Journal of Combinatorial Mathematics
and Combinatorial Computing
www.combinatorialpress.com/jcmcc

Combinatorial Press

# Using Corpus and Artificial Intelligence Technology to Build English Conversation Classroom Teaching Scenarios

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ABSTRACT

This paper analyzes the current teaching development direction of intelligent simulation context, and argues that the development and updating of semi-open human-computer dialogue systems based on scenes and topics need to rely on the division of labor between machines and human beings. In this regard, the development strategy of intelligent teaching of English dialogue interaction is proposed by combining the speech corpus annotation system designed based on artificial intelligence technology and the dialogue interaction teaching strategy derived from the interactive teaching model. The corpus annotation model of multi-layer perceptual machine is designed, which consists of real-time interaction module, core technology and algorithm module and data storage module. Draw a mind map of the framework for analyzing the effectiveness of dialog teaching, and develop a dialog interactive teaching strategy for pre-class dialog, in-class dialog and after-class dialog by invoking the interactive teaching model. Analyze the annotation results of the intelligent annotation model of speech corpus in LDC corpus and UN corpus. Observe and organize the teaching implementation effect of the dialogue interactive teaching strategy, and illustrate the pedagogical feasibility of the English dialogue interactive intelligent teaching development strategy proposed in this paper in combination with the learning achievement and questionnaire results. In the classroom English conversation, the zero feedback of dialog teaching is only 1.60%. The linguistic feedback of dialogue is reflected in the proportion of 33.87% of combing and summarizing, 33.55% of judging the correctness and error, and 30.99% of extending and pursuing questions. The effectiveness of English conversation classroom is improved.

*Keywords:* intelligent simulation context, multilayer perceptual machine, corpus annotation model, interactive teaching model, English conversation teaching

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Received 12 January 2024; Revised 25 February 2024; Accepted 15 December 2024; Published Online 16 April 2025.
DOI: 10.61091/jcmcc127b-452

## 1. Introduction

English teaching consists of four basic points, namely, listening, speaking, reading and writing, which are indispensable and vital in English learning. Situational dialog teaching mode is a comprehensive teaching mode that combines situational teaching and dialog teaching, which can carry out situational dialog interaction in all aspects of English teaching, so that students can carry out flexible learning and application of different learning contents [1-2]. Teachers in the classroom combined with the actual situation of classroom teaching and students' learning ability and strengths, to carry out different forms and levels of dialogue teaching, which is conducive to highlighting the student's main position, enhance the practicality and authenticity of English learning, and stimulate students' enthusiasm for learning [3-4]. At the same time, both teachers and students communicate about the actual effect of dialogue learning, solve the problems encountered by students in the learning of situational dialogue classroom, give full play to the guiding role of the teacher, and promote students' understanding of knowledge [5-7].

The role of the scenario is to visualize the content of language training in front of the students, and with the help of information technology can well help students quickly understand and master the points contained in the scenario [8-9]. In recent years, the human-computer dialogue system centered on artificial intelligence has been developing rapidly, and how to make the computer correctly understand human discourse intentions in dynamic contexts is the focus of human-computer interaction, which is the ultimate purpose of computer natural language understanding [10-12]. In this context, the construction and processing of dialog corpus has become one of the important trends in the field of corpus, and how to carry out in-depth processing at the semantic and pragmatic levels, and provide rich linguistic knowledge for computers has become a common concern in the fields of linguistics and language engineering [13-15].

Mei, Q. introduces the application of scenario teaching method in university English classroom, which highlights the students' dominant position in the classroom, develops students' interactive communication ability by creating dialogue scenarios with different themes, enriches students' imagination and stimulates students' interest in learning, and promotes the development of English classroom in the direction of quality education [16]. Zhong, C. reviews the role played by scenario teaching in English classrooms at all stages of English education in China, which is interesting, flexible and practical. English education at all stages, establishing long-term learning interest for elementary school learners, providing practical application opportunities for secondary school learners, and consolidating the basic knowledge of English for secondary school learners, with fun, flexibility and practicability English situational teaching mode effectively improves the learning experience of students and stimulates their learning autonomy [17]. Liang, K. et al. analyzed the situational English teaching's analyzed the quality and effect of situational English teaching, and after empirical investigation, found that students' English proficiency was limited under the traditional indoctrination English teaching mode, while the English situational teaching mode significantly improves the quality of English teaching by enhancing students' interest in learning and their ability to comprehensively utilize the English language [18].

