

Study of Wireless Sensor Network Applications in Network Optimization

Li HAIGANG

School of information and Electrical Engineering, China University of Mining and Technology

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Abstract: Because of the rapid development of wireless sensor network, it widely applied in all areas of life, in-depth study of the technology will also explore the potential application of more in-depth. The main research of WSN technology in some environment in the real world information acquisition and processing technology, it realizes the intercommunication of the real world and the Internet world, opened the human WSN network era. WSN network through the digital world com. Human concepts inherent information world and explore the objective facts, from the inquiry from change the people and things in nature, the data are the basic objects interactively; the sensor node has sensing effect in direct contact with the objective environment, continuously enhance the practical function of virtual networks, but also increase the capacity of human understanding of the objective world; through the real-time sensing and found the state change monitoring target, at the same time the collection of data processing, the processing of useful information through the wireless transmission mode is transmitted to a data collection center or client. It will make the development and wide application in various fields of social life are more intelligent and modernization. Although its development still in an immature stage, Tan of many problems still has not obtained the very good solution, research work on WSN is far from over. In this paper the concept and system structure of wireless sensor network analysis began to design, application system based on wireless sensor network monitoring farmland use temperature and humidity ZigBee as an example to study the development process of application system for wireless sensor networks.
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Keywords: Automatic, Pattern recognition, Algorithm, ZigBee.

1. Introduction

With the development of microelectronic systems, system on chip and wireless communication technology, integrated wireless sensor network sensor technology, microprocessor technology, embedded operating system, network and wireless communication technology and distributed information processing technology of (Wireless Sensor Network, WSN) in recent years rapidly achieved significant development, now has been the through the original military field has been

popularized and applied to all fields of traffic, environment and industrial production life related, can through the real-time monitoring of different integrated micro-sensor, sensing and collecting a variety of environmental or monitoring information, the information is transmitted by wireless mode, and returns to the self-organizing multi-hop manner to the user, so as to realize the physical world, communicates the three world and human society [1].

Wireless sensor network with its own characteristics increasing reflects the unique advantage of connecting people and the material

world [2]. Its development and application will bring the profound influence on various fields of human life and production, research and application of wireless sensor network is a kind of inevitable trend, it will bring great changes to human society, so many countries attach great importance to scientific research and commercial institutions. Is considered one of the top ten technologies affects human life first in twenty-first Century [3].

Although there are still many problems unsolved, research work on WSN is far from over [4]. But the current research has made WSN in some areas more mature and entered the practical stage, in the military, environmental monitoring and forecasting, health care, intelligent home furnishing, building monitoring, complex mechanical monitoring, city traffic, space exploration, large workshop and warehouse management, as well as the airport, all of its related practical examples safety monitoring of large industrial park [5]. On this premise and application requirements continue to improve the situation, research on the development of WSN application system has become the current application and application technology through the key link in the development of WSN technology and the application [6].

Wireless sensor network is composed of a large number of static or mobile nodes through wireless communication mode to form a self-organization and multi-hop wireless network, its purpose is to monitor information together to perception, acquisition, processing and transmission network covering the geographical area perceived objects, and to the user through the wireless network report [7]. Sensor, sensing the object and the observer is the three basic elements of sensor network. Wireless sensor network is between, communication between sensors and the observer, for establishing a communication path between the sensors and the observer; cooperative sensing, collecting and processing information of sensor network is the function of the lotus [8]. With a large number of functions of the wireless sensor collaboration to complete the perception task is an important function of sensor networks [9].

This paper introduces the development of wireless sensor network and great application potential, according to its development and application status quo of its application development significance [10]. A detailed description of the concept of wireless sensor networks, wireless sensor network architecture from the two aspects of nodes and network protocols. Analysis on the process and method of wireless sensor network application system, to set up the wireless sensor network to realize monitoring farm 03 temperature and humidity system based on ZigBee for example, study and methods to solve the application of wireless sensor network system design and optimization process and problems. The system can be used for other applications [11-13].

2. Introduce the Concept of Wireless Sensor Network Architecture and Key Technologies

2.1. The Architecture of Wireless Sensor Network

The development process of wireless sensor network is shown in Fig. 1, including sensor nodes, the coordinator node (also known as the sink node), monitoring stations and network protocol, sensor nodes monitoring data along the other sensor nodes in multi-hop transmission, monitoring data in the transmission process can be dealt with a number of nodes, the coordinator node in order to routing multihop, finally through the Internet or wireless network to the monitoring station. The user through the given node operation instructions on sensor network configuration and management, send monitoring tasks and accept the monitoring data [14].

