Information Design of Distance Teaching System for English Translation Course Based on Unsupervised Learning

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Abstract. Remote learning systems are susceptible to feedback from business Slervlets, leading to abnormal operation of some functional modules. Therefore, it is necessary to design a new distance learning information system for English translation courses based on unsupervised learning. Designed FPGA chips, IDE memory controllers, and PIO transmitters. This paper constructs the remote teaching system architecture of English translation course, generates an English corpus translation engine based on unsupervised learning, designs the distance teaching information module of English translation course, and realizes the distance information teaching of translation course. The system testing results indicate that each functional module can operate in an orderly manner, with good performance, reliability, and certain application value.

Keywords: Unsupervised learning · English · Translation course · Long-range · Teaching system · Promotion of information technology · Design

1 Introduction

In the era of information digitalization, many advanced teaching technologies have been born, and the original teaching model has been greatly impacted. In this context, the distance education model came into being [1–3]. Distance education can use advanced information technology to create an effective online interactive teaching platform, through which teaching can be completed, learning tasks can be released, and time and space constraints on teaching can be broken. At present, many colleges and universities begin to use the online and offline hybrid mode for teaching [4–6]. The advantages of distance teaching mode are becoming more and more prominent, which plays an important role in promoting the progress of online teaching in China.

In the process of distance learning, it is necessary to optimize the relationship between teaching and learning according to the characteristics of different disciplines, create a relatively real interactive teaching environment, so that students can truly integrate into education and integrate existing teaching behavior and teaching content. Research shows that there are more and more types of virtual teaching [7] in China, including virtual libraries, classrooms, laboratories, etc. Through a rich and colorful virtual teaching

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environment, teachers and students can effectively complete their writing learning and integrate existing learning behaviors. Distance learning system is a new teaching system based on virtual teaching environment. Through the distance learning system, students can effectively achieve mobile learning and obtain the learning resources they need in real time. Build experience marketing. At present, the architecture used by most distance education systems is not perfect, the connected hardware also has certain problems, and it is difficult to adapt to the changing network. Moreover, some distance education systems do not use visual programming technology, and the software development conditions are backward. In this context, it is necessary to design an effective distance education information system based on the characteristics of distance education.

In fact, there are several important changes in the development of distance education. First, the educational environment has changed, secondly, the application of multimedia technology has changed, and finally, educational interaction has changed. At present, distance education tends to combine modern information with education, and uses the advanced information education template, which is more open as a whole. Relevant researchers have designed several conventional distance education information systems based on the characteristics of English translation courses, but most of the information systems mainly use the Slervlet controller to assign task requests to Java beans, which is vulnerable to the impact of business Slervlet feedback, leading to abnormal operation of some functional modules. Therefore, this paper is based on unsupervised learning. A new distance teaching information system for English translation classroom is designed.

2 Hardware Design

2.1 FPGA Chip

When the remote teaching system of English translation course is running, it needs to continuously complete the transmission of resources, and this process needs high-speed processing chip as support. Therefore, this paper selects FPGA chip as the core processing chip, which has a high-performance processing module, and additional peripheral interfaces are added to achieve effective driving, and complete the task of English translation teaching resources processing, the schematic diagram of the high-performance processing module of the chip is shown in Fig. 1.

2.2 IDE Storage Controller

The storage controller has a simple shape and is mainly packaged with STM32F103ZET6 MCU. The main characteristic parameters of the IDE storage controller are shown in Table 1.

It can be seen from Table 1 that the IDE storage controller is equipped with a special oscillation circuit, which can be used as the clock of the distance learning system for frequency division output to achieve PLL supply. The frequency of the oscillation circuit is 8 MHz, and there is a SWD basic composition circuit. After multiple debugging and correction, it can generate an infrastructure that meets the system operation requirements, which is convenient for processing a large number of distance learning information

