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Retraction

Retracted: Visual Analysis of English Teaching Model Based on Scientific Programming

Mobile Information Systems

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This article has been retracted by Hindawi, as publisher, following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of systematic manipulation of the publication and peer-review process. We cannot, therefore, vouch for the reliability or integrity of this article.

Please note that this notice is intended solely to alert readers that the peer-review process of this article has been compromised.

Wiley and Hindawi regret that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] L. Hu, "Visual Analysis of English Teaching Model Based on Scientific Programming," *Mobile Information Systems*, vol. 2022, Article ID 8592802, 12 pages, 2022.

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Research Article

Visual Analysis of English Teaching Model Based on Scientific Programming

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In order to continuously enrich the connotation of teachers' teaching ability in the context of the deep integration of information technology and English teaching, thus changing the relationship between the important elements of college English teaching ecology, a visual analysis of English pronunciation teaching mode based on speech recognition technology is proposed, with the support of Internet technology, designed and implemented a visual analysis platform for English phonetic transcription-assisted learning, introduced two types of random graph models G(n, p) and G(n, M), and then introduced the concept of phase transition. A research model is established, using the algorithm of generating random graphs and the Hamiltonian circuit logic program to point out that the critical function value of G(n,p) existence loop is $p = 1/n$. The test results show that the platform can basically meet the requirements.

1. Introduction

Since the twenty-first century, in the environment of fierce international economic and scientific and technological competition, the competition of talents in the field of high technology is undoubtedly very important. Countries all over the world have put the development of education in the primary position of social development. In China, the development plan of education has also been put on the agenda of social development. As Comrade Xi Jinping pointed out: "A strong country must first strengthen education," which emphasizes the importance of education, as shown in Figure 1 [1]. Richards (2008) once proposed that in the long practice of educational reform, China has gradually realized that it is very important to establish a perfect professional development system for English teachers and guide English teachers to carry out professional development independently. Only in this way can the quality of English teachers be improved, the growth of students be promoted, the effect of teaching be improved, and the goal of educational reform be realized [2]. The research on the professional development of English teachers in China has developed rapidly in recent ten years, has made very rich theoretical research results, and the construction of English discipline itself has been further strengthened. In the face of a large number of complex research results, we need to know clearly what are the subjects and hot spots of China's English teachers' professional development research in recent years, what are the cutting-edge trends of the research, and how to present the research trend [3]. Due to the different subject settings, different teaching focuses, and different training objectives of different colleges and universities, the general college English teaching resource library obviously cannot meet the needs of each school. Under this circumstance, it is an important task for colleges and universities to develop and construct college English teaching resources with their own characteristics.

2. Literature Review

Raju, K. S. and other researchers have different understanding of the connotation of teachers' professional development from their own research perspectives, which can be divided into two types: first, the development of teachers' profession, that is, the professionalization of teachers, which is mainly reflected in the process of improving and improving their professional knowledge, skills, and attitudes by participating in training activities carried out by different organizations,

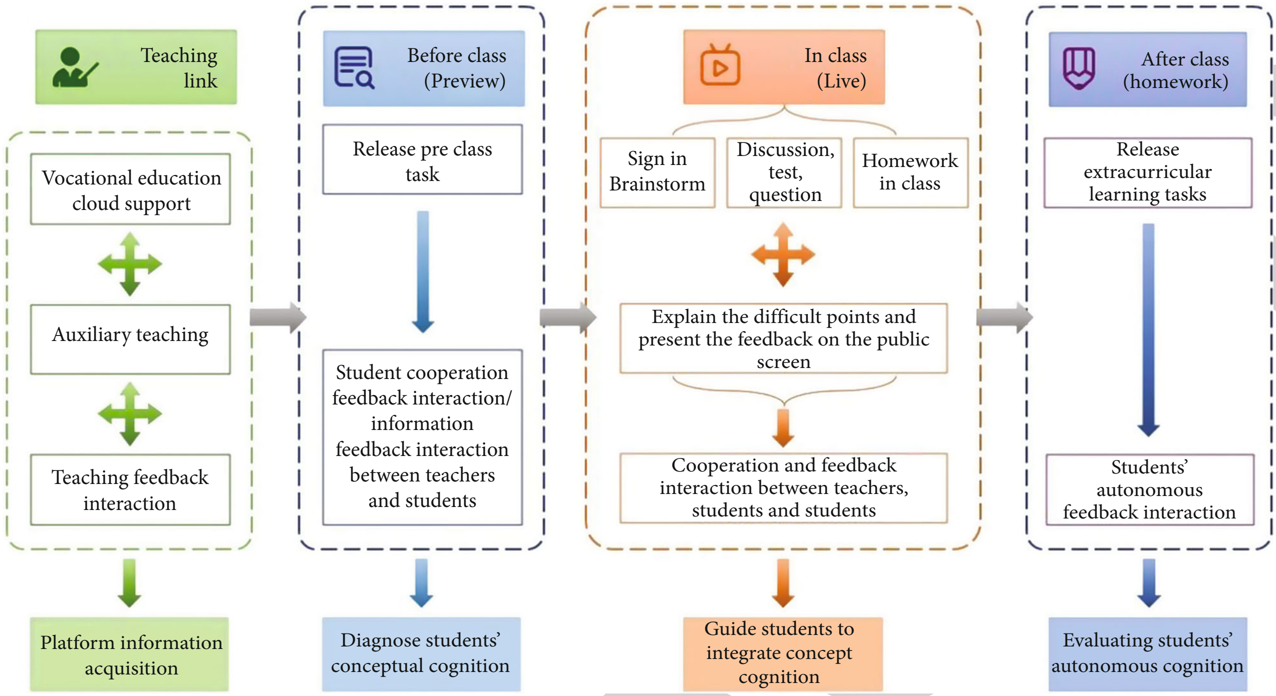

Figure 1: English teaching mode.

