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The Impact of Network Teaching Mode on Teaching Quality in The Context of Big Data: A Case Study of College Foreign Languages



Abstract: - Under the heritage of massive data, community education has been extensively used in the area of education and has an essential effect on education quality. Taking university English education as an example, this paper analyzes the impact of community instructing mode on education quality. First of all, the paper introduces the influencing elements of community instructing fantastic below the heritage of massive data. Secondly, primarily based on regular differential equation (ODE), particle swarm optimization (PSO), and least square help vector computing device (LSSVM), a university English educating great assessment mannequin is constructed, and the impact of English educating in a positive college is tested. The effects exhibit that in contrast with different present comparison systems, the proposed assessment mannequin has benefits in pace and accuracy, and the contrasting impact is the best.

Keywords: Big data; Network teaching mode; Ordinary differential equation; Particle swarm optimization algorithm; Least squares support vector machine; College English teaching.

I. INTRODUCTION

In the remaining analysis, the cause of university English education is to allow college students to study an overseas language and use it to resolve issues in their future work and study[1]. Therefore, university English education fashions and techniques conforming to the improvement of The Times have usually been the concern of non-stop lookup by means of English educators. In the present-day era, massive records have penetrated into all components of people's lives, and they bring comfort to people's lives[2-3]. We have entered the generation of large data. In the new era, university English instruction should be carefully blended with large data, discover the effective impact of elements of large statistics on university English teaching, and continuously enhance the instructing effect.

Big data refers to the massive, high growth rate and diversified information assets, such as consumption records and login information, which must adopt new processing modes to obtain decision-making, insight, and process optimization capabilities[4]. Its development process is shown in Table 1. Big data technology not only enables people to master massive data information but also enables professional processing of this data. Only in this way can these data have practical significance[5].

The non-stop making of statistics ensures that the boom of record quantity is non-stop and that the evaluation of the statistics is effective. With the fast improvement and popularization of the Internet and cellular networks, large records are being utilized extra and more broadly in a number of fields[6]. There will be huge demand for records in many industries, such as the telecommunications industry, the Internet industry, the pharmaceutical industry, the training industry, the energy industry, etc.

Table 1. The development process of big data

stage	describe
Data collection stage	Relying on traditional database systems and file storage methods, data is collected through methods such as questionnaire surveys and sensor monitoring and stored on local servers.
The rise of big data technology	With the popularization of the Internet and the development of mobile devices, a large amount of data is generated and accumulated. Research and develop new technologies and tools, such as distributed storage systems, MapReduce, etc., to address the challenges of massive data.
Big data analysis and mining	Introduce machine learning and data mining algorithms to extract and analyze valuable information from big data. Application areas include marketing, finance, healthcare, etc., helping enterprises make more accurate decisions.
Cloud computing and big data fusion	Utilize cloud computing technology to extend big data storage and processing capabilities to the cloud, providing elastic computing and storage resources. This can reduce costs, improve efficiency, and support large-scale data analysis and mining.
Combination of edge computing and the Internet of Things	Collect, process, and analyze data on edge devices to reduce data transmission latency and network load. By combining IoT technology, intelligent data collection and decision-making can be achieved, promoting the penetration of big data applications into various industries.

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Data Privacy and Security With the expansion of big data applications, data privacy, and security are facing challenges. Introduce technologies such as encryption, permission control, and data anonymization to protect user privacy and data security and promote a trustworthy big data environment.

In the context of big data, innovative teaching models are emerging, as shown in Table 2. These courses are becoming increasingly popular with students. Traditional teaching mainly relies on textbooks and blackboard writing to teach students English, which could be more varied and exciting[7]. It is easy for students to get tired during the learning in the classroom. Over time, students lose interest and motivation in college English. In the context of big data, innovative teaching models such as MOOC and Flipped the Classroom allow students to choose high-quality and rich teaching content at any time according to their circumstances, formulate learning plans according to their ability level, and control learning progress, And realize the organic combination of online and offline learning[8]. In addition, Flip Classroom and MOOC online platforms allow for detailed analysis of student learning, learning styles, and characteristics to maximize student learning efficiency and effectiveness[9]. After the birth of these new and rich teaching modes, it is easy to attract students' attention, so it is urgent to change the traditional English teaching mode actively[10].

