



Web Service Based Oral English Teaching Assistant Training System

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Abstract. In order to solve the problem of the low fault tolerance rate of the teaching and training system and improve the auxiliary teaching ability of oral English education, an auxiliary training system for oral English teaching based on Web services is designed. Through the design of hybrid training architecture, user management module and online examination module, the hardware design of application structure of auxiliary training system is realized. According to the generation conditions of Web services that can replace adapters, the sensitive call function is defined, and the fuzzy training engine is combined to train the auxiliary teaching behavior, and the relevant application components are combined to complete the design of the auxiliary teaching training system. The experimental results show that the compatibility degree of the test program under the function of Web services is more than 90%, which can meet the practical application requirements.

Keywords: Web services · Teaching oral English · Auxiliary training · Alternative adapter · Training engine

1 Introduction

A Web service is a platform-independent, low-coupling, self-contained, programmatically based application for developing distributed interactions that can be described, published, discovered, coordinated, and configured using open XML (a subset of the Standard General Markup Language) standards. Using Web services technology enables different applications running on different machines to exchange data or integrate with each other without the need for additional, specialized third-party software or hardware. According to Web services, data can be exchanged regardless of the language, platform, or internal protocol used by the application [1]. Web Service is a self describing and self-contained available network module that can perform specific business functions. Web services are also easy to deploy, because they are based on some common industry standards and some existing technologies, such as subset XML and HTTP under the standard general markup language. Web services reduce the cost of application interfaces. Web Service provides a common mechanism for the integration of business processes between the entire enterprise and even multiple organizations. The Web Service platform requires a set of protocols to create distributed applications. Any platform has its data

representation method and type system. To achieve interoperability, the Web Service platform must provide a set of standard type systems for communicating different types of systems in different platforms, programming languages, and component models.

Tian et al. [2] interactive semantic recognition analysis based on deep learning algorithm, feature fusion of translation vocabulary and sentence output based on deep learning, automatic. Zheng et al. [3] interactive output of translation data under deep learning, and global optimization design of system software layer parameters around deep learning algorithm. However, the above systems cannot realize the mutual call and data transmission between different platforms and languages, and only by using specific middleware or transit server can the data interaction channel be established between the client and the server, so the application has limitations.

Aiming at the above problems, a new type of oral English teaching assistant training system is designed based on Web service theory. On the basis of designing the hardware of the system, the Web service is introduced to replace the adapter, reset the fuzzy training engine, and realize the smooth application of the oral English teaching auxiliary training system based on Web services. The practical value of the system is verified by case analysis, which provides students with flexible and convenient learning methods, and is no longer limited to traditional classrooms or learning centers, and provides convenience for distance education and independent learning, which is an innovative and cutting-edge application in the field of educational technology.

2 Application Structure Design of Oral English Teaching Assistant Training System

The hardware application structure of the oral English teaching assistant training system consists of a hybrid training architecture, a user management module, and an online examination module. This chapter focuses on its specific design methods.

2.1 Hybrid Training Architecture

For the oral English teaching auxiliary training system, its hybrid training architecture includes B/S model and C/S model. Under the effect of the Client architecture, it can combine the SOP auxiliary training host and the Web server terminal to schedule multiple client objects, so as to improve the specific implementation process of auxiliary training education while realizing oral English teaching.

The C/S model is directly connected with the client object and responsible for collecting students' learning habits. Its network traffic is less than that of the B/S model. Generally speaking, for the same task, the C/S model has a faster running speed; Because the C/S mode installs a complete set of application programs on the client computer, it can have a strong human-computer interaction function. The computer examination system has a strong control over the examination, which makes the use of candidates very convenient.

As the subordinate load structure of the C/S model, the B/S model can provide an access environment for teaching recipient objects and student terminals [4]. The client computer uses a general Web browser, so its designed exam interface is very friendly.

The exam terminal computer can conveniently log in to the network exam with the help of a common browser; The functions of B/S mode are all completed by the Web server. In this case, the development and maintenance work only needs to be carried out around the server, and the maintenance work is simple and easy.

Therefore, the development and design of the real network examination system for different examination tasks to be realized and different examinee objects to be served can comprehensively absorb and utilize the respective advantages of C/S mode and B/S mode, and reasonably match the mixed mode, thus realizing various functions required in the network examination system.

The complete hybrid training architecture layout model is shown in Fig. 1.

