cluster maintenance are set in advance. Based on the LDMC algorithm, the OACM algorithm is improved and optimized. When the startup conditions are met, restart cluster maintenance, reduce the energy consumption of cluster maintenance, reduce service interruption time and network interruption time, and extend the network life cycle. The implementation of the algorithm is as follows.

1. Elect the chairman of the cluster: according to the LEACH algorithm, a cluster head is selected, and the node randomly generates data to compare with a threshold to decide whether to select a cluster head.

2. The stage of cluster establishment: the cluster head sends a CH_ADV broadcast message to the entire network. The member selects the cluster they want to join by comparing the strength of the received cluster head broadcast signal and responding to the cluster head JOIN_REQ message. When the cluster head receives the joining information of the node, it creates a TDMA slot table for the member nodes in the cluster and sends it to the member nodes in the cluster.

3. Stable cluster communication phase: the nodes in the cluster send data to the cluster head according to the TDMA schedule. When the node is not in its own transmission slot, the node goes to sleep. After the cluster head fuses the received data with the self-monitoring data, the cluster sends the data to the base station in the form of single-hop or multihop according to the carrier intercepting multiple access.

4. Cluster maintenance phase: when an event requiring maintenance occurs in the network of the perception layer of the Internet of Things, maintenance costs, and nonmaintenance costs (if the normal node dies, the cluster head deletes it directly), the slot list method is calculated according to the calculation, and no maintenance cost is involved. Then, calculate whether the current state of the network meets the startup cluster.

If the conditions set by the formula are met, cluster maintenance is started and the corresponding maintenance operation is invoked in the local area according to the specific damage condition. If the startup condition for cluster maintenance is not met, the damaged node will not respond to the event and the network will continue to operate normally until the next event occurs and then continue to determine if the cluster maintenance start condition is met.

5. When the cluster maintenance ends, the information in the event list is empty. The OACM algorithm repeats steps 3 and 4 until the network energy is exhausted or the node dies too much to complete normal data communication.

The steps for heterogeneous data fusion in the Internet of Things are as follows:

1. Randomly deploy a certain number of sensors in the monitoring area, with a certain communication range, forming an Internet of Things.

2. In the Internet of Things, multiple sensors continuously collect real-time and online status data of monitored objects to obtain raw sensor devices (preliminary data).

3. Filter the data collected by each sensor by wavelet transform, initially reduce the amount of data, and improve the data quality of the Internet of Things, and then each sensor sends the denoised data to the cluster head.

4. Each cluster head collects its own sensors and processes the cluster head data using the K-means algorithm. Line redundancy processing eliminates redundancy between cluster data and enables initial data fusion.

5. The cluster head sends its own cluster data to the aggregate sensor to obtain a large amount of heterogeneous data in the Internet of Things.

6. In the aggregate sensor, a least-squares support vector machine is used to determine the weight of each cluster head data and combine them. Get the best weight.

7. According to the optimal weight determined by the least-squares support vector machine, the data of each cluster is weighted and fused, and the data of the heterogeneous data fusion in the Internet of Things is obtained and sent to the Internet. Users can get the data needed for the Internet of Things through the Internet.
3.2. Application Function Design and Experimental Data Set.

The function of the application is a series of processing of user instructions. Application features include Bluetooth data reception, data processing, exception alerts, data storage, and submission.

3.2.1. Main Program Design. After the application software runs, the first step is to determine if the Bluetooth on the smartphone is lit and then search for the device after Bluetooth is turned on to detect the connection parameters. Receive and analyze packets as they are connected to the device. In order to judge whether the data is valid, when the pulse value is greater than 200 BPM and the body temperature is lower than 30 degrees Celsius, the condition is invalid. Obtain pulse values for the device, muscle scan, appearance damage scan, body temperature, and remaining battery power, which is displayed in the corresponding position on the main interface. Invalid data was not processed, probably because the user did not wear or mislead the detection device. Parsing valid data, that is, extracting data from the packet. Determine whether the valid data is abnormal, and send an abnormal alarm message to the employee when the number of abnormal times is reached, to remind the employee to make corresponding processing in time.

