International Journal of Frontiers in Sociology
ISSN 2706-6827 Vol. 4, Issue 2: 61-75, DOI: 10.25236/IJFS.2022.040212

The Management Mode of College Students' Mental Health Based on Wireless Sensor Network

Peng Wang, Dan Li, Xiangyin Meng

College of Control Engineering, Xijing University, Xi`an, China
China Design Group Co.,Ltd

Abstract: *In today's society, there are more and more psychological problems among college students, and the main source is no longer purely from academic pressure, society, parents and other aspects. As a result, more and more college students are facing mental health problems, and the lack of better mediation of mental health problems has exacerbated this phenomenon. The purpose of this article is to explore the management model of college students' mental health. For this reason, this paper proposes to monitor the mental health of college students through the use of wireless sensor networks. A trust model is established for analysis, and the sensor node structure is re-arranged to ensure the stable operation of the wireless sensor network and the reliability of the monitoring results. At the same time, experiments are designed to explore the mental health of college students. The experimental results of this paper show that the newly deployed wireless sensor network can increase the monitoring efficiency of the existing sensor network by 31%, which can greatly improve the monitoring of college students' mental health and help them solve related psychological problems.*

Keywords: *Wireless Sensor Network; Mental Health of College Students; Mental Health Management; Trust Model*

1. Introduction

In a rapidly changing and rapidly developing modern society, social changes and their brutal competition are characteristic. This has brought tremendous pressure and influence to the psychology of college students, and there are also instances of personality deviation and crime caused by psychological problems. The mental state of college students is one of the urgent problems to be solved, so it is essential to strengthen the mental health education of college students. With the rapid development of network information technology, the network has expanded its tentacles for college students, especially in all areas of social life, and the acceptance of new things is very special. The wireless sensor network has changed the learning of college students, and it has a great impact on their living conditions and their mental health.

The rapid development of computer and network technology has brought many new effects to the mental health of college students. College students can share high-quality resources through the Internet, obtain information more conveniently, and communicate with each other more conveniently. However, the Internet is for all college students. Although it is convenient to study and live, it will also have a negative impact on the mental health of college students. Many college students do not know how to restrain and control themselves while surfing the Internet. This leads to psychological barriers to the Internet such as dependence, Internet loneliness, and Internet poisoning syndrome. Affected and influenced by the Internet trend, the form, content, and organizational mechanism of mental health education for college students have undergone tremendous changes. The traditional mental health education model is difficult to adapt to the severe issues brought about by the Internet. Therefore, for university mental health educators, it is necessary to strengthen the research of mental health education models in the network environment. Through the wireless sensor network in the network environment, explore ways to implement the mental health education of college students more appropriately.

With the advent of the computer industry era, the use of wireless sensor networks has become more and more frequent, which has led to more and more application researches on the construction of related wireless sensor networks. Ren J proposed that network life is a key performance indicator for evaluating data collection wireless sensor networks, in which battery-powered sensor nodes periodically perceive the environment and forward the collected samples to the sink node. In this article, he proposed an analytical model to estimate the entire network life cycle from network initialization to

ISSN 2706-6827 Vol. 4, Issue 2: 61-75, DOI: 10.25236/IJFS.2022.040212

complete disabling, and to determine the boundary of the energy hole in the data collection WSN. It proves the effectiveness of the proposed analysis model in estimating the network lifetime and energy hole evolution process [1]. In his article, Chen proposed CANS, a congestion adaptive and small stretch emergency navigation algorithm with WSN. Specifically, CANS uses the idea of a level set method to track the evolution of exits and the boundaries of dangerous areas, so that people near the dangerous area can achieve light congestion at the cost of a slight detour, while those far away from the dangerous avoid unnecessary detours. CANS also considers emergency situations by combining local but simple state update schemes [2]. Chen Z proposed that if the sensor node needs to be upgraded, the node will distribute the program code package to them. As a result, new capabilities can be obtained and the so-called software-defined network can be formed. However, due to the large capacity of the code package, the constrained energy of sensor nodes and the unreliable link quality of the wireless network, it may be a challenge to broadcast the code package to all nodes in the network [3]. Luo J proposed that because most sensor nodes are equipped with limited non-rechargeable batteries, energy-saving optimization has become one of the main issues in the design of wireless sensor network routing protocols. He focuses on minimizing energy consumption and maximizing the life of the data relay network in a one-dimensional queue network. He follows the principle of opportunistic routing theory, and the decision to optimize network energy efficiency in multi-hop relays is based on the difference between sensor nodes, the difference in their distance to the sink and the remaining energy of each other [4]. Benzaid C proposes to use cooperation between nodes to accelerate signature verification, and the acceleration scheme allows a longer network life. The new scheme saves up to 45% of the energy consumed in the verification process, and the accelerated scheme is 66% faster than the traditional signature verification, and it has carried out analysis, simulation and real-world experiments [5]. Jiang J proposed an efficient distributed trust model (EDTM) for WSN, and as shown by the number of bundles acquired by the sensor hub, direct trust and recommended trust are specifically calculated. In the estimation of direct trust, communication trust, vitality trust and information trust are considered. Improving the accuracy of the recommendation trust through the characteristics of trust credibility and nature. The proposed EDTM can more accurately assess the reliability of sensor hubs and more successfully maintain security vulnerabilities [6]. Zhang H considers the secure resource allocation of Orthogonal Frequency Division Multiple Access (OFDMA) two-way relay wireless sensor network (WSN), and the optimization problem appears to be mixed integer programming and non-convex. For scenes without CJ, he proposed an asymptotically optimal algorithm based on the dual decomposition method and a suboptimal algorithm with lower complexity. Finally, the proposed scheme is evaluated through simulation and compared with the existing scheme [7]. Dong M proposed a new type of event data collection method called reliability and multipath encounter routing to meet reliability and energy efficiency requirements, thereby further extending the life of the network. Both theoretical and experimental simulation results show that RMER applied to event detection is superior to other solutions. The results clearly show that compared with other solutions, RMER improves energy efficiency by 51% and network life by 23%, while ensuring the reliability of event detection [8]. The above several documents are quite good for the research of related technologies, and the design of the experiment is also a composite specification. The idea of the experiment can be used as a reference to the actual application to improve the experimental part of article.

The innovation of this paper is to use the construction theory of college students' mental health education model as the theoretical support. After a certain degree of understanding of college students' psychological health education, the structure of wireless sensor network is built and the structure of nodes is deployed. And using this as a technical support to ensure the technical feasibility of the management model of college students' mental health based on the wireless sensor network, and at the same time ensure the theoretical feasibility of the management model.