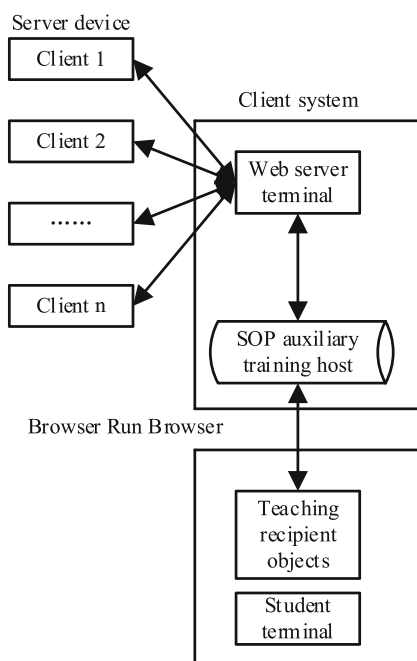


Fig. 1. Hybrid training architecture layout model

As can be seen from Fig. 1, the model includes server device, client system, and browser running browser. Multiple client objects can be scheduled through the Web server terminal, and SOP assists the training host to transfer customer requirements to the teaching recipient object, thus realizing various functions required in the network test system.

In addition, the C/S mode has installed a complete set of applications in the client computer, so it can achieve a more powerful human-computer interaction function. For customers, one of its greatest advantages is that it separates the program part from the database part. Even if the database structure is modified, it will not have a dramatic impact on the operation of the program. Conversely, even if the program is greatly modified, it will not affect the original structure of the data.

The advantages of B/S application lie in:

- (1) Simplify the connection behavior of server components in data and data management layer;
- (2) It reduces the requirements of teaching client object in hardware connection;
- (3) Through centralized management of business logic, the maintainability of the system is improved. When the business logic changes, it only needs to be modified in the business logic layer, and the user layer will not be affected;
- (4) The scalability of B/S mode is very strong and has strong maintainability.

2.2 User Management Module

The good operation and maintenance of the system requires all types of users to operate legally within their respective permissions. Therefore, the management and permission assignment of system users is a prerequisite for ensuring the system operation. According to the requirements of system operation, three groups of users are set in this system, namely administrator user, teacher user and student user. Each group of users is open to different groups of people, with different permissions assigned, and administrator users have the highest permissions.

According to the principle that different user types target different people and different user types assign different permissions, the three groups of users in the system are set as follows:

The administrator user can manage student user information, add/delete student information in batches according to teaching needs, or add, delete or modify the information of a student, set or limit the subjects that students can participate in learning and training, arrange exam dates according to teaching plans, coordinate and arrange exam subject settings, and schedule students related to exam subjects to participate in exams, Set the student's initial password, whether to allow students to view their exam scores, whether to allow students to view their exam papers, whether to allow students to view their exam paper evaluation reports, etc.

Teacher users can modify and improve their personal information. It is recommended that teacher users often change their login passwords to prevent teaching accidents caused by the leakage of teacher user passwords.

Student users have the lowest authority. In short, they log in to the system and participate in the exam.

The specific connection structure of the user management module is shown in Fig. 2.

As can be seen from Fig. 2, the user management module gives permissions to different applications for different user types, and teacher users manage login behaviors and student users, thus providing students with a lot of teaching convenience.

The user management function allows you to add or delete users in the examination system, modify user basic information, and assign user permissions. After the system administrator successfully logs in to the management system through legal means, he/she can implement the management work of creating exam administrators and examinee users, importing/exporting administrator and examinee information in batches according to work needs; After the system administrator successfully logs in legally, he/she can carry out management work [5] such as establishing examinee users, importing and exporting examinee lists in batches according to the obtained permissions. The