Table 2. Innovative teaching mode

teaching model	describe
Flipped classroom	Students preview course content through online teaching resources (such as videos, online materials, etc.) before class, and teachers mainly engage in discussions and practical activities in class to help students deepen their understanding and apply knowledge.
Project driven learning	Students actively solve problems and complete tasks by participating in real-world projects, cultivating practical application skills and teamwork spirit. Teachers play a guiding and supportive role.
collaborative learning	Students collaborate in small groups to complete tasks and projects, promoting learning outcomes through cooperation, discussion, and sharing of knowledge. Teachers can serve as organizers and guides.
Gamified teaching	Integrate game elements and mechanisms into the teaching process, stimulate students' learning interest and enthusiasm through competition, rewards, and other incentive methods, and improve learning effectiveness and participation.
Simulation experiment teaching	Using virtual experimental software or physical devices for experimental teaching allows students to obtain actual experimental results through operation and observation and cultivates experimental skills and scientific thinking abilities.
Personalized and customized teaching	Tailor teaching content and learning paths according to the learning characteristics and needs of students. Provide personalized learning resources and feedback through intelligent educational technology and personalized learning platforms.
Interdisciplinary, integrated teaching	Integrating knowledge and methods from different disciplines organically, cultivating students' comprehensive thinking ability and problem-solving abilities through interdisciplinary teaching design and activities.
Community participation in teaching	Schools and communities collaborate to incorporate community resources and practical environments into their teaching scope, allowing students to gain practical experience and knowledge through social interaction and participation in community projects.

Under the positive influence of big data technology, many colleges and universities in our country have introduced the Internet and mobile phones into English classrooms, and a variety of online classes have been created to facilitate students to learn English anytime and anywhere, thus improving the efficiency of English teaching[11-12]. It is because of a series of changes that the role of college English teaching begins to change, and students change from passive recipients to active learners. With the help of the rich information resources of the Internet, students can choose English courses according to their needs and study on demand. In the course of teaching, teachers are mainly the organizers of classroom activities[13]. They are both a guide and evaluators of students and a leader in the classroom, moving from a single knowledge transfer[14].

Therefore, this paper takes university English education as an instance to analyze the impact of community instructing mode on instructing quality. First of all, the paper introduces the elements that influence community instruction, which are great underneath the historical past of massive data. Secondly, based totally on everyday differential equation (ODE), particle swarm optimization (PSO), and least rectangular help vector desktop (LSSVM), a university English educating high-quality assessment mannequin is constructed, and the impact of English educating in a sure faculty is examined.

II. ANALYSIS OF INFLUENCING FACTORS OF NETWORK TEACHING QUALITY

The influence of network stability on teaching

As shown in Figure 1, network English teaching depends on the choice of network teaching platform. However, in the process of online English teaching, due to the limitation of network speed, speech or image delay and crashes are easy to occur. Unstable cyber environment. This phenomenon will lead to the online teaching courseware playback and the teacher's lecture synchronized phenomenon[15]. Moreover, due to the limitation of computer running speed and configuration, it is more likely to run slowly, resulting in the

phenomenon of teaching screen delay. The network environment causes teachers to explain knowledge in class without fluency. The students also answered the teacher's questions intermittently. Online English teaching has been affected[16]. Keep the network stable and smooth to facilitate English learning. Before conducting online teaching, it is necessary to check whether the network is smooth and whether the online teaching platform is running smoothly. Choosing a powerful learning platform will bring us a lot of convenience in teaching[17]. Before class, students should be trained to learn how to log in, speak, raise their hands, and perform other basic functions to prepare for school. Also, choose a radio station with a recording function so that students who are unable to attend classes can watch and replay missed classes at any time[18].