such as schools and society [4]; secondly, it is the professional development of teachers, that is, the development of individual teachers, that is, as mature professionals, teachers constantly master new knowledge, exercise new skills, cultivate professional ability, expand professional connotation through independent learning and continuous exploration, and reach the realm of professional maturity. Andrew found that the connotation of English teachers' professional development is basically the same as that of teachers' professional development in a general sense [5]. The professional development of English teachers mentioned by Langtangen et al. is the integration of the above two views, which refers to the dynamic process of continuous learning, practice, reflection, and growth of English teachers under the guarantee of educational environment. It includes not only the process of individual promotion of English teachers, but also the development process of English teachers' professional status and social value [6]. Naga and others analyzed that generally a disjunctive logic program may have no answer set, only one answer set or multiple answer sets, and it has been proved to be NP. Therefore [7]. P. Wang, Y. and others through the concept of no basis set, disjunctive logic program without function is easier to calculate, and some researchers have implemented the corresponding solver [8]. Kim and others found that the logic program with function is not easy to calculate its stable model. Now, the method of solving the calculation is to calculate after the program specification or after changing the situation. Henk and others found that at present, no researchers have proposed the concept and method of good basis semantics of logic programs with functions. When we discussed the good basis semantics of disjunctive logic programs with functions, we found that this idea can be used to solve the solution of stability model of disjunctive logic programs with functions [9]. Pere and others found that in this way, we can calculate the answer set of disjunctive logic program through its good base semantics. In this way, we can calculate any form of disjunctive logic program, which is a very meaningful thing, as shown in Table 1 [10].

3. Method

Students have many tasks to complete through network autonomous learning, but how to ensure the effectiveness of students' autonomous learning? How can teachers and educational administration departments understand students' self-study? Therefore, it is necessary to build a reasonable and effective visual analysis, implement the joint management of external control and internal control, and use the visual analysis mode to realize internal and external supervision.

The whole multivisual analysis is not completed independently by a single department, but an organic whole. It should be jointly participated by several organizations or groups such as educational administration department, teaching supervision group, college English teachers, network administrators and students [11]. As shown in Figure 2.

Due to the different subject settings, different teaching priorities, and different training objectives in colleges and universities, it is obvious that the general college English teaching resource database cannot meet the needs of each school [12]. Colleges and universities should not simply buy ready-made resource banks, but should encourage teachers and students to actively explore and offer ideas and suggestions so that they should not only become pure resource users, but also active resource participants and builders, as shown in Figure 3 [13].

Table 1: Text environment.

Text environment	Multimedia environment
Single channel information input	Multichannel information input
Poor image	Vivid and vivid
Language information	Language information, auxiliary language information, nonverbal information
Semantic learning	Phonetic learning, semantic learning

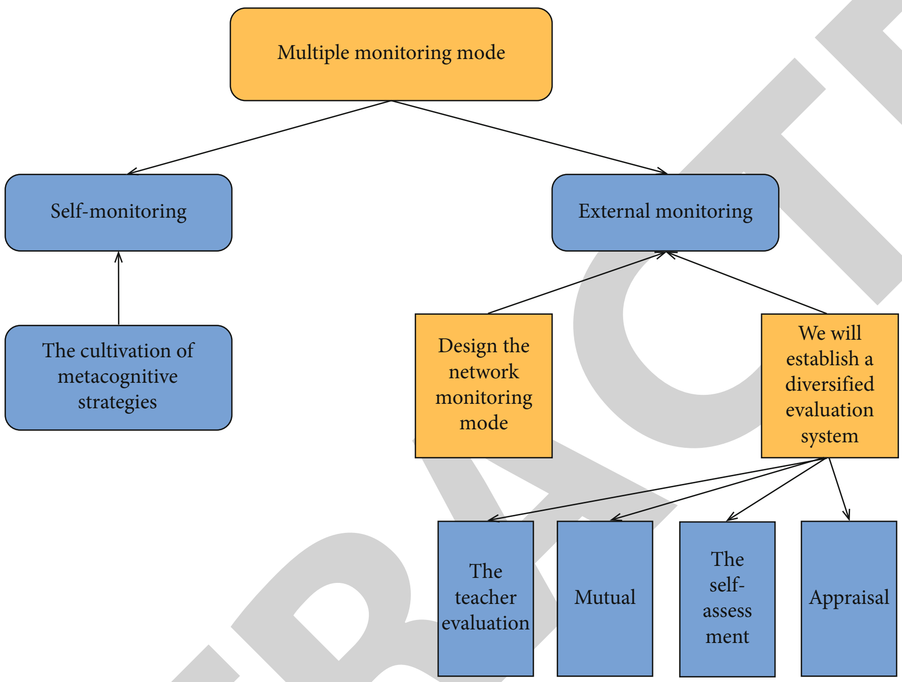

Figure 2: Multivisual analysis of students' autonomous learning.

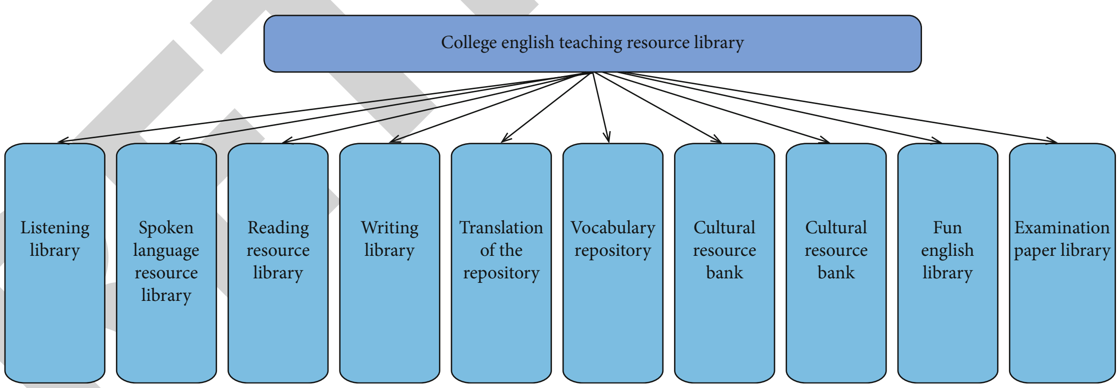

Figure 3: College English teaching resource database.