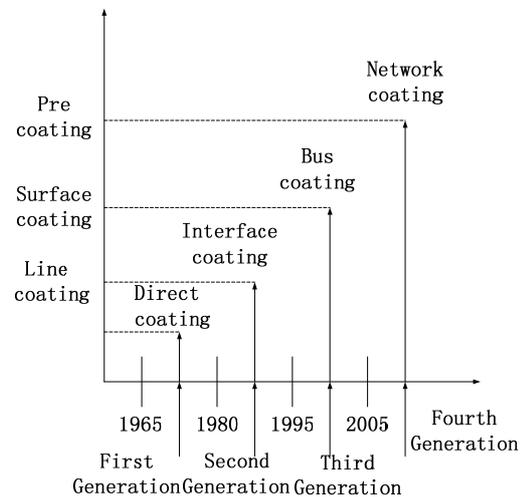


Fig. 1. The development process of wireless sensor network.

Sensor network node is an embedded system miniaturization, it constitutes the basic layer of wireless sensor network platform [15]. The node part consists of a sensor module, a processor module, wireless communication module and power supply module is composed of four parts, as shown in Fig. 2.

They are responsible for their own work. Data acquisition module, sensor module consists of sensor, A/D converter, in charge of the information collected in the monitoring area, conversion and data format, the original analog signal into digital signals, convert the AC signal into a DC signal, for subsequent module to use [16, 17]. The processor module is divided into two parts, respectively is the processor and memory, generally by the embedded CPU components, such as ARM chips or 8051 series microcontroller, data processing and control module are respectively responsible for the processing nodes

of the control and data storage includes a memory and a microprocessor, control of the whole sensor node operation, processing and storage data and the data of other nodes to [18]. The power module is used to provide energy for sensor node, generally adopts micro battery.

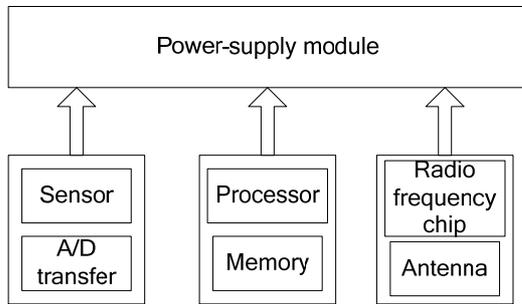


Fig. 2. Wireless communication module and power supply module.

2.2. The Protocol of Wireless Sensor Network

The network protocol of wireless sensor networks is the software part, it defines the topology structure and communication protocol of network, is used to achieve network and its components shall be complete functional description [19-21]. Wireless sensor network design is generally oriented application, network structure is relatively simple, but the function structure of the network is difficult to give the detail level [22]. To this end, researchers have proposed many sensor nodes on the stack, a typical protocol consists of physical layer, data link layer, network layer, transport layer and application layer, and the energy management, mobile management and task management platform for 3, was shown in Fig. 3.

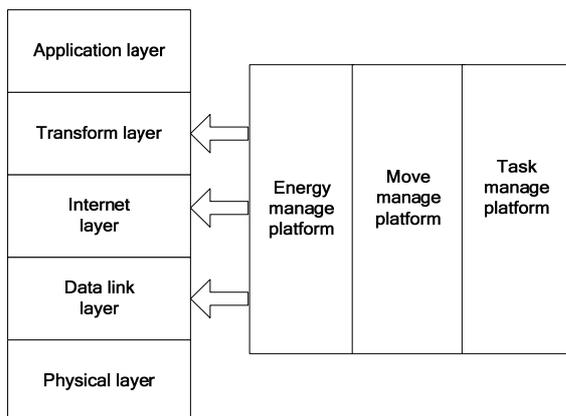


Fig. 3. Protocol stack of wireless sensor network.

The application layer is composed of a variety of sensor network software systems [23], the software provides effective development environment and

tools for users to develop a variety of sensor network application software. Code to use less data compression process:

$$X_0 = a_1x_1 + a_2x_2 + L + \dots + a_nx_n \quad (1)$$

where X_0 is the monitoring value; \hat{X}_0 is the predictive value of X ; $\{a_i \mid i=1,2,L,n\}$ is the prediction coefficients; n – the prediction order.

