Automatic Calibration System of English Lesson Plan Information Under Big Data Analysis

Huijun Liu[1(✉)], Liu Yong[2], and Ming-fei Qu[3]

[1] Faculty of Business and Foreign Studies, Hunan International Business Vocational College, Changsha 410200, China
lhj6339@163.com
[2] Survey and Design Institute of Agricultural Seventh Division, Kuitun 833200, Xinjiang, China
[3] Mechanical and Electronic Engineering School, Beijing Polytechnic, Beijing 100176, China

Abstract. The traditional English course planning information automatic calibration system has poor precision, weak data analysis ability and low calibration accuracy. To solve this problem, the new English course plan information automatic calibration system is designed with big data analysis technology, and the hardware and software parts of the system are designed. Designed with high-precision ARM processor, TA64 embedded tracking chip and CS652 positioning chip, the hardware consists mainly of two types of power supply, calibrator and monitor in series and parallel. The software part is designed with five functional modules: teaching case information collection, information processing, information analysis, information correction and correction structure detection to complete software optimization. The effectiveness of the calibration system has been verified compared to traditional automatic calibration systems. The experimental results show that the system has strong data analysis capability, high precision after calibration, good calibration effect and large development space.

Keywords: Big data analysis · English teaching plan · English information · Automatic calibration

1 Introduction

With the improvement of the mode of education, English teaching has risen from the traditional primary teaching to the intermediate teaching, and the English teaching mode has become more and more diversified. Many colleges and universities want to abandon the rules of teaching, introduce high technology to improve the quality of teaching. The improvement of modern technology provides more opportunities for teaching methods, not only can improve teaching quality, but also can increase the use of modern technology. The introduction of multimedia teaching has greatly changed the English teaching mode and made the original empty English teaching more vivid

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and concrete. Multimedia teaching has been made up of many systems. This paper focuses on the automatic calibration system of English lesson plan information [1].

The calibration system is of great significance for the information determination of English teaching cases. A good calibration system can help teachers to determine the information taught better and improve the quality of the professors. In this paper, a new automatic calibration system for English lesson plan information is designed by using big data analysis technology. The hardware and software parts of the system have been designed, and the actual effect of the calibration system has been verified by experiments.

2 Hardware Design of Automatic Calibration System for English Lesson Plan Under Big Data Analysis

The automatic calibration system of English teaching case information is designed to refer to the globally recognized high precision processor ARM processor. The internal chip is a TA64 embedded tracking chip and a CS652 positioning chip [2]. The power design part is divided into two forms in parallel and series. The storage and storage device is used to store the program and parameters in the form of FLASH. The touchscreen is LCD touch screen, and the whole indoor positioning system hardware is connected by Ethernet.

The overall hardware structure of the English teaching plan information automatic calibration system is shown in Fig. 1 below.

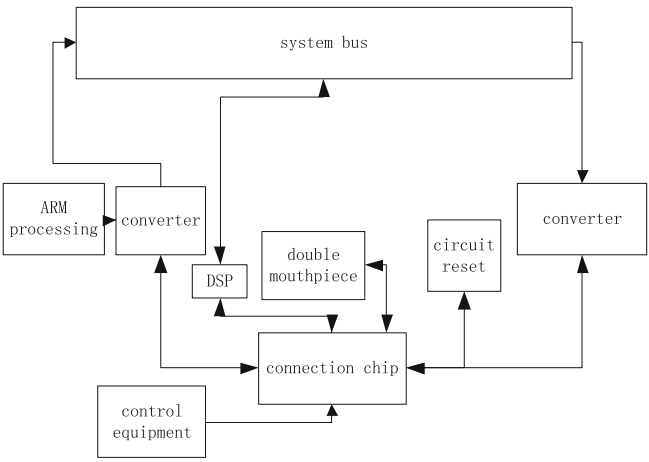

Fig. 1. Hardware architecture of automatic calibration system for English lesson plans

It can be seen from Fig. 1 that two transformers are connected to the system bus, which are an input transformer and an output transformer, and both transformers are connected to the connection chip. A DSP is also connected to the system bus, which is

also connected to the connection chip. The amount of data processed by the ARM is transmitted to the output transformer, which in turn is transferred to the system bus. The connection chip plays a central role and is controlled by the control device and circuit reset in addition to the hardware device. This constitutes the hardware structure of the English class planning automatic calibration system.