2. Mental Health Management Methods for College Students

2.1 Theoretical Basis for the Construction of the Mental Health Education Model for College Students

From the perspective of academic theory and internal logic, the construction of a mental health education network model for college students should be guided by the education concept of "Moral and Heart Co-education" to establish a solid theoretical cornerstone for the construction of the mental health network education model for college students [9]. Several common psychological puzzles of college students are shown in Figure 1:

ISSN 2706-6827 Vol. 4, Issue 2: 61-75, DOI: 10.25236/IJFS.2022.040212

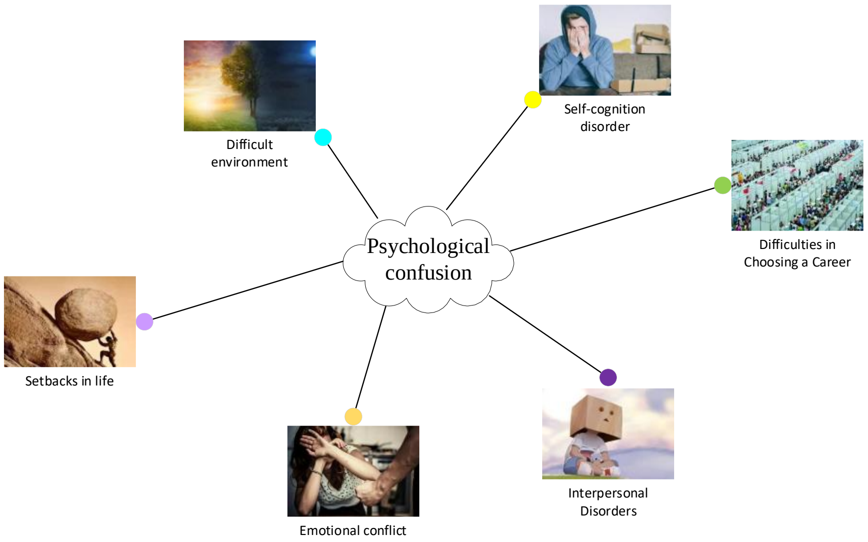

Figure 1: Several psychological puzzles common to college students

"Morality and Heart Education" means the fusion of moral education and heart education [10]. "Nurturing the heart with virtue, storing virtue with the heart, cultivating with virtue and heart, and blending with virtue and heart" is the ideal state of the integration of virtue and heart. The fusion of virtue and heart will eventually form the beauty of virtue and heart, which better reflects the people-oriented thinking, and is a kind of education of the highest kind, the most truth, and the most beautiful [11]. The concept of mutual education of morality and heart is shown in Figure 2:

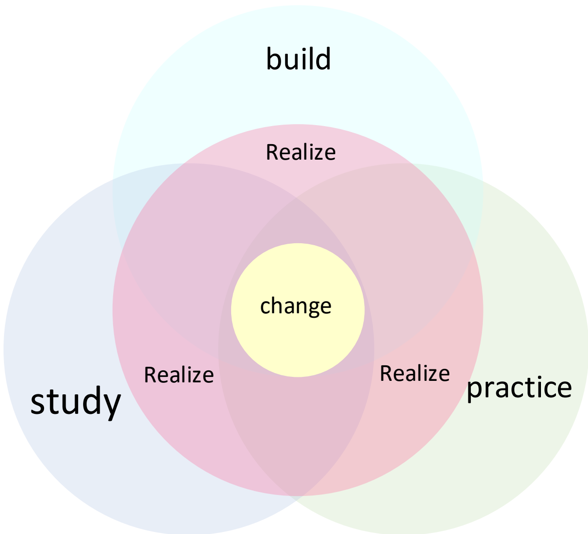

Figure 2: The concept of mutual education of morality and heart

First, moral education should absorb beneficial elements from mental health education, integrate it into one's own work, and use it for "I". Second, mental health education should rely on moral education to guide itself. Third, the construction and cultivation of "sound personality" should be the best "cutting point" for the organic combination of moral education and mental health education [12].

2.2 Trust Model of Wireless Sensor Network

(1) Trust model based on weighted wireless sensor network

After studying the research work of many domestic and foreign scholars on wireless sensor networks, this paper designs a weight-based trust model for wireless sensors. This model introduces the base station, which makes full use of the base station's strong computing power, huge storage space, and relatively stable and safe working environment. Most of the computing tasks of the entire wireless sensor network are handed over to the base station, which not only reduces the workload of ordinary wireless sensor nodes, but also effectively strengthens the defense capabilities of the entire network and

ISSN 2706-6827 Vol. 4, Issue 2: 61-75, DOI: 10.25236/IJFS.2022.040212

ensures the security of the wireless sensor network.

As shown in Figure 3, the weight-based wireless sensor network trust model designed in this paper is divided into two modules: parameter module and calculation module. Among them, the parameter module mainly refers to the wireless sensor nodes in the wireless sensor network. The task of the parameter module is to collect and record the working log of the node, including the historical behavior of the node communication, power, risk value and other parameters. The calculation module is composed of a base station, which is responsible for integrating the parameters and other data sent by the trust system. Based on these parameter data, the optimal path between the two nodes required in the wireless sensor network is calculated according to the algorithm designed by the user. After calculating the shortest path, the calculation module broadcasts the result to all nodes in the entire network. Each sensor node updates its own path table as needed, and each time it forwards data, it must access the latest path table to determine its own transmission route in the network [13].