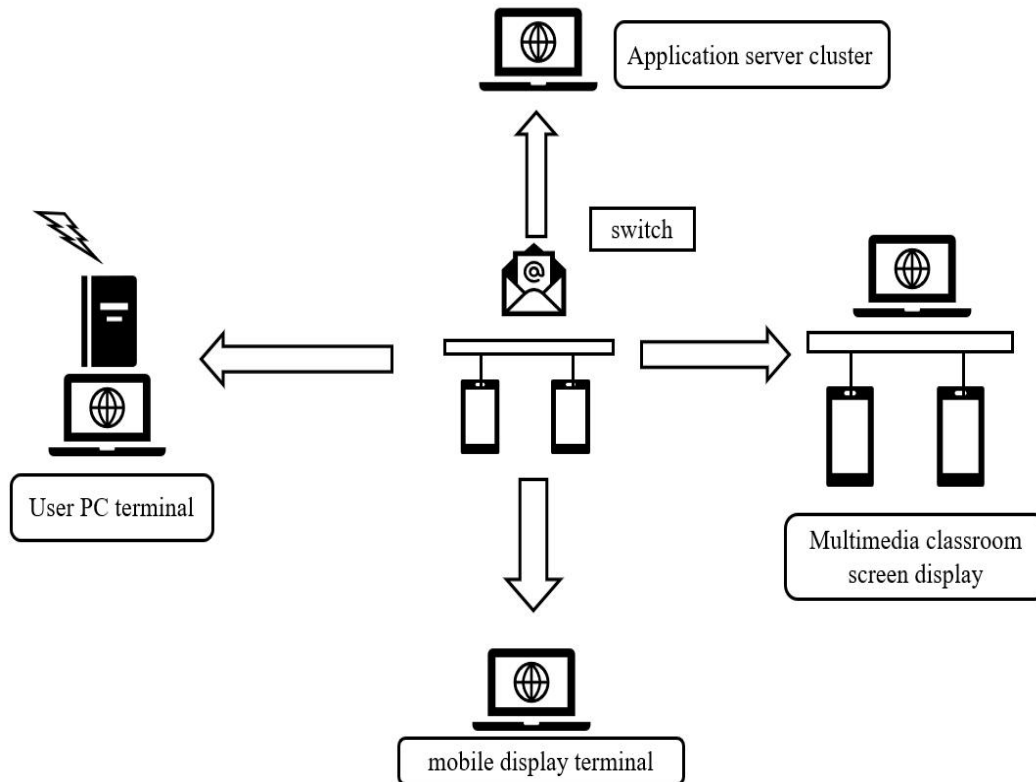


Figure 1. Links between online English teaching and online teaching platforms
The interactive impact of college online classroom

Although teachers can interact with students through the microphone connection function of the online teaching platform, online teaching creates a distance between teachers and students and cannot be paid attention to. Class status for each student[19]. Due to differences in learning ability and personality, some students are inactive or silent in online classes. Online teaching time is limited, and teaching checks are not available to all students. The interactivity of network teaching needs to be more effective[20].

As shown in Figure 2, the online interaction between teaching and learning has been enhanced in many ways. According to the unit theme, the effective interaction between teaching and learning is strengthened[21]. Each unit of English teaching materials has a unit theme closely related to the actual situation, and the teaching content revolves around the theme. For example, when teaching the unit topic of "Going to the hospital," students are asked to collect professional terms about hospital visits and share them with the online professor. Set topic content in class according to the current epidemic situation[22]; Settings must be layered, from learning words and sentences to practicing English conversation. For example, when learning a text about objects, first learn the words about animals and then learn the sentence patterns related to them, integrate the learned animal words into the practice of the relevant sentence patterns, and then set up an environment for friends to meet for training. Love the topic of animal training. This setting allows students to learn the important and difficult points at a glance. Also, I learned a Japanese article, "I have been asked many times what life means[23]." I am myself, what is the meaning of life? "you should also distinguish the layers, from simple words to sentences and then to the article. With the familiar life situation teaching background, the understanding and application of knowledge are realized in the dialogue practice[24].

