Sports Event Data Acquisition Method Based on BP Neural Network and Wireless Sensor Technology

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Abstract. The current data acquisition methods use sensors and fixed equipment to collect data. When applied to sports events, a large number of sensor deployment will lead to large data transmission loss and low data acquisition efficiency. In order to reduce the data transmission loss and improve the efficiency of data acquisition, the sports event data acquisition method based on BP neural network and wireless sensor technology will be studied. After building the wireless sensor network for sports event data acquisition, BP neural network is used to fuse the sensor node data. Compressed sensing is used to initially locate the sensor nodes in the network, and the sensor node data is gathered according to the honeycomb principle to realize the event data collection. The test results show that after the application of the proposed data acquisition method, the average energy loss ratio of the node is only 6.61%, the data acquisition efficiency is greatly improved, and the test effect is good.

Keywords: BP neural network · Wireless sensing technology · Sports events · Data acquisition · Data fusion · Routing protocol

1 Introduction

In the process of continuous practice and development of competitive sports, relevant practitioners gradually realize the guiding role of corresponding technical and tactical analysis and physiological and biochemical analysis for training and on-the-spot competition. Therefore, in the long-term evolution process, a set of objective competition data analysis system has been established. With the development and application of big data technology, data collection is more and more widely used in the field of sports events, such as improving athletes' competitive level, preventing sports injuries, measuring athletes' value, developing fan services, doping investigation and punishment, assisting referees in sentencing, etc. Using wearable equipment to collect athlete data is the most commonly used means at present. The use of sensors makes venue equipment such as camera and lighting become an important way of athlete data collection. A large number of athlete biometric data, technical action data and life data are obtained. In the field of world sports, data acquisition system is widely used, especially in ball games, such as

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football, basketball, volleyball, tennis, table tennis, badminton and so on. It can be said that the data statistics in ball games can not only collect the relevant information of the game, but also play a vital role in improving the sports level of athletes, the law enforcement level of referees and even the position of the sport in the world sports field. With the continuous improvement of digital technology, sports event data acquisition methods are also constantly updated [1]. In terms of collection means, the collection means that affect the normal life, training and competition of athletes should not be adopted. Usually, the collected sports event data can be mainly divided into technical data and non-technical data. Technical data mainly refers to the athletes' technical actions, personal performance, whether they break the rules, detailed single data, etc. Non technical data mainly refers to the data in the process of abnormal competition and some relevant data after the competition. It is mainly used to record the status information of athletes, referees, etc. during the competition, the violations after the competition and the corresponding punishment [2]. In sports event data acquisition, high-speed cameras are mainly used to capture the basic data of the movement track of the data acquisition object in the event from different angles at the same time: These data are generated into three-dimensional images through computer calculation; Finally, using the real-time imaging technology, the collected data information is clearly presented from the large screen.

Wireless sensor network is an intelligent self-test and control network system which is composed of a large number of ubiquitous micro sensor nodes with communication and computing capabilities densely arranged in the unattended monitoring area, and can independently complete the specified tasks according to the environment. The early sports event data acquisition mainly used the camera to assist the infrared sensor and pressure sensor to collect the movement start or trajectory change data of athletes in sports events. The accuracy and accuracy of the collected data are affected by the acquisition equipment. With the continuous maturity of wireless sensor technology, the accuracy of sensors is rapidly improved and the types of sensors are constantly enriched. The number of sensors available for sports event data acquisition is rapidly increasing rapidly, raising higher requirements for the accuracy of event data acquisition. Reference [3] studies the data acquisition method of underwater wireless sensor nodes. The self-organizing map is used to optimize the path of sensor nodes; Combining the optimized path graph and K-means algorithm to find the internal aggregation point of the path; The data collection points within the communication radius of the sensor are obtained by using the aggregation points and the nodes of the sensor. Finally, the optimal path for each data collection point to collect data is obtained by self-organizing mapping. Reference [4] designed a multi-channel synchronous data acquisition system suitable for magnetic anomaly detection sensors. The design system is based on the modular construction structure, and uses the parallel operation characteristics of field programmable gate array to ensure instruction synchronization; An analog-to-digital converter with a resolution of up to 32 bits is used in combination with digital filter and chopping zero stabilization technology to realize sensor data acquisition.