Predictive encoding:

$$e = x_0' - x_0 = \sum_{i=1}^n a_i x_i - x_0 \quad (2)$$

The mean square error:

$$MSE = \frac{1}{n \sum_{i=1}^n e_i^2} \quad (3)$$

The transport layer according to the sensor network needs to produce data flow, transmission control and is responsible for the data flow, which is an important part of ensuring communication service. The network layer transport layer provides maintenance data stream, mainly focus on the routing technology, responsible for route generation and routing [24, 25].

The main task of the data link layer physical layer transmission original bit is a weighted function, so that the upper show an error-free link, which generally includes the media access control (MAC) layer and the logical link control (LLC) layer, the MAC layer provides for different users to share the channel resources, LLC layer responsible for providing the service interface to the network layer to.

$$A_n = A_p + C_d * R + n, 1 \leq n \leq (C - R) \quad (4)$$

Mean square error:

$$MSE = \left(\frac{1}{N}\right) \sum_{i=1}^n (x_i - x_i')^2 \quad (5)$$

Noise-signal ratio:

$$SNR = 10 \times \lg\left(\sum_{i=1}^n \frac{x_i^2}{MSE}\right) \quad (6)$$

Peak signal to noise ratio:

$$PSNR = 10 \times \lg((\max(x_i)) / MSE) \quad (7)$$

where N is the number of sampling data; X_i is the original sampling data; X_i' is the forecast data.

On the premise of mobile factors such as network environment noise and sensor node's, responsible for data stream multiplexing, data frame detection, medium access and error control, reduce conflict between neighboring nodes broadcast, ensure reliable point-to-point and point-to-multipoint communication.

Sensor module will collect data from the environment, these signals through the data conversion, will be transmitted to the processor module for processing. Processor module is suitable to deal with the data to send data to other nodes, so the data into the wireless communication module. In the wireless communication module, data through the network layer to the data link layer (Data Link Layer), the data via a data link layer and physical layer transceiver to, namely, in here, the data is converted into binary physical signal transmission in the medium [26]. The node receives the data which is received by the transceiver physical signal, it up to the MAC layer to the network layer, finally to the application layer, namely the processor module [27].

2.3. The Composition and Function of the Temperature and Humidity Monitoring Wireless Sensor Network System

This chapter introduces the concept of wireless sensor network, and analyses the system structure from two aspects, summarizes and analyzes the main characteristics of the wireless sensor network and the current hot research direction. Lay the theoretical foundation for the research on the application and development of wireless sensor network, and makes theoretical preparations for the hair and may encounter problems and needs of knowledge.

$$C(P) = \sum_{i=1}^l c\{[D_i, D_i + 1]\} \quad (8)$$

Between the above on the basic concept and characteristics of the wireless sensor network is introduced, in order to use monitoring farmland wireless sensor network temperature and humidity as an example to illustrate the process of building the application of wireless sensor networks system, firstly analyze the system framework and function, such as Fig. 4.

The graph shows the system is divided into front-end collection network, gateway and client of three parts, data acquisition network which is responsible for the system core part is composed of WSN node network, in this section, will be a large number of WSN nodes reasonably distribute in the monitoring area and the ad hoc networks form a connected wireless network, data acquisition to achieve through

sensor nodes and the communication module node multi-hop transmission data ultimately sends the data to the gateway. Data storage gateway will be received and needed by cable and other cable or GPRS wireless mode to the client receiving stations.

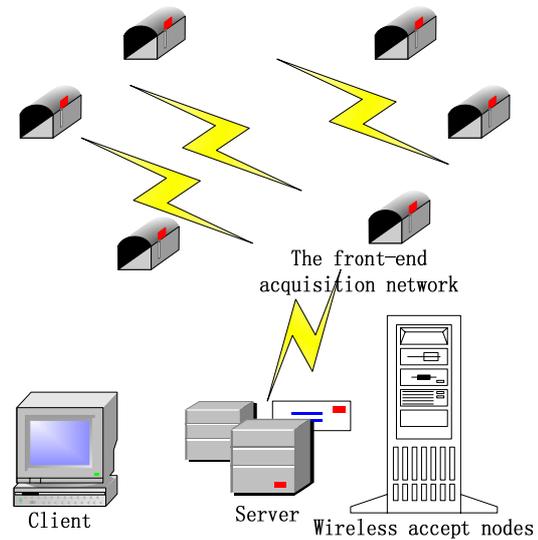


Fig. 4. Diagram of Temperature and humidity monitoring system.

