Analysis of Intelligent Computer-aided Preschool Education Effect Evaluation System

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Abstract. This paper builds the preschool education campus network application system architecture based on the educational function model of the information school, proposes a preschool education campus network application effect evaluation model, and designs the evaluation of the preschool education campus network application effect on the basis of this model system. It explains the theoretical core of preschool education modernization. Starting from the analysis of the theoretical elements of preschool education modernization, the research reveals the three pairs of basic elements of preschool education modernization, namely "region", modernity and preschool education modernity, preschool education modernization and education modernization index system. On the basis of speculative research, an in-depth theoretical analysis of the modernization of pre-school education is carried out from three aspects: material dimension, system dimension and value dimension, and answers the prerequisite question of what kind of pre-school education modernization should be realized. Starting from the model adaptation in the preschool education effect evaluation analysis, a selective adaptive strategy is proposed to select the relative standard data in the pronunciation data of the speaker to adapt the acoustic model used in the preschool education pronunciation evaluation system, and the influence of the amount of selected data and the granularity of data selection on the adaptive effect is analyzed. The piecewise linear regression model is used to optimize the general mapping model, and three piecewise linear regression model algorithms based on confidence interval piecewise linear regression, GMM probability weighted linear regression and SVM classification piecewise linear regression are introduced in detail. At the same time, the experiment compared the performance of the three models.

Keywords: Intelligent computer; preschool education; effect evaluation; adaptive.
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1 INTRODUCTION

The construction of preschool education campus network is an important part of the construction of education information, and its application level directly reflects the level of school information technology and curriculum integration. To promote the construction of educational information system and strengthen the integration of information technology and courses, we must strengthen the construction of preschool education campus network and improve the application effect of preschool education campus network; we must standardize the construction of campus network and insist on studying the application effect of campus network. Since the evaluation of campus network application effects is a relatively complicated task, and most research institutions or organizations work independently and draft evaluation standards and content on their own, there are problems in the evaluation of campus network application effects. In response to these problems, relevant experts pointed out that it is urgent to study the relatively standardized, scientific, and comprehensive evaluation methods of campus network application effects that emphasize application. The evaluation of the application effect of preschool education campus network has become the current strengthening of campus network application and improvement of education. The top priority is of the information level.

How can the construction of preschool education campus network be more standardized, more efficient in application, and more suitable for modern education and teaching models, teaching strategies and teaching methods? Which construction plan is the best and most practical? What model will be used to build the preschool education campus network? These problems not only trouble the builders of the preschool education campus network, but also puzzle the users. Professor Balat and Gülden proposed the educational function model of the information school, also known as the school intranet function space model [1]. Da and Balat proposed this model to provide a theoretical basis for in-depth study of the application of preschool education campus network, the 7 aspects: teaching, management, information resources, extracurricular education, family education [2], each aspect of the teaching function Completed by a subsystem. Among them, teaching subsystem, management subsystem and resource subsystem constitute general school functions; while extracurricular education, family education, and social education systems can be regarded as extensions of school functions; communication system serves as a support platform for other subsystems, Arnold and Andreas proposed to combine them into a whole [3]. Regarding the relationship between preschool education and modernity research, Modernity is a fundamental problem that cannot be avoided in educational research [4, 5]." Specifically, Kataoka can "see" pre-school education and pre-school education based on modernity. For example, "On the basis of inter-subjectivity, education is the education of "people", and those who focus on inter-subjectivity education and training are the real people and the subjects in social relations [6].", Modernity is an important and not negligible part of preschool education. Under normal circumstances, we can deduce the connotation and characteristics of educational modernity through modernity. Aboud proposed that educational modernity as an important factor in the modernity system is the reflection of the general characteristics of modernity in education and its special performance. This understanding based on educational modernity as a subordinate concept of modernity has its own Reasonable [7], but what could not be ignored is that Keklicek believes that the modernity of preschool education should pay attention to the generation characteristics and behavioral performance of its educational field [8]. Intelligent computer-assisted teaching is a highly comprehensive system engineering [9, 10]. It is based on educational science, psychological science, and cognitive science, and uses artificial intelligence, multimedia technology, data visualization technology and many other computers. Relevant technologies, by studying the characteristics and processes of human learning thinking, seek learning cognitive models; by designing an intelligent computer-assisted teaching system, helping teachers to teach in accordance with their aptitude, provide targeted guidance, and enable students to follow different

