Original Research Article

Design of Remote Health Monitoring System Client

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ABSTRACT

Benzoxazine resin, a new type of phenolic resin, has many advantages such as strong molecular design, no small molecular release in the curing process, excellent thermal stability and mechanical properties, and high residual carbon ratio. Thus, it is important for electronic communication industry matrix material. To meet the needs of high-frequency and high-speed communication technology for low-dielectric polymer resin, the low dielectric modification of benzoxazine resin is of great significance to the high frequency and high speed propagation of the signal, which causes a wide range of materials researcher's attention. In this paper, we reviewed a series of studies on the low dielectric modification of benzoxazine resin in recent years, including the synthesis of new monomers, inorganic - organic hybridization, copolymerization with other resins, and low molecular weight benzoxazine Resin research trends were outlined.

KEYWORDS: telemedicine; health monitoring client; human signs

Introduction

Telemedicine health is through a number of medical terminal equipment on the human body in all aspects of physiological information collection, and through the wireless network will be collected by the human body information sent back to the server, and professional analysis after giving a corresponding treatment program technology. In recent years, due to the rapid development of wireless networks and data transmission, for telemedicine has a greater practicality and availability, some of the more remote health care system is not perfect or lack of local health care can be used to achieve the treatment of the disease, share the country's medical resources. As the most critical part of telemedicine technology, the telemedicine health monitoring system client needs not only to call the monitoring data of the human body, but also to facilitate the analysis and use of professionals. This article mainly considers the use of SQL server database and Visual Basic for remote health monitoring system client design.

1. Wireless sensor network overview

1.1. Introduction to Wireless Sensor Networks

In the current information age, the function of the sensor in the rich and timely, from the initial simple data processing to the current data acquisition, data analysis and wireless data transmission and other powerful features. And the benefits are also gratifying, but cannot do without the support of its function of the technology, especially in the microelectronics technology, computing technology and wireless communications and other technical aspects. For the wireless sensor network, it is not just a simple network system, it can change with the environment changes, with the changes in the task changes, fully reached the point of intelligence. As shown in Figure 1, the sensor network structure, in its interior, is filled with countless tiny sensor nodes. When the manual deployment work, will wake up the sensor system to start operation. First, the sensor node to complete the data collection, and then began to data transmission. And the transmission path required for data transmission is constructed by cluster nodes and sensor nodes. Finally, when the data is transferred to the coordinator node, the coordinator node determines the transfer mode and then transfers it to the data center processing center (gateway node) [1].
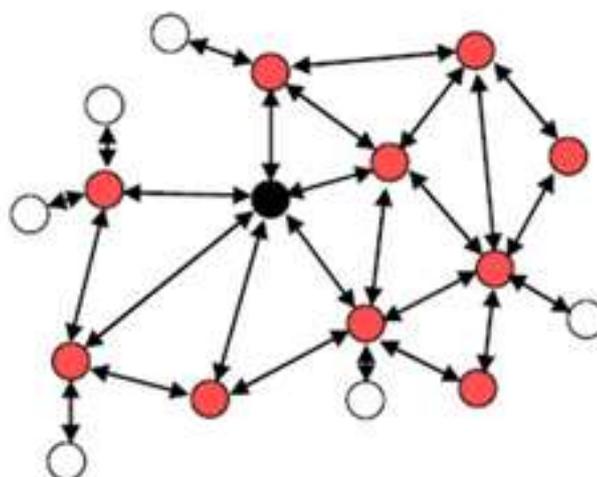
Figure 1.   Structure of the wireless sensor network

1.2.   The history of wireless sensor networks

Wireless sensor network development history can also be called wireless and sensor development history, wireless sensor network research and ultimately, these two technology figure, they can be said with the honor and disgrace, coexistence and death. From the time history, the wireless sensor network can be divided into four generations. The 1970s simple point-to-point generation sensor network to the 20th century, 80 years can handle a slightly more complex problem of the second generation sensor network to the 20th century, the late 90's fieldbus third generation sensor network, finally to the present wireless large functional four generations of sensor networks. From the time point of view, only less than half a century, the development of wireless sensor networks can be used to describe the speed. The beginning of the wireless sensor network is also used only for the collection of battlefield intelligence, and its practicality is also very low, and with the information age step by step, people began to gradually understand the great prospects of wireless sensor networks, as well as the future position in the field of science and technology. Some well-known universities in United States have also begun to mention the wireless sensor network topics on the agenda, and continue to study, speed up the wireless sensor network replacement, step by step to strengthen its functionality and practicality. And in the domestic wireless sensor network development started more than United States behind a lot, until 1999 was officially started. As the wireless sensor network in China's national conditions, life and production of all aspects of great influence, making its research status in China quickly established [2].