2.1 Design of Power Supply

In the calibration system hardware, the power supply occupies an important position and provides power for the system. There are two types of power supply: centralized power supply and distributed power supply. The centralized power supply structure is composed of a module, which can not be segmented again in the process of use, resulting in high efficiency, but poor flexibility. The distributed power supply type is made up of several modules, which can be assembled freely and split flexibly while using, but the working efficiency is low [3]. The calibration system in this paper takes into consideration the advantages and disadvantages of centralized and distributed power supply. The two structures are combined together to build the power hardware [4]. The connection mode of the power circuit is connected in series and in parallel, which is connected in series with the active device and the load end of the adjusting unit, and the connection between the transformer and the control end is made. Join to ensure that the working mode is always in the linear mode. The collector voltage is between 15 V–25 V, and the power generated is between 100 W–500 W. The power supply circuit allows multiple types of voltages to pass through, and the reset chip inside generates a reset signal to provide maximum power.

2.2 Calibrator Design

The calibrator consists of two parts: signal conditioning board and DSP motherboard. In addition to receiving the calibration target signal, the calibration process can also receive the X light diffraction signal and the filter signal. These interference signals will greatly affect the accuracy of the calibration results, so the interference signals must be removed before the signals are stored inside the calibrator. The main work of the DSP motherboard is to collect and process filtered data, and the calibration data is transmitted to the computer through the USB interface. The signal tracking mode is a hardware filter, and the DSP main board is used to trace the signal by software filtering [5]. This combination makes the anti-interference effect greatly improved, and the acquisition rate can reach 10 m/s. Calibrator schematic diagram (see Fig. 2).

Because the calibration is easy to be affected by the environment and interference equipment, the signal will be unstable, so it is necessary to enlarge the process of signal acquisition and turn the voltage signal into a standard signal. The amplification mode is magnified by layer by layer and the number of the amplification layer is four layers: the first layer is the operation amplifier circuit to prevent the signal from drifting; the second layer circuit is added. The filter chip selects the interference signal; the third layer circuit introduces photoelectric isolation; the fourth level circuit inputs the voltage to the calibrator, amplifying the analysis and tracking signal [6].

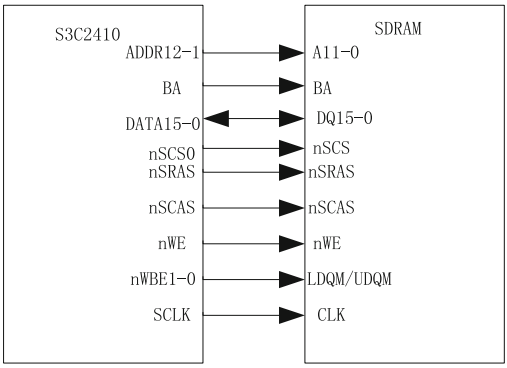

Fig. 2. Calibrator schematic diagram

2.3 Display Design

Using the most advanced liquid crystal material to make the display, we should pay more attention to the actual needs of the users, let the users make the main selection and match their own products, more modularized and liberalized, and more operable. The main parameters of the display are summarized in Table 1 as follows:

Table 1. Display parameters

Project	Parameter
Screen size	27 in.
Screen ratio	16:9
Panel material	IPS
Screen best resolution	2560 × 1980
Video interface	HDMI
USB interface	Two
Body color	Black/white/red/blue/green/purple
Screen ratio	16:9 (Widescreen)
High definition standard	1080p (Quan Gaoqing)
Panel type	MVA
Backlight	LED backlight
Dynamic contrast	100万:1
Static contrast	1000:1
Gray scale response time	5 ms

The DM64 developed by TI is a high-performance 32 bit fixed-point DSP for multimedia applications. The main frequency of the DSP is up to 720 MHz, and 8 parallel computing units can handle 5760MIPS, using the two level cache structure, 64 bit external memory interface [7]. It also integrates 3 configurable video ports, 10/100 Mbit/s Ethernet MAC and other peripherals. With DM642 as the core, the real-time acquisition, compression, playback and transmission function of the video signal is completed.