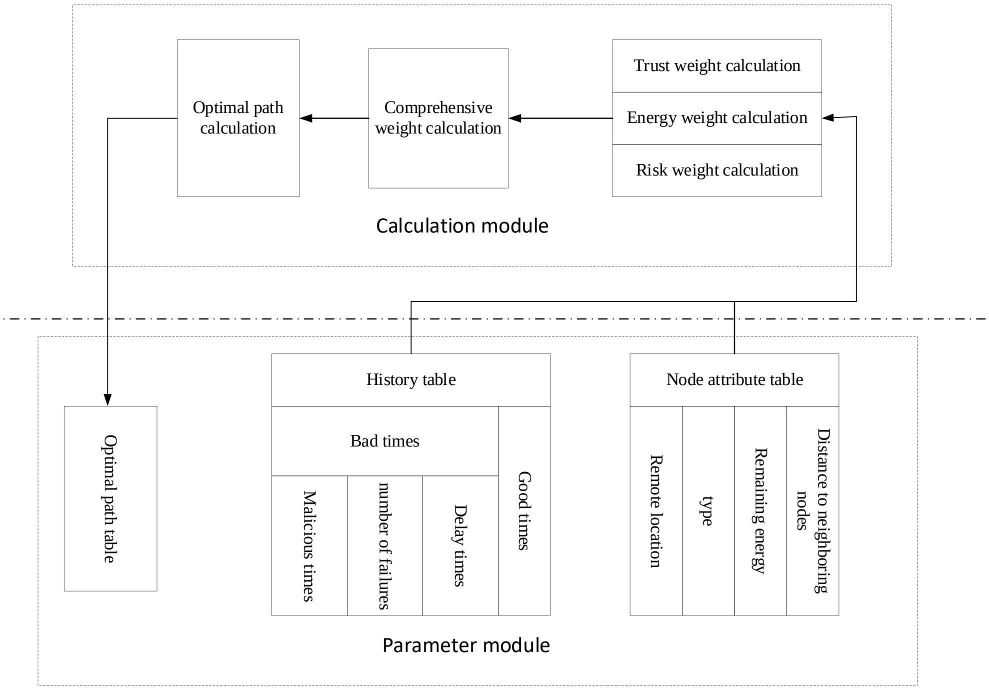

Figure 3: The structure of the weight-based trust model of wireless sensors

This model adds a calculation module to the traditional trust model, and transfers the calculation work such as path selection to this module, which can reduce the workload of ordinary nodes. Although this reduces the intelligence of ordinary nodes to a certain extent, it can reduce the possibility of node intrusion and increase its working life [14]. As long as the source node receives the result of the optimal path, it starts to send data directly based on this result, and does not need to occupy local resources to calculate the next hop node like the traditional trust model. In addition, the optimal path selection module can not only calculate trust weights, energy weights, and risk weights, but also plan the initialization of data in the network, and specify the storage and access methods of data [15].

(2) The structure of the wireless sensor node

The structure of the wireless sensor node is shown in Figure 4.

The power supply module is the energy source of the sensor node, ensuring the stable supply of the node's working electrical energy. The power supply method can be an external battery, or it can be powered by solar power technology [16]. At present, due to cost reasons, the most common is to use battery power to support the operation of wireless sensors [17]. The application field of the power supply module is shown in Figure 5:

ISSN 2706-6827 Vol. 4, Issue 2: 61-75, DOI: 10.25236/IJFS.2022.040212

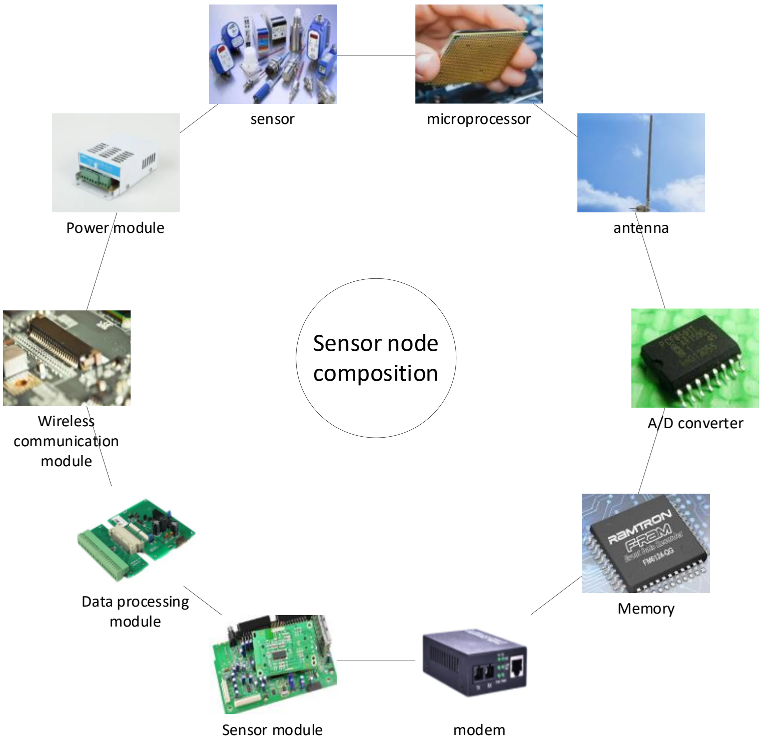

Figure 4: The structure of the wireless sensor

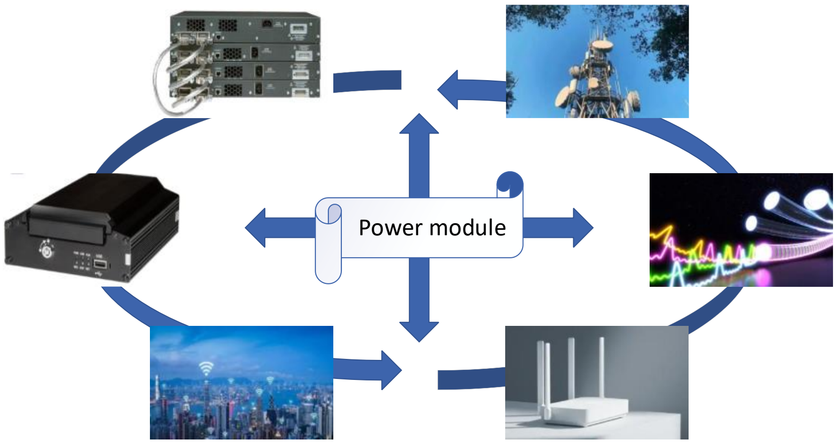

Figure 5: Application areas of power supply modules

The sensor module is equivalent to the "eyes" of the sensor node, which is responsible for real-time sensing of the dynamic change information of the monitored object, such as scalar quantities such as temperature, voltage, light, and vibration. And through the A/D converter, the collected information is converted into a digital signal suitable for spreading in the network circuit, and handed over to the data processing module. According to different application environments, wireless sensors can be divided into explosion-proof type and anti-corrosion type [18]. Several common explosion-proof and anti-corrosion sensors are shown in Figure 6:

The data processing module can be said to be the most critical and important module, which is equivalent to the "brain" of the sensor node. It controls and directs the work of the entire sensor node, and is responsible for data processing and storage. However, the processing power of the processors of wireless sensors on the market is very limited. Due to the low-cost requirements, the storage capacity and computing power of the sensors cannot be designed to be very high.