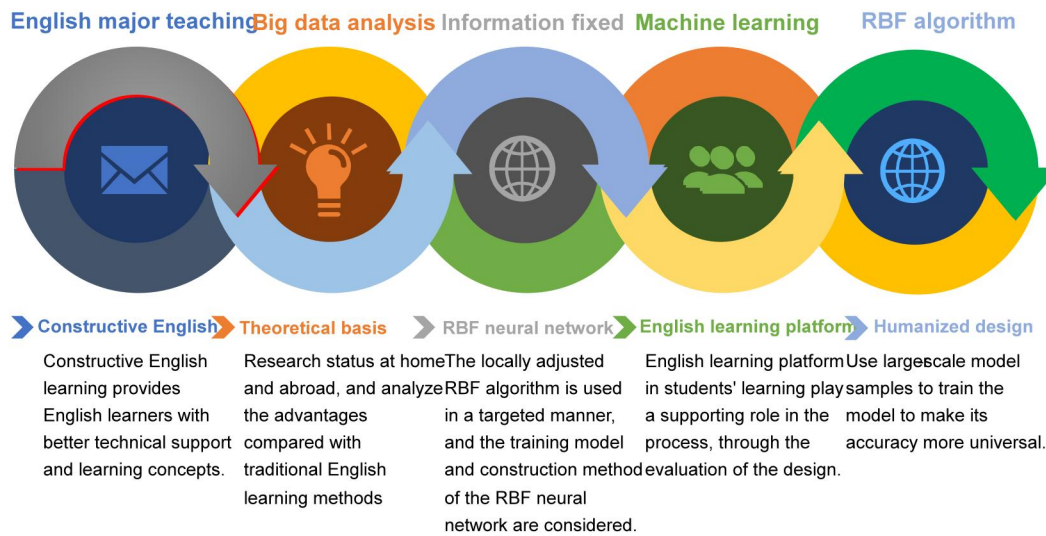


Figure 2. Multi-dimensional online interaction improves teaching according to unit themes

Setting emotional goals combined with the current topic enhances emotional interaction, which is what we usually call the processes and methods, emotions, attitudes, and values. His emotional vision must be closely linked to the topic at hand. In the context of the national anti-coronavirus epidemic, from the perspective of life development, the essence of teaching can be summarized as the quality of life and an increase in the value of life[25]. Education can improve the quality of life of individuals, which means individuals can enhance their skills through education so that they can lead happy and prosperous lives[26]. Improving the value of life means leading individuals to strengthen their ideological morals and talents through education to make contributions to society and others. We must cultivate patriotism, collective honor, and other virtues. For example, when studying the relevant texts, we can set emotional goals based on the epidemic situation. Now, we need to fight the epidemic together, and the epidemic situation needs to go to different parts of the motherland to see the Dachuan there. Such an environment can not only enhance students' confidence to fight against victory but also cultivate lofty patriotism from childhood. Let every online English lesson have a strong sense of patriotism[27-28].

Online teaching affects students' enthusiasm.

Teaching methods must increase students' interest in learning, whether online or offline, by applying the technique throughout English lessons. However, unlike offline teaching, we are faced with the interaction of teaching and learning with students through online platforms due to time and place constraints, so there are certain differences between learning methods and offline teaching. Begin[29]. There are many forms of warm-up for online English classes. Aiming to stimulate new knowledge and learning before class, the musical form can be played before class to get students to relax before learning a new lesson, which helps them focus in class[30]. If there is enough time, you can also converse with each student in liaison language to shorten the distance, which helps teach development. It is also possible to display the songs or illustrations in the course body in the form of multimedia courseware. For example, when learning English, when asking which season the other person likes best, the images of the four seasons can be played in the courseware. After the students say the words of the season in English, the teacher asks them to derive new knowledge.