However, due to the design defects of the sensor and the weak ability of the sensor node processor, the accuracy of the sensor acquisition results is not high. In addition, the energy and communication capabilities of wireless sensor network nodes are very

limited, and it is impossible to use existing wired network protocols for data transmission. In order to avoid wasting communication bandwidth and energy and improve the efficiency of information collection, this paper will study the sports event data collection method based on BP neural network and wireless sensor technology.

Establishment of Wireless Sensor Network for Sports Event Data Acquisition

Sports event data acquisition wireless sensor network is mainly composed of a large number of high-precision sensors, which are randomly deployed in the sensing area to collect environmental information. The high-speed and high-precision camera also uses sensors to track the data acquisition object and locate the object in time. In the wireless sensor network structure, sensor nodes are divided into cluster head nodes and cluster member nodes. The member nodes are responsible for collecting the environmental parameters around them, and the cluster head node is responsible for collecting the data of all member nodes in the whole cluster and forwarding these data to the base station node or mobile aggregation node.

Wireless sensor network node is the basic part of wireless sensor network. In different applications, the composition of nodes is different, but the basic composition includes the following units: sensor module, processor module, wireless communication module and energy supply module. In the whole network structure, the member nodes in the cluster are responsible for monitoring the surrounding environment data they are interested in. The member nodes can also cooperate with each other to remove the redundant data between adjacent nodes, and finally forward the data to the cluster head node in the current cluster. On the one hand, the cluster head node needs to indicate its identity to other nodes in the cluster by sending broadcast packets. On the other hand, it needs to process the received data and then send it to the mobile aggregation node or relay node. Cluster head nodes often need to consume more energy in the transmission process. In order to avoid premature death of some nodes, nodes with more energy are usually selected to play this role [5]. After the mobile sink node completes the information collection in the whole sensing area, it sends the data to the manager service node and data analysis terminal according to the network protocol. In terms of network topology structure, this paper mainly combines hierarchical and mobile network topology mechanism to realize an energy-saving and efficient wireless sensor network and maximize the life cycle of sports event data acquisition network.

The energy calculation formula of the sensor node sending and receiving data is as follows. E_d^{Tx} is the power consumed by the wireless sensor network transmitting a data packet, and E_d^{Rx} is the energy consumed by the data transmission mechanism. The energy E^{Rx} consumed by receiving information and the energy E^{Tx} consumed by transmitting information can be calculated by the following formula [6]:

$$E^{Tx}(l, r) = lE_d^{Tx} + l\varepsilon r^n \tag{1}$$

$$E^{Rx}(l, r) = lE_d^{Rx} \tag{2}$$

where l is the length of the transmitted or received information, r is the distance, and n represents the path loss index of the distance specified in the wireless signal propagation model; ε is the energy consumed by transmitting unit size data per unit distance. It

can be seen that sending messages consumes energy to run wireless communication and signal amplifiers, while receiving messages only consumes energy to run wireless transmission. A large number of sensor nodes are randomly distributed in the network, and the network coverage is equal to 1. In the sensing range, sensor nodes can detect reliably. The sensing range is a circular area with radius R. Therefore, the effective area of each sensor node can be πR^2, but the range of simultaneous interpreting of different sensors may overlap. When calculating the coverage, we can't simply sum up the sensing range of each sensor node.

When deploying each sensor node in the wireless sensor network, it needs to be set according to the data collection range of sports events. When collecting sports event data, we should avoid loopholes in the sensor data collection range. Ieee802.0 is used in the wireless sensor network for sports event data acquisition 15.4 standard communication, and then set the routing protocol in the data acquisition network as LEACH protocol. In LEACH protocol, the sensing area is divided into multiple uneven clusters according to the Euclidean distance between nodes. In each cluster, a cluster head node is selected to collect and process the network information resources of its cluster members, and then each cluster head node transmits the data to the base station through a single hop. The protocol stipulates that new cluster head nodes will be reselected in each round, which avoids the problem of premature energy depletion in the long-term high load operation of cluster head nodes, thus prolonging the stability period of network transmission.