Figure 6: Several common explosion-proof and anti-corrosion sensors

The wireless communication module is equivalent to the node "mouth and ears" and is responsible for data receiving and sending. Using electromagnetic waves to communicate wirelessly between its own node and other sensor nodes in the network, and its wireless communication methods include WIFI, GPRS, 2.4G, etc.

(3) Calculation module

In the model designed in this paper, the calculation module chooses the base station as the main equipment. Under normal circumstances, the base station has relatively powerful data analysis and calculation capabilities, and can be placed in an attended indoor environment, and its energy and storage capabilities can be regarded as unrestricted [19].

In this paper, the calculation of the optimal path is handed over to the base station. After receiving the statistical data sent by the parameter module, the base station performs trust weight calculation, energy weight calculation and risk weight calculation according to the algorithm designed below, and calculates three weights are fused into a comprehensive weight. After the wireless sensor network nodes are deployed, the base station will store the topology of the network. By combining the network topology and comprehensive weights, the network is abstracted into an undirected graph with weights. Using the optimal path algorithm designed in this paper to calculate the optimal path, and return the obtained optimal path result to the sensor node in the trust system [20]. The calculation method of its comprehensive weight is as follows:

$$H(S_1, S_j) = \lambda_1 T + \lambda_2 E - \lambda_3 R \quad (1)$$

For the trust variable t, the probability density function of its Beta(α,β) distribution is:

$$f(t;\alpha,\beta) = \frac{1}{B(\alpha,\beta)} t^{\alpha-1}(1-t)^{\beta-1} \quad (2)$$

The mathematical expectation can be obtained by calculation as:

$$E(T) = \frac{\alpha}{\alpha+\beta} \quad (3)$$

The calculation of the direct trust of the sensor node Si to the sensor node Sj can be completed by formula 4. The formula is as follows:

$$H_D(S_i, S_j) = E(T) = \frac{S+1}{S+f+2} \quad (4)$$

The indirect trust calculation method of the node Sj obtained by the node Si through the neighboring nodes is as follows:

$$H_{ID}(S_i, S_j) = \frac{\sum_{k-1,k\neq 1}^{n} H_D(S_j, S_k) \times H_D(S_k, S_j)}{n} \quad (5)$$

Add the weights of the direct trust and indirect trust of the sensor node to get the comprehensive trust of the sensor, the calculation formula is as follows:

ISSN 2706-6827 Vol. 4, Issue 2: 61-75, DOI: 10.25236/IJFS.2022.040212

$$H(S_i, S_j) = \rho H_D(S_i, S_j) + (1-\rho) T_{ID}(S_i, S_j) \quad (6)$$

At the same time, the calculation formula of the trust weight T is given as follows:

$$T = \frac{T(S_i, S_j) + T(S_i, S_j)}{2} \quad (7)$$

4) Calculation method of energy weight

The wireless sensor network is composed of sensor nodes, and each sensor node is not only responsible for sensing and collecting the information of the observation object, but also participating in the data forwarding work of the entire network, and forwarding the data sent by other nodes to the next target node. Of course, the sensor node must consume energy whether it is sensing or collecting information or forwarding data. The energy of sensor nodes is directly related to the life cycle of the entire network [21].

If the remaining energy of the node is not considered, it is easy to cause the operating frequency of a node to be too high, the energy consumption rate is too fast, and its working life will be greatly reduced. The premature death of a single node in the network will cause holes or disconnections in the network, which will affect the stability and reliability of the network. In addition, with different types of sensors and different working environments, the energy consumption of sensor nodes themselves when collecting information is different. If a sensor node has high energy consumption, we should reduce its participation in data forwarding to ensure that it has enough energy to complete its information collection work [22]. Therefore, this article will comprehensively consider the remaining energy of the node, the energy consumed by the node's communication and transmission, and the energy consumed by the node itself to collect information to calculate the energy weight.

Now suppose: the spatial distribution of all sensor nodes in the wireless sensor network can be regarded as a two-dimensional plane, and the position of all sensor nodes will not change after being placed; there are different types of sensor nodes in the network; each node has a full range of net unique identification number [23].

As mentioned earlier, the wireless sensor node is divided into four modules [24]. Among them, the wireless communication module and data processing module will consume most of the energy of wireless sensor nodes.

The energy consumption of wireless communication is generated by the wireless communication module of the wireless communication module. The energy consumption is related to the communication distance, the energy loss of the transmitting circuit, and the power amplification loss.

The energy consumed by the node Si is composed of the loss of the transmitting circuit and the loss of power amplification, namely:

$$E_T(S_i, S_j) = mE_u + m\varepsilon_1 d^2, d < d_0 \quad (8)$$

$$E_T(S_i, S_j) = mE_u + m\varepsilon_2 d^4, d \geq d_0 \quad (9)$$

When the remaining energy of any one of the sensor nodes EL<Ew+ET, the energy weight between the two nodes E=0; otherwise, the energy weight calculation formula is as follows:

$$E = \frac{1}{2}\left[\frac{E_{IL}}{E_T(S_i, S_j)} + \frac{E_{IL}}{E_{iw}}\right] \quad (10)$$

$$E = \frac{1}{2}\left[\frac{E_{JL}}{E_T(S_J, S_i)} + \frac{E_{JL}}{E_{jw}}\right] \quad (11)$$

Adding formula 10 and formula 11 can get the final energy weight calculation formula:

$$E = \frac{1}{2} \times \left[\frac{E_{IL}}{E_T(S_i, S_j)} + \frac{E_{IL}}{E_{iw}}\right] + E = \frac{1}{2} \times \left[\frac{E_{JL}}{E_T(S_J, S_i)} + \frac{E_{JL}}{E_{jw}}\right] \quad (12)$$

ISSN 2706-6827 Vol. 4, Issue 2: 61-75, DOI: 10.25236/IJFS.2022.040212

(5) Evaluation of the risk value of bad communication behavior

As mentioned earlier, each sensor node will record the communication records with other nodes, including the number of good communications and the number of non-good communications [25]. If a sensor node has bad communication behavior, we should consider the node to be risky. This article will classify the bad communication behaviors of nodes, and count the times of different types of bad communication. The classification situation is shown in Table 1:

Table 1: Classification and statistics of bad communication behavior

Description of bad communication behavior	type	frequency	Penalty coefficient
Content malicious	A	F1	C1
Communication failure	B	F2	C2
Large transmission delay	C	F3	C3
other	D	F4	0

Under normal circumstances, what we cannot tolerate the most is that the data sent by sensor nodes in the network contains malicious content. This is often caused by malicious destruction by some attackers, so we must severely punish the nodes that have bad behaviors like A. Secondly, the communication between the two nodes has failed in the most recent period of time or the communication delay between the two nodes is too large. This shows that these two nodes are likely to be in danger, so they will also be punished by the system.

