Application of Music Assisted Instruction System in ARM And SA Algorithm

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Abstract. In this paper, CAI is preliminarily discussed and some suggestions are put forward. In this paper, the reasons for the topic selection, domestic and foreign research status, research content and research ideas are elaborated.The integration of virtual reality technology and teaching is not only the inevitable trend of information technology development, but also provides a brand new teaching method for music teachers in the future. VR technology has been more and more applied in geography, biology, chemistry and other disciplines, and there are matching software and software systems.

Keywords: ARM; Simulated annealing algorithm; Music teaching evaluation; Objective evaluation; Global optimization

1 Design and implementation of system hardware

1.1 Basic design concept

Scientific, objective and quantitative evaluation of teaching effect is of great significance to promote students' music literacy, improve teaching methods and promote teaching quality. However, it is difficult to get an objective, fair and effective evaluation if it simply depends on the subjective feelings of the evaluator. The reason is that although subjective evaluation has many advantages, it has high requirements on the quality of the evaluator, and it is also affected by the physical condition, emotion and other factors of the evaluator, and it is difficult to give accurate and quantitative evaluation indicators. This has little effect on the technical improvement of the evaluated. The system can comprehensively evaluate students' playing, such as the timing of keyboard strokes, timing and so on. According to the ordinary keys, make a completely different from the ordinary keys. Built-in ARM microprocessor, USB connection[1] , keyboard scanning and more. ARM microprocessor is responsible for receiving, processing and converting the key information on the keyboard, and transmitting the information to the computer via USB. The voice is implemented by a MIDI device on the computer. The system can record, process and transmit the information of the keys played by students on the keyboard, produce the effect of playing by computer, record the result of playing, and evaluate and recommend it by the system's playing evaluation module. The basic principle of the system is shown in Figure 1[2] :

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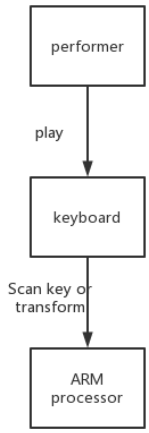

Figure 1: Basic principle of the system

1.2 ARM processor and USB interface circuit

AMR single chip adopts S3C44B0X as general ARM7 single chip. For USB interface chip, due to its high complexity, USB device controller must be able to detect and respond to USB port events and provide a way of data saving. Therefore, this system selected PHILIPS PDIUSBD12, which supports USB1.1 chip. In FIG. 2, the related circuits between PDIUSB12D and S3C44B0X are shown more specifically. As shown in the figure, the D0-D7A0 bus of S3C44B0X is connected to a position on a position bus of S3C44B0X. For nGCS4, WR_N and RD_N of PDIUSBD12 are connected to nWE and nOE of S3C44B0X.

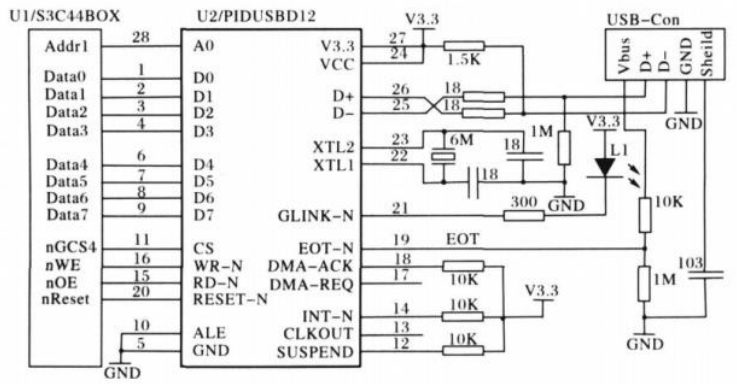

Figure 2: PDIUSBD12 and S3C44B0X interface circuit diagram

1.3 Function design of keyboard panel

Dial and sweep are the most common 61 key standard keyboards for electric style pianos. So, the keyboard-scanning circuit can recognize 64 keys using an 8 by 8 matrix circuit. In general, because the application conditions are not very large interference, so can be used in high resistance mode. As shown in Figure 3 and Figure 4:

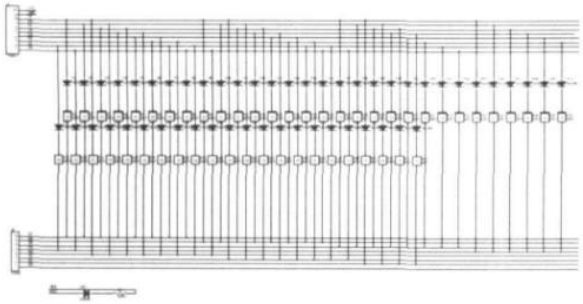

Figure 3: Schematic diagram of matrix scanning circuit

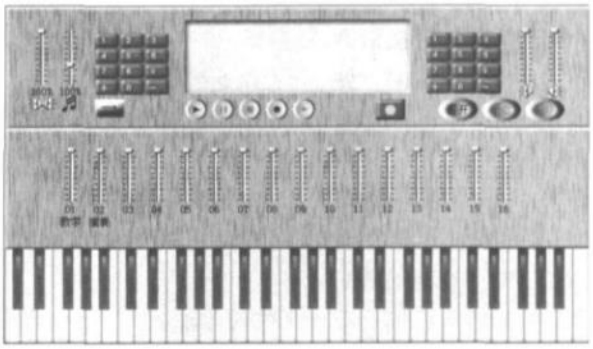

Figure 4: The main interface of the host system

2 Programming

Among them, software includes two main modules: hardware programming and hardware programming.

2.1 Hardware Programming

In addition to the required startup initialization function, firmware programming also includes two tasks: 1) locally repeat scanning of the key and release information of the music keyboard and function keys, and timely uploading it to the computer. 2) Accept and process various messages sent from the computer.

