The Design of Visualization Classroom System in University

Guo-qing SU and Ling LONG

Southwest University for Nationalities, Chengdu Sichuan
*Corresponding author

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Abstract. In view of the current difficult situation of seat management in colleges and universities, the very serious occupying phenomenon, we put forward a low cost, high efficiency, suitable for visual classroom selection of the solution. Using the low-power MSP430 microcontroller to detect the status of the front-end sensor through GPRS communication to the back-end database, the Web site server through the access to the database server to obtain information, the information published through the Web site to the Internet. Smart phones on the Android terminal to access the Internet, real-time remote view classroom seat status and to achieve seat selection. You can let students more quickly and directly access to the classroom seat of the situation, effectively improve the classroom seat utilization.

Introduction

Now the major colleges and universities in the prevalence of class and self-study classroom occupies a serious phenomenon, the existence of occupying not only affect the normal learning of students, but also a waste of time, easy to lead to disputes. If students can go to study room before you can master the study room "intelligence", then you can greatly avoid the emergence of these problems. The current classroom seat does not achieve online booking, under normal circumstances is only to the classroom to clear whether there is a seat, if the classroom seat management system on the line, students can use mobile phones, flat and other mobile devices to achieve classroom seat reservations and inquiries. So the classroom seat management system can be a good solution to this problem. And with the popularity of the network, the development of the Internet + trend, classroom seat management and appointment seat into people's lives.

System Frame Structure Design

Visual classroom guidance system based on a comprehensive perception, reliable delivery, visualization of functional requirements, can be divided into the perception layer, network layer and application layer three levels. System frame structure shown in Figure 1.
Communication

The system uses GPRS communication. GPRS operation, is through the routing management to address and establish data connection, and GPRS routing management performance in the following three aspects of the mobile terminal to send: data routing; mobile terminal to receive data routing; and mobile terminals in the establishment of data routing when roaming.

GPRS network not only has a wide range of coverage, data transmission speed, high quality communications, always online and traffic billing and other advantages, and its itself is a packet data network, support TCP / IP protocol, can communicate with the Internet directly. GPRS in the wireless Internet, environmental monitoring portable, traffic monitoring, mobile office and other industries with unparalleled price advantage. Therefore, the system uses GPRS communication.

System Hardware Design

Microcontrollers. One of the microcontroller model MSP430F149. Compared with other microcontrollers, MSP430 is a 16-bit ultra-low power microcontroller, RISC streamlined instruction set, a single clock cycle can execute a command, processing speed. With up to 60KB of flash memory and a variety of high-performance analog and intelligent digital peripherals. Chip-powered minimum voltage can be about 1.8V, 1MHz clock conditions when running, the current will be the lowest in 165μA, RAM to maintain the mode of the lowest power consumption is only 0.1μA.

Detect System. The system detects the use of pressure sensors. A variety of pressure sensors, its performance is also a big difference, we use HX711 pressure sensor, using 24-bit high-precision A / D converter chip HX711, with two channel inputs, internal 128-bit gain programmable amplifier. The input circuit can be configured to provide bridge-bridge bridge sensor mode, is an ideal high-precision, low-cost sampling front-end information.

Power. The system power supply using button lithium manganese battery. Lithium manganese one-time button battery nominal voltage is 3V, the termination voltage of 2V, the typical operating current in 0.1-0.2mA. Using four buttons lithium manganese battery in series, the total voltage of 12V, the use of LM2940 chip, the voltage stabilized to 5V, to msp430 power supply. Compared
with other batteries, long life, large capacity, small size, light weight. The battery is semi-sealed and is safe to use.

**Android Client Software Design**

Android client control system design mainly includes user interface, database design. An Android application consists of one or more components, each of which performs a different task in the application, each group is individually activated, or other application is activated.

**Android Phone Client Interface.** Android phone control the main interface shown in Figure 2. Figure 2.A for the login page, enter the correct student number and password to enter. Figure 2.B is the choice of teaching building. Figure 2.C shows the status of each classroom seat information. If the seat is full, it is red, not full, green, and the number of remaining seats is displayed. Figure 2.D for the classroom seat usage, allowing users to more accurate positioning to the school each classroom for each seat to visualize the seat and appointment seat.

![Android phone control the main interface.](image)

**Database.** By building a MySQL database on the cloud server, the state data for all seats in the classroom are stored. If the seat is idle, the seat has been reserved, the seat has the status data, the user in the APP to see the seat status, the seat selection, information through the page page to return the data to the database, the database updates the data and real-time display on the APP. So as to achieve the purpose of real-time visualization classroom selection system.

**Conclusions**

We use MSP430 technology, communication technology, play ultra-low power microcontrollers and communications coverage, data transmission speed advantage, to design a more intuitive understanding of classroom information system, to achieve the students in any place you can use the smart phone to accurately obtain the status of each seat in the school information and can reserve seats in advance. Compared with other ways to obtain classroom seat information and reservations seat, with intuitive, convenient, high precision, to adapt to a wide range of advantages.

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