Speech recognition technology, broadly speaking, refers to semantic recognition and voiceprint recognition. In a narrow sense, it refers to the understanding and recognition of speech semantics, also known as automatic speech recognition (ASR), so as to realize the control of speech to the machine [14]. In the development of speech recognition technology, although different researchers have proposed many different solutions, the basic principles are similar. In the processing of speech signals, any speech recognition system can be used (Figure 2) to show its general recognition principle. The most important module of speech recognition system is speech feature extraction and speech pattern matching, as shown in Figure 4.

The first step of speech recognition is speech signal preprocessing. Speech signal preprocessing is not only the premise and foundation of speech recognition, but also a key step of a feature extraction of speech signal. Only when the characteristic parameters representing the essence of the speech are extracted in the speech signal preprocessing stage and can the comparison speech be compared with the

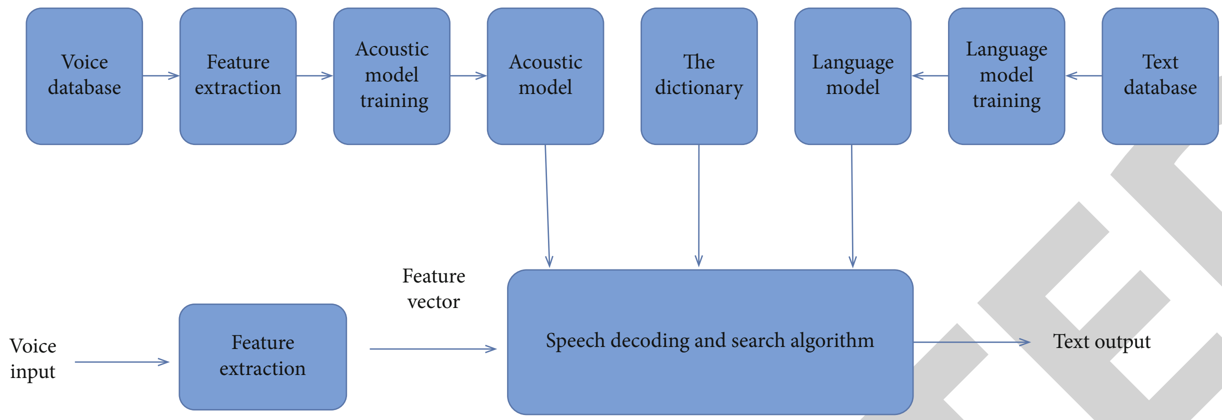

FIGURE 4: System recognition speech D block diagram.

standard speech to obtain the best similarity effect. There are generally five steps to deal with the preprocessing of audio signals: speech signal digitization, endpoint detection, framing, windowing, and pre-emphasis [15].

Pre-emphasis is to solve this contradiction. The common practice is to realize the speech signal through a digital filter with 6 dB/OCT:

$$H(z) = 1 - \mu^{*z-1}. \tag{1}$$

As shown in Formula (2),

$$S_{2(m)} = S(m) -^{*} S(m-1). \tag{2}$$

Generally speaking, speech signals can be regarded as infinite and change with time. However, in a very short time range, such as 10 ms-25 ms, the characteristic change of speech signal is very small. We can regard the signal in this short time as a steady-state signal and the spectral characteristics of speech in this period as fixed. Therefore, short-time analysis can be used to frame the speech signal, that is, the speech signal has the same segmentation on the time axis. We extract the characteristic parameters of the speech signal on each segment of the test speech and compare them with the segmented characteristic parameters of the standard speech to achieve our desired goal [16]. At the same time, in order to smooth the transition between adjacent frames of speech signal and make the continuity between adjacent frames of signal, there needs to be an overlap between frames. This overlap is usually called frame shift, and the amount of data contained in a ton of speech is called frame length. The system adopts 44 The sampling rate of 1 kHz is 4411 sampling points per second, and 255 sampling points occupy about 28 ms. Window functions generally use rectangular windows or Hamming windows, as shown in Formula (3):

Rectangular window:

$$W_R = \begin{cases} 1(0 < n < N\text{-}1) \\ 0(\text{Other}) \end{cases}. \tag{3}$$

Hamming window:

$$W_{HM} = \begin{cases} 0.5 - 0.46\cos\left(2\pi n|N-1\right)(0 < n < N-1)| \\ 0\ (\text{Other}) \end{cases}. \tag{4}$$

Hanning window:

$$W_{HN=}\begin{cases} 0.5 - 0.5\cos\pi n|M - 1(0 < m < N\text{-}1) \\ (\text{Other}) \end{cases}. \tag{5}$$

The choice of window is very important. Different windows will make the average result of energy different. Therefore, selecting a function that meets the requirements can better reflect the characteristic changes of speech signal.

In the process of speech signal processing, including speech recognition or speech comparison, whether the endpoint detection is accurate is related to whether the subsequent recognition results of speech recognition are credible. Correctly identifying the start point and endpoint of speech signal is a necessary condition for accurately obtaining speech information. Speech endpoint detection refers to using computer digital processing technology to find the starting and ending points of words and words from a section of speech signal, so as to store and process only effective speech signals. Endpoint detection plays two important roles. One is to distinguish whether the voice signal is effective or silent and noise so that a lot of useless signal data in the voice signal can be removed. Second, the speech signal after endpoint detection can improve the rate of feature extraction, so as to improve the program running efficiency [17].