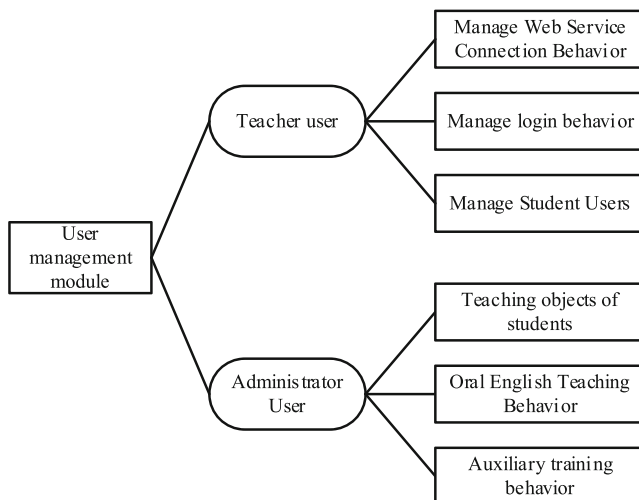


Fig. 2. Connection structure of user management module

system administrator has the highest authority, which can dynamically allocate or terminate the administrator's management authority over the question bank, examination papers, and examinations according to the progress of teaching and examination work, and can dynamically allocate or terminate the authority of examiners to participate in examinations and view examination results.

During the operation of the computer, it is inevitable to encounter many emergencies, such as computer disconnection, crash, automatic restart, etc., which will cause the ongoing examination to be interrupted and damaged abnormally, not only affecting the continuation of the normal examination, but also affecting the examinee's performance to a certain extent. If the terminal computer can continue to answer questions on the basis of the answers before disconnection after it resumes work, it will minimize the impact on the examination work and the examinees' scores. Therefore, whether it can continue to take the examination after disconnection has become a key problem that must be solved by the online examination system.

2.3 Online Examination Module

In the auxiliary training system of oral English teaching, the implementation of the online examination module needs to take into account three aspects: the examination user's test paper formation, the prevention of identical test papers, and the examinee's score query. The main task of this module is to organize and complete the examination process. It mainly includes the following contents:

- (1) Open examination. The examination system is open according to the pre-set starting date and time of the oral English subject, and relevant candidates are allowed to log in to the examination system through a legal login mode to participate in the online examination of the designated subject.

- (2) During the oral teaching test, the examinee can normally answer the test questions, and can check their answers at any time during the test as required.
- (3) After the examination starts, the examination system will display the time that has been carried out and the remaining time of the examination to the students in real time.
- (4) When the end time of the exam is not up, but the examinee has completed all his answers, he can submit the answers by himself. The system can normally retrieve the answers and terminate his exam. When the end time of the exam is up and the student fails to complete the answers, the system will automatically retrieve the examinee's completed answers and terminate the exam.

The Fig. 3 describes the specific implementation capabilities of the online exam module functions.

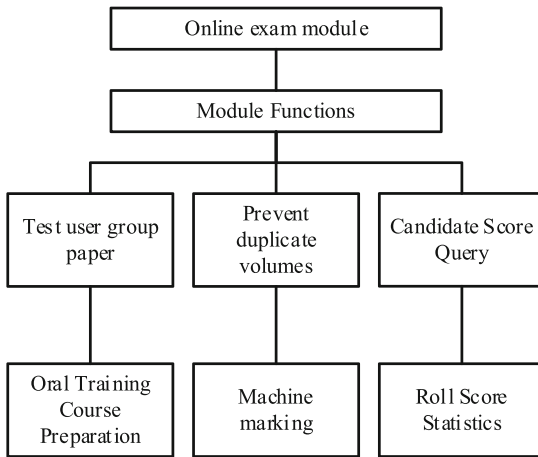


Fig. 3. Detailed function diagram of online examination module

According to Fig. 3, the online examination module has many functions, which can test the oral training course user group papers, has the machine marking ability, avoid drawing the same content of the paper, has the automatic scoring function, and provides the candidate score query port after the test.

In the exam preparation stage, the teacher user assigns each test paper generation parameter to the system for test paper generation according to the needs of oral English teaching tasks and test investigation requirements. The parameters that can be set by the teacher user include: exam date, exam start time, exam duration, source of question bank, difficulty of questions, type of questions, etc. After the teacher user submits the request for paper formation, The examination paper is generated by the examination system (if the automatic test paper generation operation is selected, there is no need to give so many parameters, only a small number of necessary parameters such as examination subjects, examination time, etc.), and the system will randomly form a specified number of mutually independent test papers.

In order to avoid the situation that two (or more) examinees can't take the exam normally because they have taken the exam paper with identical content, the system is designed to bind the exam paper with the IP address of the examination terminal computer where the examinee is [6] when the examinee takes the exam paper. After the exam starts, the examinee will draw a test paper. When the system receives a request for drawing a test paper, it will draw a test paper for the examinee. However, before assigning the test paper to the students, the system should first confirm the test paper to see whether there are examinees already using it. If the system detects that the test paper has been used by examinees, the system will give up the test paper and start drawing again. Only when the examination papers that are not used by other examinees are drawn can they be assigned to the examinees to take the examination.