$$C(l) = \begin{cases} 7 \\ \min(7, \text{round}(\frac{1}{P_i^4})) \end{cases} \quad (9)$$

$$C=(c_0, c_1, L, C(N-1)) = \begin{cases} c_0, 0 & c_0, 1 & L & c_0, N-1 \\ c_1, 0 & c_1, 1 & L & c_1, N-1 \\ M & M & 0, & M \\ c_m-1, 0 & c_m-1, 1 & L & c_m-1, n-1 \end{cases}$$

At present, WSN physical layer protocol in the aspects of hardware and software are also need to do further study. Hardware: there is a certain gap between the current WSN node in the volume, cost and power consumption with its widely application standard, realize system miniaturization, lack of low cost, low power chip; software: WSN physical layer, there is an urgent need to meet the characteristics and requirements of the agreement, in algorithm design, in particular modulation mechanism. Virtual MIMO modulation cooperative transmission can be cooperative transmission to achieve the remote base station, can reduce or avoid multi-hop loss, but this approach requires precise synchronization, but with the development of science and technology, especially the development of space-time coding technology, this technology will have great potential.

$$A < D < A + C_{skip}(d - 1) \quad (10)$$

$$N = A + 1 + \left[\frac{D - (A + 1)}{C_{skip}(d)} \right] * C_{skip}(d) \quad (11)$$

$$d = a + bt + \varepsilon, \varepsilon \sim (0, \delta^2) \quad (12)$$

$$a = \frac{1}{n \sum_{i=1}^n d_i - \left(\frac{1}{n} \sum_{i=1}^n t_i \right) b} \quad (13)$$

$$b = \frac{\sum_{i=1}^n t_i d_i - \frac{1}{n} \left(\sum_{i=1}^n t_i \right) \left(\sum_{i=1}^n d_i \right)}{\sum_{i=1}^n t_i^2 - \frac{1}{n} \left(\sum_{i=1}^n t_i \right)^2} \quad (14)$$

WSN is now in the face of the practical application and hair, the general steps are as follows: 1 the application demand analysis of 2 according to the demand analysis to select the appropriate hardware and protocol of wireless sensor network and the design of burning the protocol stack to the hardware debugging using software according to the demand of 3.

Each layer can require accurate positioning in WSN networking technology requirement for temperature and humidity monitoring using WSN in this system, the demand characteristics of the system are: monitoring of large area and low cost, monitoring point fixed location, fixed periodic data collection, no energy continued for the does not require complete real-time data acquisition in position 6 mark.

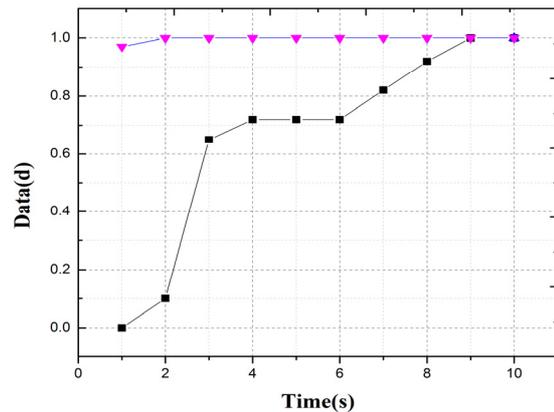
$$f_{max} = \frac{10^6}{T} = 50KHz \quad (15)$$

$$T = \frac{10^6}{f} - T \quad (16)$$

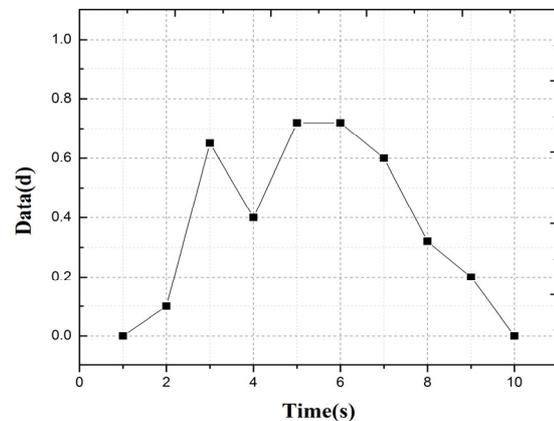
According to the system demand the relative WSN requirement of each layer technology and reasonable WSN network protocol. Generally speaking, WSN network mainly relates to the physical layer, MAC layer and network layer of three layers of technology. The following analysis of the mature application in WSN is at the physical layer, the related technology of MAC and network layer. The physical layer defines between physical wireless channel and MAC layer interface, provide a physical layer data service and physical layer management service (sending and receiving modulation,