There is no fixed method for endpoint detection. Different detection methods can be used for different systems. The following two common methods are introduced:

(a) The nth frame$X_n$of the voice signal is set, as shown in Formula (6):

$$E_n = \sum_{m-0}^{N-1} x\frac{2}{n}(m), 0 < m < N\text{-}1. \tag{6}$$

We can distinguish speech and noise by analyzing the energy of the signal. The speech signal will show higher energy if it is close to the pickup. Using short-time energy, speech signal and noise signal can be easily distinguished under the condition of high signal-to-noise ratio. However, in the environment with low signal-to-noise ratio, short-term energy cannot clearly distinguish speech signals from noise signals.

(b) Zero traverse rate for a short time

Since the sign of the two sample values of the F discrete signal is different, it indicates that it passes through a time axis, and then the zero crossing rate can be calculated, as shown in Formula (7):

$$Z_n = \frac{1}{2}\sum_{s-0}^{W-1} I \operatorname{sgn}\left[\mathrm{x}_n(s)\right] - \operatorname{sgn}\left[\mathrm{x}_\mathrm{n}(s-1)\right] I, \tag{7}$$

where sgn [x] is a symbolic function:

$$\operatorname{sgn}[\mathrm{x}] = \begin{cases} 1(\mathrm{x}>0) \\ -1(X-<0) \end{cases}. \tag{8}$$

Generally speaking, through the analysis of zero crossing rate, we can find that the speech segment has a relatively stable zero crossing rate, but the noise does not have this characteristic. Therefore, we can judge the endpoint of speech by short-time zero crossing rate. These parameters can describe the characteristics of the speech signal. Compared with linear prediction coefficient (LPCC), Mel cepstrum coefficient (MFCC) has stronger noise resistance and stability. Li Junyi tested the English pronunciation by using three characteristic parameters (MFCC, pitch, and magnitude). Finally, the experiment showed that the accuracy of MFCC was the highest. The characteristics of each characteristic parameter are shown in Figure 5.

From the above analysis and summary of the three feature parameters, it can be seen that the MFCC feature parameters have good noise resistance and robustness so that after extracting many feature parameters, MFCC feature parameters are selected to realize speech recognition and comparison, which one has good identification performance and antinoise performance at the same time. In addition, Mel cepstrum coefficient, i.e., MFCC characteristic parameter, can fully characterize human ear auditory characteristics. The human ears have different sensitivity to different frequencies. The human ear can keenly feel the difference of low frequency of sound, and the receptivity will decrease after exceeding a certain frequency. Figure 6 is a description of this relationship.

The relationship between mel scale and frequency can be expressed by the following equation:

$$f_{mel} = 25951\mathrm{og}_{10}\left(1 + \frac{f}{700}\right) \tag{9}$$

where the unit of actual frequency f is Hz, as shown in Figure 7.

3.1. Pretreatment. Pre-processing includes pre-emphasis, framing, and window functions.

3.2. Fast Fourier transform (FFT). Different energy distributions represent different phonetic features. Therefore, after multiplying the Hamming window, each frame must undergo fast Fourier transform to obtain the energy distribution in the spectrum.

$$Y(i,w) = FFT[yi(w)]. \tag{10}$$

(1) Spectral line energy

The spectral line energy of speech signal can be obtained by using the modulus square of spectrum.

$$E(i,w) = \left|X(i,w)^2\right|. \tag{11}$$

(2) Calculate the energy through the Mel filter

In the frequency domain, it is equivalent to multiplying and adding the energy spectrum $E(i,k)$ of each frame.

$$S(i,n) = \sum_{K-0}^{N-1} E(i,k) H_m(K). \tag{12}$$

(3) Calculate DCT cepstrum

The MFCC coefficient is obtained by the discrete cosine transform (DCT):

$$mfcc(i,n) = \sqrt{\frac{2}{M}}\sum_{c-0}^{C-1} 1\mathrm{og}[S(i,C)] \cos\left(\frac{\pi n(2c-1)}{2c}\right), n-1,2..\cdots L. \tag{13}$$

Adjusting the path range of the search matrix will have a great impact on the matching speed. We can control the search area by setting two slopes. If the search area is too small, the search speed will be greatly improved, but many useful paths will be lost, resulting in incorrect comparison. On the contrary, the search area is too large, which will affect the matching speed. Finally, after the experiment, it is found that the improved DTW search path will not search the whole data matrix area in the figure, but reduce the parallelogram area surrounded by two lines with a slope of 2/3 and 3/2 with the origin as the coordinate and the starting and ending points (see Figure 8).

Three hypotheses of visual analysis cognitive theory are as follows:

(1) The bidirectional channel hypothesis refers to the auditory/phonetic channel and the visual/image channel. Visual channels are used to process the material presented to the eye, and the auditory