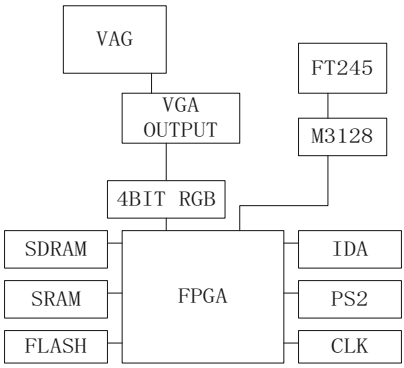

Fig. 1. High performance processing module of FPGA chip

Table 1. Main Characteristic Parameters of IDE Storage Controller

Project	Parameter
Voltage	2.0–3.6 V
Current	≤109 mA
Maximum main frequency	72 MHz
FLASH capacity	512 K
SRAM capacity	64 KB
I/O quantity	112
Number of SPI interfaces	3
Number of 12C interfaces	2
Number of CAN interfaces	1
Number of UART interfaces	5
ADC quantity	3 × 21
ADC accuracy	12 bit
Number of timers	12x16 bit/2x32 bit
Floating point unit	Single precision

variables, At this time, the internal structure of the IDA storage controller is shown in Fig. 2.

It can be seen from Fig. 2 that the IDA storage controller designed in this paper has a high precision and can quickly collect clock signals to achieve physical addressing. The storage controller always uses ATA/ATAPI-6 protocol and can adjust addressing parameters in real time. The IDE storage controller has 40 pins, and the connection relationship of different pins has certain differences. When the system is running, it can quickly process relevant instructions and complete reading through the internal storage center. The storage parameters of the storage controller are shown in Table 2.

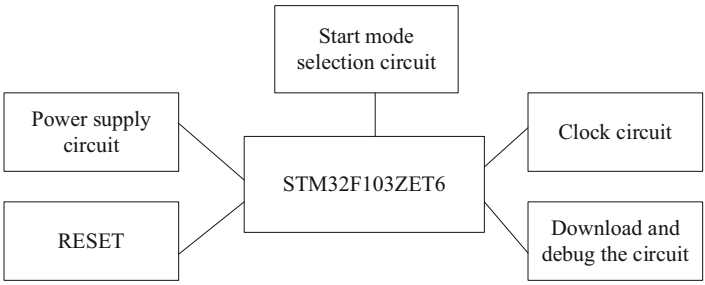

Fig. 2. Internal Structure of IDA Storage Controller

Table 2. Registering parameters of storage controller

CS0	CS1	CS2	CS3	CS4	CS5	CS6
N	A	N	N	A	A	N
A	N	A	A	A	N	A
A	N	N	N	N	N	N
A	N	A	A	N	N	A
A	N	N	N	A	N	N
A	N	A	N	A	N	N
A	N	A	N	N	N	N
A	N	N	A	A	N	N
A	N	N	A	N	N	N
N	N	X	X	X	N	N

2.3 PIO Transmitter

In order to solve this problem, the system designed in this paper selects the running sequence of PIO transmitter processing system to ensure that the data transmission line matches the actual running state of the system. The PIO transmitter consumes less overall transmission resources and can effectively improve the transmission speed of the transmitter. The command transmission conversion conditions of the transmitter are shown in Table 3.

It can be seen from Table 3 that using the above command conversion conditions can quickly execute the commands issued by the system, thus optimizing the existing system operation status and improving the system operation reliability.

Table 3. Command transmission conversion conditions of PIO transmitter

Transition condition	Description
1	Host enables PIO transmission
2	Activate the disk, write PIO transmission commands and parameters
3	Disk device fully turned on
4	BSY = 0, DRQ = 0
5	BSY = 1
6	BSY = 0, DRQ = 1
7	Interrupt enable closed, data register read completed
8	Data register read incomplete
9	Data register reading completed, execute all commands

3 Software Design

3.1 Construction of Distance Teaching System Architecture of English Translation Course

According to the requirements of English translation course distance learning, this paper constructs a new distance learning architecture. This teaching architecture is based on C S, which effectively carries out concurrency control, so as to improve the integrity and reliability of data. In addition, the system designed in this paper optimizes the existing service browser, uses Web integration technology to achieve data processing, and combines the above foundations, the distance learning system architecture of English translation course constructed in this paper is shown in Fig. 3.