responsible for data). Its design goal is to obtain the energy loss as less as possible link with large capacity. In order to ensure the smooth performance of the network layer, the general need to closely interact with the MAC layer. The physical layer needs to consider the communication frequency, modulation and coding mode and the communication rate etc.

The MAC layer is a high physical access channel to provide point-to-point service interface, how to control channel access for a communication link to establish a reliable point-to-point, point to multipoint or multipoint sharing is the main task of the MAC layer. At present, the basic characteristics between WSN network, MAC protocol in addition to the design's main goal to solve the basic problems of traditional wireless network MAC protocol needs to solve is the energy efficiency and self-organization. The main need of consider the message contention, idle listening, crosstalk and the control overhead of these four aspects. In addition, the specific application needs to meet the requirements of QoS and the performance of MAC protocol, the corresponding emphasis on considering the real-time, energy efficiency, safety, location awareness and mobility problems. The Schematic diagram of DP algorithm was shown in Fig. 5.



(a)



(b)

Fig. 5. The Schematic diagram of DP algorithm.

2.4. Introduction of ZigBee Protocol

According to the demand analysis technology to compare each layer section, select the layer technique is basically corresponding demand ZigBee as the network protocol stack of the system, ZigBee is designed for wireless transmission of low-rate control network design formulation. The standard ZigBee in the Union will continue to improve and expand its protocol and application effort, great progress has been made in. It has low power consumption, low cost, strong network function, usually, in accordance with one of the following condition, you can consider using ZigBee technology for wireless transmission.

ZigBee technology is a kind of provide control or electronic components such as sensors wirelessly connected wireless communication technology. It is a new wireless network technology, the name is derived from the bees (bee) communication, bees by jump chewing mouth (Zig) dance to exchange information, to share the food source direction, location and distance information. ZigBee is to meet the needs of small, cheap equipment of wireless network and control developed for sensor networks, building automation applications such as the short distance wireless technology specification.

ZigBee technology to fill the low cost, low power consumption and low rate wireless communication market blank, its ease of use is the key of this technology, automatic control and remote control field with its suitable for short distance in small range, in home furnishing control, building automation and industrial automation has wide application prospect in actual life in terms of.

With the continuous development of ZigBee technology and perfect, it will become one of the most advanced in the world of digital wireless technology. The ZigBee alliance predicted that in the next four to five years, each family will have 50 ZigBee devices, finally will reach each family 150. I believe that in the near future, there will be more and more with the function of ZigBee products come into our life, has brought great convenience to our life and work. It has significant advantages such, so that it will have broad application prospects, is decided by its characteristics.

3. Research on the Key Technology Applied in the Field of Monitoring WSN

3.1. Development and Key Technology Research of Wireless Sensor Network

Wireless sensor network as a new information acquisition technology effectively implement large-scale monitoring and tracking service complex, has the profound influence people's way of life and work. The United States business weekly and MIT Technology Review in forecasting the future

technology development report, respectively, the wireless sensor network is one of the top 10 technology 21 most of twenty-first Century and change the world. The distributed wide area sensor network architecture was shown in Fig. 6.

Application of the United States Department of defense for the first WSN in the last century 70's, will be dedicated to wireless sensor network is extended to the future military war. The United States Department of Defense Advanced Research Program (DARPA) began to study funded by the Carnegie Mellon University set up a distributed sensor network working group of distributed sensor network in 1978, this is seen as a WSN prototype. The United States military department at the WSN research fruits, the period of 2001~2005, the United States Army put forward "smart sensor network communication" plan, the sensor and the robot system as a unified network, using a dynamic understanding of the battlefield of the network timely in military operations, adjust the operational plan. The United States Navy recently for the establishment of a set of real-time database management system to carry out a "sensor network system" project, the system uses a dedicated portable sensor device, can coordinate the air and ground monitoring equipment, access and data information to deploy to all levels of command unit.