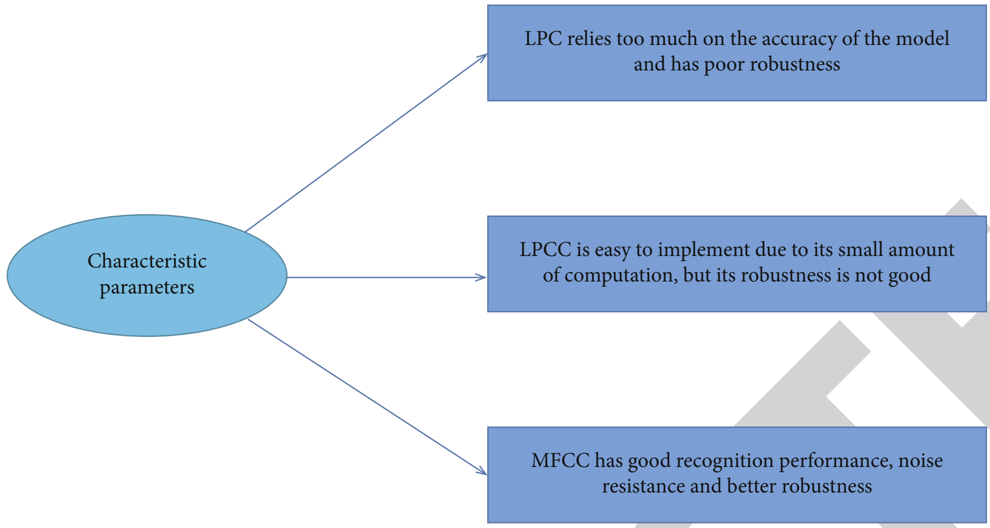

Figure 5: Characteristics of characteristic parameters.

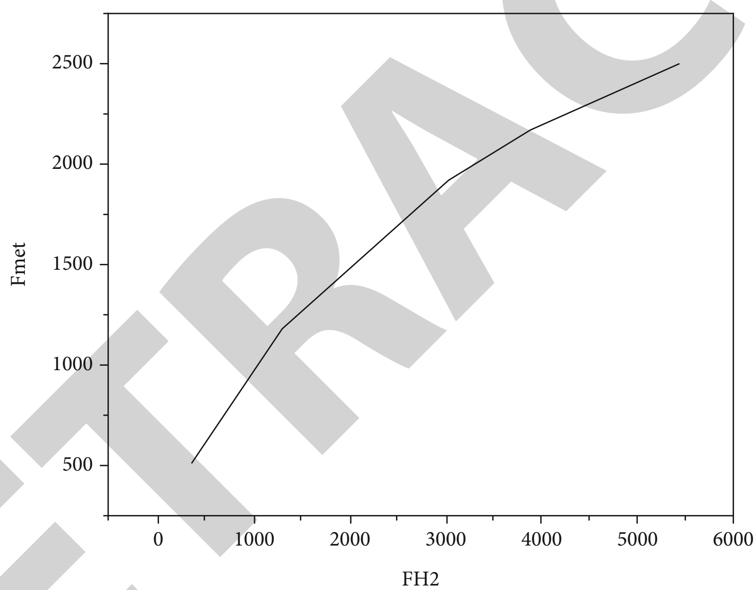

Figure 6: Relationship between human ear hearing range and Mel frequency.

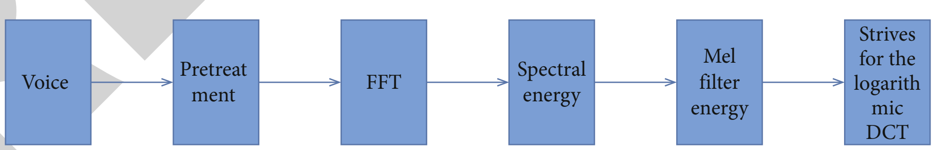

Figure 7: Extraction diagram of feature parameters

channel is used to process the material presented to the ear. However, when learners allocate enough cognitive resources to the task, the learners can also change the representation so that they can process information in another channel. For example, the screen text presented to the eyes may be processed in the visual channel first, but the learners can psychologically convert visual materials into sound through reading aloud and process them in the auditory channel

(2) When something is taught to the learners, whether it be illustrations, animations, or oral explanations, the learners do not remember everything, but only parts or pieces of knowledge. Therefore, presenting too much teaching information will bring a burden to learners' cognition

(3) In active processing hypothesis, people will actively process the information presented by visual analysis.

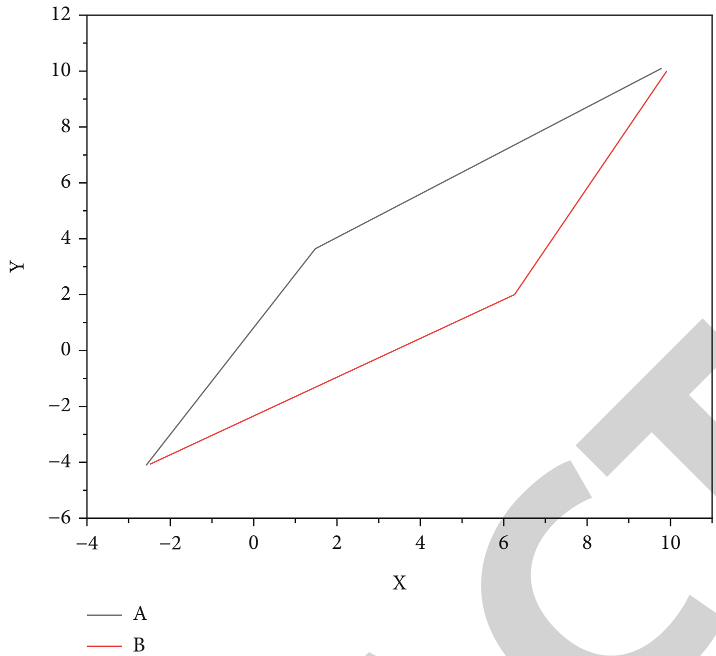

Figure 8: Schematic diagram of matching path constraints.