By importing images, students can be attracted to bright colors and focus on interacting with teachers in the pre-classroom in a short amount of time. Start your newly taught studies in good shape with a fun listening, speaking, or rap exercise[31]. Teachers should keep in mind that online English lessons should be student-centered and design classroom activities that students are willing to participate in and interact with. The production of courseware should not be the listing of knowledge points and the display of teaching connections but the gathering of teaching paths from teachers and the sparkle of wisdom. For example, with the play function of multimedia software, teachers can enter relevant texts and answers through colorful background animations, and students can carry out corresponding exercises. Since students cannot operate online teaching with a mouse click, they can complete the answer to the question in the form of student selection and teaching. Compared to pure text study, the students prefer exercises and text information with clear animation effects[32]. When

learning to recite or retell the text, you can use the corresponding soft-drop Teletext animation to let students imitate the voice of the text animation characters, which can greatly increase classroom learning participation.

III. CONSTRUCTION OF COLLEGE ENGLISH TEACHING QUALITY EVALUATION MODEL BASED ON THE ODE MODEL

Basic concept

ODE stands for "ordinary differential equation." It is one of the mathematical models describing dynamic systems in natural phenomena and engineering problems. It is usually used to solve problems in the fields of physics, chemistry, engineering, and biology, as shown in Table 3. The ODE is an equation about an unknown function and its derivatives, where the unknown function has only one independent variable. There are two types of ODE: first-order ODE and higher-order ODE. First-order ODE involves only the first-order derivatives of unknown functions, while higher-order ODE involves unknown functions. There are two types of ODE: linear ODE and nonlinear ODE. In linear ODE, unknown functions and derivatives appear in linear forms. Nonlinear ODE does not satisfy this condition. For a given ODE problem, we need to find its analytical or numerical solution. An analytical solution is an exact solution that can be expressed by a formula or function expression. In contrast, a numerical solution is the result of an approximate solution by a computer program. In practical applications, we usually use common methods such as Euler's Lunge + Kutta method to solve ODE problems.

Table 3. Application of "ordinary differential equations."

field	application
physics	Describe phenomena such as motion, vibration, and electrical circuits
engineering	Control system, power system, signal processing, and other issues
economics	The Change Process and Trend Prediction in Economic Models
biology	Modeling of biological processes, such as ecosystem dynamics, population growth, drug uptake, etc

Particle swarm optimization (PSO) is an evolutionary computing technological know-how based totally on swarm talent invented by Dr. Eberhart and Dr. Kennedy. It is additionally a new department in the subject of evolutionary computing. PSO algorithm is a technique that is stimulated by the conduct traits of the organic populace and is used to remedy optimization problems. In the PSO algorithm, the doable answer to every optimization hassle can be imagined as a factor on the D-dimensional search space, which can be referred to as a "particle." The particle travels at a sure velocity in the search space, which can be dynamically adjusted in accordance with its very own flight journey and the flight ride of its companions. All particles have a suitable cost decided with the aid of the goal feature, and their satisfactory and cutting-edge role so far has been recognized. This can be viewed as the particle's very own journey of flight. In addition to this, every particle additionally is aware of the fine region of all the particles discovered in the complete populace so far.

The least rectangular aid vector computer (LSSVM) transforms the studying hassle of the widespread help vector desktop (SVM) into a linear matrix fixing the problem, which drastically improves the fixing pace and successfully solves the defects of the SVM algorithm. Moreover, LSSVM has the benefit of minimizing the structural risk, and it makes use of sample records to decide the structural parameters in the education process. Therefore, there will be no overfitting problem. However, fallacious parameter determination of the LSSVM mannequin may additionally hinder the accuracy of the ghost prediction results.

