

The Implementation of the Intelligent Family Balcony Farm System based on Android System

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Abstract. The balcony farm system organically combines McS-52, WIFI module, temperature and humidity module, relay module and other modules to realize the monitoring of the environment by mobile phone APP. The idle balcony space can be reasonably utilized for vegetable cultivation, and precise control can be implemented according to the environmental requirements of crops, so as to conduct scientific and efficient management.

Keywords: LCD1602; Android System; WIFI, MCS-52.

1. Introduction

Balcony agriculture is to point to use the space such as dweller balcony, courtyard, housetop to undertake a kind of agricultural production. Although started late in the balcony agricultural Internet of things in China, but the government is more and more attention to the development of agriculture in the Internet of things, some enterprises and academics have been actively studying the balcony agricultural Internet of things[1], some successful case is worth learning and using for reference, the large-scale application of emerging technologies such as Internet of things of agriculture will become the new engine for boosting our country agriculture comprehensive development by leaps and bounds.

2. Requirements Analysis

Requirements analysis is a prerequisite for all development and design. The basic task of requirements analysis is to accurately answer the question "what must the system do? The basic purpose of feasibility study is to determine what must be done by the system in a short time at a low cost, that is, to put forward complete, accurate, clear and specific requirements for the target system[2]. The result of requirement analysis is the foundation of system development, which is related to the success or failure of engineering and the quality of software products.

3. System Design

The system includes two parts: software and hardware. The operating environment of the software system is Android operating system, and the hardware system includes McS-52 SCM, temperature and humidity sensor, LCD1602 LCD screen, WIFI module, relay and LED lamp [3].

The main functions of the system include collecting temperature and humidity, turning on fan, turning off fan, turning on LED light and turning off LED light, and automatically controlling fan and LED light according to temperature and humidity data.

4. Microcontroller Program Development

4.1 Pin Definition

Sbit RS = P1 ^ 0; // register select bit, RS bit is defined as P1.0 pin
sbit RW = P1 ^ 1; // read/write select bit, define RW bit as P1.1 pin
Sbit E = P2 ^ 5; // enable signal bit, E bit is defined as P2.5 pin
Sbit BF = P0 ^ 7; // busy flag bit, and BF bit is defined as P0.7 pin

```
Sbit DU = P2 ^ 0;
Sbit WE = P2 ^ 1;
```

4.2 Main Functions

(1) Reading Function of Temperature and Humidity Sensor

```
void wendudq(void)
{
    U8 i;
    For (i=0; i<8; i++)
    { U8FLAG=2;
      While ((! P2_0)&&U8FLAG++);
      Delay_10us ();
      U8temp=0;
      if(P2_0) U8temp=1;
      U8FLAG=2;
      while((P2_0) &&U8FLAG++);
      if(U8FLAG==1) break;
      U8comdata<=<=1;
      U8comdata|=U8temp;
    } }
```

(2) Power on Initialization of ESP8266

```
void esp8266_init ()
{
    Uart1Sends("AT+CIPMUX=1\r\n");
    delayesp(50000);
    Uart1Sends("AT+CIPSERVER=1,8080\r\n");
}
```

(3) Androidprogramming

In addition to displaying temperature and humidity, the mobile phone APP also sends instructions to the WiFi module, which sends instructions to the SCM through the serial port to realize the control function [4].

The code snippet for the onCreate () method is as follows:

```
protected void onCreate (Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);
    ..... }
class ledturnon implements OnClickListener
{
    @Override
    public void onClick(View v) {
        if (isConnecting && mSocketClient != null) {
            new Thread () {
                public void run () {
                    String output = "?";
                    try {
                        mPrintWriterClient.print(output);//
                        mPrintWriterClient.flush();
                    }
                    catch (Exception e) {
                        Toast.makeText(mContext, "Mobile phone communication permission is not open"
+ e.getMessage (),
                                Toast.LENGTH_SHORT). show ();
                    }
                }
            };
        }
    }
}
```

```

        }. start ();
    }
    if (mSocketClient == null) {
        Toast. makeText (mContext, "ununitied", oast. LENGTH_SHORT).show();
    }   }}

```

5. Interface Implementation

When you enter the system, the login interface pops up first. After entering the password, you enter the main interface of the system. There are five modules: data administration, system setup, note pad, help and exit [5,6]. Click data administration to display the interface of temperature and humidity display and control, as shown in figure 1.

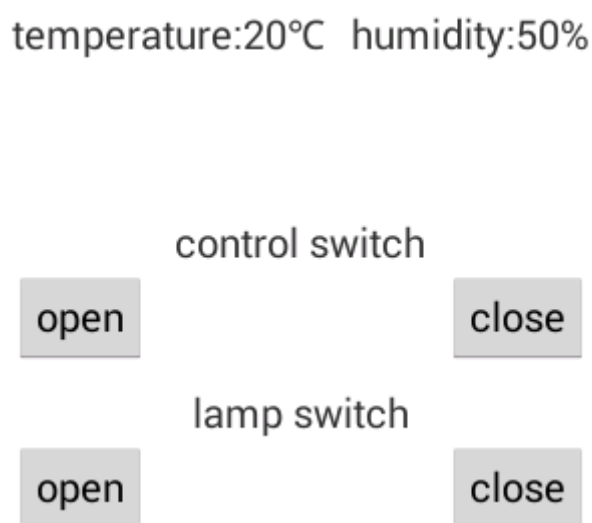


Fig. 1 interface for temperature and humidity display and control

6. Summary

In this paper, the function of the system is first analyzed, Java program development, combined with MCS-52, WIFI, temperature and humidity module, control module, to achieve intelligent management of the family balcony farm.

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