For the three kinds of bad communication behaviors A, B, C, the risk function of constructing bad communication is as follows:

$$\eta_A = \frac{c_1 f_1}{f} \quad (13)$$

$$\eta_B = \frac{c_2 f_2}{f} \quad (14)$$

$$\eta_C = \frac{c_3 f_3}{f} \quad (15)$$

The calculation formula of the risk value based on the bad communication behavior of the node is given as follows:

$$H(\eta) = (\eta_A + \eta_B + \eta_C) \quad (16)$$

Combining the bad communication behavior, location and vulnerability of sensor nodes, this article uses the following risk quantification formula to calculate the risk weights between the measurement nodes in the trust model proposed in this article:

$$R = \frac{H(\eta)}{3} + \frac{b_i + b_j}{2} + \frac{r_i + r_j}{2} \quad (17)$$

It can be seen from formula 17 that as long as the number of bad communication behaviors of a sensor node is more, the location is more remote or the more vulnerable it is, the higher the risk weight generated by its quantification is also in line with common sense.

After weighting, the allocation of network addresses also needs to be recalculated. In distributing the network address of the device, the distributed allocation mechanism is mainly used. After the coordinator is successfully established, the parent device of the device will assign the network address to the device after the device applies to join the network. In order to ensure the uniqueness of the network site selection in this network, when receiving the network site selection (the site selection information assigned by the parent device), the device generally forms a "device statement" and sends it to other devices. Assuming there is a conflicting address, the router will provide a broadcast display of "Network Status-Address Conflict" for other devices in the network. Based on the conflicting address, the device changes the address and rechecks whether the address conflict still exists. The terminal device does not have the function of broadcasting information, and its broadcasting information needs to depend on the parent device. The maximum depth determines the network address, and all parent devices include the maximum number of child devices, and three indicate the maximum

ISSN 2706-6827 Vol. 4, Issue 2: 61-75, DOI: 10.25236/IJFS.2022.040212

number of routing child devices. Through these parameters, the parent device (depth is d) router sub-device address interval Cskip (d) can be analyzed and calculated:

$$Cskip(d) = 1 + Cm*(Lm - d - 1) \quad (18)$$

$$Cskip(d) = 1 + Cm - Rm - Cm*Rm^{(Lm-d-1)}/(1 - Rm) \quad (19)$$

Under normal circumstances, the routing node network address of the parent node does not have continuity. Also in terms of network addresses, the same parent node terminal node has continuity, and this is an objective phenomenon. Specifically, the network address an distribution network point can be calculated according to the following formula.

$$An = Ap + Cskip(d)*Rm + n \quad (20)$$

In summary, it can be seen that as long as the following three values of Rm, Cm, and Lm are determined, it is equivalent to obtaining the address of the entire network device.

2.3 Wireless Sensor Network Structure

There are many ways to arrange sensor nodes in the monitoring range, such as: random spraying, parachute spraying, carrying by remote control aircraft, manual arrangement, etc. When the sensor network system is working, the environmental information collected by the sensor is transmitted in a multi-hop manner, and then transmitted to the sink node through other sensor nodes. The aggregation node then sends the collected data to the management personnel of the service terminal through the Internet network. The personnel of the management department can issue monitoring tasks to the wireless sensor network through the management node, and the task information is sent to the sensor node through the sink node, so as to realize the process of collecting and sending monitoring data.

(1) Features of wireless sensor network

Compared with the two wireless ad hoc networks, they not only have many similarities, but also have great differences to a certain extent. The wireless ad hoc network is an ordinary wireless local area network, which contains dozens or even hundreds of sensor nodes, in order to carry out high-speed and effective transmission of multimedia information streams on the basis of dynamic routing and mobility management technologies. The network topology changes with the arbitrary movement of nodes, and the nodes in wireless ad hoc networks usually use power supply instead of batteries. Generally speaking, the state of nodes in wireless sensor networks is different from that of ad hoc networks, and they are not mobile but fixed. The specific features are as follows:

1) Network self-organization, topology dynamic change

The network topology is constantly changing, the reason is: the environment change of the node of the wireless sensor network will cause the state to change accordingly; the number of nodes in the network is not static. In the process, nodes will join or exit the network; the small size of the nodes in the network leads to limited energy storage, so there will be node distortion. On this basis, the nodes in the network should have the ability to self-organize, automatically manage and establish routes.

2) Large scale, high density, and limited node capacity

In a real application environment, in order to collect accurate and comprehensive environmental information, wireless sensor networks are generally deployed in a large monitoring area. Taking into account the cost of nodes in the deployment process, sufficient control is required, which results in a single sensor node's energy, processing capacity, storage capacity and communication capacity are limited.

3) Application-related, data-centric

The wireless sensor network has a significant feature, that is, the system is designed according to different application backgrounds and application requirements of the network, and different application backgrounds will have different design schemes. Not only that, compared with traditional networks, wireless sensor networks have a unique addressing process, which is reflected in that all links of wireless sensor networks are data-centric. Because the performance of a certain task and the effect of feedback are the main points that the network pays attention to, the number of the node is irrelevant.

(2) System structure

The sensor node is a micro-embedded system with weak computing power, communication power and storage power, and it is powered by batteries with limited energy. From the perspective of network functions, sensor nodes have both traditional network terminal functions and routing functions.

The sink node can be used not only as a powerful sensor node, but also as a gateway with no monitoring function but only a wireless communication interface. According to the different structure of sensor nodes in the network, wireless sensor networks can be further divided.

Sensor nodes have the same ability in communication, storage, calculation and reliability, and the nodes are equal, and there is no central node.

In the hierarchical wireless sensor network structure, the cluster head node has higher storage, computing and communication capabilities than ordinary nodes, and can even be installed with solar cells for continuous power supply. It is responsible for the distribution, negotiation and update of common node keys in the cluster, and it is also responsible for the fusion and forwarding of data in the entire cluster.