Model construction

The enter pattern of university English impact contrast information is taken as the least squares assist vector enter pattern to recognize university English impact evaluation. The kernel feature parameters and regularization parameters of the particle swarm answer least squares computer are used to optimize the solution, and the comparison method of the optimized minimum differential guide division vector laptop is proven in Figure three. Determine whether or not the parameters are the foremost solution; if not, use the particle swarm algorithm to retune to the gold standard solution; if so, consider the check pattern and output the result. Least squares help vector laptop assessment principle: set a coaching pattern set to be described by means of $s=(X_i, Y_i)$, the place $i=1,2,\dots$.

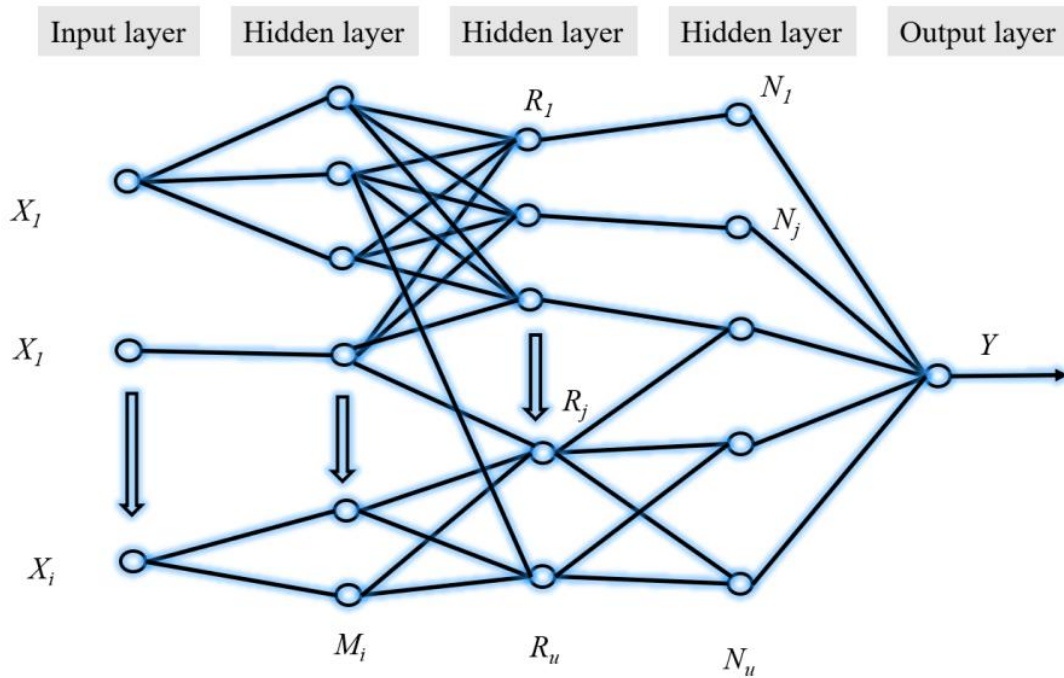


Figure 3. Optimized least squares support vector machine evaluation process

The input data of the least squares support vector machine is expressed in r , the number of training samples is described in l , the output data is described in y , and the linear regression function in four-dimensional space is the formula (1).

$$y = wx + b \tag{1}$$

Among them, the deviation is described by b ; the weight vector is defined by w .

Let A1-A10 be the sub-functions of the W variable and B1-B10 be the deviation rate sub-functions. The optimized vector machine model data integration is shown in Figure 4.