3.2.2. Data Processing Design. After the application gets the packet, it first parses the data. Each data is separated by a comma and the packets are separated by commas. The obtained data is in turn the pulse value of the test device, the muscle scan image, the appearance damage scan image, the body temperature value, and the remaining battery power value. The obtained data is displayed at the corresponding position on the main interface, and the validity of the parsed data is judged. If the data is valid, it is stored in the database SQLite of the ANDROID system and submitted to the network platform. The communication between the application and the network background follows the HTTP protocol. The GET method in the HTTP protocol is used to submit data, and the GET method is used to receive data on a network platform. After completing the data storage and submission, we can further determine whether the data is abnormal, that is, whether the set physiological parameter threshold is exceeded. When the temperature or pulse is abnormal, the abnormal information is displayed on the main program interface, and the number of abnormal events is recorded.

3.2.3. Design of Abnormal Alarm. In this study, we sent an alert message to the nurse in the form of a short message, the content of which is as described above. When measuring body temperature, the temperature sensor takes about five minutes to measure the body temperature caused by heat exchange. If the alarm is turned on at the beginning of the program, it will cause a false alarm, so the temperature alarm in the programming will not open until five minutes after the application is opened. Pulse detection is very fast and there is no limit. In addition, to avoid unnecessary losses, an alert message is sent every 10 minutes.

This article takes 56 dragon boat players from the three universities of M University as the experimental subjects, including 35 male athletes and 24 female athletes. The sports injuries before the team members entered the Dragon Boat Team training were compared with the sports injuries after the Dragon Boat Team began training. The analysis of the sports injuries before the team entered the team had certain contributing factors to the sports injuries after the team training.

As shown in Table 1, before joining the Dragon Boat Team, 18 boys had sports injuries, of which 53.4% were boys, 16 were not injured, 46.6% were girls, 9 were sports injuries, 45% were girls, and 44 were harmless. The ratio is 55%. It can be seen that the number of sports injuries exceeds the number of uninjured, while the number of male and female athletes exceeds the number of uninjured. The proportion of male athletes injured was 54.3% higher than that of female students. The training of the M University Dragon Boat Team is mainly divided into two stages, one is daily training without competition, and the other is prematch training.

As shown in Table 2, it can be seen that the main training content of the daily training of the M University Dragon Boat Team is that the endurance training is mainly for long-distance running, and the strength training is mainly for strength training in the gym, then endurance training, strength training, and water practice alternate. The prematch targeted training is mainly based on the content of the upcoming competition. Take the 200-meter and 500-meter dragon boat races as an example. The main practice is the high-frequency hoist 30 paddles and then the low-paddle inferior paddles and boats. Pull the boat to practice, practice the same distance with different paddles, and conduct actual combat tests every day. The training time for daily training and prematch training is two hours a day on weekdays and two hours on the weekends.

4. Discussion

4.1. Analysis of Sports Injury Parts and Causes. There are three types of divisions on the dragon boat, paddlers, drummers, and helmsmen. This is mainly for the investigation of the injured parts of the paddlers and drummers. As shown in Table 3, for the results of sports injuries of athletes, from the data in the table, it is found that the sports injuries of the dragon boat athletes in our school are mainly concentrated in the hands, arms, shoulders, waist, buttocks, and other parts.

As shown in Figure 2, for the number of people in the sports injury area of the dragon boat athletes, it can be seen from the figure that in all the injury parts, all the athletes’

| Sports injury | Yes | No |
|---------------|-----|----|
| Male          | 18  | 16 |
| Female        | 9   | 11 |
hands are damaged, and then the arms, waist, and shoulders are in turn. The back and buttocks have the fewest injuries and the least. Therefore, athletes should pay attention to the protection of their hands during the training process.