CPLD (programmable logic control) circuit is selected in the circuit, and it can realize the functions of FLASH, page address signal, serial port interrupt, clock signal, I/O control, reset signal, interrupt signal and so on. Similar to the WB9D of MEG in appearance design, the base is round, stylish and simple, and saves space. The brightness and 500:1 contrast of 300 cd/m^2 are consistent with the specifications of the mainstream LCD. Widescreen LCD has better visual effect compared with ordinary LCD products, and is more suitable for video playback applications.

3 Software Design of Automatic Calibration System for English Teaching Plan Based on Big Data Analysis

The software is programmed according to the hardware part of the calibration system, and the software flow chart is shown in Fig. 3.

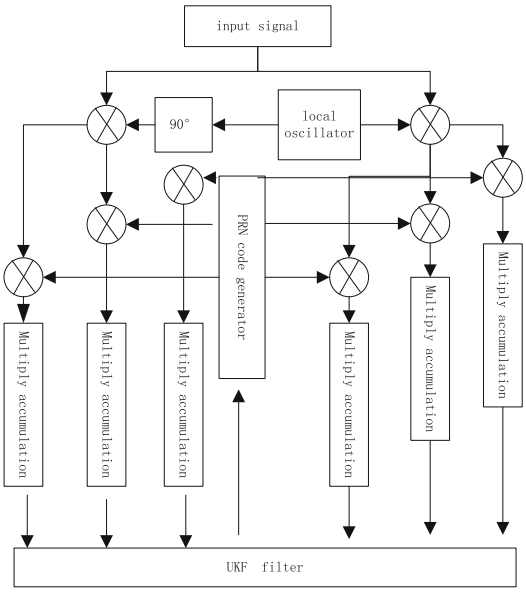

Fig. 3. Software workflow for calibration system

Calibration system software work is a complex process, which is divided into six steps. Introduce it to it:

(1) Collect the external information by the collector. The acquisition process is often aimed at multi-target, and the amount of information acquisition is very large, and there are some interference signals and weak signals. The collector eliminates the interference signal through the screening system, amplifies the weak signals with the amplifier, and selects useful signals to transmit to the processor [8].

(2) Processing calibration information. The 8 processing channels start work at the same time [9]. The collected information is classified according to the target, and the information of different targets is entered into different channels. There is a gap between channels and channels to avoid interference between information. The processed information is fed back to the computer system host and the mobile terminal respectively.
(3) Central system analysis. The results can not be displayed in the liquid crystal display immediately. To compare with the data of the internal database of the Internet of things, if there is a large deviation, the calibration result is inaccurate, and the last unit should be returned and relocated. If there is little difference between the internal data and the database, then the calibration result is more accurate.
(4) Determine the calibration information. The information of teaching plan is determined by different calibration nodes and recorded in the central system.
(5) The results were traced. After the calibration result is determined, the monitoring device is carried out in all directions to ensure the locking target and prevent the target from breaking the regulatory scope of the system.
(6) Show the results. When the target can be completely controlled by the calibration system, the IOT operation center [10] can display the result on the LCD LCD screen.

4 Experimental Research

In order to verify the actual working effect of the automatic calibration system of English teaching plan proposed in this paper, a contrast experiment is set up comparing with the traditional calibration system. The experimental environment was built using Matlab software to implement the proposed method and runs on an Intel Pentium Ml.6 GHz CPU.

4.1 Experimental Parameters

The experimental parameters are Table 2 as follows.