Lee, S. et al. designed PEEP-Talk, an English situational dialog chatbot for foreign language learners, which not only generates responses to learners' off-topic utterances, but also provides feedback on grammatical error corrections for learners' sessions, which can effectively reduce the barriers to natural conversations in English for learners [19]. Li, K. C. et al. designed an innovative English conversation system using natural language processing techniques and machine learning algorithms, which is able to simulate goal-oriented conversation scenarios for learners to practice, and according to the students' feedback results, the system is reliable in improving students' oral fluency [20]. Al Khateeb, A. et al. showed that the lack of authentic language learning tasks is an important reason for the low oral proficiency of many English language learners, and that the use of corpus analysis

methods to investigate grammatical and lexical collocations in oral and communicative tasks in foreign language textbooks can provide a reasonable distribution of tasks for situational dialogic examples [21].

This paper analyzes and proposes four basic modules of artificial intelligence technology in English speaking teaching, mentions the current development dilemma of intelligent simulation context teaching, and points out that the improvement of semi-open human-computer dialogue system based on scenario and topic requires the division of labor between machine and human. Design the construction of two major modules of speech corpus text and speech, and build the corpus annotation system based on artificial intelligence technology. Use multi-layer perceptual machine algorithm to optimize the automatic annotation of speech corpus. Combined with the strategy of separate cooperation between machine and artificial proposed in the previous paper, this paper combines the intelligent annotation system of speech corpus with the interactive teaching mode of dialogue to optimize the dialogue teaching scenario in the English classroom.

## 2. Intelligent directions for the development of English conversation teaching

### *2.1. The Use of Artificial Intelligence Technology in the Teaching of Spoken English*

Intelligent speaking interactive teaching should be devoted to the design and improvement of four basic modules, including teaching and dialog module, error correction and assessment module, prompting and diagnosis module, and corpus generation and processing module. Combined with the research theme of this paper, this paper mainly analyzes the module of artificial intelligence technology and English conversation classroom teaching.

2.1.1. Instructional Development of Intelligent Simulation Contexts. The simulation teaching environment realized by virtual technology can greatly improve the user's interactive experience, realizing a deeper integration of the physical and virtual learning space of the school and making teaching more immersive, interactive, conceptual and intelligent [22-23].

However, most of the current teaching of intelligent simulation context, the essence of the fixed “script” plus real or synthetic pictures or videos, teaching most of them still stay in the text to follow, read aloud the preset “lines”, the main form of its intelligent dialog function as follows Its intelligent dialog function is mainly in the form of “machine asks, student answers”, or students' “sentence-making” dialog according to the given vocabulary. These attempts to make reading aloud electronic and entertaining so as to stimulate students' enthusiasm for learning, but the form still cannot get rid of the use of pre-set “scripts” to carry out mechanical dialogue drills.

2.1.2. Teaching dialog in virtual scenarios. The latest human-computer interaction technology has been able to simulate a more realistic interpersonal conversation in a specified scene (or topic), and to communicate more “freely” with the user. Students can “speak freely” to the computer, free from mechanical reading and fixed procedures. The computer determines the speaker's semantics and intent through natural language processing technology, and then relies on reasonable modeling algorithms and human-set dialogue logic to make more natural and realistic responses and ensure that the conversation goes on smoothly. It can also play the roles of “asking” and “answering” at the same time. Therefore, students also have a certain degree of freedom in sentence structure, vocabulary, and expression content, and can express themselves more freely without sticking to the "script" within a given theme, and truly "practice" in "learning".

The development of semi-open human-computer dialogue systems based on scenarios and topics relies on a cooperative mechanism of dialogue established by simultaneously utilizing natural language processing techniques and the artificial setting of logical structures, which requires a division of labor between machines and humans. If entirely through intelligent technology, machines often lack accurate algorithms to make further responses when the topic is too open, the user's answers are too

varied, or beyond the scope of the machine's training.