After the examination, if the administrator has assigned the right, the examinee can view the examination answers of all subjects and courses, and can also access the standard answers of relevant examination papers for analysis and improvement. If assigned by the administrator, the examinee can query the exam scores of all subjects and courses; If assigned by the administrator, the examinee can query the test score ranking table of the relevant oral English education. In addition, with the permission of the administrator, the examinee can view the analysis report of the test paper of the individual English teaching auxiliary training courses.

3 Auxiliary Teaching Behavior Training

On the basis of the hardware application structure at all levels, a Web service can replace the adapter, and then the sensitive calling function is combined to reset the fuzzy training engine, so as to realize the smooth application of the Web service based oral English teaching assistant training system.

3.1 2Web Service Can Replace Adapter Generation

Web services generated based on the hybrid training architecture, user management module, and online examination module can replace the adapter closed-loop, and can achieve on-demand scheduling of oral English teaching resources [7]. The adjustment of Web adaptation services at all levels follows the following principles:

- (1) Receive the teaching resource message sent by the sender;
- (2) Store the receiver's oral English teaching and training messages;
- (3) According to the mapping relationship between teaching and training messages and auxiliary parameters, the transformation or synthesis of Web services and adaptive parameters is carried out;
- (4) Send the required Web service message to the receiver after the stored oral English teaching training message and parameters are converted or synthesized;
- (5) Filter redundant messages or parameters.

set up α Real time training parameters representing spoken English teaching information, A represents the auxiliary training characteristics of teaching information parameters. The above physical quantities can be used together to schedule the authority of

the Web service S_α Expressed as:

$$S_\alpha = \frac{\dot{A}}{\bar{a} \cdot |\Delta s|} \cdot \alpha \quad (1)$$

\bar{a} represents the transmission direction vector of spoken English teaching information in the auxiliary training system, Δs refers to the unit accumulation of spoken English teaching information.

\Re represents a sample set of spoken English teaching data, d_1, d_2, \dots, d_n express n . The values of the unequal teaching data parameters meet the expression shown in formula (2).

$$d_1, d_2, \dots, d_n \in \Re \quad (2)$$

In the adaptation strategy design phase, adaptation analysis can be carried out according to the substitutability principle of Web services to determine whether services can be adapted, and adaptation strategies can be designed to determine whether there are corresponding receiving or sending actions in the sending or receiving actions to determine the adaptability. However, in the case of redundant receiving action, the redundant receiving action may be followed by sending action, but since the redundant receiving action cannot be performed, any subsequent action cannot be performed.

For any Web service alternative adapter structure that has been successfully developed and can be successfully applied in practice, one of the most important research contents is the automatic generation of test papers - test paper generation operation. According to different teaching tasks and inspection purposes, the requirements for test papers are also different, and on the basis of fairness and justice, the randomness of test paper selection is required the scientific organization of the test questions and the rationality of the test paper arrangement make the test paper generation a difficult problem in the development of the computer test system [8]. When the computer test system runs in the network environment, this puts forward higher requirements, not only to continue to ensure the richness of the content and comprehensiveness of the knowledge points of the test papers obtained after the test paper generation operation, but also to complete the test paper generation operation at an extremely fast speed, and to generate the test papers in time for the candidates to answer.

Set up χ represents an alternative parameter, δ real time input vector representing spoken English teaching data, β represents the real-time connection coefficient of Web service behavior. With the support of the above physical quantities, formula (1) and formula (2) can express the closed loop definition formula of Web service alternative adapter as:

$$D = |\chi - 1| \cdot \frac{\sum_{\delta=1}^{+\infty} \beta S_\alpha}{(d_1^2 + d_2^2 + \dots + d_n^2)} \quad (3)$$

In the process of alternative adaptation analysis of Web services, alternative adaptation contracts will receive and cache the actions of all services, and generate new changes. Therefore, the generation process of alternative adaptation contract is a generation process of STS model, and the final result is an STS model. Finally, the feasibility of alternative adapters is verified through STS synchronous interaction.