1.3.   wireless sensor network applications

Wireless sensor network not only in the military, agriculture, environmental monitoring, intelligent home, building monitoring, complex mechanical monitoring and urban transport and other widely used, but also in the long-range health care has an irreplaceable advantage. In the military because of its high efficiency, high reliability and high intelligence makes it very suitable for use in the military field, such as monitoring the enemy's strength and equipment and the battlefield of various intelligence gathering, so that we quickly get favorable combat information, to develop a combat plan. In agriculture, it is possible to detect accurate environmental information such as crop, soil, air, surface and other environmental data and crops. In the environment can carry out a wide range of air, surface, biological and weather detection. In the case of buildings, due to the general building in the invisible crustal vibration may be damaged, the use of sensor networks can detect the building's solid security conditions for timely repair [3]. And in the remote medical health application is the background of this article, followed by the remote health monitoring system, the general idea.

1.4.   Remote health monitoring system overall design

Based on ZigBee wireless network of remote medical health detection system mainly by the ZigBee wireless network, coordinator gateway, client host computer system composed of three parts. Users through the physiological information collection terminal, free collection of their own physiological indicators, such as heart rate, blood pressure, pulse and body temperature, and through the ZigBee wireless network to send information to the coordinator processing, as shown in Figure 2. After this step to the coordinator, the rest is to send the data to the terminal. In this process, the coordinator played a 'keep the next' role, not only can pack up the next came the data, but also to further processing to send to the terminal. In the terminal equipment and then the final analysis of the data, so as to draw the corresponding conclusions.
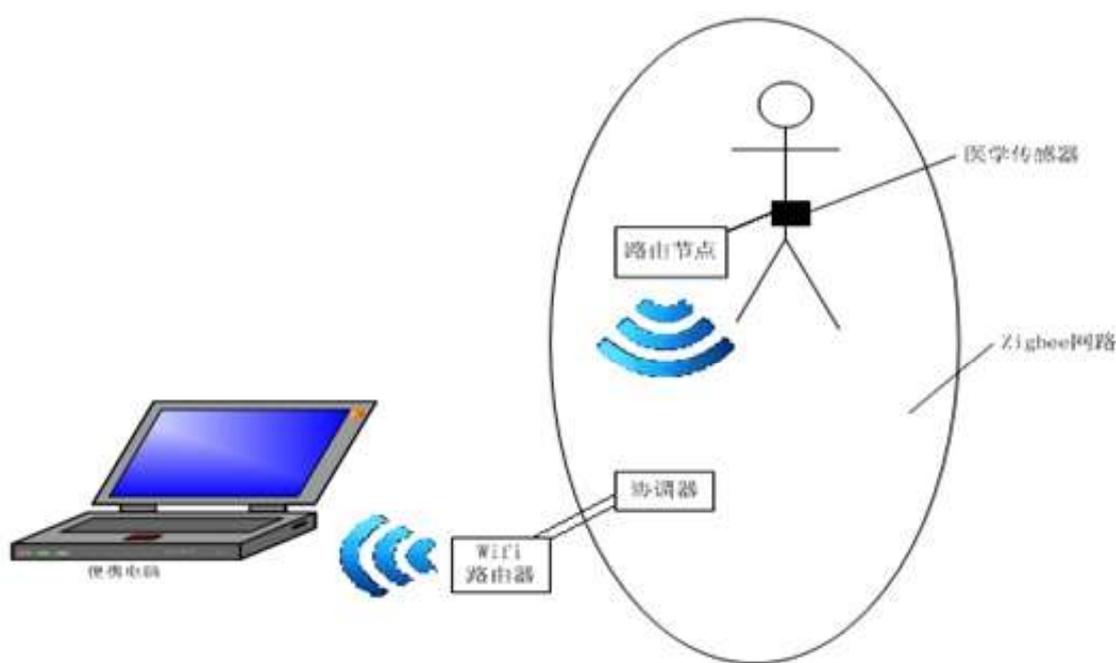
Figure 2.   Health monitoring system for wireless networks

For the system as shown in Figure 3, the problem solved by each module is the main problem of the remote medical health detection system. It can see several aspects, including the collection of physiological information, the transmission of physiological information data, the protocol conversion, and parameter conversion, in the remote monitoring platform for data processing, and data storage and updates. The process of the system is mainly to carry out the collection of physiological information, and then collect the data collected and converted, and finally the data sent to the remote monitoring platform for monitoring and analysis, the report after the storage of data and results, the end of the process [5].