> These active cognitive processing processes include forming attention, organizing new information, and integrating new information with other knowledge. Based on this understanding, Meyer proposed the learning process of learners in the visual analysis environment, as shown in the visual analysis cognitive model shown in Figure 9 below

According to the two-way channel hypothesis, the representation materials of knowledge can be converted between different information processing channels. When presenting knowledge to learners, the system can provide graphic and audiovisual stimulation, so as to facilitate learners to select their preferred information processing channels for information processing and finally form a language model or visual model of working memory. Because the amount of information processing by college students is very rich, the material components and presentation methods of knowledge points should be integrated and systematic in the organization of learning materials. At the same time, the correlation between knowledge points should be close, which can help the learners understand relevant knowledge as soon as possible. The learners can choose the appropriate learning content according to their level, establish auditory model and image model through different information processing channels, integrate them with the prior knowledge in their long-term memory into a complete model, and form their own knowledge structure. The English goal is shown in Figure 10.

Through the above analysis, we can define the path traversed by this solid line as a search path of dynamic time regularization, which is represented by W, and the kth element of W is defined as wk = (i,j)k, which defines the sequence Mapping of M and N. Thus, we have

$$W = w_1, w_2, \cdots, w_{k-1}, \cdots, w_k\,;\ \max\,(m, n) \le k \le m + n - 1. \tag{14}$$

The K in the denominator is mainly used to compensate for regular paths of different lengths. The idea of DTW is to extend and shorten the two time series to obtain the shortest distance between the two time series. This shortest distance is the final distance measure of the two time series. Here, all we have to do is choose a path that minimizes the total distance we end up with. Here, we define an accumulated distance, starting from the (0, 0) point to match the two sequences M and N, and each time a point is reached, the distances calculated by all the previous points will be accumulated. After reaching the endpoint (h, k), this cumulative distance is the final total distance we mentioned above, that is, the similarity between sequences M and N. The relationship between the accumulated distance g(i, j) and the current feature point d(i, j) is as follows:

$$g(i, j) = \min \begin{cases} g(i-1) + d(i, j) \\ g(i-1, j-1) + 2d(i, j)\,. \\ g(i, j-1) + d(i, j) \end{cases} \tag{15}$$

4. Results and Analysis

The algorithm of generating random graph is designed by visual analysis, and the Hamiltonian loop problem is programmed by answer set programming. The distribution laws of Hamiltonian loop existence, nonexistence, and difficult calculation of random graph are experimentally studied. On the basis of generating random graphs and Hamiltonian

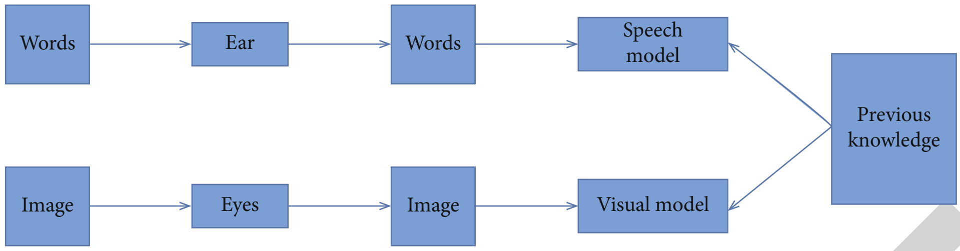

Figure 9: Meyer's visual analysis cognitive model.

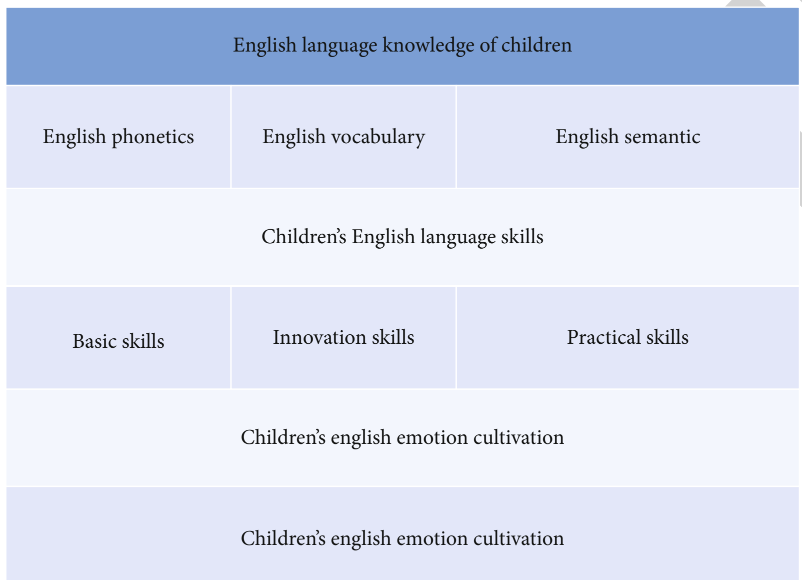

Figure 10: English objectives.

loop logic program HP.1p, we use clasp as the answer set Solver (its version is clasp-2.1.0) and lparse ° as its front end (its version is lparse-1.1.2). The Hamiltonian loops of these random graphs are solved on 8 Intel 2.27GHZ CPU, 8G memory, and 64 bit Linux system server (Fedora17). According to the running results of all random graphs, whether clasp solves the Hamiltonian loop and its running time are counted. For each subclass of the graph, the statistical data are as follows (Figure 11):

4.1. Average Time. In Figure 11, time is the ordinate (unit s), and 1/N of the total number of sides is the abscissa. According to Figure 11, when the number of nodes is determined, the time used to calculate whether there is a Hamiltonian loop in the random graph decreases with the decrease of the number of edges. However, the time increases abnormally in the process of time decreasing. For example, when the total number of edges of 40 nodes is between 1/8 and 1/10, the time used for solving abnormally increases, while when the total number of edges of 50 nodes is between 1/ 10 and 1/13, the time used for solving abnormally increases, etc. This is because clasp takes more time to solve the Hamiltonian loop of some random graphs (more than 10 times the average time), so the average time increases abnormally in the range of edges.

4.2. Proportion of Solvable Graphs. Among the 30 graphs of each subclass, the solver clasp returns the proportion of the number of random graphs with Hamiltonian loops in the total number of random graphs of each subclass within 3 minutes, which reflects the probability of Hamiltonian loops in the random graphs of this subclass (see Figure 12).