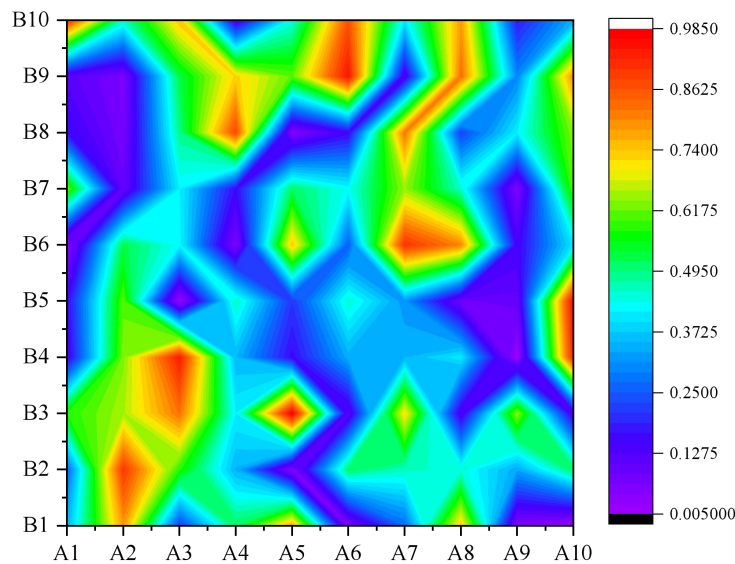


Figure 4. Optimized vector machine model data integration

The regression characteristic in the high-dimensional function house is Eq: (2).

$$f(x) = w\varphi(x) + b \tag{2}$$

$\varphi(x)$ is a nonlinear mapping from the entered house to a high-dimensional space.

Let A1-A10 be the sub-functions of the W variable, B1-B10 be the deviation rate sub-functions, and the model optimization data integration of the support vector machine is shown in Figure 5.

The optimization goal feature of the least squares aid vector laptop is equation (3).

$$\min = \frac{1}{2w^2} + ce_i \tag{3}$$

The constraint condition is formula (4).

$$\varphi(x) + b + e = y \tag{4}$$

The Lagrange multiplier is described through y . The least squares aid vector desktop optimizes the information and integrates it, as proven in Figure 6.