cognitive abilities carry out individualized adaptive learning. The intelligent computer-assisted teaching system can concentrate the teaching experience and wisdom of each teacher [11,12]; it can allow students to freely and actively use the system to acquire knowledge according to their personal circumstances, improve teaching efficiency, and make teaching activities truly active. The best path teaching strategy and teaching rules are stored in the teaching strategy library. There are many methods and strategies for classroom teaching [13], but there are several teaching strategies most commonly used by teachers. The main ones are: direct correction of students' mistakes, guidance, teaching methods, and Socratic methods (that is, systematically asking students, encourage students to reason, and then correct the wrong method) etc. Different strategies are designed into a framework that can be filled and reorganized, represented by simple and clear icons [14], allowing teachers to combine different materials, teaching units and different teaching strategies according to their needs, so as to be flexible cope with various teaching situations.

In view of this, this article starts from the actual effect of preschool education application in my country, proposes an evaluation model for preschool education application effect, researches and designs an evaluation system for preschool education application effect, in order to evaluate the application effect of preschool education, and explore the construction and construction of preschool education. Based on the analysis and study of the actual situation of pre-school education and teaching, this paper hopes to try to design and develop an intelligent computer-assisted teaching system suitable for pre-school education and teaching in accordance with the requirements of the current classroom teaching development. Through this auxiliary teaching system, students can make full use of their spare time after learning in class. Through online teaching and a large number of practical exercises, students can gradually understand and master knowledge and skills, and feedback their learning records to teachers. It makes up for the shortcomings of poor face-to-face instruction, and allows teachers to grasp the learning situation of students in class. Finally, through the study of this course, students will reach the level of preschool education.

2 INTELLIGENT COMPUTER-AIDED PRESCHOOL EDUCATION EVALUATION SUBSYSTEM

2.1 Intelligent Computer-assisted Teaching System Architecture

The network online intelligent auxiliary teaching subsystem can be used as a separate subsystem to provide teachers with intelligent auxiliary teaching, and can also be used as a subject library in the online intelligent learning system for learners to choose to listen to lessons. Teachers can effectively modify and expand the teaching design strategy library, teaching template library and media through the visual interface editor, as shown in Figure 1.

(1) The organization of teaching information of the visual interface editor also affects the learning effect of learners. A good way of organizing teaching information can not only make teachers think clearly, improve the courseware, and speed up the search and retrieval of teaching information, which is conducive to deep understanding of teaching information.

(2) Instructional design strategy library the instructional design strategy library is not to move various instructional design theories, but to provide teachers with some enlightening guidance and suggestions. The instructional design strategy library includes the following aspects: an overview of the general process of instructional design, teaching organization strategies, and the theory and basis of media selection. Its content can be continuously enriched and improved. Let the teaching design strategy library be in the position of assisting teachers to generate strategies, which is conducive to teachers' initiative and creativity, and enhances teaching effectiveness.

(3) Media editor the media editor of this system is mainly used to edit static flat media objects (graphics, images, text, mathematical formulas), and can also be embedded with OLE objects. It is the main editor of the presentation templates in the teaching template library surroundings.

(4) Teaching resource library as shown in the figure above, the teaching resource library provides a platform for teachers to modify according to their own needs, expand their own teaching content, show teachers' teaching style, and reflect teachers' rich teaching experience. Teachers can use a visual interface the editor previews its own design of teaching resources to achieve better teaching effects. The determination and realization of the teaching resource function is a difficult point in the development of this system. The segmentation of the teaching resource function not only affects the efficiency of courseware development, but also affects the use of courseware.