In Figure 12, the scale of the solvable graph is the ordinate, and 1/N of the total number of sides is the abscissa. According to Figure 12, when the number of edges of a random graph is large, there are Hamiltonian loops in each random graph (the number of edges exceeds 1/6 of the total number of edges, and the proportion of solvable graphs in the graph is 1). In the process of decreasing the number of edges, the probability of Hamiltonian loop in the graph decreases (the proportion of solvable graph decreases gradually). When the number of edges continues to decrease, there is no Hamiltonian loop in the random graph (the number of edges is less than 1/26 of the total number of edges, and the proportion of solvable graphs in the random graph is 0). When the number of nodes of a random graph is 40, the proportion of a solvable graph begins to decrease at the position where the total number of edges is 1/6. When the number of nodes is 60, the proportion of solvable graphs begins to decrease at the position where the total number of edges is 1/7. When the number of nodes is 80, the proportion of

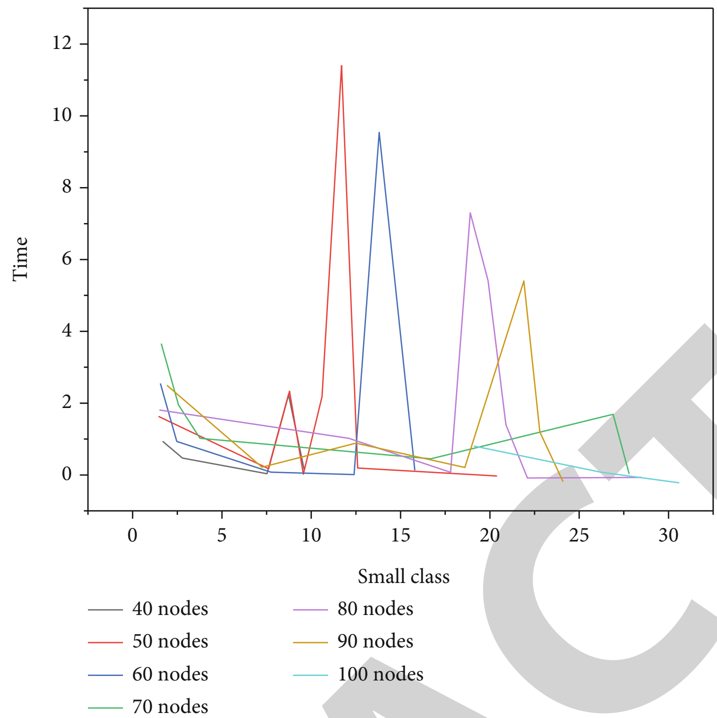

Figure 11: Average time.

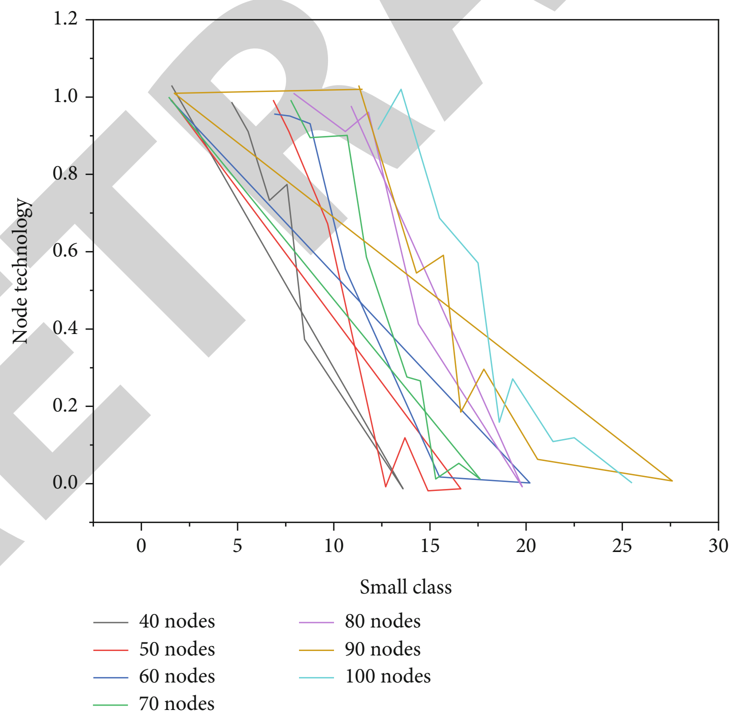

Figure 12: Scale of interpretive graph.

the solvable graph begins to decrease at the position of 1/9 of the total number of edges. The proportion of the number of edges whose proportion of the solvable graph begins to decrease in the total number of edges decreases (the position gradually moves backward).

4.3. Proportion of Unknown Solution Graphs. Among the 30 graphs of each subclass, the proportion of the number of random graphs was terminated by the solver clasp without finding the answer within 3 minutes in each subclass graph, which reflects to a certain extent the probability that the