3.2 Sensitive Calling Function

The function of the sensitive call function is that every time the student has finished the first online answer of the computer test system, the server side of the test system will detail the student Liu Yiyu's mastery of all knowledge of the course. The main index items recorded by the system are: exam subjects, exam chapters, types of questions, students' answers and exam time, etc. The system automatically summarizes these recorded data into a training set, and in each subsequent test, it will continue to record more data to get more training sets. After multiple test results feedback, it can control the prediction performance of sensitive calling functions under the combination of Web services that can replace the adapter closed-loop.

Regulations g_1, g_2, \dots, g_n express n . There are two unequal and non-zero oral English teaching data sensitivity training vectors, whose definition formula is as follows:

$$\begin{cases} g_1 = \gamma_1 \sqrt{\frac{\bar{h}}{K_1}} \\ g_2 = \gamma_2 \sqrt{\frac{\bar{h}}{K_2}} \\ \vdots \\ g_n = \gamma_n \sqrt{\frac{\bar{h}}{K_n}} \end{cases} \quad (4)$$

Among them, $\gamma_1, \gamma_2, \dots, \gamma_n$ respectively n defining parameters of teaching and training items, \bar{h} indicates that the Web service can replace the teaching data aided training feature in the adapter closed-loop, K_1, K_2, \dots, K_n respectively represent the auxiliary teaching service vectors matching the parameters defined in the training item.

The input of the sensitive function call path generation technology is the interactive binary component and its corresponding data stream keywords, and the output is the sensitive function call path [9] that references the data stream keywords in the interactive binary component and may lead to security vulnerabilities. The sensitive function call path is the target of the binary code dynamic instrumentation technology, when it is applied to the interactive binary component of the device Web service. The fuzzy test method in this chapter builds an efficient anomaly monitoring mechanism for embedded Web services by monitoring the sensitive function call path.

Simultaneous formula (3) and formula (4) can define the call path of the auxiliary training object of spoken English teaching as:

$$\varphi = \left(1/\phi\right)^2 \cdot \left| \frac{D}{g_1 \times g_2 \times \dots \times g_n} \right|_{\varepsilon^2}^{\frac{1}{\varepsilon^2}} \quad (5)$$

ϕ represents the spoken English teaching data sample, ε represents the transmission parameters of data flow keywords under Web service conditions.

About Parameters ϕ , Parameters ε , the value condition shown in the constant formula (6) is true.

$$\begin{cases} \phi \in (-\infty, 0) \cup (0, +\infty) \\ \varepsilon \in (-\infty, +\infty) \\ \phi \neq \varepsilon \end{cases} \quad (6)$$

The binary code dynamic instrumentation technology is a mechanism to obtain the real-time execution status of the oral English teaching assistant training program. The traditional binary code dynamic instrumentation technology starts from the entry function of the target program. For interactive binary components in embedded device Web services, other functions in front of the Web business functions that actually provide functional support to the front end Web management interface are not the focus of program instrumentation.

Use formula (5) to solve the sensitive calling function. The solution result is shown in formula (7).

$$L = \frac{\lambda\sqrt{f\varphi}}{\sum_{\substack{z=1 \\ x=1}} \hat{j}^2 - (C_z + C_x)} \quad (7)$$

where, λ represents the binary coding parameters of teaching data based on Web services, f dynamic pile insertion vector representing teaching data, z and x represents two unequal training program definition parameters, C_z indicates parameter based z call coefficient of teaching data samples, C_x indicates parameter based x call coefficient of teaching data samples, \hat{j} represent that the Web service can replace the adapter's call feature for oral English teaching assistant training behavior.

The main purpose of generating the sensitive function call path is to find the introduction points of these keywords in the interactive binary components of the back-end Web service through the data flow keywords in the front and back ends of the Web service, and extract the sensitive function call path that takes these introduction points as the starting point and may lead to security vulnerabilities. Avoid the pointless instrumentation nodes when traditional binary code dynamic instrumentation technology is applied to embedded device Web services.

3.3 Fuzzy Training Engine

When designing the oral English teaching assistant training system, in order to avoid starting from the entry function of the interactive binary component and reduce the number of stub function paths, it is also necessary to first locate the introduction point of data stream keywords in the interactive binary component [10] according to the generation of sensitive function call paths. For the establishment of a fuzzy training engine, the Web service system needs to adjust the location of the introduction point according to the category of the parameter class data flow keywords: The direct reference type parameter class data flow keywords can directly find the introduction point in the interactive binary component; The introduction point of the cross process reference type parameter data stream keyword that conducts information exchange between different processes through nvrAm depends on the identification of the access function of nvrAm. The functions to be concerned about cross process reference are shown in Table 1.