Nodes under LEACH protocol are divided into ordinary nodes and cluster head nodes. During the operation of the network, all nodes will generate a random number in the range of (0, 1). if the random number of the node that has never served as the cluster head in the network is less than the set threshold $T(n)$, the node is determined as the cluster head, and the value of $T(n)$ is shown in the following formula [7].

$$T(n) = \begin{cases} \dfrac{p}{1 - p * \left[t \bmod p^{-1}\right]}, n \in G \\ 0, n \notin G \end{cases} \tag{3}$$

where, G is the node set that has not been the cluster head in the current round, t is the number of current round robin, p is the proportion of the number of cluster heads in all nodes, and $T(n)$ represents the probability threshold that the node will act as the cluster head. According to the above formula, all nodes will act as cluster heads once.

In this protocol, all nodes can compete for the cluster head in turn, which ensures that the energy consumed by each node is relatively balanced and can prolong the life cycle of the network. The cluster head sends an invitation message to other nodes in the network in the communication mode of NP CSMA. Other nodes choose to join the cluster with high signal strength according to the strength of the transmitted signal from the received cluster head, and send a join ACK message to the cluster head with NP CSMA to join the cluster. After the preliminary construction of sports event data acquisition wireless sensor network, data fusion is carried out.

1.1 BP Neural Network Fusion of Wireless Sensor Network Data

In practical application, the sink node can be placed on athletes. The sensing node cannot know the moving position of the sink node in advance. Once a person or animal

enters the sensing area, the sink node can obtain the data of all sensor nodes within the communication range. In the aggregation node data collection algorithm based on random movement, the mobile aggregation node reaches the sensing range of the sensor node in a probabilistic way, which can be regarded as a Poisson arrival process.

In traditional static sensor networks, nodes mainly forward data to base stations by single hop or multi hop. This static network structure often has a typical energy hole problem, which can not guarantee the principle of balanced energy consumption of nodes in the network. In the data collection algorithm with mobile sink node, the mobile sink node collects the sensing data of sensor nodes in the cluster according to a certain moving track, which avoids the problem of high energy consumption and load of some nodes in the static network. However, for mobile sink nodes, designing an appropriate mobile path has also become an important problem. Generally, the mobile mode of sink node can be divided into fixed mobile mode and controllable mobile mode. A data collection algorithm of sink node with fixed moving track is adopted. On the one hand, the fixed moving mode is suitable for the network model of uniform clustering, which is easy to construct the moving track of cluster head node; On the other hand, the fixed mobile mode can save the computing cost of the network, including the planning of mobile trajectory and the later route reconstruction [8].

In this paper, BP neural network is used for data fusion of sports event data acquisition wireless sensor network. The model of wireless sensor network is similar to BP neural network. The node used to collect the surrounding environment information in WSN is equivalent to the neuron in BP neural network. WSN needs to transmit information through certain connection rules, just as BP neural network needs to transmit information through synapse. The whole process of wireless sensor network is to process a large amount of information collected and obtain the characteristics of data, which is the same as the function of data fusion based on BP neural network. Therefore, BP neural network can be applied to the data fusion of wireless sensor networks.

BP network model is usually composed of input layer with one or more nodes, output layer with one or more outputs, and one or more hidden layers. When the last layer of the network adopts curve function, the output is limited to a very small range, while the output can be any value using linear function. General neural networks are adjustable, or trainable, so that a specific input can get the required output data. The basic idea of BP algorithm: for an input sample, after the calculation of weight and excitation function, get an output, and then compare it with the expected sample. If there is a deviation, back propagate the deviation from the output, and adjust the weight and threshold to make the network output gradually consistent with the expected output.