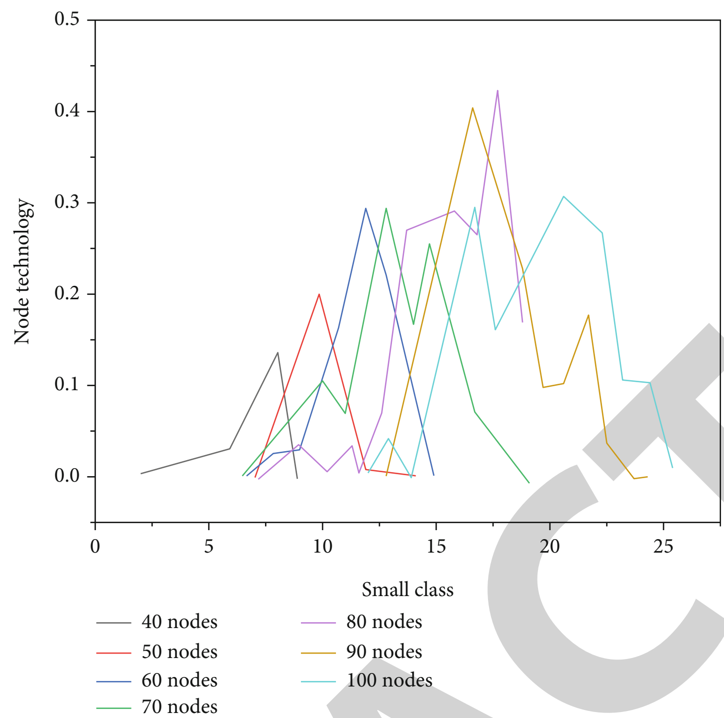

FIGURE 13: Scale of unknown solution

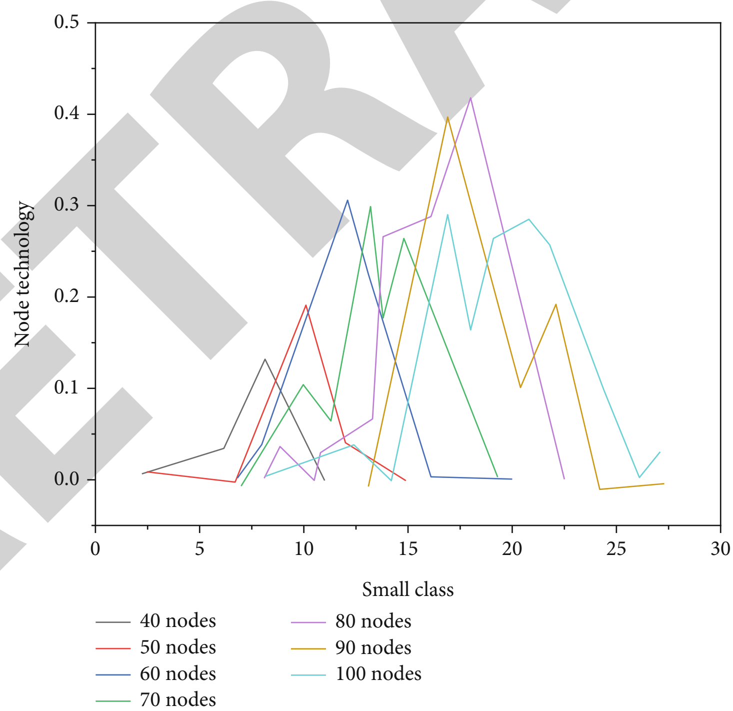

FIGURE 14: Scale of difficult figure.

random graph is difficult to solve the Hamiltonian loop (see Figure 13).

In Figure 13, the scale of the unknown solution graph is the ordinate, and 1/N of the total number of sides is the abscissa. According to Figure 13, it can be found that when the nodes are different, a number of edges of the random graph that cannot solve the Hamiltonian circuit are different.

4.4. Scale of difficult (Figure 14). According to the experimental statistical data, it is found that the time spent by the solver clasp in calculating some graphs in some subclasses is more than 10 times that of most other graphs in this subclass, which leads to an abnormal increase in the average time spent on calculating Hamiltonian loop under a certain node under the main trend (decreasing with the decrease of the number of edges). Therefore, the number of random graphs (including graphs with unknown solutions) in which the time used to solve the Hamiltonian loop in each small class of random graphs exceeds 10 times the average time of the small class is counted, and its ratio to the total number of random graphs (30) of the small class is the proportion of difficult graphs.

In Figure 14, the scale of the difficult to solve graph is the ordinate, and 1/N of the total number of sides is the abscissa. According to Figure 14, it can be found that when the number of nodes is different, the range of the number of edges of the difficult to solve graph increases. At the same time, the position of the number of edges of the intractable graph begins to move backward. By comparing the proportion of a node difficult to solve graph in Figure 14 with the proportion of its corresponding node in the unknown solution graph in Figure 13, it can be seen that the random graph that is not easy to solve at the beginning can solve the result within the specified upper limit of time, that is, whether there is a Hamiltonian loop, but the calculation needs a very large time. Then, with the decrease of the number of edges, it is impossible to calculate whether there is a Hamiltonian circuit in the random graph, so there is an unknown solution graph. Then, as the number of edges continues to decrease, it is difficult to calculate the random graph of Hamill circuit, and whether it has Hamiltonian circuit can be solved, but it takes a long time.

5. Conclusion

After discovering the practical problem that college students' oral English level is relatively weak, taking improving students' English phonetic scores as the starting point, in order to be supported by Internet technology, combined with a series of educational theories, this paper designs and implements a visual analysis platform for English phonetic assisted learning, introduces two kinds of random graph models, and then introduces the concept of phase transition. The algorithm for generating random graphs was designed by visual analysis, and the Hamiltonian circuit problem was programmed by answer set programming. Based on the generated random graph and the Hamiltonian circuit logic program HP.1p, we use clasp as the answer set solver (its version is clasp-2.1.0) and lparse°as its front-end (its version is lparse-1.1. 2). The Hamiltonian circuits of these random graphs are solved on 8 Intel 2.27GHZ CPUs, 8G memory, and 64-bit Linux system server (Fedora17). The detection results show that the visual analysis platform can basically meet the requirements. A questionnaire survey was conducted on the mastery of spoken English of local college students, problems were found, and the original design intention of the platform was put forward.

Data Availability

No data were used to support this study.

Conflicts of Interest

The author declares that there is no conflict of interest with any financial organizations regarding the material reported in this manuscript.

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