3. Wireless Sensor Network Equipment and Questionnaire Survey Experiment

3.1 Experiments on the Vulnerability of Wireless Sensor Network Equipment

Before designing the final questionnaire experiment, a certain degree of exploration and comparison of the vulnerability of wireless sensor network equipment is carried out. The specific investigation situation is shown in Table 2:

Table 2: Classification of remote location of sensor nodes and their own vulnerability levels

Remote sensor node location level	Risk value r	Vulnerability level of sensor nodes	Risk value b
I	R_1	I	B_1
II	R_2	II	B_2
III	R_3	III	B_3

It can be seen from the table that the wireless sensor network needs to be fixed when it is just established, because once the node in the wireless sensor network is placed, its location will not change. Regarding the specific value of r, it needs to be determined according to the specific actual application environment. This article will not discuss it in depth. For the time being, this paper simply believes that as long as the distance between the node and the sink node is farther, the greater the risk value r. We also divide the vulnerability levels of sensor nodes into three levels: Ⅰ, Ⅱ, and Ⅲ. The vulnerability of wireless sensor nodes is innate, so how to define the vulnerability of nodes is not discussed. But what is certain is that the structural design and component composition of sensors with different functions are also different, and the defensive resistance of wireless sensors produced through different manufacturing materials and manufacturing processes is different. In other words, the vulnerabilities of different types of sensors are definitely different. Using b to measure the risk value brought by the vulnerability of the sensor node, and the larger the value of b, the more vulnerable the sensor node and the more risky it is.

3.2 Investigation and Experiment on Mental Health Status of College Students

Table 3: Statistics of the sex ratio of the survey respondents

gender	Frequency	Composition ratio
male	377	44.93%
Female	462	55.07%
total	839	100.0

In order to better reflect the mental health of college students, we introduce the term mental resilience to judge it, and the psychological resilience value reflects the mental health recovery ability of college students. The statistics of the survey subjects are shown in Table 3:

From the above table, we can see that there are a total of 839 subjects in this survey, males accounted for 44.93%, while females accounted for a little more, accounting for 55.07%. The total number of men is 377, and the total number of women is 462, 85 more than men, accounting for

ISSN 2706-6827 Vol. 4, Issue 2: 61-75, DOI: 10.25236/IJFS.2022.040212

10.14%. At the same time, statistics are made on the distribution of the survey subjects and their grades. The statistics are shown in Table 4:

Table 4: Grade distribution of survey subjects

grade	Frequency	Composition ratio (%)
Freshman	198	23.6%
Sophomore	177	21.1%
Junior	214	25.51%
Senior year	250	29.79%
total	839	100.0%

From Table 4, we can see that the number of freshmen surveyed was 198, accounting for 23.6% of the total number of people, and then the number of sophomores was 177, accounting for 21.1% of the total number of people. The number of juniors is 214, accounting for 25.51% of the total, and the seniors are 250, accounting for 29.79% of the total. In general, the distribution of grades is relatively even, and the number of people in each grade is not much different. Then, according to their gender and grade, the differences in the psychological elasticity of college students of different genders and different grades are explored. The statistics are shown in Table 5:

Table 5: Differences in psychological resilience of college students of different genders and different grades

	Mental resilience		Mental resilience
male	39.426±6.219	Freshman	38.16±5.99
		Sophomore	38.23±6.28
Female	39.147±5.946	Junior	40.13±7.55
		Senior year	40.21±7.71
T	0.064	T	2.749
p	0.952	p	0.041

It can be seen from Table 5 that the mental elasticity value of men is 39.426±6.219, and the mental elasticity value of women is 39.147±5.946. It can be seen that the mental elasticity of women is lower than that of men, which is mainly manifested in the situation that women are more likely to show collapse when they are transported to problems. For college students of different grades, the mental elasticity value of freshman is 38.16±5.99, the mental elasticity value of sophomore is 38.23±6.28, the mental elasticity value of junior is 40.13±7.55, and the mental elasticity of senior is 40.21 ± 7.71. It can be seen that as the grade increases, the psychological resilience value of college students also increases. It is mainly reflected in the increase in grades, the increase in life experience, and the stronger ability to deal with problems, which can effectively solve most problems.

4. General Mental Health of College Students

4.1 Differences in General Mental Health of College Students of Different Genders andCoping Styles

Through the experimental part of the use of wireless sensor networks to manage the mental health of college students, we can see that among college students, gender has a greater difference in the psychological resilience of college students. To this end, we investigate the general mental health status and coping styles of college students, and explore their ability to cope with mental health problems caused by gender. The statistical chart is shown in Figure 7:

ISSN 2706-6827 Vol. 4, Issue 2: 61-75, DOI: 10.25236/IJFS.2022.040212

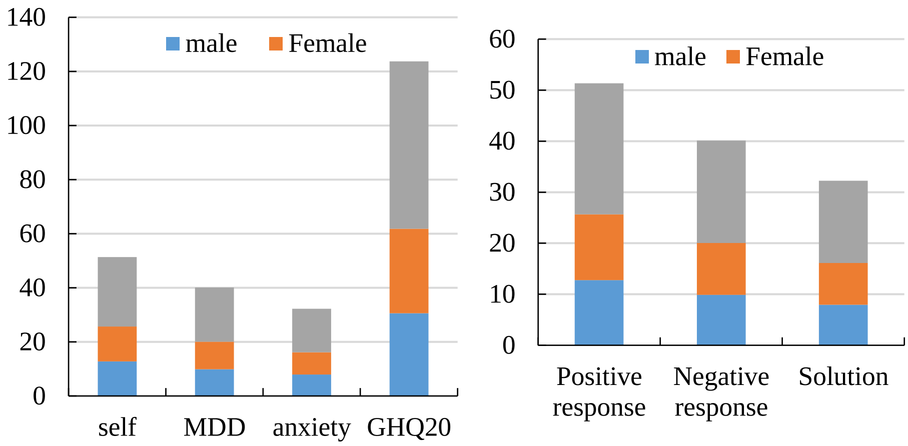

Figure 7: Comparison of mental health problems and coping styles of college students of different genders

From the comparison in the Figure 7, we can see that college students of different genders have a higher percentage of self-affirmation on mental health issues, and the percentage of female self-affirmation is higher than that of males, and depression takes the second place. The same women have a higher proportion of depression than men, and fewer anxiety symptoms, and women have a higher proportion than men. In terms of coping styles, the proportion of people who adopt positive coping methods is close to twice the proportion of people who adopt negative coping methods. The same proportion of women is higher than that of men, and in the way of adopting negative coping, the proportion of men is higher than that of women, but they are generally closer.