The basic idea of bpnda is that firstly, after WSN forms a stable cluster structure according to the routing rules of LEACH protocol, the sink node collects the information tables of the nodes in the cluster and the cluster head, and constructs BP neural network. Then the sink node collects the samples matching the cluster member information in the sample database for training, and obtains the neural network parameters of the cluster member and the cluster head node. Finally, the bpnda data fusion algorithm is applied to each cluster. The cluster node transmits the original data to be fused to the cluster head. The cluster head node uses the BP neural network data fusion algorithm to fuse the collected information and transmits a small amount of eigenvalues of the reaction

information to the sink node. Therefore, the application of bpnda in wireless sensor networks reduces the amount of data transmission between cluster head nodes and sink nodes, reduces the energy consumption of nodes, and prolongs the life cycle of WSN.

In the process of applying BP neural network algorithm to the data fusion of WSN, the wireless sensor network area has the following specified assumptions [9].

1. The ID of each sensor node is unique, its energy is limited, and the energy cannot be supplemented during the whole experiment. Its position will not move in theory after the deployment is completed.
2. The sink node is unique and fixedly distributed outside the region. Its energy can be continuously supplemented, and it has enough power to send data information to ordinary nodes, which cannot.
3. The position coordinates of all nodes can be obtained.

In BP neural network, the establishment of network model needs to set network parameters, such as the weight and threshold between neurons. These parameters can be trained by the information to be measured of BP neural network. After the wireless sensor network forms a stable clustering structure through LEACH protocol, before BP neural network is applied to wireless sensor network, BP neural network needs to be trained to obtain the weight and threshold value. Because the energy may be consumed greatly in the process of network training, resulting in the shortening of network life cycle, the data fusion algorithm bpnda will complete the training of neural network in the sink node of wireless sensor network and obtain relevant parameters.

In the process of data fusion of BP neural network, this paper selects a three-layer neural network: input layer, output layer and hidden layer. The input layer and output layer have only one node, and the hidden layer has k nodes.

The essence of data fusion using BP neural network is to train the weight by gradient descent according to the output error function, so that the error value tends to the minimum. In this process, the weight adjustment method is shown in the following formula.

$$W^{n+1} = W^n + \Delta W \tag{4}$$

$$\Delta W = -\eta \frac{\partial E}{\partial W} = \eta \delta O \tag{5}$$

where, W is the weight of neural network; E is the output deviation of neural network; η is the gradient descent learning rate; δ is the partial derivative ratio; O is the output of neural network. Formula (4) is a typical weight adjustment formula in BP neural network, which indicates that the next training weight W^{n+1} is the sum of the current weight W^n and the change rate ΔW of the current weight relative to the output error. Because the BP neural network algorithm adopts the gradient descent method, the weight adjustment in formula (5) is negative, indicating that the value of the error function gradually tends to decrease with the weight adjustment.

The error function of BP neural network is a multi-dimensional function about the weight W. The stereo image constructed by BP neural network has multiple extreme

points, and the surface is in a steep state when it is adjacent to the extreme points. The change rate ΔW of the weight here with the error function is too large, resulting in too large adjustment range of the weight, and it is easy to miss the error minimum points in the adjustment process, resulting in oscillation. In the flat area of the image, if the change rate of the weight of the error function is too small, it may be mistaken that the error function has converged to the extreme point. This misjudgment will stop the training and not get the best value, and if the change rate of the weight is too small, the training time of the network will be prolonged.

On the basis of the adjusted weight term α, therefore:

$$W^{n+1} = W^n + \alpha \Delta W \tag{6}$$

Momentum term α is generally taken as a random constant between (0, 1). Because the momentum term α is added on the basis of the weight change rate, the range of the change rate of the error function is relatively reduced. When the weight value converges on the steep slope of the surface, it can make up for the defect of missing the best minimum value or causing oscillation due to excessive adjustment range to a certain extent.