Table 2. Experimental parameters

Project	Parameter
Converter	A/D conversion
Working mode	SUA
Calibration time	20 min
Working frequency	300 Hz–1000 Hz
Calibration requirements	Accurate and fast
Calibration network	Internet

4.2 Experiment Process

According to the parameters set above, the traditional information automatic calibration system and the calibration system studied in this paper are used to calibrate an English teaching case at the same time to record the ability and accuracy of large data processing.

4.3 Experimental Results and Analysis

The results obtained are as follows (see Fig. 4).

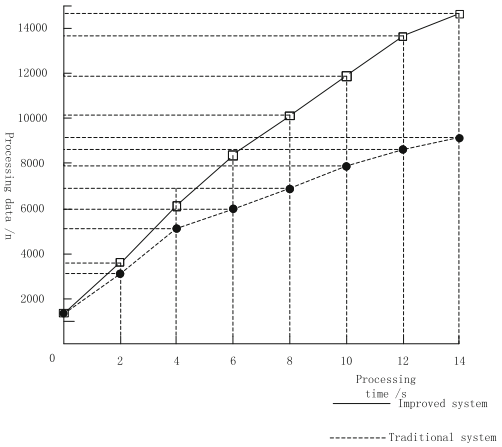

Fig. 4. Experimental results of large data processing capability

Figure 4 shows that when the processing time is 4 s, the data processed by the traditional correction system is 3600, and the data processed by the improved correction system is 3800; when the processing time is 8 s, the data processed by the traditional correction system is 6,900, and the correction system is improved. The processed data is 10,500; when the processing time is 12 s, the conventional correction system processes 8600 data, and the improved correction system processes 13800 data (Fig. 5).

When the data volume is 10000 MB, the accuracy of the traditional calibration system is 22%, and the accuracy of the improved calibration system is 43%. When the data volume is 20000 MB, the accuracy of the traditional calibration system is 32%, and the accuracy of the correction system is corrected. 61%; when the data volume is 30,000 MB, the accuracy of the traditional calibration system is 34%, the accuracy of the improved calibration system is 64%; when the data volume is 40,000 MB, the accuracy of the traditional calibration system is 41%, the correction is improved. The accuracy of the system is 82%.

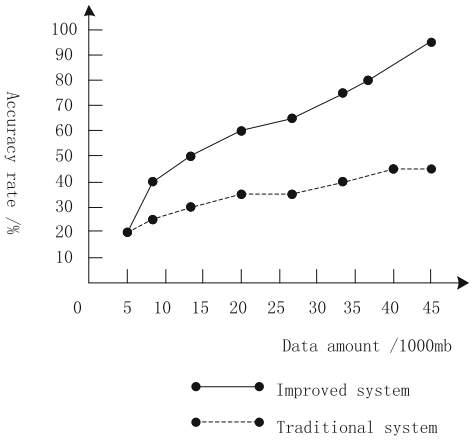

Fig. 5. Accuracy test results

4.4 Experimental Conclusions

According to the above experimental results, the experimental conclusions are as follows: the improved design of the automatic calibration system and the traditional automatic calibration system can calibrate the English teaching case information, but the improved calibration system processes the data in a larger amount of time per unit time and can Finding large amounts of data in a short period of time is more accurate than traditional calibration systems.

5 Concluding Remarks

Our country pays more and more attention to English education. The traditional oral instruction can not meet the current teaching plan. In order to improve the teaching efficiency, scientists continue to study effective educational means and high-tech technology. With the development of large data analysis technology, more and more high-tech cites large data analysis technology. In this paper, large data analysis is integrated into the automatic calibration system of English teaching case information, and the actual work effect of the system is verified by comparing with the traditional calibration system. The research shows that the system has a strong ability of data analysis, can quickly screen out a lot of information in a short time, compare with the information in the database, find out the wrong information and calibrate it, the calibration effect is good, and the ability is strong, it is the inevitable development direction in the future.

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