2.2 Programming of large computers

And the host software, according to its own needs, can do very complex, can do very simple. The main interface shown in Figure 4 is one of the scenarios presented in this article. Its main functions are:

1) Basic performance performance: performance performance in response to the key information sent by S3C44B0X, as well as some performance performance performance according to specific functional keys, and can change the tone and so on.

2) MIDI can be used

A common digital music sheet.

3) Can record the effect of playing and singing in the form of MIDI file, and can be played.

4) Different accompaniment clips can be set in the performance, and can be set as an accompaniment editing interface

5) Communicate with the electronic organ, and control different indicating lights on the electronic organ

6) Development of effective algorithms to evaluate the effects of performance.

2.3 USB Driver

In addition to some basic features of ordinary USB drives, the real-time performance of USB drives is the most important. First of all, a discontinuous interface should be used on the hard disk, so that the USB hard disk can ensure the periodic access to the interface, so as to achieve the real-time requirements. Second, when an application reads data from the keyboard, it must have an asynchronous read that has been delivered but not returned, after completing the asynchronous read.

3 Teaching and Assessment units

3.1 Simulated Rough method

This method is a heuristic based random optimization method, which is a global optimization, adaptive and fast convergence method.

1) initialization: (sufficiently large) initialization, (the iteration start of the method) initialization, (the iteration point of the method), (T) the number of iterations L and (T) the control parameter t

2)3) to 6) For k=1..... L Repeated operation. 3) Study new solution methods.

4) Use f (.) as an evaluation function and find △ f= f (s)1 f (s).

5) When delta f<0, s' is considered as a new solution; If not, a new solution is used, which is to receive S 'with a possibility eh.

6) Output the current solution as the best solution when the end condition is met, and jump out. On this basis, a method based on jumping out is proposed.

7) T gradually decreases and tends to 08) rotate 2).

3.2 A music education evaluation method realized by SA

An objective and quantitative evaluation of a performer's performance is necessary, not only to make a comprehensive evaluation of the whole performance, but also to take into account the correctness, timing, length, number, number and size of each key, etc. In this way, a musician's job can be compared with an ordinary job. In order to reduce the complexity of the calculation, the judgment of chord value is excluded for the time being.

In order to make the simulated annealing method can quickly find the optimal results, these standard tracks are divided into several keywords according to the music tracks, and then each keyword is evaluated.

R - [∑ (lx - 1... = т ') + ∑ | - t. avg (T_) T 'N

(1) where, x∈{0,1}, and x=1 indicates that the key is correct; Where 0 indicates incorrect keystrokes or fewer keystrokes, T is the actual keystroke duration, T is the standard keystroke duration, T is the multi-keystroke duration, avg(T) is the average standard keystroke duration, and N is the number of keystrokes. For the whole performance result (and all actual keys), there is the following SA evaluation function:

F = mi ∑ F

(2) When applying simulated annealing algorithm to generate new solutions, the constraints should be satisfied as follows: a=Tal

(3) The standard number of keys in az T ∈ o(1,8) T

3.3 Algorithms for judging whether to press wrong keys, multiple keys or fewer keys

For the sake of judgment and description, the following concepts are introduced:

Primary key: Ratio to standard keystroke duration p=-'∈ o(1,δ), where δ

Is a normal quantity <l.

Secondary key: Ratio to standard key duration p<1. One wrong key: press the wrong key.

3.3.1 Method for Determining Whether the key is the Primary Key

Without loss of generality, assuming that i, one and one keys before the actual key have been judged, now judge whether the actual key is the main key from the first key.

When p≥1, no matter whether the type of key is correct or not, we will consider the key is wrong and will not take it into consideration.

When p∈ o(1,δ), this key is the primary key. The primary key will go to the next round, pending further evaluation;

When p is less than 1-8,

a>1+q case 1

Beta = Tml >1 Case 2

a∈ o(1,δ),

Beta = <1 case 3

β=∑ T1! >1 Case 4

a<1-q

Beta = <1 case 5

3.3.2 Algorithm for Determining Key Status

Let T(start) be the beginning of the actual keystroke, T(end) be the end of the I-th standard keystroke, and 8 be some normal quantity. The following judgment conditions are introduced:

T(start)-T(end)>-8 (4)

Then the algorithm can be simply described as.

Otherwise, the keys to be examined are secondary keys, and these secondary keys are multi-pressed keys. 3) Output results and jump out.

The flow of this algorithm is shown in Figure 5.

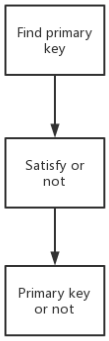

Figure 5: Algorithm flow of key judgment

4 Conclusions

In short, you can extend this connection to two other different applications, so that you can have a security policy for each kind of component. In the JAVA Virtual Machine (JVM), using JAVA Security Manager can provide better protection for WebLogic servers. When Java 2 (SDK1.2 or later) runs on Java 2 (or later), WebLogic Server takes advantage of Java 2 security policies to prevent a suspected piece of code from being exploited by a WebLogic Server. Using the Iava security policy documentation, as well as internal security handling, the JVM allows users to define a suspect algebra. Do the following: java... - Djava. Security. ManagerDjava. Se cu rity. Policy in this section will use such as "= =" tag, says set up one or more of the right of way. After setting this security profile, Java's security manager is used only in the weblogic.policy profile. In your coding instructions, be careful not to mistakenly write it with "=" to avoid attaching a weblogic.policy to the end of some existing security policies. You can also set the stereotype security principle. In the Java security policy profile, the default security policies of service, EJB, and J2EEResourceAdapters are defined in the following part of the code.

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