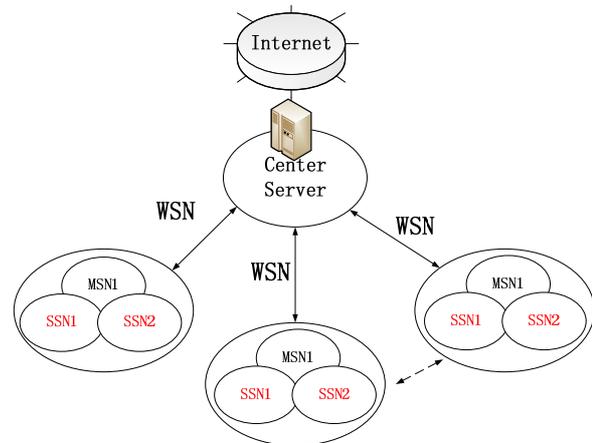


Fig. 6. The distributed wide area sensor network architecture.

The network structure of a typical wireless sensor was in Fig. 7. With the rapid development of WSN, WSN has been involved in various aspects of people's lives, has been widely used in military applications, medical care, environmental monitoring, space exploration and other fields, WSN technology into the technology of the Internet of things has become a trend in current research.

$$Loss = 32.44 + 10 * k * \log_{10}^d + 10 * k * \log_{10}(f) \quad (17)$$

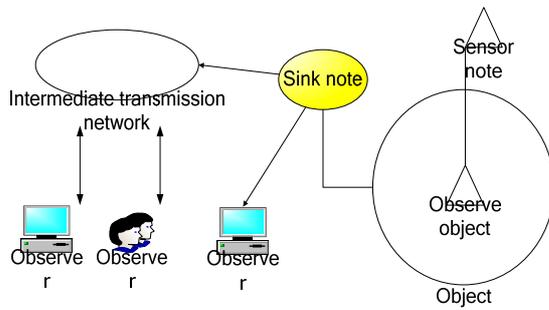


Fig. 7. The network structure of a typical wireless sensor.

3.2. Locating Technology Based on WSN

Cover the deployment strategy is directly related to the optimal allocation of monitoring sensing requirements of target area and limited resources of wireless sensor network, determines the service quality of the wireless sensor network to improve the. With the deepening of theoretical research and application demand unceasing expansion, the three-dimensional WSN close to the reality of the physical world is attracting more and more attention, such as three-dimensional network as the background of the underwater acoustic sensor networks and atmospheric monitoring sensor network.

At present, most of study on the method of 3D spatial coverage problem is pumping into three-dimensional space three-dimensional ball cover, that is to say, the sensing range of each sensor node as a node is the center of the sphere, and then use a plurality of coverage overlap sphere covering the entire three-dimensional monitoring area. In order to reduce the number of nodes in the work to save the network energy angle, coverage optimization problem corresponding to the maximum of how to use the minimum number of spheres to the 3D space coverage.

This chapter uses the ball for a 3D spatial coverage model design covering method, the model of a cuboid structure based on the theory, this chapter deduces the quantitative relationship between coverage model and node sensing radius, further based on the quantitative relationship between the computing network area to keep sufficient minimum number of nodes needed to cover the network, finally regional 3D mesh finite mesh node coverage model in accordance with the deployment of. The grey forecasting model was shown in Fig. 8.

Among them, the tetrahedral ABCDA'B'C'D' is a long, width and height respectively, X, Y, Z cuboid; middle plane EFGH in cuboid ABCDA'B'C'D', with the bottom surface ABCD parallel, and in the Z/2, I is a planar EFGH center; node deployment in E respectively, E, F, G, H, I five positions of the place a sensor node. Coverage density equal to the volume ratio of the sensing radius of five r sensor node sensing the total range of space and the cuboid ABCDA'B'C'D' coverage model, denoted as R, V, and type set:

$$\sigma(r, V) = \frac{20\pi r^3}{3V} \quad (18)$$

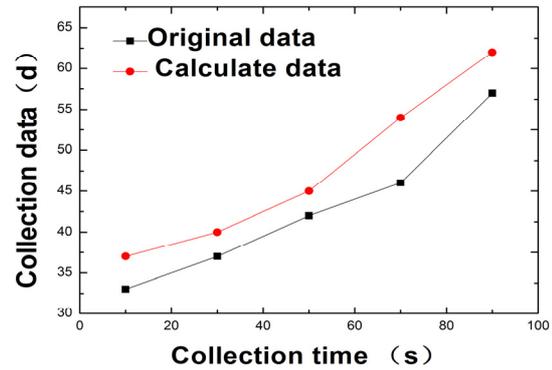


Fig. 8. The grey forecasting model.