Therefore, the way to solve this problem at this stage can only be an organic combination of the two.

1) Initially establish the basic model and algorithm of dialog hierarchy through machine training. And then artificially formulate “rules”, such as which key information to extract, the order of questions, the logical connection between various sub-topics, conversation strategies, dialog levels in multiple rounds of dialog, etc.. Afterwards, these “rules” are then applied to the machine training, so that the machine itself “learns” to formulate rules and train a more optimized and smarter model, which ultimately reduces the workload.

2) The need for cooperation between teachers, foreign language researchers and programmers. In addition, the logical structure also includes a prompting mechanism, indexing function, etc., so that the model of dialogic cooperation is not only for the smooth progress of the dialog, but also to enable the practitioners to effectively practice the language expressions learned in the course, consolidate the key concepts and basic knowledge, carry out a certain degree of thinking and master practical and effective dialogic skills.

### *2.2. Design of Intelligent Speech Corpus*

#### 2.2.1. Speech corpus text design

1) Principles of corpus construction. Speech corpus text is designed to cover as many natural language phenomena as possible with as little corpus as possible [24]. Good corpus building is the need to use a relatively sparse number of training sets to fill the feature space with as many speech units as possible. From this feature space, the set of corpus sentences that can best represent the speech features is selected, while the set of corpus sentences used in training is required to reach a global or local minimum. The essence of this process is the problem of how to refine a mathematical model of coverage.

Let $F=\{1,...,N\}$, $N$ be the number of eigenfactors. For any $\forall i \in F$, define the eigenfactors $F_i$ as a discrete set, $F_i=(F_1,...,F_\xi)$, where $\xi=|F_i|$. Define the eigenspace $F=(F_1\times F_2...F_N)$ such that each eigenvalue $\rho$ corresponds to an eigenvector:

$$f(\rho)=(f_1,...f_N)\in F \quad f_i\in F_i(1\le i\le N) \tag{1}$$

In the most extreme case, the statistical model is to build a lookup table that lists all the feature vectors. Using this method, it is necessary to achieve 100% coverage of the feature space, covering $\prod\xi_i$ possible eigenvector. The additive model is another method considered, where eigenvector $f$ corresponds to eigenvalue $D(f)$:

$$D(f)=\sum_{i=1}^{N}A_i(f_i) \tag{2}$$

where $A_i(f_i)$ is the contribution parameter when the characteristic factor $i$ takes the value of $f_i$. It is easy to show that the number of free parameters in the additive model is $1+\sum_{i=1}^{N}(\xi_i-1)$. Eq. can be rewritten as:

$$D(f)=D_{mean}+\sum_{i=1}^{N}D_i(f_i) \tag{3}$$

where $D_{mean}$ is a constant and $\sum D_i(f_i) = 0, 1 \le i \le N$. So a minimum of only $1+\sum_{i=1}^{N}(\xi_i - 1)$ samples are required to solve for all parameters. The requirement for training set coverage is drastically reduced than the lookup table method.

2) Greedy Algorithm and Text Selection. The proposed array, defined as $M = (X, M)$. where $X$ is the set of elementary elements, $M \subseteq 2^x$ is a subset cluster of $X$ and satisfies the following conditions: $\varnothing \in M$, $Y \in M \Rightarrow Z \in M, \forall Z \subseteq Y$, $Y \in M, Z \in M, |Y| > |Z|, \exists x \in Y, \hat{E}^1 Z \cup \{x\} \in M$.

A set in $M$ is called an independent set. For any $T \subseteq X$, define the rank $rank(T)$ of $T$ to be the technology of the largest independent set in $T$. For a subset cluster $S \subseteq 2^x$ of $X$, define $rank(S) = rank(U_{T \in S} T)$. and $rank(M) = rank(X)$.