However, the defect improvement caused by flat area is not large, and the decrease of the adjustment range of weight will lead to slowing the adjustment speed and the longer time of weight training.This paper also considers the weight change rate of the first three times in the weight adjustment degree, and the improved weight adjustment degree is shown in formula (7).

$$\Delta W = \Delta W^n \pm \frac{\left(\Delta W^{n-1} + \Delta W^{n-2} + \Delta W^{n-3}\right)}{\Delta W^{n-1}} \tag{7}$$

In formula (7), $\pm$ means that the positive sign is applied when the weight change rate ΔW^n is greater than 0, otherwise the negative sign is used to ensure that the value of the error function gradually tends to decrease with the weight adjustment. ΔW^{n-1}, ΔW^{n-2} and ΔW^{n-3} represent the weight change rates of the first three times, and its value can be obtained from formula (5).

After determining the parameters in the BP neural network, the data fusion of the sports event data acquisition wireless sensor network is conducted according to the flow chart shown in Fig. 1.

Firstly, the wireless sensor network is initialized to determine the initial state of each node in the network, including the initial energy, ID and location information of each node. Then, leach clustering routing protocol is used to select the optimal cluster head of the network, and a stable cluster model of wireless sensor networks is established. At this time, each node in the cluster sends its own information table to the cluster head of the cluster, and each cluster head transmits the information to the sink node. The sink node constructs a typical three-layer BP neural network model according to the specific requirements of the information to be fused. At the sink node, the relevant samples are trained by BP neural network to obtain the required parameter information. Finally, the sink node assigns the trained network parameters (weight and threshold) to each corresponding node, including nodes in the cluster and cluster head nodes. Finally, the wireless sensor network can use the trained BP neural network model to process

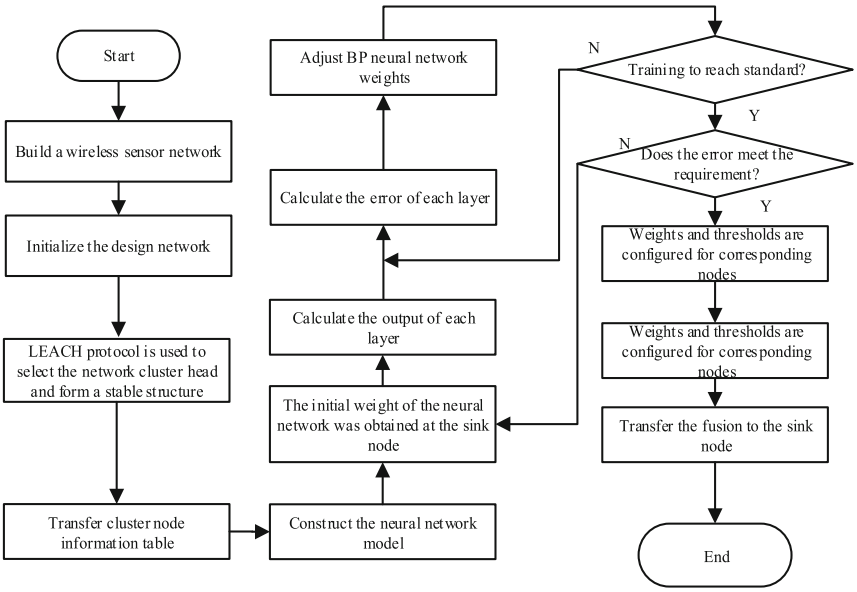

Fig. 1. Flow chart of BP neural network data fusion

the information collected by the wireless sensor network. The common nodes in the cluster are located at the bottom of BP neural network. The information collected by the wireless sensor network will be initialized by the input neuron function, and the processing results will be transmitted to the cluster head node. The cluster head node further fuses the information data according to the hidden layer function and the output layer function, and transmits the fusion results to the aggregation node. Based on the momentum term, the dynamic optimization of the weight adjustment degree Δ w can make up for the defects of oscillation caused by excessive adjustment amplitude or missing the optimal minimum to a certain extent, make the final output result more accurate, and shorten the training cycle of BP neural network. After using BP neural network to fuse the data of sports events, the data collection of sports events is realized.