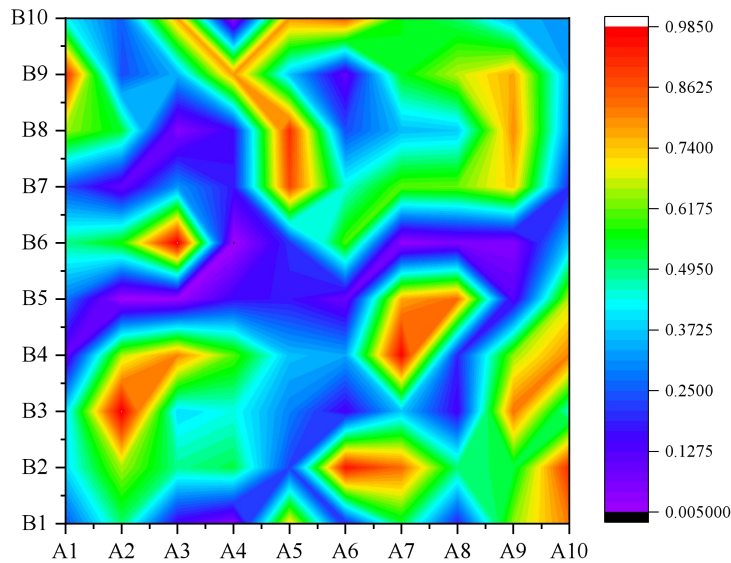


Figure 5. Model-optimized data integration for support vector machines

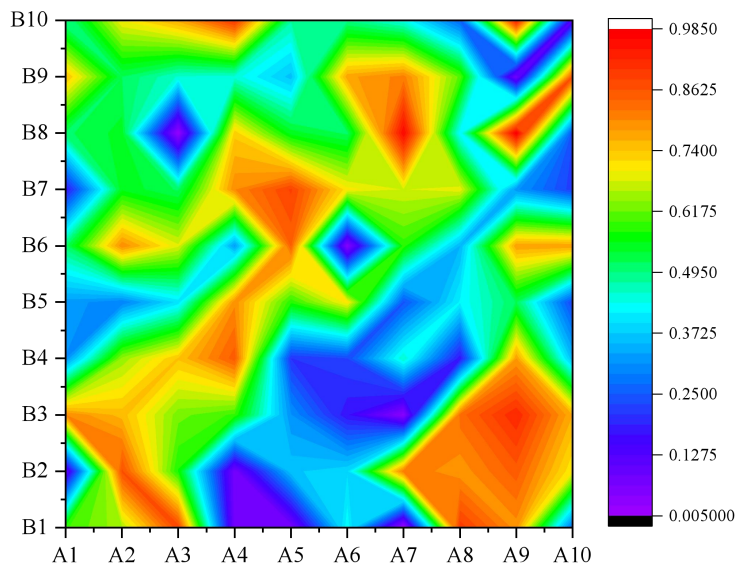


Figure 6. The least squares support vector machine optimization data

IV. MODEL EVALUATION EFFECT TEST

Select the English teaching effect of a school as the search object, gather pattern facts in accordance with the instructing impact of faculties and universities, and attain the evaluation of the effects of university English instructing by way of specialists on university English instructing cost via the real scenario of university English teaching. Obtain two hundred, take a look at records samples, and divide them into ten agencies of records units with 20 statistics samples in each group. Among them, the impact of university English instructing is represented with the aid of y , and English grades are used; description, etc., the variety of English classification interruptions is described by means of x_{is} , the experimental contrast technique is used to optimize the BP neural community educating charge mannequin in schools and universities, and the university English based totally on the category-weighted goal decision-making assessment technique is implemented. Effect assessment test. Three strategies are used to take a look at the experimental data, and the accuracy calculation effects of the three strategies are proven in Table 4.

Table 4 Comparison of evaluation accuracy results

Dataset number	This article method/%	Optimize BP Neural Networks/%	Class-weighted grey target Decision method/%
1	96.25	90.22	75.52
2	97.86	89.66	77.66
3	95.68	88.23	78.92
4	97.68	87.69	75.68
5	96.88	89.66	76.98
6	95.66	90.26	78.42
7	96.77	89.69	79.69
8	96.88	88.69	78.56
9	95.23	90.23	77.69
10	96.66	91.26	79.66

It can be viewed from Table 1 that the common differential mannequin comparison of the guide vector laptop differential variable approach proposed in this paper has an accuracy charge of 96.56%, which is greater than the common assessment accuracy of the universal excellent optimization comparison mannequin optimization technique of the fulcrum neural community educating pleasant in schools and universities. The common correct critique differential fees for the category-specific weighted blue goal selection map educational assessment intent approach have been 7% and 18.68%. Therefore, the approach in this work has the easiest assessment accuracy in contrast with the current ones.

V. CONCLUSION

Taking university English instruction as an example, this paper analyzes the impact of community instructing mode on education quality. First of all, the paper introduces the elements that influence community education first-class, below the heritage of massive data. Secondly, primarily based on everyday differential equation (ODE), particle swarm optimization (PSO), and least rectangular assist vector computer (LSSVM), a university English educating high-quality contrast mannequin is constructed, and the impact of English instructing in a positive faculty is tested. The results are as follows:

(1) There is a complex relationship between the quantitative nonlinear function and the effects of various indicators of college English teaching and similar indicators of evaluation concepts. The complex quantitative results lead to strong subjectivity of evaluation scores and fractal cones, which affects the fairness of the objective evaluation of the model. The evaluation model composed of this system can accurately analyze the effect of college English teaching and the quality of classroom listening.

(2) This paper studies the quantitative analysis factor evaluation of college English teaching effectiveness based on particle-based medium complex group algorithm and the least square vector separation mechanism. Compared with other existing vector machine evaluation systems, the proposed method has advantages in speed and accuracy, and the evaluation effect is the best.

VI. DATA AVAILABILITY

The experimental data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declared that they have no conflicts of interest regarding this work.

Funding Statement

This work was sponsored in part by: Fund Project "Research on Japanese Translation of Chinese Cultural Documents under the Background of Cultural Exchange and Mutual Learning" (KY2023FS09), Fujian Polytechnic Normal University, Fujian Province in 2023

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