4.2 Differences in General Mental Health and Coping Styles of College Students of Different Grades

The above has explored the differences in the mental health of college students by different genders and the differences in coping methods. Now according to the design of the experimental part, the differences in general mental health and coping styles of college students of different grades are analyzed. The situation is shown in Figure 8:

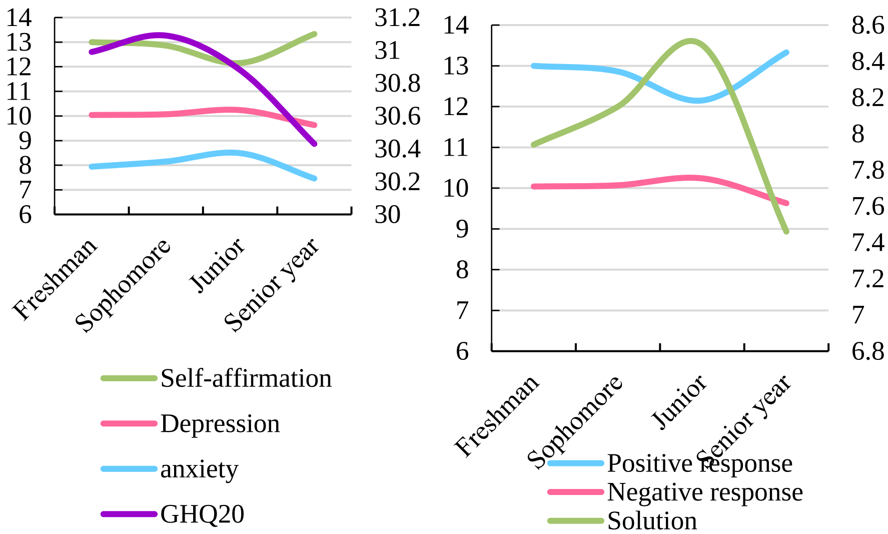

Figure 8: Comparison of mental health problems and coping styles of college students in different grades

As can be seen from the Figure 8, different grades have a relatively small impact on the mental health of college students. From freshman to senior year, the mental health of most college students has no major changes, but the only difference is in the senior year that the unhealthy mental state has been significantly reduced. In terms of coping methods, from freshman to senior year, the proportion of people who responded positively was much higher than the percentage of people who responded negatively, and the overall performance was relatively stable. At the same time, statistical analysis of differences in mental health status and coping styles of college students between different disciplines. The statistics are shown in Figure 9:

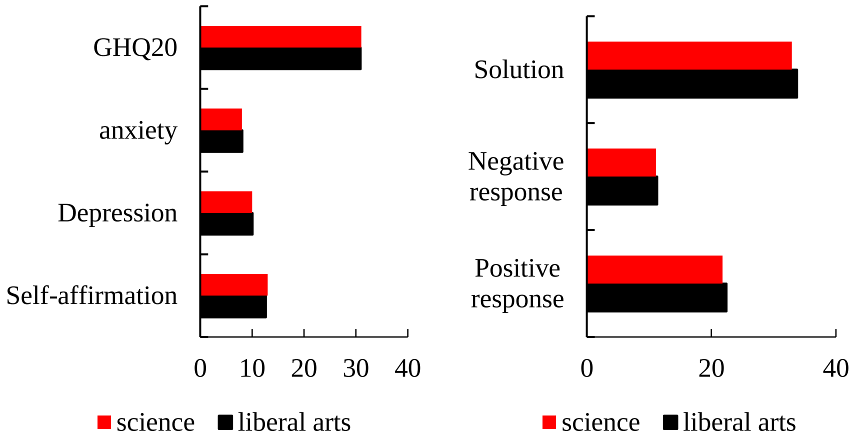

Figure 9: Comparison of mental health problems and coping styles of college students among different disciplines

It can be seen from the comparative analysis graph that there is little difference between college students in different disciplines in terms of self-affirmation or mental health problems such as depression or anxiety. The proportion of science students in self-affirmation is higher than that of liberal arts students. Under psychological conditions such as depression and anxiety, the proportion of liberal arts students is higher than that of science students. Similarly, although there are differences, the differences are not big.

4.3 Differences in General Mental Health and Coping Styles of College Students from Different Places of Origin

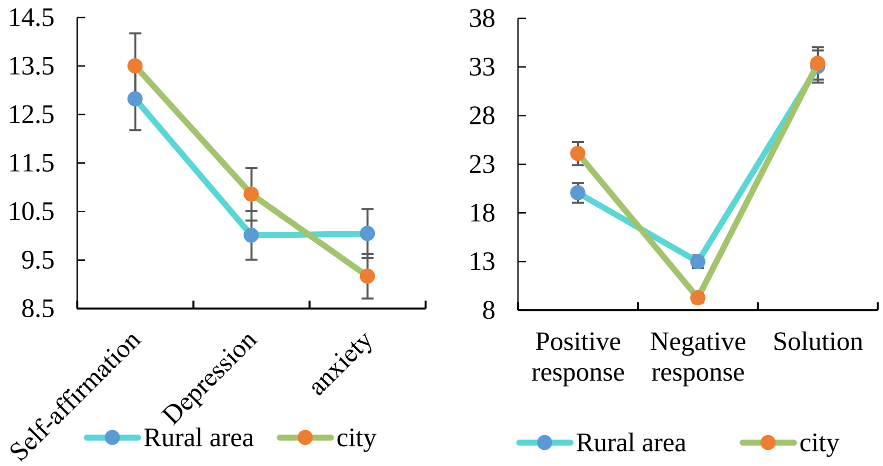

Figure 10: Comparison of mental health problems and coping styles of college students between different places of origin

Taking into account the diversity of factors affecting the mental health of college students, it is not simply limited by gender, grades and disciplines. The same source of origin has a greater impact on the mental health of college students. To this end, a separate survey of the origin of college students and the mental health status of different origins and their responses to mental health are designed. The specific situation is shown in Figure 10:

From the Figure 10, we can see that the mental health problems of college students from different places of origin are: urban household registration students are higher in self-affirmation and depression than rural students. In terms of anxiety, students from rural areas are higher than those from urban areas. When dealing with mental health problems, most of the students from urban sources can take a

ISSN 2706-6827 Vol. 4, Issue 2: 61-75, DOI: 10.25236/IJFS.2022.040212

proactive approach to face the problem. The proportion of rural students who take active responses is less than that of urban students, because rural students are prone to adopt negative ways to deal with problems.