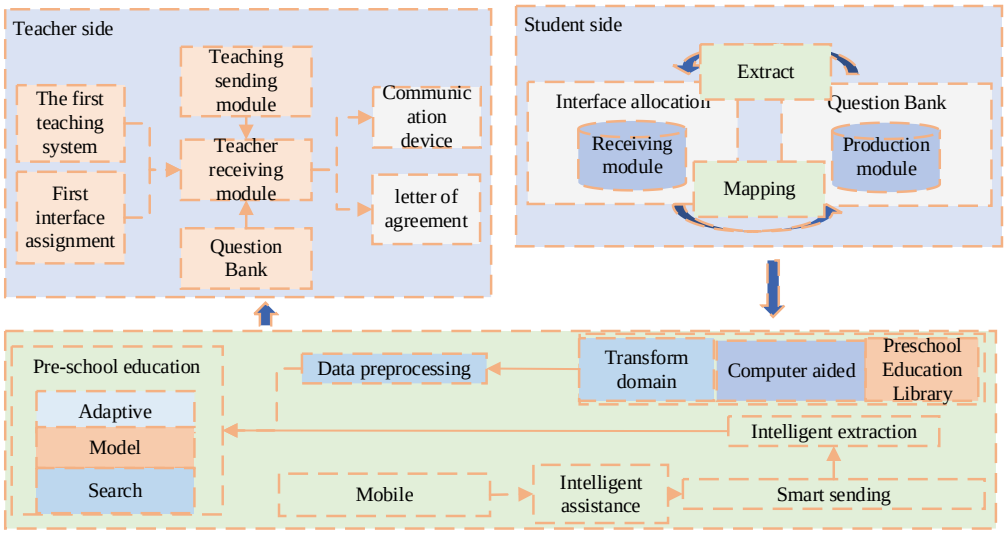

Figure 1: Intelligent auxiliary teaching subsystem.

The online intelligent answering subsystem can be divided into three parts: learner, teacher and assistant agent, adopting client/classification/server model. The assistant teaching agent categorizes, organizes, and executes the collaborative teaching assistant on the server, specifically: when the student asks a question to the system, the assistant agent first classifies the question briefly, and performs an intelligent search on the system to answer the question according to its classification Teachers with domain knowledge then request online teachers in the domain to answer them. When answering this question, teachers can also coordinate teaching with other teachers through the system. The teaching assistant agent can be a hierarchical structure composed of a general agent and sub-agents, or a parallel structure composed of several agents. Sub-agents can be the teaching assistants of subjects and courses, and they can complete interdisciplinary and course teaching guidance through the cooperation of teaching assistants. Learners and teachers exchange information with teaching assistants through the network, and the collaboration between learners, teachers and students, and teachers are all realized through teaching assistants.

2.2 Proposal of Evaluation Model and Design of Evaluation System

The educational function model of an information school is also called the school intranet function space model. This model provides a theoretical basis for the in-depth study of the application of the preschool education campus network. The seven aspects: teaching, management, information resources, extracurricular education, family education, social education, and communication. Each aspect of the teaching function is completed by a subsystem. Among them, the teaching subsystem, management subsystem and resource subsystem constitute general school functions; while the extracurricular education, family education, and social education systems can be regarded as

extensions of school functions; the communication system serves as a support platform for other subsystems. They are united as a whole.

The basic function (general function) part of this functional space model is an important module for implementing the core work of the school, and it is also the theoretical basis for the current research on the application and effect of the preschool education campus network. With the development of information technology and the maturity of computer network technology, networked teaching and management has become a reality and has become the focus of attention.

The system structure of preschool education campus network application is put forward according to the various application function modules of campus network based on the educational function model of information school and the theory of preschool education campus network topology structure. In fact, the pre-school education campus network is an integrated application system of educational information based on network technology and guided by education and teaching theory. It provides modern communication information for students' learning activities, teachers' teaching activities, scientific research activities, and teaching management activities. Pre-school education campus network to truly exert its effectiveness, mainly depends on the role of each subsystem in its system structure. The system structure of the preschool education campus network application is shown in Figure 2.