After investigation, it is found that the types of sports injuries in various parts of M University Dragon Boat Athletes are bruises, muscle strains, muscle strains, and other types. The specific situation of sports injuries in the sports injury parts of dragon boat athletes is shown in Table 4:

As shown in Figure 3, by analyzing the data in Table 4, it can be known that the type of abrasion in the type of sports injury mainly occurs in the hands, arms, buttocks, etc.; muscle strain mainly occurs in the arms, waist, back, and other parts. The main parts of a muscle strain are the arm, shoulder, waist, back, and other parts. The main reason is that these parts are directly in contact with the hull and the paddle during water training and competition; muscle strain is caused in the arms, waist, back, and other parts because these parts are the main force parts when paddling. Muscle strain in the arms, shoulders, waist, back, etc. is due to long-term high-frequency training and participation in a large number of competitions so that the load on these parts is too large, and it is easy to cause muscle strain.

4.2. *Etiology Results and Accuracy Analysis.* For dragon boat athletes, strength endurance quality and speed endurance quality are key factors that play a good role in the game, especially in the upper limbs and waist and back. Dragon boat sports is a kind of physical endurance exercise. It not only requires athletes to have good water stroke skills but also requires good strength endurance and upper limb speed endurance quality. Therefore, if athletes want to achieve good results in the competition, they must strengthen their training for special endurance, but in training, they may develop if they ignore the following factors. Damage has occurred. (1) The preparatory activities were inadequate and the injury rate was 29%. Dragon boat sports require high-intensity torso and upper limb muscles. Strength training equipment is usually used for training. If you ignore any part in the preparation activity, it is easy to cause damage, especially to the waist and shoulders. Lack of psychological preparation before the game is a subjective factor in the injury. (2) Lack of scientific training, improper control of exercise volume and selection of training programs, and ignoring personal treatment can easily lead to overwork and injury. (3) Rough sports equipment, improper training, and competitive clothing are easy to cause damage. (4) Participation in training and injury competition is the cause of repetition and multiple injuries. As shown in Figure 4, the
monitoring system detects the cause of the injury to the athlete and compares it with the cause found in the actual inspection. As can be seen from the figure, the detection system is very accurate for the detection of the cause, and the accuracy rate is basically 100%.

As shown in Figure 5, it can be seen from the figure that hip wear accounts for 61.5%, ranking first. Secondly, the waist injury accounted for 12.3%, and the shoulder belt injury accounted for 10.1%. Lumbar muscle strain accounts for 59% of lumbar spine injuries, and rotator cuff injuries account for 69% of shoulder injuries. The relative damage rate of the outer thigh wear, muscle damage, palm wear, and rhomboid muscle strain is higher. It can be seen that most of the injuries are bruises, strains, and sprains. For further analysis, there are two main factors. First, the inner edge of the dragon boat and the seat edge are too rough. In addition,
athletes wear inappropriate clothing for training or competition, resulting in lateral wear of the buttocks and thighs, so we should choose appropriate clothing training and improve training equipment to reduce wear. Secondly, the characteristics of this sport, whether it is on the ship or on the land for specialized endurance training, are repeated single-player movements at a fixed position, which can easily lead to local overload and injury. Therefore, before and after training, special attention should be paid to the relaxation movement of the muscles in the load zone to avoid excessive fatigue and prevent injury.

5. Conclusions

(1) In order to solve some shortcomings in the current IoT heterogeneous data fusion process, an IoT heterogeneous data fusion method based on an intelligent optimization algorithm is designed. The improved algorithm is used to analyze the sensor data in the IoT cluster. Redundant operation reduces the scale of IoT data and better meets the online requirements of IoT data fusion.

(2) Monitoring the cause of injury through the Internet of Things technology, mainly driven by technology and artificial collaboration, reducing the cost of human participation, and reducing the cost of original testing, this model can essentially solve the wide coverage and high efficiency of scientific movement, economic, and other goals.

(3) The top three injuries of dragon boat athletes are hip, hand, and shoulder; the main injury to the hands and hips is abrasion; the main injury to the wrist is the tendon sheath; the main injury to the shoulders, waist, and back is a muscle injury.

(4) The etiological detection system designed in this paper can analyze the cause of injury of dragon boat athletes well and can provide a good prevention method. The test results are basically consistent with the actual situation.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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