Research on Application System of Remote-Control Computer of Android Mobile Phone

Yuanyi Chen¹,*

¹College of Internet of Things, Jiangxi Teachers College, JTC, Yingtan, 335000, China

*Corresponding author e-mail: chenyuanyi@jxsfgz.edu.com

Abstract. With the development of smart phone system, Android has become one of the most extensive systems in the world. Meanwhile, Android system has also been used in tablet computers, automobile GPS navigation and other devices. In this paper, the design of remote control of Android mobile phone and four components of Android are first described, and the wireless connection technology and implementation of Android mobile phone and computer are explored for readers' reference.

Keywords: Remote Control, Application System, Send Instructions, Wireless Connection Technology

1. Introduction
With the continuous development of information technology, the system of smart phone has also been developed rapidly [1-3]. Due to the large size of the computer, it is not convenient to carry it compared with the mobile phone, so the application system of remote control of the computer by Android mobile phone has become an important content of the research. By sending instructions from the phone to the computer, the computer can send the results back to the phone.

2. Remote control design of Android mobile phone

2.1. System Framework
The system is mainly composed of four kinds of components: one is the binding component, the second is the remote implant device, the third is the anti-modification digital signature bypass component, and the fourth is the remote-control program component [4-6].

2.2. Remote implantation of components
The remote implant component in a practical application requires the remote-control program to be secretly implanted and installed in a designated Android phone in a timely and efficient manner. From the technical perspective, it is not easy to realize the above functions. Two major difficulties need to be overcome. On the one hand, android system has a unique structure, and its program format is mainly Apk, which needs to take up a large amount of space. On the other hand, the client needs to implement a variety of functions, which means that the program needs to take up a large amount of space, often
several megabytes.

2.3. Binding component
The main purpose of this system is to expand the application functions and better meet the needs of users. For the remote control system, two basic requirements should be met: one is to meet the stealth requirements of the controlled; The second is to meet the uncontrollable requirements. Therefore, in the process of designing the system, the remote control program should be kept in a hidden form. In addition, it is also necessary to ensure the operation and communication at a predetermined time. This system in reference to the PC platform code into thought, on the basis of the remote control in the form of a scientific and reasonable procedures and legitimacy and meets the requirements of the Apk bundled together at the same time it is embedded into the page, in the process, without the operator artificially controlled the Apk in normal operation, the secret remote control program can be run directly using the same boot interface.

2.4. Composition of remote control system
The remote control system is composed of smart phone, controlled device and Web server. Wireless routing (AP) provides WiFi wireless network for the system. Smart terminals such as mobile phones and tablets can remotely monitor and control devices in factories and workshops. The controlled device receives the control instruction of WiFi wireless module through single chip microcomputer, and the remote intelligent control of the device can be realized through PLC or relay. The design idea of the system is to deploy the server application on the Tomcat network server, responsible for providing user logic and MySQL database query services, and communicating with Android smartphones and controlled devices. Users can complete login, device addition, monitoring and control and other functions through mobile phone software. The communication between client and server is realized by the interface of both sides. First, the client sends a request to the server through the httpClient interface. Second, the Web server sends the request from the client to the Servlet interface. After the user logic analysis is carried out in the interface, the response content is returned to the client from the Servlet interface. The Tomcat server acts as a container for the Servlet interface class and is responsible for receiving and responding to mobile client requests. In the process of wireless network communication, the communication protocol used by both parties is HTTP protocol, which specifies the content and format of data transmission.

3. Four Android groups
The Android application is composed of four components: an active page, a service, and a content provider. Broadcast receiver.

Developers need to learn more about the four components of Android and the relationships between them before they can develop an Android application. Android also provides a tool called Intone that allows users to communicate information between the four components.

3.1. Activity
The Activity is the most commonly used of the four components, and usually comes with a screen interface that can be visually viewed by the user. Activities displayed on the interface inherit Activity, so they all inherit some Activity methods. In the intuitive sense of the user, Activity acts as an interface to the program and responds to other Windows. However, in terms of some internal history, the life cycle of an Activity needs to be considered if it wants to keep its state (Figure 1. Activity simulation of mobile phone).
3.2. Service
A Service is a background Service with an eternal life cycle and no user interface. So in simple terms, it's Activity going straight out of bounds. The most obvious aspect of Activity is that when Service is running, the user will not feel its presence. Because it goes back in the background. But in one respect it's similar to Activity. That is, when a Service is running, it doesn't interfere with other user interfaces or components. In general, we want to prevent the Service from affecting our main interface. Our developers will create a new separate thread to perform time-consuming tasks.