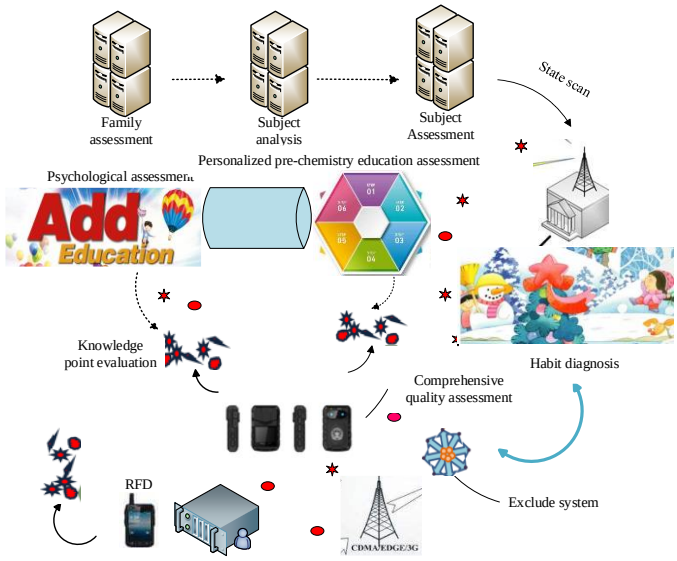

Figure 2: Architecture of preschool education campus network application.

It is necessary to adopt scientific research method to study the application effect of preschool education campus network. This paper adopts the bottom-up research method to study the application effect of preschool education campus network. This scientific research method based on the standard evaluation theory is to firstly study the evaluation model of the application effect of preschool education campus network, and then study the evaluation system on the basis of the evaluation model.

The architecture of this model is different from the teaching design platform and teaching management platform, not to mention a simple teaching website, which needs to pay attention to its teaching resources, teaching process and teaching management, and more comprehensively reflect the basic ideas of education theory and learning theory.

The evaluation model of the application effect of preschool education campus network consists of six subsystems: student learning subsystem, teacher teaching subsystem, resource construction

subsystem, examination evaluation subsystem, discussion and question-answering subsystem, and management support subsystem. They provide support and service for students' independent learning, teacher-led teaching, teaching resources, examination evaluation strategies, discussion and answer between teachers and students, teaching management and other aspects.

(1) Student learning subsystem. Students can receive guidance from teachers in real time and non-real time through the learning subsystem; Refer to the teacher's handout; Preview, homework, review.

(2) Teachers' teaching subsystem. The teacher teaching subsystem provides teachers with a variety of teaching modes, teaching strategies and teaching methods, teaching design platform, homework review and a series of teaching activities.

(3) Resource construction subsystem. The sub-system of resource construction provides teachers and students with large-capacity teaching resources, such as test questions, cases, courseware, integrals, pictures, audio and video, etc. In particular, it can provide teachers with a system that can develop courses and courseware with templates. Templates can greatly simplify the design difficulty and reduce the technical requirements of developing online courses.

According to the guiding role of evaluation model and evaluation theory in the application of preschool education campus network and the basic principle of system theory, this paper designs an evaluation system for the application effect of preschool education campus network, as shown in Figure 3.

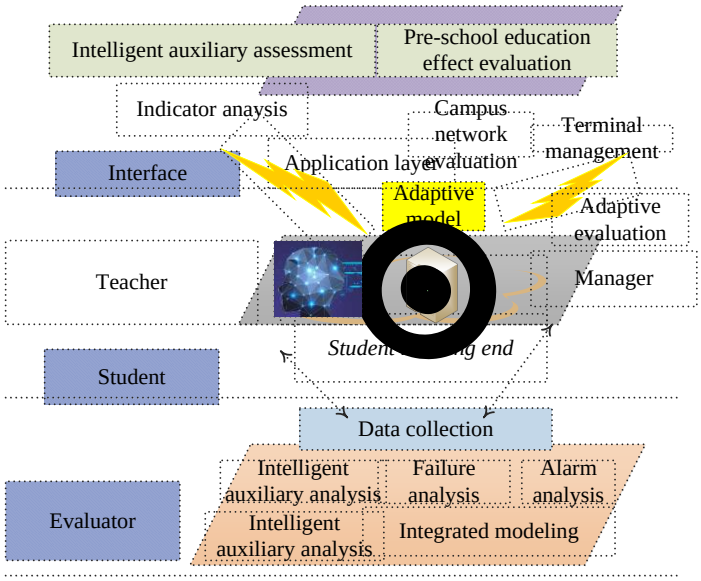

Figure 3: Evaluation system of preschool education campus network.

Figure 3 contains three meanings: First, the evaluation system of the application effect of preschool education campus network is an open system composed of six subsystems, evaluators and mentors (when necessary); Secondly, in the evaluation system of the application effect of preschool education campus network, the mutual composition of each element determines the application effect of preschool education campus network. Third, the evaluation of the application effect of preschool education campus network is to reflect the function of the evaluation system in educational and teaching activities, so that it has practical significance and role.