Define cost function $c : \to R$ and a subset cluster with cost function $c(S) = \sum_{Y} \in Sc(Y)$. A subset cluster $S$ satisfying condition $rank(S) = rank(M)$ is called a cover of $M$. Given $M = (X, M)$ and a cost function $c : 2^x \to R$, the problem of fitting an array cover is to solve a cover of $M$ that minimizes the cost function. Let $X$ be the set of all vectors in $R^n$ space, and $M$ be a subset cluster of linearly independent vectors in $X$, then $M = (X, M)$ clearly satisfies the definition of the proposed matrix. Considering the matrix $X(C)$, and the $P_i$ corresponding submatrix $X(P_i)(1 \le i \le s)$ of each sentence in $C$, each $X(P_i)$ is a subset of vectors in $R^m$ space, here $m = |P|$ if defined:

$$c(X(P_i)) = 1, 1 \le i \le s \tag{4}$$

$$c(Y) = s + 1, Y \in 2^x \tag{5}$$

Then solving the least costly cover of $M$ yields a minimal subset of the base of the text base $C$ such that $X(C)$ is invertible, if such a $C'$ exists, when solving the optimal text selection, i.e., the proposed matrix cover problem. Each step of the algorithm selects the $X(p_i)$ that increases the rank of the covering set by the most to be added to the covering set until a complete covering is found, or until $X(C)$ is irreversible.

3) Greedy algorithm and text selection. The screening of the corpus is to ensure the specification of the corpus data, after the initial specification of the text also need to use the greedy algorithm to select the optimal text. From this, we can know that the sentence selection problem is, as the name suggests, an optimal text selection problem, which is also commonly referred to as the NP problem. A common approach to this problem is to use a greedy algorithm to solve its optimal solution. The greedy algorithm used for selection in this paper is shown below:

STEP1:

$$S = \{\text{A collection of all sentences}\}, C = \{\varnothing\}, U = \{\text{The set of units to cover}\} \tag{6}$$

STEP2: Calculate the score for each sentence $i$ in $S$.

STEP3: Place the highest scoring sentence $j$ from $S$ into set $C$ and remove the cells contained in sentence $j$ from set $U$.

STEP4: Repeat steps 2 and 3 until $U$ becomes the empty set or $S$ becomes the empty set.

STEP5: The obtained set $C$ is the corpus set.

4) Automatic selection of text corpus. According to the requirements of speech synthesis and speech recognition on speech corpus, and considering the characteristics of Chinese speech, the following guidelines are proposed for the selection of utterances:

Ⅰ, the three-tone sub-model is chosen as the basic unit for describing speech, and the selected sentences are required to include as many linguistic phenomena as possible.

Ⅱ, Maximize the coverage of various linguistic phenomena with as few utterances as possible, that is, to ensure a certain coverage rate.

Ⅲ, in speech synthesis and speech recognition systems, high-frequency words have a higher chance of appearing, so the selected sentences should include as many high-frequency words as possible.

Ⅳ, Data sparsity should be avoided so that each triphone occurs a certain number of times.

The process of corpus selection includes: original corpus → segmentation of sentences → segmentation → annotation → scoring → selection of corpus.

2.2.2. Construction of the speech corpus. Corpus is the foundation of natural language processing, corpus quality and size directly affect the final results, especially for speech recognition technology, the quality and size of the corpus is the core of all the problems.

The detailed workflow of English online speech acquisition software is described in detail. First, the prepared standard text corpus is put on the server, and the format of the corpus is text format. The server-side program on the server splits the overall text file into several task files, and the format of the split task files is also in txt format. According to the actual demand, each task file is assigned to 500 sentences inside. For example, there is a text corpus containing 5000 sentences on the server side, so the server side automatically segments this corpus into 10 separate task files containing 500 sentences each, and the user side downloads the tasks assigned by the server side before recording. This time, the requirement is to collect 500 natural read-aloud voice data of a person, so the number of sentences allocated in a task file is 500.

After the user starts the speech acquisition software, he/she enters the task list and downloads the tasks assigned by the server. After the task is downloaded, the user can start recording. After the user enters the recording stage, the mobile program reads the 500 sentences in the task file by line and displays them to the user. When the user sees a line of sentences on the screen, he/she clicks the Record button at the bottom of the screen and reads out the displayed sentences for recording. When the recording is finished, click “Finish Recording”.