5. Conclusion

The main research direction of this article is the study of the management model of college students' mental health. In today's society, more and more college students have caused various mental health problems under the pressure of society and parents. Facing these problems, making good improvements has now become the top priority of colleges and universities, and the first thing to do before making improvements is precise monitoring. So this paper proposes a method of monitoring the mental health of college students through wireless sensor network. The structure of the sensor network and the node structure have been re-arranged, and the calculation modulus has been accurately calculated, which can increase the monitoring efficiency of the existing sensor network by 31%. This effectively guarantees the degree of grasp of the mental health of college students, so as to provide precise assistance to them.

References

[1] Ren J , Zhang Y , Zhang K , et al. Lifetime and Energy Hole Evolution Analysis in Data-Gathering Wireless Sensor Networks[J]. IEEE Transactions on Industrial Informatics, 2016, 12(2):788-800.

[2] Chen, Wang, Hongzhi, et al. CANS: Towards Congestion-Adaptive and Small Stretch Emergency Navigation with Wireless Sensor Networks [J]. IEEE Transactions on Mobile Computing, 2016, 15(5):1077-1089.

[3] Chen Z , Liu A , Li Z , et al. Energy-Efficient Broadcasting Scheme for Smart Industrial Wireless Sensor Networks[J]. Mobile Information Systems, 2017, (2017-01-23), 2017, 2017(12):1-17.

[4] Luo J, Hu J, D Wu, et al. Opportunistic Routing Algorithm for Relay Node Selection in Wireless Sensor Networks [J]. IEEE Transactions on Industrial Informatics, 2017, 11(1):112-121.

[5] Benzaid C, Lounis K, Al-Nemrat A, et al. Fast authentication in wireless sensor networks [J]. Future Generation Computer Systems, 2016, 55(FEB.): 362-375.

[6] Jiang J, Han G, Wang F, et al. An Efficient Distributed Trust Model for Wireless Sensor Networks [J]. IEEE Transactions on Parallel & Distributed Systems, 2016, 26(5):1228-1237.

[7] Zhang H , Hong X , Cheng J , et al. Secure Resource Allocation for OFDMA Two-Way Relay Wireless Sensor Networks Without and With Cooperative Jamming[J]. IEEE Transactions on Industrial Informatics, 2017, 12(5):1714-1725.

[8] Dong M, Ota K, and Liu A. RMER: Reliable and Energy-Efficient Data Collection for Large-Scale Wireless Sensor Networks [J]. IEEE Internet of Things Journal, 2017, 3(4):511-519.

[9] Deng Y , Wang L , Elkashlan M , et al. Physical Layer Security in Three-Tier Wireless Sensor Networks: A Stochastic Geometry Approach[J]. IEEE Transactions on Information Forensics and Security, 2017, 11(6):1128-1138.

[10] Hu Y, Dong M, Ota K, et al. Mobile Target Detection in Wireless Sensor Networks with Adjustable Sensing Frequency [J]. IEEE Systems Journal, 2017, 10(3):1160-1171.

[11] Fei Z, Li B, Yang S, et al. A Survey of Multi-Objective Optimization in Wireless Sensor Networks: Metrics, Algorithms, and Open Problems [J]. IEEE Communications Surveys & Tutorials, 2017, 19(1):550-586.

[12] Oller J , Demirkol I , Casademont J , et al. Has Time Come to Switch From Duty-Cycled MAC Protocols to Wake-Up Radio for Wireless Sensor Networks?[J]. IEEE/ACM Transactions on Networking, 2016, 24(2):674-687.

[13] Duan J, D Gao, Dong Y, et al. An Energy-Aware Trust Derivation Scheme with Game Theoretic Approach in Wireless Sensor Networks for IoT Applications [J]. IEEE Internet of Things Journal, 2017, 1(1):58-69.

[14] Dobslaw F, Zhang T, Gidlund M. End-to-End Reliability-aware Scheduling for Wireless Sensor Networks [J]. IEEE Transactions on Industrial Informatics, 2016, 12(2):758-767.

[15] Boselin P, Sakkthi V, Babu A, et al. Mobility Assisted Dynamic Routing for Mobile Wireless Sensor Networks [J]. Social Science Electronic Publishing, 2017, 3(1):9-19.

[16] Seo S H, Won J, Sultana S, et al. Effective Key Management in Dynamic Wireless Sensor Networks [J]. IEEE Transactions on Information Forensics and Security, 2017, 10(2):371-383.

[17] Gu Y, Ren F, Ji Y, et al. The Evolution of Sink Mobility Management in Wireless Sensor Networks: A Survey [J]. IEEE Communications Surveys & Tutorials, 2017, 18(1):507-524.

[18] Bouaziz M, Rachedi A. A survey on mobility management protocols in Wireless Sensor Networks

ISSN 2706-6827 Vol. 4, Issue 2: 61-75, DOI: 10.25236/IJFS.2022.040212

based on 6LoWPAN technology [J]. Computer Communications, 2016, 74(Jan.15):3-15.

[19] Remah A, Khaled E. Performance and Challenges of Service-Oriented Architecture for Wireless Sensor Networks [J]. Sensors, 2017, 2017(17 536):536-575.

[20] Adam, B, Noel, et al. Structural Health Monitoring Using Wireless Sensor Networks: A Comprehensive Survey [J]. IEEE Communications Surveys & Tutorials, 2017, 19(3):1403-1423.

[21] Yaghoubi F, Abbasfar A, Maham B. Energy-Efficient RSSI-Based Localization for Wireless Sensor Networks [J]. IEEE Communications Letters, 2016, 18(6):973-976.

[22] Yetgin H, Cheung K, El-Hajjar M, et al. A Survey of Network Lifetime Maximization Techniques in Wireless Sensor Networks [J]. IEEE Communications Surveys & Tutorials, 2017, 19(2):828-854.

[23] Quan W, Jin J. Comparative Examination on Architecture and Protocol of Industrial Wireless Sensor Network Standards [J]. IEEE Communications Surveys & Tutorials, 2016, 18(3):2197-2219.

[24] Zheng T, Gidlund M, Akerberg J. WirArb: A New MAC Protocol for Time Critical Industrial Wireless Sensor Network Applications [J]. IEEE Sensors Journal, 2016, 16(7):2127-2139.

[25] Sheng Z , Mahapatra C , Leung V , et al. Energy Efficient Cooperative Computing in Mobile Wireless Sensor Networks[J]. IEEE Transactions on Cloud Computing, 2018, 6(99):114-126.