The application effect of the campus network is studied by using the evaluation system, which is in line with the guiding ideology of overall design, construction by stages and gradual improvement in the construction of campus network. The problems in the construction and use of campus

network can only be found in the application process under the guidance of phased construction and gradual improvement. These problems are fed back to the builders and decision makers through teachers, students and managers, who modify and improve the construction plan of the campus network from the perspective of users, so that the campus network can truly meet the needs of teaching and management without causing idle waste.

The evaluation system of the application effect of preschool education campus network shows that: (1) the application effect of preschool education campus network is to evaluate each subsystem on the basis of the application of preschool education campus network by teachers, students and administrators under the guidance of the construction guidance group; (2) The evaluation results, namely the application effect of preschool education campus network, are fed back to the constructors and decision-makers of the construction guidance group through teachers, students and managers; (3) The construction steering group shall make decisions based on the mutual exchange of feedback information, and then rectify and improve the construction of preschool education campus network; (4) in preschool education campus network applications, the application effect of campus network of pre-school education through constant feedback and guidance group for the rectification of the preschool education campus net and perfect, can improve the performance and quality of preschool education campus network, improve the utilization rate of preschool education campus network, so as to improve the application effect of preschool education campus network, promoting the sustainable development of education.

3 ADAPTIVE MODEL INTELLIGENT COMPUTER-AIDED PRESCHOOL EDUCATION ASSESSMENT

In the study of preschool education effect evaluation analysis, adaptive model is based on the statistical model of preschool education effect evaluation analysis technology is a research focus, it not only can be used to reduce in preschool education effect evaluation analysis different pronunciation of tone and style differences recognition effect brought about by the decline, also can be used to make up for the speech model application environment and the training environment does not match the recognition effect caused by the decline.

Although, on the basis of the existing statistical recognition model, preschool education effect evaluation analysis and pronunciation evaluation are "fuzzy" off people's tone, habits, etc., speech model training corpus need to use multiple tone and pronunciation habits of people as much as possible of the pronunciation, but pre-school education effect evaluation analysis and the "standard" to "fuzzy" off voice, and voice evaluation is the need to "fine" for the degree of standard pronunciation man. So preschool education effect evaluation speech model, the analysis of the degree of the pronunciation of standard training corpora also needs a variety of, to match its application, and in view of the pronunciation assessment model of speech is necessary to use standard pronunciation of people, because only with standard pronunciation as a reference template to calculate the similarity evaluation of pronunciation, only can use the similarity to "fine" by the evaluation standard of pronunciation, as only use a standard ruler can accurately measure the length of each object.

The idea of the selective adaptive strategy in pronunciation evaluation is to take the posterior probability of the segment as the reference and select the segment data with high posterior probability as the adaptive data to adapt the model. Since the original model is trained with standard pronunciation data, the sound segment with high posterior probability must have a high standard degree, which can reduce the impact of mispronunciation data on the pronunciation evaluation model. The general steps of selective adaptation are as follows:

1. Segmenting the pronunciation data according to the given text;
2. Calculate the posterior probability WW(P) of each sound segment;
3. Preset posterior probability threshold Thresh;

4. According to the preset threshold, data are screened, and WW(P) is retained and discarded as supervised adaptive data;

5. Use the selected adaptive data to implement the globally supervised MLLR adaptive model;

6. Supervised MAP adaptation of the model with the selected adaptive data;

The purpose of pronunciation evaluation is to distinguish good pronunciation from bad pronunciation. If the acoustic model adaptive data is used without discrimination, it will inevitably damage the acoustic model to distinguish good pronunciation from bad. Therefore, in the previous section, we proposed the selective adaptive strategy and its steps. We mentioned in the section of data selection is based on the sound, but the actual period can have a variety of particle size, like a layer of sentences and phoneme, syllable, this section we aimed at the sound of several different granularity for further discussion, later in the experimental part, we will also be presented, the use of several different granularity passage for the performance of the data selection.