### *2.3. Design of corpus annotation system based on artificial intelligence technology*

2.3.1. Corpus annotation system based on artificial intelligence technology. The corpus annotation system based on artificial intelligence technology aims to provide users with the results predicted by pre-trained corpus annotation models. And it provides the prediction results of more than two different algorithms in order to assist manual decision-making of the annotation results, so as to improve the efficiency of corpus annotation. The overall architecture should ensure the standardization of the annotation process, the efficiency of the annotation process, and the stability of the annotation results preservation, in order to ensure that the artificial intelligence technology can guarantee the corpus annotation process in all aspects.

The system architecture of the corpus annotation system based on artificial intelligence technology is shown in Figure 1. The corpus annotation system based on artificial intelligence technology can be roughly divided into three modules from the overall architecture, namely, real-time interaction module, core technology and algorithm module and data storage module.

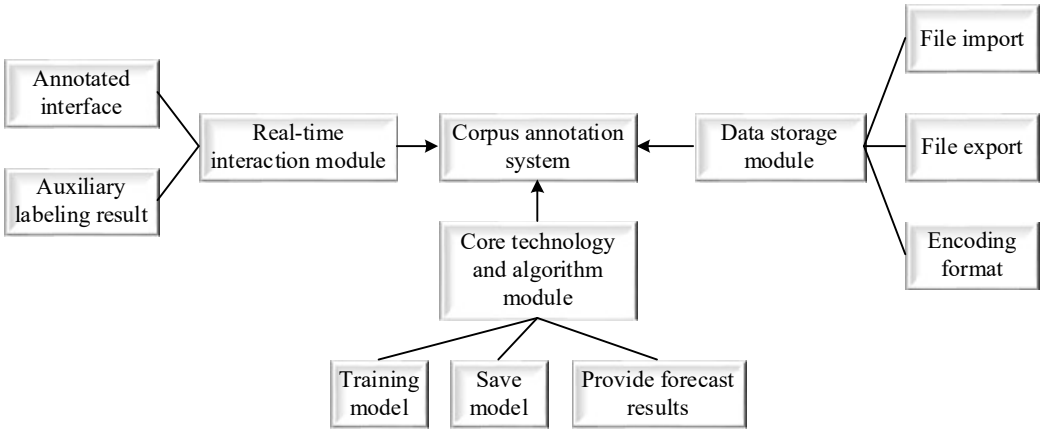


**Fig. 1.** The system architecture of the corpus labeling system of intelligent technology

2.3.2. Multi-Layer Perceptron-based Corpus Labeling Models. Multilayer Perceptron (MLP) is a feed-forward artificial neural network, which has been widely used in various fields, for example, natural language processing, language recognition, image recognition, and so on. The multilayer perceptron model consists of 3 layers: input layer, hidden layer, and output layer. The input layer is used to receive raw data provided by the user. The hidden layer, on the other hand, utilizes weight coefficients, activation functions, etc. to extract features from the data. The working principle is that through the input layer, the input data will be connected by multiple neurons in the hidden layer, and finally converge to the output layer, which means that the output layer will get the prediction results. There can be one or more neurons in the hidden layer, and each neuron in the hidden layer is connected to all the neurons in its corresponding previous layer, this connection is called a full connection, and it is the usual connection method.

Multilayer Perceptron Machine is a powerful deep learning model with strong nonlinear processing capability and better generalization performance. The multilayer perceptron network model is a powerful neural network model, which is generalized from the perceptron model, and has more hidden layers than shallow neural networks, and therefore has more network parameters and a stronger ability to deal with nonlinear problems. The basic unit that constitutes a multilayer perceptual machine network is the neuron, whose mathematical expression is given in equation (7), where $w_i$ denotes the weight coefficient corresponding to input $x_i$ and $b$ is the bias term.

$$z = \sum w_i x_i + b \tag{7}$$

The multilayer perceptron learns the appropriate parameter weights and bias terms from the input data through neurons, and uses the activation function $f(z)$ to transform linear relationships into nonlinear signals, enabling the network to accurately perform a variety of tasks in areas such as classification or regression prediction.