2.   Introduction to physiological information collection

2.1.   parameter collection of physiological information

As shown in Figure 4, for the underlying medical sensor data acquisition module associated graph.

Through the heartbeat, blood pressure, body temperature and other sensors to sense the physiological information of the body, after the sensor to respond, the collected data A / D conversion, and the routing node to convert the data into a fixed standard data structure, by calling the protocol stack of the ZigBee layer is sent to the coordinator node [5]. As the system on the human body to collect the physiological data, including: body temperature, ECG and blood pressure. For the different physiological parameters, the collection of the relevant types of sensors used and the collection method is not the same, and because the physiological indicators of the accuracy of the data collected by different requirements, resulting in the selection of the sensor type is also a certain requirement [6].

2.2.   Conventional parameters of human physiology

(1) Body temperature

Body temperature data is an important indicator of the human body, the general human body temperature detection of the normal range of 36- 37.3 , and the accuracy of the data collection requirements are higher, which requires the sensor to collect the temperature data using a more appropriate A / D conversion [7].

(2) Heart rate

Heart rate refers to the number of times the heart beats every minute. According to medical research shows that the heart rate of the human body is not a fixed value, it will be with all the external conditions or the subjective psychological activities such as the occurrence of floating up and down. While the baby is generally faster heart rate in adults, the elderly heart rate is the slowest. Healthy heart rate of 60-100 times/ min, usually 60-80 times/ min. Age or

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gender or lifestyle will determine a person's average heart rate, the need for specific analysis of the object, such as long-term exercise of the crowd, their heart rate is generally slow.

(3) Blood pressure

Blood pressure refers to the body's blood delivery to the body parts of the required pressure. Normally the monitored data includes high pressure and low pressure. And high pressure refers to the blood flow from the ventricle to the arterial pressure, that systolic blood pressure. Low pressure refers to ventricular diastolic, arterial retraction, at this time the pressure that diastolic blood pressure. Normal blood pressure in order to promote the normal circulation of blood in order to maintain normal metabolism. Therefore, blood pressure is an important sign of our body signs, directly related to the human body is normal or not, it is the normal representative of human organs data. Even when the human body died, blood pressure disappeared. So blood pressure data has a very important role. The normal systolic blood pressure detection range of 90mmHg- 140mmHg, diastolic blood pressure in the 60mmHg- 90mmHg. And blood pressure and heart rate are subject to the outside world more or less affected, including mental activity and human behavior, will fluctuate up and down. Generally speaking, hypertension refers to abnormal blood pressure than normal, systolic blood pressure greater than or equal to 140mmHg or diastolic blood pressure greater than or equal to 90mmHg. Hypotension is abnormally lower blood pressure than normal, systolic blood pressure less than or equal to 90mmHg or diastolic blood pressure less than or equal to 60mmHg. Hypertension is common for older men and poses a great threat to the health of the elderly, so blood pressure monitoring data is important for telemedicine health monitoring systems.

3.   Client development software

3.1.   Visual Basic

Visual Basic is a structured, modular, graphical programming language developed by Microsoft that includes development-oriented, object-oriented event drivers for mechanisms. VB has a graphical user interface, making it the first visual design tool, and it has a fast application development system, more quickly create the use of control functions.

Compared to other software development tools, this article chose this software, because it is for beginners, whether you have no basis, you can quickly and easily develop the software, not only because of its visual window application, You can also easily use the inserted controls, the development speed and efficiency are very reliable [8]. Finally, because this design needs to connect to the database, and VB open data connection makes it easy to connect homemade database. It is taking into account its various characteristics, and ultimately chose this software to develop remote health medical monitoring system client.

3.2.   Introduction of SQL

SQL (Structured Query Language), the full name of the structured query language. As an advanced non-procedural programming language, not only can access data, queries, and updates can also manage the database. And as the operating language of the database, from the development so far not only did not decline, its influence is growing. SQL language itself is independent of the database and has a good portability, in addition, do not need to store the data to establish a field, ready to access, very convenient. But also in front of a large number of data with excellent reading and writing ability, which is particularly important. Although not a complete programming language, but it can be achieved through the VB to quickly call the database system. Therefore, based on the characteristics of this software with VB to achieve remote health care detection system client [9].

4.   Client software development

4.1.   Remote medical health monitoring system client interface design

Based on the VB6.0 client interface design, mainly on the user login interface design and remote monitoring data on the main interface design. First, start VB6.0, the new project and the new window file Form 1, the window needs to compile two text files, three label files and a command file. And then code on the Form 1 compiler, requiring the realization of the user name and password to log in automatically jump Form 2 main window, if the user name or password is wrong, then prompted. The user name is set to 'Admin' and the password is 'Admin'.