First of all, when the particle size of the segment is the sentence layer, different sentences are accumulated according to the posterior probability of phonemes, as shown in the following formula:

$$WW_{se} = \frac{WW_1^{se} + WW_2^{se} + ...WW_M^{se}}{M} \tag{1}$$

Then, all the sentences of the pronouncer are arranged according to the posterior probability, and the sentences are adapted to the text of the sentences. Secondly, when the particle size of sound segment is syllable layer, different syllables are accumulated, and appropriate ones are selected according to the threshold according to the posterior probability of phoneme.

$$WW_{sp} = \frac{WW_1^{sp} + WW_2^{sp} + ...WW_M^{sp}}{M} \tag{2}$$

Then, all the syllables of the pronouncer are arranged according to the posterior probability, the appropriate syllables are selected according to the threshold, and the model ADAPTS to the text of the syllables. Finally, when the particle size of the segment is a phoneme layer, different phonemes are directly sorted according to the posterior probability of phonemes, as shown in the following formula:

$$WW^{ph} = \frac{WW(o \mid m)}{WW(o \mid m_1) + WW(o \mid m_2) + ... + WW(o + m_M)} \tag{3}$$

4 ANALYSIS OF RESULTS

The influence is of different data selection thresholds on the performance of the adaptive strategy. Since the previous experiment has verified that the selective adaptive strategy is adopted and the corpus selection granularity is phoneme, the best performance can be obtained. Its performance is shown in Figure 4.

It can be seen from Figure 4 that different data selection thresholds have a greater impact on the adaptive strategy. With the gradual increase of the threshold, although more and more adaptive data can be obtained, the adaptive data quality (The quality of pronunciation evaluation is getting worse and worse, which damages the performance of pronunciation evaluation. This also reflects the correctness of the selective adaptive strategy proposed in this chapter from another aspect.

Figure 5 shows a broken line chart of phoneme accumulation and sequence of reading two-syllable items. The phonemes after z in the figure have a posterior probability equal error recognition rate of more than 50%. For the development set, the dimensional feature has no distinguishing ability.

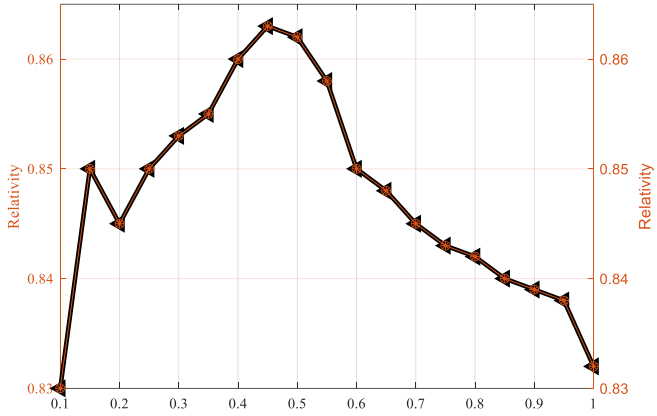

Figure 4: Adaptive strategy performance under different data selection thresholds.

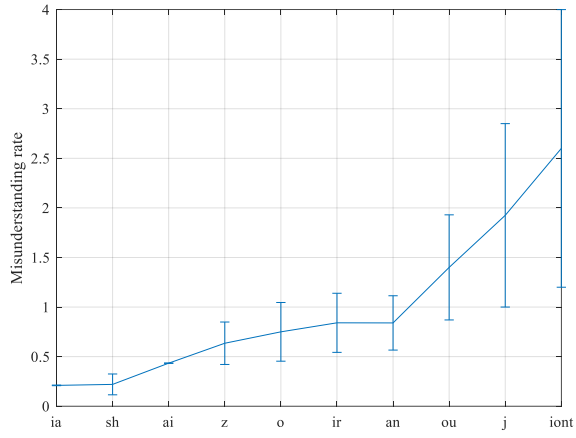

Figure 5: Cumulative sequence and line chart of phoneme Gwpp.

According to the arrangement of the DET curve, a more appropriate alpha value can be obtained, thereby determining the phoneme selected by each sub-segment classifier. In the end, we determined the feature dimension of class I and class II SVM classifiers was 51 dimensions, and the feature dimension of class II and class III classifiers was 36 dimensions. Figure 6 and Figure 7 below show the DET scatter plots of each sub-segment classifier.