According to the geometrical symmetry, we can put the whole cover covering the whole three-dimensional cuboid is mapped to 2D rectangular ABCD. A sensor node sensing radius is S_r , then the node is a circle in the plane ABCD sensing range, the region of radius R_s are:

$$R_s = \sqrt{R_s^2 - \frac{z^2}{4}} \quad (19)$$

4. Result and Discussion

4.1. Protocol Design and Debug Process

ZigBee uses network address distributed addressing scheme. This scheme ensures that all distribution of the whole network address is only to ensure that a particular data packet to send equipment it specified does not appear chaotic. In addition, for scalability helps network address allocation, distribution characteristics of the addressing algorithm makes the equipment only their parents' communication equipment to accept a network address without the need of the whole communication network.

Nodes to join the network, addressing scheme need to know and to configure some of the protocol stack parameters. These parameters are MAX_DEPTH, MAX - ROUTERS and MAX - CHILDREN. MAX CHILDREN determines the maximum number of a router or a coordinator node processing nodes. MAX ROUTER determines the maximum number of a router or a coordinator node can have routing function node processing. This parameter is a MAX - CHILDREN set, terminal nodes using (MAX - CHILDREN -MAX - ROUTER) the rest of the address space. In and hair according to the reasonable application setting these values, need to complete the following steps to set

up: first, to ensure that the new parameter assignment contusion to legitimate (the entire address space can't be more than 216), which limits the maximum value of the parameters can be set. When choosing a legitimate data, but also to ensure that no longer use the standard stack configuration, and the use of network custom stack configuration (in the protocol stack of NWK - globals.h file STACK_PROFILE_ID to NETWORK - SPECIFIC). Then the MVK - MAX - DEPTH parameter in the globals.h file will be set to the appropriate value. In addition, you must also set the nwk_globals.c file in the Cskipchldm array and the CskipRtrs array. The values of the array changed by MAX - CHILDREN and MAX - ROUTER.

The following focuses on transmit temperature and humidity data acquisition principle and processing of the data to identify the source of part of the. The original data fitting curve was shown in Fig. 9 flow data is transmitted to the coordinator node and eventually transferred to the monitoring terminal, the data acquisition chip sensor and through the analog-to-digital conversion, through the PC serial transmission to ZigBee chip and processes data, such as sending to increase the transmission mode and identification code information package after RF module to send to the upper node, finally through multi-hop transmission is transmitted to the coordinator node, the coordinator node will send the data to the monitoring end.

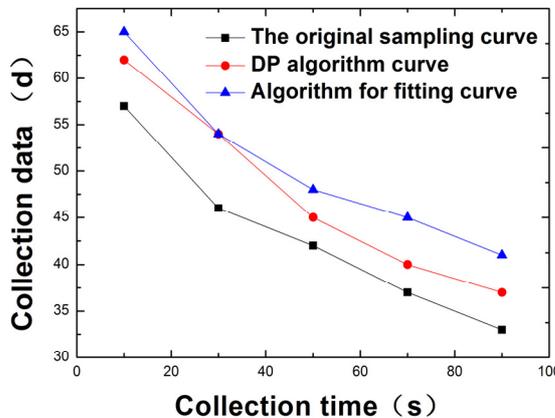


Fig. 9. The original data fitting curve.

Systems can be received in the region to monitor data also demanded to know the source of data, so as to meet the monitoring purpose, the returned data meaningful. There are many ways of nodes identified in the ZigBee protocol, according to whether the actual measurement of the distance between nodes or angle positioning process, wireless sensor networks can be divided into distance from positioning algorithm (Range-Based) localization algorithm and distance (Range-Free) positioning algorithm.

Range-based location algorithm by measuring the distance between neighboring nodes or range to determine the location of the unknown node, usually

ranging, positioning and correction steps. Distance positioning algorithm: RSSI algorithm, T algorithm, propagation time to time difference method TD, wave incident angle method. Range-based location algorithm because of the distance and angle measurements between nodes, usually high positioning accuracy, but the hardware requirements are relatively high, and the positioning of large amount of computation and communication, energy consumption is relatively more.