1.2 Realize Sports Event Data Collection

Sports event data collection needs accurate positioning information, and it is meaningless to study the lack of positioning information. This paper uses compressed sensing to locate the wireless sensor network nodes of sports event data collection. Compressed sensing can losslessly recover the signal from low rate sampling, and the probability of recovery is very high, mainly because it has the following two characteristics: the original signal has the characteristics of sparsity; Perception matrix and transformation basis are not related. As an important part of compressed sensing, signal reconstruction refers to the process of solving sparse signal X through observation matrix Y. Where Y is M dimensional, X is n-dimensional and satisfies $M \ll N$. The MP matching tracking algorithm is used to reconstruct the signals of wireless sensor network nodes for sports event data

acquisition. The main idea of MP algorithm is to select an atom in the perception matrix after each iteration, which is the best matching item of the signal. The specific process is to calculate the residual after sparse approximation, select the obtained residual, and take the residual as the atom of the best matching item. After repeated iterations, the signal can be represented by the linear combination of atoms. The algorithm needs more iterations and is more complex, because the signal has the problem of non orthogonalization in the projection process. When the sparse matrix and perception matrix are not related to each other, the same solution will appear when solving the l_0 norm optimization. At this point, it can be transformed into linear programming.

The sensing area is set as a regular polygon structure, which is mainly to divide the sensing area into multiple honeycomb structures of equal size. Among them, k sensor nodes are deployed in the sensing area, and the specific IDs of these nodes are represented by set $\{S_1, S_2, \cdots, S_k\}$. These nodes are mainly responsible for monitoring and collecting the sensing signals in the target area.

In the process of network clustering, this paper mainly uses a uniform clustering method to divide the sensing area into multiple honeycomb clusters of equal size. Different from the previous clustering methods, this clustering method can be applied to the network environment with irregular shape. The area of the cluster is calculated by its fixed side length, which not only ensures that each sub cluster covers as many nodes as possible, but also avoids the communication blind area between clusters. In addition, in order to ensure full coverage of all nodes, the number of clusters is determined by the size of the sensing area.

After selecting the cluster head node of each cluster according to the reason protocol, first, the cluster head node will broadcast its ID number, specific location information and the remaining energy capacity of the node to all member nodes in the cluster by sending broadcast packets. After that, the ordinary member nodes in the cluster are responsible for receiving the broadcast packet and recording the information of the cluster head node. Finally, the ordinary node starts to forward the sensing data it obtains to the cluster head node. The greedy selection strategy can be adopted in the cluster. When the node is far from the cluster head node, the node will select the nearest node in the direction of the cluster head node as its next hop transmission relay node. This transmission method not only reduces the energy consumption of data transmission, but also avoids the packet loss caused by long-chain transmission. When the node is close to the cluster head node, the single hop transmission mode can be adopted. The energy calculation formula is as shown in formula (1) (2). In order to avoid long-chain transmission, the transmission distance in the cluster will not be greater than the set threshold value y_0, and the energy consumption calculation of free space model is adopted for data transmission. When the node is far away from the cluster head node, the multi hop transmission mode is adopted. The node will first send the data to the relay node st_j, which is responsible for receiving and forwarding the data to the cluster head node. After the data transmission in the cluster is completed, the sink node starts to collect the information of each cluster head node. Multi hop transmission mode is adopted between cluster head nodes. After minimizing the data transmission between cluster head nodes, it is necessary to forward the data to the sink node to realize the data collection in the sensor network. According to the above contents, the research on the sports event data acquisition method based on

BP neural network and wireless sensor technology is completed. The data acquisition method can improve the data transmission efficiency and reduce the energy consumption of wireless sensor network.

2 Test Research and Analysis

2.1 Test Preparation

This section will test and analyze the sports event data acquisition method based on BP neural network and wireless sensor technology. The simulation environment parameters of this test are: 200 identical network nodes (except geographical location) are randomly deployed in the 200 m * 200 m area, the sink node is located at the origin of the area, and 1200 cyclic experiments are carried out in wireless sensor networks. Distributed environment is configured with Hadoop framework and has Cloudera Hadoop version; serial environment is ordinary PC and Intel i5-9400F processor. The experimental platform was a Cluster consisting of multiple nodes consisting of 18 GB RAM and 2.98G 8 nuclear Intel Xeom X9870 CPU. Hadoop node cluster, and cluster communication is based on MPI library. The operating system of Win10 is used.