Through the fuzzy training engine analysis technology and the sensitive function call path generation technology, the embedded device Web service association information

Table 1. Establishment conditions of fuzzy training engine

Identify Point Objects	Engine Functions
Nvram storage	nvram.safe.set
Path mapping	path.bufget
Para input	para.setenv
Keyword function	Keyword.paths.api
Ghidra encoding	ghidra.path
P-code call	P-code.check.call
API Tuning	path.caller.chain
Bin service behavior	bin.keywd.doShell

has been obtained. The specific definition is as follows:

$$X = \left(\frac{1}{V'} \times |\Delta\kappa| \right)^2 \quad (8)$$

Among them, V' fuzzy definition vector representing spoken English teaching data, $\Delta\kappa$ represents the unit cumulative amount of Web service invocation code.

The data processing part of the auxiliary training system for oral English teaching for testing mainly includes two stages: Test case construction and test case compilation. In theory, test cases need to use data stream keywords as key data to construct test cases, but in actual testing, unless the sensitive calling function mentions the Web service function that needs to be “activated”. The fuzzy test engine will directly use the message data captured in the dynamic simulation phase to participate in the fuzzy test, omitting the construction process of test cases.

The solution of the test case object of the oral English teaching assistant training system meets the following expression:

$$\dot{B} = \frac{|\dot{I}^2 - \eta\tilde{p}|}{\sum \vec{b}(m_1 + m_2 + \dots + m_n)} \quad (9)$$

\dot{I} indicates the scheduling characteristics of the teaching data engine, η indicates the transmission efficiency of teaching data in the auxiliary training system, \tilde{p} represents the scheduling parameters of teaching data in the training engine, \vec{b} represents the teaching data sample import vector, m_1, m_2, \dots, m_n express n , the binary marking parameters of teaching data objects that meet the fuzzy scheduling principle.

Simultaneous formula (8) and formula (9) can express the definition conditions of fuzzy training engine as:

$$U = \sqrt{\frac{1}{\dot{y} \times |\Delta T|}} \cdot |X \cdot \dot{B}|^2 \quad (10)$$

where, ΔT indicates the unit scheduling duration of spoken English teaching training samples in the fuzzy training engine, \dot{y} represents the fuzzy training processing characteristics of teaching data.

The time for the system to organize students to participate in the auxiliary teaching training can be very flexible, and can be provided to students for examination at any time within the time period specified by the school. In addition, the system can immediately grade and mark the objective questions at the end of the exam and display them to the examinees in real time. The examinees generally agree with the sense of fairness and justice that the computer system automatically produces and marks papers. In a word, this system is based on high-quality test question resources and scientific method of generating test papers, and based on students' mastery of curriculum knowledge points. Through intelligent system operation and practice, it greatly reduces the workload of teachers in exam organization, and also greatly promotes students' enthusiasm for independent learning. Finally, the quality of oral English teaching and the quality of students have been comprehensively improved.

4 Example Analysis

To highlight the auxiliary training system for oral English teaching based on Web servicesSpeech recognition architecture system. System based on deep learning The following contrast experiment is designed for its practical value.

4.1 Experimental Process

The compatibility degree of the test program can be used to describe the level of fault tolerance of the teaching and training system. Without considering other interference conditions, the stronger the compatibility ability of the Windows training host for the test program, the higher the level of fault tolerance of the teaching and training system, and the stronger the auxiliary teaching ability for oral English education.

Use the equipment components shown in Table 2 to build an online training environment for Windows teaching network.

Table 2. Experimental Equipment

Item	Equipment components	Name and model
1	Online teaching host	Windows host
2	Data processor	i5-13490F
3	Data storage device	SQL Database
4	Client device	LM393 DIP8
5	Client server	STM32F407ZGT6
6	Online teaching terminal	DE2-115 Cyclone IV
7	Speech signal recognition element	MP802XILINX

First, input the executive program of the Web service based oral English teaching assistant training system in the Windows host, record the actual compatibility of the examination program under the effect of the system, and the results are the experimental group values. Then, in the Windows host, enterSpeech recognition architecture system. The actual compatibility of the examination procedures under the effect of the system is recorded, and the results are compared with (1) group of values; Second, enter in the Windows host system based on deep learning, record the actual compatibility of the examination procedures under the effect of the system, and the results are the values of the control (2) groups. Finally, the obtained variable data are counted and the experimental results are summarized.