The code for the login window is as follows:

```
Private Sub Command1_Click ()

Static n
```

```
If Text1 (0) = 'Admin' Then
    If Text1 (1) = 'Admin' Then
        Form2.Show
        Unload Me
    Else
        MsgBox 'Password is wrong!'
        Text1 (1) = ''
        Text1 (1) .SetFocus
    End If
Else
    MsgBox 'username wrong!'
    Text1 (0) = ''
    Text1 (0) .SetFocus
End If
End Sub
```

A good landing interface is shown in Figure 5

Figure 3.   Figure 5 Client login interface

And then select the project click to add the form file Form 2, so that the main interface to create a good. Form 2 function is to be able to achieve Form 1 jump into the input number click query, you can automatically link the database SQL stored in the local data, call up after the realization of data presentation. Including the user basic information and signs of information, as shown in Figure 6.

The specific steps are as follows:

The first step is to compile the form file, you need 8 text files and 12 label files and a command file.

The second step is to compile the code, the required code is as follows:

```
        Public conn As New ADODB.Connection
        Private Sub connection ()
'Set conn = ADODB.Connection
Conn.CursorLocation = adUseClient
```

Figure 4. The main window of the form interface

On Error GoTo connect

User ID = sa; Initial Catalog = Remote Health Monitoring Data; Data Source = LXC-PC '

Exit Sub

Connect

MsgBox 'database connection failed' \u0026 Err.Description

End

 End Sub

Private Sub Command1_Click ()

'On Error Resume Next

Dim rs As New ADODB.Recordset

Dim r As New ADODB.Recordset

Set rs = conn.Execute ('select * from user sign where num =' \u0026 Val (Text2))

Set r = conn.Execute ('select * from user information where num =' \u0026 Val (Text2))

Text1 (0) = r ('Names')

Text1 (1) = r ('Ages')

Text1 (2) = r ('Sex')'

Text3 (1) = rs ('Pulse')

Text3 (0) = rs ('Tempeture')

Text3 (2) = rs ('SBP')

Text3 (3) = rs ('DBP')

Set rs = Nothing

Set r = Nothing

End Sub

Private Sub Form_Load ()

Connection

End Sub

The third step is to make a link to the database, first reference the component Microsoft ADO Data Control 6.0 (SP6), and then create the ADODC1 control in the form, right-click the property after selecting the string in the Microsoft OLE DB Provider for SQL Server Click Next Select the local server, enter the server's user name and password after the test connection is successful, you can click OK, then the database connection is successful [10].

Figure 5. Remote monitoring and monitoring data interface

As shown in Figure 7 shows the main interface for debugging, after entering any of the local database to do the number, it will display all the information. If you enter the number 3, the person's name is Zhang three, gender male, age 46, heartbeat 79 times / min, body temperature 36.5 degrees Celsius, high pressure 102.1mmHg, low pressure 82.2mmHg.

4.2. Background SQL database design

Start Microsoft SQL Server Management Studio Click to enter, the user name is set to sa, the password is 123456. Click on the local database, create a new 'remote monitoring and monitoring data' database, enter the new data sheet, by the client needs, as shown in Figure 8 to establish the following two tables.

Figure 6. Database table creation

After the completion of the data can be entered, and in this paper in order to achieve the main function of the client, only a few sets of simple data, easy to design instructions, the assumptions do not repeat the data.

4.3. Client review of the development process

In the process of developing this software, encountered many problems and made a lot of mistakes. The main problem lies in how to connect VB and SQL database data call. With the help of the teacher to determine the idea and the Internet query related information and reference to the code design, after several changes to make it perfectly match the development of their own environment. Not only had the problem of coding, due to the software unskilled, resulting in a lot of common sense of error, the final stumbling completed a simple development.

Conclusions

The function of this paper is mainly on the telemedicine health detection system client brief, only the development of the client login interface and the client main interface data monitoring window. The wireless sensor network has made great progress in the development of the results of the past, remote medical health monitoring system client as a wireless sensor network in the application of medical testing has also been widely concerned about the outside world. Telemedicine technology in China's development can only be regarded as just started, and wireless sensor network has the same huge prospects. Different from the wireless sensor network is at this stage in the global scope of the development of telemedicine health have not made a breakthrough, China and foreign countries are still in a starting phase, should take this initiative, in-depth study of long-range health care system, and constantly develop its infinite potential to create social values, making China's medical system tends to improve, so that people live a more healthy life and create a more harmonious society.

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