At the same time, the average frame error rate under different speech rates is compared, and ROS = 2.4 phones/sec, the frame error rate is the lowest, as shown in Figure 8. In short, the particularity of the Mandarin evaluation scoring task makes the classification and regression natural combination. The improvement of the classification accuracy will inevitably lead to the improvement of the scoring progress, and the improvement of the scoring accuracy can in turn increase the classification accuracy. If one can be used gradually iterative enhancement mechanism, such as "Boosting" algorithm, checks and balances the classification results to improve the score, and the scoring results in turn affect the classification results. The two iterative and promote each other, thereby achieving a gradual learning mechanism. When the data continues to accumulate, system performance can be continuously improved.

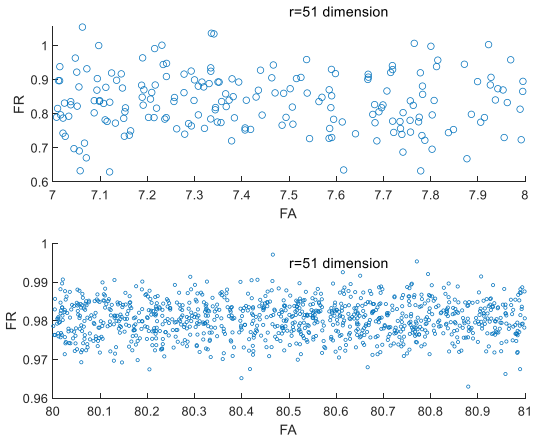

Figure 6: Classification effect of class I and class II S VM classifiers.

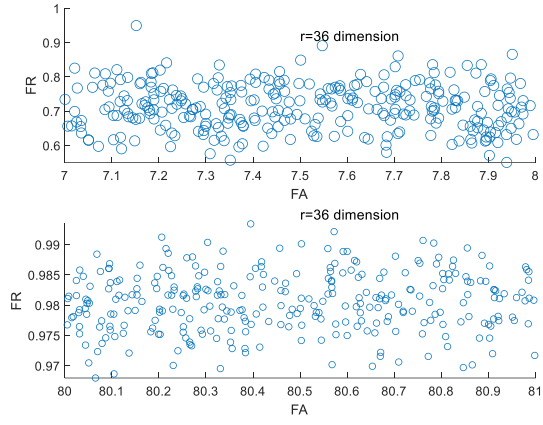

Figure 7: Classification effect of class III and class IV SVM classifiers.

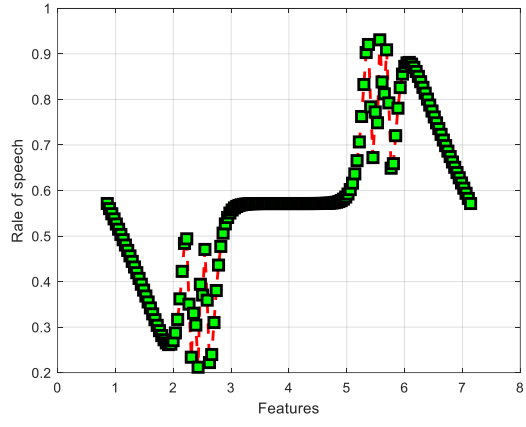

Figure 8: Average frame error rate.

5 CONCLUSION

Based on the analysis of the similarities and differences between pre-school education effect evaluation and pronunciation evaluation, this paper starts from the acoustic model adaptation in the pre-school education effect evaluation and analysis, and proposes a selective adaptive strategy for pronunciation evaluation. Model adaptation is the main method used to solve the performance degradation caused by the mismatch between the application environment of the acoustic model and the training environment in the preschool education effect evaluation and analysis system. This article considers how to use acoustic model adaptation in pronunciation evaluation. The analysis found that although pronunciation evaluation and preschool education effect evaluation analysis have many similarities, the two are completely different in purpose. Preschool education effect evaluation analysis is to "fuzzy" the pronunciation of the same word that differs greatly from different people and at different times. It is recognized as the same text, and pronunciation evaluation is to "fine" the standard degree of distinguishing these vastly different pronunciations. Aiming at the similarities and differences between pronunciation evaluation and pre-school education effect evaluation and analysis, this paper proposes a selective adaptive strategy for pronunciation evaluation, which is used to select the relative standard data in the pronunciation data of the speaker for adaptation, and analyze the data selection. The impact of the amount and granularity of data selection on the adaptive effect.

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