In order to simplify the test environment, a single type of sensor with the same parameter is used to obtain the test environment data. The specific sensor parameters are shown in Table 1.

Table 1. Test the sensor parameters

Number	Parameter	Numerical value
1	Sensing area side length	25 m
2	Number of sensor nodes	200
3	Communication radius of sensor node	80 m
4	Database size	10 MB
5	Cluster message length	50 bit
6	Baotou length	30 bit
7	Node initial energy	1.5 J
8	RF energy consumption coefficient	75 NJ/bit
9	Power consumption factor of the power amplification circuit	15 NJ/bit/m^2
10	Distance threshold	95.2 m

Reference [3] and Reference [4] are compared with this method. By comparing the energy loss of sensor nodes and the same amount of data acquisition time after using different methods to collect data, we can measure whether the performance of the data acquisition method can meet the requirements of sports event data acquisition.

2.2 Test Results

In the same experimental environment, the same group of sensors obtain the environmental data, and use three data acquisition methods to collect the data to the sink node. Take the average value of 100 tests as the final data of the current group of tests. Select Microsoft SQL Server 200 as the tool for building the data warehouse; and the data mining module developed by Microsoft Visual Basic6.0 is used to process the relevant data, and the processing results are stored in the SQL Server database. Table 2 shows the energy loss ratio of nodes and the comparison of data acquisition time in each group of data acquisition.

Table 2. Comparison of the energy loss ratio and the data acquisition time for the node

Group	Data acquisition method based on BP neural network		Reference [3] method		Reference [4] method	
	Energy loss ratio/%	Data acquisition time/ms	Energy loss ratio/%	Data acquisition time/ms	Energy loss ratio/%	Data acquisition time/ms
1	6.44	4.15	9.54	10.23	13.78	11.74
2	6.52	3.81	8.62	11.36	14.84	11.61
3	7.46	3.76	9.18	10.95	14.42	11.50
4	6.83	3.72	8.31	10.83	11.83	12.27
5	7.37	4.05	8.24	12.21	14.60	10.41
6	5.76	4.23	8.99	11.12	12.34	11.46
7	6.28	4.37	8.53	10.28	11.46	11.63
8	6.19	3.91	8.75	12.05	12.21	10.62
9	7.56	4.02	9.27	12.26	11.68	11.85
10	6.13	4.28	9.08	12.51	14.67	11.31
11	5.71	3.74	8.43	11.08	12.55	11.64
12	7.02	3.82	8.86	12.37	12.05	11.67

From the data analysis in Table 2, it can be seen that after the method collects data, the energy loss proportion of the sensor node is the smallest, with an average of 6.61%, which is higher than the average energy loss proportion of the reference [3] method of 8.82% and the average energy loss proportion of the reference [4] method of 13.04%. The data acquisition time of this method is significantly less than that of the other two comparison methods, which shows that the acquisition rate of this method is higher and the effect is better when applied to the data acquisition of sports events.

Summarizing the above test data, the sports event data acquisition method based on BP neural network and wireless sensor technology proposed in this paper can quickly

collect sports event data, prolong the working time of sensor nodes and improve the efficiency of data acquisition.

3 Conclusion

In the process of sports events, the statistics, summary and analysis of the technical data of each game will help to improve the management and technical level of sports events. Athletes can find their problems in the competition by summarizing their various performances in each competition, so as to continuously improve their technical level; Referees can find their own mistakes in enforcing the competition by summarizing the data; Managers can find the lack of athlete training from the sports event data. The collection and statistics of technical data for sports events have been widely used in sports events in various countries. In this paper, a sports event data acquisition method based on BP neural network and wireless sensor technology is proposed. Through the comparison test with the current data acquisition methods, the effectiveness of the data acquisition method is verified.

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