4.2 Data Processing

In order to verify the practical performance of the designed system, the compatibility degree is taken as the experimental index without considering other interference conditions, and the compatibility ability of the three systems at different times is compared by accessing single object and multi-object in the examination program. The higher the value, the higher the fault tolerance level of the system. Under the action of different training systems, the specific experimental values of the compatibility of the test program are shown in Fig. 4 and Fig. 5.

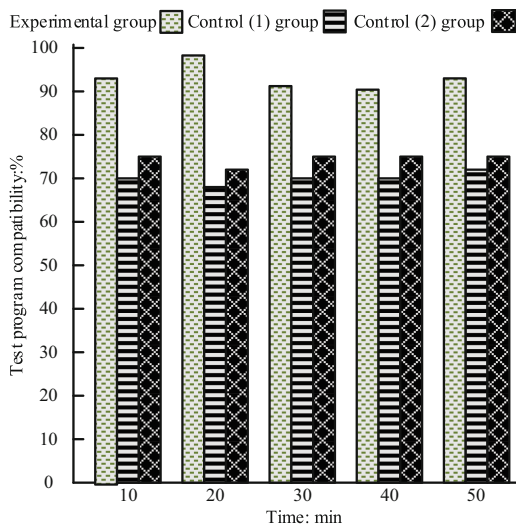


Fig. 4. Test program compatibility (single object access)

It can be seen from the analysis of Figs. 4 and 5 that the test program compatibility value of the experimental group is significantly different in the case of single object access and multi object access, and its average value is more than 90%. The test program compatibility of the control (1) group is relatively high in the case of multi object access, but its maximum value can only reach 68.2%, which is lower than that of the experimental

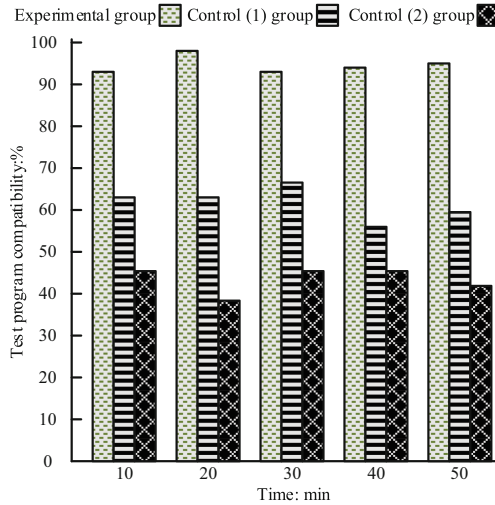


Fig. 5. Test program compatibility (multi object access)

group. The test program compatibility of the control (2) group is relatively high in the case of single object access, but its maximum value is only 76.2%, which is still lower than the value of the experimental group.

4.3 Conclusion

To sum up, the conclusion of this experiment is:

- (1) Based on Speech recognition architecture system, its application is not enough to solve the problem of low fault tolerance of the teaching and training system, so it does not meet the practical application needs of improving the ability of oral English education assisted teaching.
- (2) The application of Web service based oral English teaching assistant training system can improve the compatibility of the examination program, better solve the problem of low fault tolerance of the teaching and training system, and meet the practical application needs of improving oral English teaching assistant teaching ability.

5 Conclusion

In order to improve the auxiliary teaching ability of oral English education, an auxiliary training system of oral English teaching based on Web services is designed. Based on the advantages of C/S mode and B/S mode, the mixed training architecture is built reasonably, and the hardware components of the system are built together with user management module and online examination module. The Web service can replace the adapter, introduce the sensitive call function and reset the fuzzy training engine, so that the oral English teaching auxiliary training system can be flexibly applied. The design can be competent to complete the most important student ability test in the teaching process, complete the usual practice test and mid-term and final examination, and efficiently and quickly improve the quality of students' learning and teachers' teaching effect.

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2. The Research Science Institute of colleges and universities in Anhui Province “Research on the validity of translation of Tourism publicity discourse based on genre analysis” (Project No. 2022AH052428).

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