The training process of the multilayer perceptron network consists of two stages: forward propagation and back propagation. The forward propagation algorithm computes the output of the next layer by computing the output of the previous layer until the output layer is computed. Assuming that the training data is $(x_i, y_i)$, the total number of input layers is $L$, the weight matrix corresponding to all the hidden and output layers is $W$, the offset vector is $b$, the output of each layer is calculated as $a^l$ according to the neural network arithmetic rules, and the final output is $a^L$, $f$ is the activation function, and $z$ is the output after passing through the neuron as shown in Equation (8):

$$a^l = f(W^i a^{l-1} + b^l)(2 \le l \le L) \tag{8}$$

In the process of forward propagation, the weight matrix $w$ and bias vector $b$ of the network are randomly initialized, and a back-propagation algorithm is needed to determine the appropriate weight matrix $w$, with the bias vector $b$. The goal of the back-propagation algorithm is to find the optimal parameters by minimizing the loss function. The mean square error is a commonly used loss function in backpropagation algorithms, which is used to measure the gap between the predicted and actual values output by the network. For each training sample $(x, y)$, the coefficient 1/2 is used to cancel out the exponent derived from the differentiation, and its mean square error can be expressed as equation (9):

$$J(W,b,x,y)=\frac{1}{2}\| a^L-y\|_2^2 \tag{9}$$

Output to the last layer i.e. layer $L$, $W$ and $b$ of the output layer satisfy equation (10):

$$a^L=f(z^L)=f(W^L a^{L-1}+b^L)-y\square_2^2 \tag{10}$$

For the output layer parameters, the loss function becomes:

$$J(W,b,x,y)=\frac{1}{2}\| f(W^L a^{L-1}+b^L)-y\|_2^2 \tag{11}$$

In order to solve for the gradient, the derivatives of $W,b$ are obtained separately and the results are shown in Eqs. (12) and (13), where $\square$ denotes the Hadamard product, i.e., the product of the corresponding elements of two matrices of the same dimension. i.e:

$$\frac{\delta J(W,b,x,y)}{\delta W^L}=\frac{\delta J(W,b,x,y)}{\delta z^L}\frac{\delta z^L}{\delta x}=(a^L-y)(a^{L-1})^T\square\ f'(z) \tag{12}$$

$$\frac{\delta J(W,b,x,y)}{\delta b^L}=\frac{\delta J(W,b,x,y)}{\delta z^L}\frac{\delta z^L}{\delta x}=(a^L-y)\square\ f^{'}(z) \tag{13}$$

According to the forward propagation algorithm, equation (14) is obtained:

$$z^{'}=W^{'}a^{I-1}+b^I \tag{14}$$

This leads to the derivation of the gradient of $W^{'},b^{'}$ at level $t$, as shown in Eqs. (15) and (16), where $T$ denotes the transpose of the matrix. i.e:

$$\frac{\delta J(W,b,x,y)}{\delta W^L}=\frac{\delta J(W,b,x,y)}{\delta z^L}\frac{\delta z^L}{\delta x}=\delta^l(a^{l-1})^r \tag{15}$$

$$\frac{\delta J(W,b,x,y)}{\delta b^L}=\frac{\delta J(W,b,x,y)}{\delta z^L}\frac{\delta z^L}{\delta x}=\delta^l \tag{16}$$

Further, a recursive relation about $\delta$ is obtained as in Eq. (17):

$$\delta^{'}=\delta^{'+1}\frac{\delta z^{'+1}}{\delta z^{'}}=(W^{'+1})^T\delta^{'+1}\square\ \sigma^{'}(z^{'}) \tag{17}$$

From the recurrence equation for $\delta$ one can derive the recurrence equation for $W,b$ as in equations (18) and (19):

$$W'=W'-a\sum_{i=1}^{m}\delta^{iJ}(a^{iJ-1})^T \tag{18}$$

$$b^i=b^i-a\sum_{i=1}^{m}\delta^{ij} \tag{19}$$

When the change values of $W$ and $b$ are both less than the iteration threshold, the linear coefficient matrix of each hidden layer and the output layer is output $W$ with the offset vector $b$. At this point, the training of the whole neural network is completed.