3.3. the Content Provider
Content Providers in Android mainly store and share data. Data in developed applications can be shared and used by other components. The other three types of data storage in the Android are file systems, databases, and resource files: In addition, the Content Provider does not have direct access to the application's internal database or data files, it is only an abstract storage access method.

3.4. BroadcastReceiver
Broadcast Receiver, as the fourth largest component, mainly completes broadcast receiving, registration and forwarding of GUANGfo. Its function is to monitor the triggering of events within the system.

4. Wireless connection technology between Android mobile phone and computer
Android is the software platform and operating system based on the Linux kernel, is Google announced on November 5, 2007 mobile phone system platform developed by Google, early after the Open Handset Alliance (the Open Handset Alliance) development, hardware provides excellent support for handheld devices at the same time a large number of immediately available libraries and application software, can be developed as a desktop application complexity of mobile phone software. Google provides a complete Eclipse-based development environment simulator, documentation help, and examples that are easy to implement. WIFI, or wireless fidelity technology, is a high-frequency wireless technology that can connect personal computer handheld devices wirelessly. It has the following characteristics :
(1) low power consumption;
(2) It is healthier and safer. The actual
transmitting power of WIFI is 60-70 milliwatts, which has low radiation to human body, no contact with human body, and high safety factor; (3) It is faster and more reliable. The maximum broadband of WIFI can reach 11Mbps. It can also automatically adjust the bandwidth according to the strength of the signal, providing a stable and reliable network environment. (4) Low cost, only wireless access point and wireless network card are needed to build WIFI network, which simplifies the network installation. Socket is known as the "Socket", contains the IP address and port, the C/S structure of network applications use the Socket network communication interface to realize the streamline door side (mobile phone) communication with the server (computer), when the Socket is used to establish network connection is successful, will produce a transceiver instance on both ends of the application, the programmer operating this instance, complete the required session. This system can be used to establish the connection between the teacher's teaching assistant mobile phone client and the computer server by MEANS of TCP. The teacher can move in a classroom to ensure the stability of the connection.

![Figure 2. Remote computer control by mobile phone.](image)

5. Design and implementation of android mobile phone and computer interaction system

5.1. Analysis of system functional requirements

According to the analysis of the most commonly used functions of the daily computer, the system design functions include the following three parts: wireless mouse, wireless keyboard assistant.

5.2. Realization of system functions

The client side is responsible for receiving the user's input and converting it into the corresponding command to send the instruction to the server side. The server side uses TCP protocol to receive the data sent by the client side, and sends the instruction from the control layer to the application layer. The application layer interprets and executes commands, and is responsible for updates Display status.

1) Send instructions to the client to the server:

```java
public void sendMessage(String str)
{
    try {
        // Write the data to outputStream
        DataOutputStream.writeBytes(str);
        // Ensure that all data is sent
        this.dataOutputStream.flush();
    } catch (IOException e) {
        // TODO: handle exception
    }
}
```
2) Mouse functions:
Left mouse button, click the implementation code:
public void leftClick(float x, float y) {
    try {
        message
        buildMessage(MOUSE, LEFT_CLICK, x, y);
        this.mConnector.sendMessage(message);
    } catch (Exception e) {mouse touch sensor area
}

3) Keyboard functions
The main function of the keyboard is to monitor the changes in the input Edit, and when the changes occur, send the contents of Edit to the server.

|white collection
public void afterTextChanged(Editable) {
    //TODO Auto-generated method stub
    try {
        str = edt_keyboard.getText().toString();
        String message = buildMessage(KEYBOARD, INPUTSTRING, str, 0)
        mConnector.sendMessage(message);
    } catch (Exception e) {
}
}

4) PPT presentation control
PPT player requires the PPT to be in open state. Control commands that can be sent include start playing, stop playing, next page, up-page and so on.
public void onClick(View v) {
    switch(v.getId())
    case R.id.btn__ppt_next:
        String message = buildMessage(PPT, PLAY_NEXT, 0, 0)
        mConnector.sendMessage(message);
    } catch (Exception e) {

6. Conclusion
To sum up, through to the android mobile phone remote embedded components, bundling machine components and remote-control system are introduced, and the android mobile phone and wireless connection of computer technology, understand the android mobile phone and computer interactive system design, the basic principle of the technology at the same time in the lecture and the teacher in class such as occasion has very strong practicability.

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