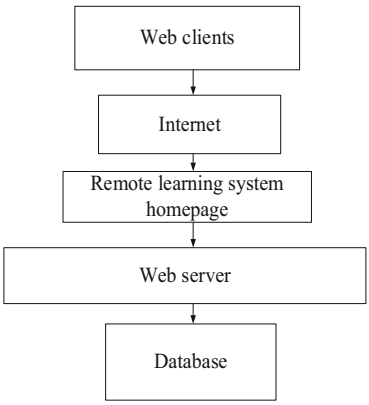

Fig. 3. Distance teaching system architecture of English translation course

3.2 Generating English Corpus Translation Engine Based on Unsupervised Learning

In order to fully tap the semantic information of English translation courses and improve the comprehensive translation performance of the system, the system designed in this paper uses unsupervised learning technology to generate an English corpus translation engine according to the semantic information characteristics of English translation. First, unsupervised learning target selection function can be generated according to the characteristics of English corresponding corpus F, as shown in (1).

$$F = \|M_T \cdot R\| \tag{1}$$

In formula (1), M_T represents the Frobenius norm, R represent processing scalar. Different projection data points have different attributes, so simplified projection data points can be generated according to the discriminant feature relationship $\min B$, , as shown in (2).

$$\min B = F - \gamma R \tag{2}$$

In formula (3), γ represent the corpus coefficient. In fact, there are different discriminant relationships between different corpora. This paper conducts regularization processing to ensure that each corpus cluster is in an independent state. At this time, the generated corpus translation engine representation Q_{ij} as shown in (3).

$$Q_{ij} = \left(\frac{\min B}{f \cdot \lfloor F \rfloor} \right) \tag{3}$$

In formula (3), f representing the weight of sentence vector, the above English corpus translation engine needs to perform clustering processing in a unified way in the process of use. Text clustering technology is used to ignore sentences outside the threshold to achieve effective translation training, so as to meet the system's translation requirements and improve the user's sense of experience.

4 System Test

In order to verify the operation performance of the designed English translation course distance teaching information system based on unsupervised learning, this paper builds a system test platform, configures a basic test environment, runs the English translation course distance teaching information system based on unsupervised learning designed in this paper, and conducts system testing, as follows.

4.1 Test Preparation

In combination with the test requirements of the English translation course distance teaching information system, this paper configures the experimental environment. First, select IBM 3850 CPU E7550, 2.0 GHZ, DDR3 32 GB servers, and set the network bandwidth. The test parameters set at this time are shown in Table 4.

It can be seen from Table 4 that the above test environment meets the test requirements of the English translation course distance teaching information system, and subsequent system tests can be carried out.

Table 4. Test Environment Parameters

Device	Parameters	Illustrate
Application Server	Processor	IntelP87002, 53 Ghz
	Hard disk	2 TB
	Memory	8 GB
	Network card	100\1000M
	Operating system	Windows Server
	Processor	Intel P87002, 53 Ghz
	Hard disk	2 TB
Client computer	Hard disk	1 TB
	Memory	4 GB
	Network card	100\1000 M
	Operating system	Windows 10

4.2 Test Results and Discussion

According to the above test preparation, the English translation course distance teaching information system can be tested, that is, under the preset test environment, the English translation course distance teaching information system designed in this paper based on unsupervised learning can be run, and the test results obtained at this time are shown in Table 5.

It can be seen from Table 5 that under the preset test environment, each functional module of the distance teaching information system of English translation courses based on unsupervised learning designed in this paper runs well, and all pass the system test, which proves that the distance teaching information system of English translation courses based on unsupervised learning has good performance, reliability and certain application value.

Table 5. System Test Results

Test items	Testing process	Test result
Translation courses set for on-demand settings, verifying whether the on-demand function is normal	Publish complete tasks	Test passed
Online remote operation function	Display comment information list	Test passed
Post comments function	Enter the correct password and prompt the user to log in correctly	Test passed
Log in	Registered user information cannot have duplicate names	Test passed
User Registration	Testing process	Test passed

5 Conclusion

In the context of informatization, China's educational technology is making rapid progress, and various colleges and universities are gradually replacing the original teaching mode with online and offline hybrid teaching mode. Various distance learning systems have also emerged as the times require. The distance learning system can break the time and space restrictions and improve the learning effect of students. However, most of the current distance learning systems have poor performance and often run stuck. Therefore, this paper designs a new distance learning information system for English translation courses based on unsupervised learning. The system test results show that the designed distance teaching information system for English translation classroom has good performance, reliability and certain application value, and has made certain contributions to promoting the development of online teaching in China.

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