Node of the system is fixed in the spread on farmland, each node positions are determined in the place, so in order to reduce power consumption and the amount of code protocol core, combined with the characteristics of the fixed nodes use can increase the method to locate the specific node ID node information: in the scattered nodes will be placed in the position of each node in advance of all code and build corresponding location database, and start running on the network, the node to the increase in the temperature and humidity data transmission monitoring other node preset before coding, type of position and nodes of the coded representation of the node. This makes the final return to the coordinator and display the temperature and humidity data in the monitoring end with node identification, according to a decoding process node and the monitoring end position coding database to get position information of the data.

4.2. Prospect Design of Application of Wireless Sensor Network System

Because of the characteristics of WSN application correlation, wireless sensor network and standard protocols, and each protocol layer in the same in the face of different applications developed different types of technology. However, standard lead to the application of correlation of wireless sensor network protocol although many, but not the one corresponding to different applications, so in the application and hair can only according to the application characteristics of the selected hardware devices and one of the most suitable scheme to select from existing WSN many network protocol, then the selected protocol stack is modified to meet the application requirements.

The current WSN application open system are used to stack units exist independently, therefore cannot be different protocol stack fusion to form a new protocol stack, in the face of the actual development as needed without corresponding protocol stack will bring a lot of inconvenience. As the application of A, WSN1 is more suitable for the physical layer and MAC layer but not suitable for the requirements of network layer, WSN2 is suitable for the network layer requirements but not for physical layer and MAC layer, which requires the selection of WSN1 and network layer to modify the WSN1.

In order to avoid these problems, puts forward a matching layer wireless sensor network system

development concept stack fusion. The system is not in the protocol of wireless sensor network overall find as a unit, but at the physical layer, MAC layer and network layer all kinds of algorithms and protocols by layer unit encapsulated into the layer scheme database development scheme, according to application needs to adopt the matching layers, each layer of the selected scheme into WSN new find Fig. 10 schematic was shown as follows:

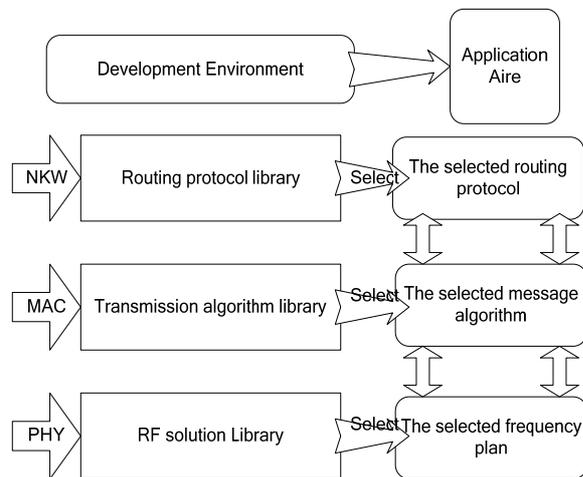


Fig. 10. The system development process.

Each factor conditions correspond with three layer protocol compliance in the scheme, in the face of application design system by the developer from these seven factors according to the need to choose the factors needed for the application, and set priorities, and then from the selected factors continue to choose the corresponding conditions, corresponding to the three layer protocol automatically given the condition that the scheme of system.

5. Conclusion

Provides a basic mode of wireless sensor networks in general application development, the design of the system, application system can be related to other features. But the wireless sensor network is applied related strong technology, different applications have different ideal solution. In this paper the concept and system structure of wireless sensor network analysis began to design, application system based on wireless sensor network monitoring farmland use temperature and humidity ZigBee as an example to study the development process of application system for wireless sensor networks. System is analyzed in this paper and the comparison of all kinds of wireless sensor network technology in the corresponding analysis of. In the choice of realization of the use of ZigBee network to ZigBee network are analyzed in detail. Node

hardware design of the relevant project file PCB circuit connected to the CC2430 and SHT10 chips are temperature and humidity sensor SHT10. Finally based on ZigBee protocol used for 2006 project files for ZigBee network and debugging in IAR environment, modify the network structure in the protocol stack and add a temperature and humidity sensor part file debugging, add node recognition function and eventually send data through the serial port function to display monitoring data in the super terminal. Put forward in the process of development. The matching layer stacks fusion and systems thinking.

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Handbook of Laboratory Measurements and Instrumentation

Maria Teresa Restivo
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