### *2.4. Intelligent English conversation classroom teaching scenario development*

In the discussion of this paper, dialogue teaching is an advanced teaching method, which is both a teaching tool and at the same time a teaching concept and principle, or to realize the purpose of education to train students to communicate and express themselves. This paper discusses English conversation teaching from the perspective of the way of conversation teaching. In a word, dialogic teaching can be defined as a way to realize the purpose of education through communication between teachers and students as well as between texts in teaching.

English conversation teaching is the application of conversation teaching in English subject, so the meaning of conversation teaching also applies to English conversation teaching, i.e., English conversation teaching is a way of teaching in which teachers and students as well as texts communicate with each other in order to realize the goals of English teaching. Specifically, under the guidance of the teacher, students take the initiative to learn English by means of "dialog" (including students' self dialog, teacher-student dialog, student-student dialog, student-based dialog, etc.) in order to master English learning skills and the ability to communicate with others.

2.4.1. A Framework for Analyzing the Effectiveness of Dialogue Instruction. For the problem of how to analyze the effectiveness of classroom dialogue teaching, this paper designs and constructs a framework for analyzing the effectiveness of dialogue teaching, which provides a new perspective for the study of the effectiveness of dialogue teaching.

Dialogue teaching effectiveness analysis framework mind map shown in Figure 2.

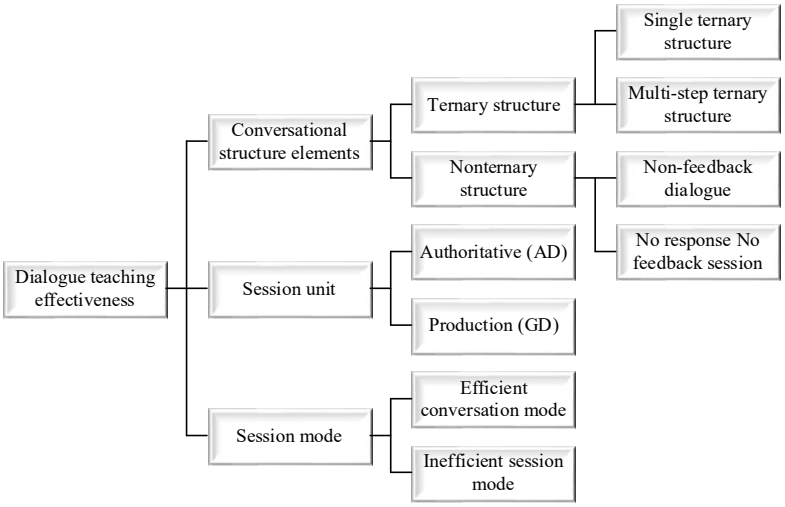


**Fig. 2.** Dialogue teaching effectiveness analysis framework thinking map

2.4.2. Effective Interaction Strategies for Teaching Dialogue. Interactive teaching mode refers to giving full play to the main role of students in the teaching process, inspiring and guiding students to think well and participate enthusiastically. It is a mode that realizes the interaction between teaching and learning and achieves the resonance between teaching and learning, thus effectively improving the efficiency and quality of teaching [25].

As a basic language subject, college English is guided by dialogue, and its interaction should be easy to carry out and can effectively achieve the teaching goals, highlighting the students' main position. There is no fixed program specification for interactive teaching, and its implementation has a lot of room for play, but the generation of effective interaction should follow certain rules and requirements.

From the form, the interaction should be diversified to meet the diversified teaching goals. From the process point of view, the spirit of dialog should run through the whole teaching process, and the interactive process has consistency. In terms of effect, the practicality of interaction should be reflected.

Based on the basic process of college English teaching, dialog teaching can be divided into three stages: pre-course dialog, in-course dialog and post-course dialog. The interactive generation of dialog teaching is shown in Figure 3.

1) Pre-lesson dialogues mainly consist of three forms: teacher-based dialogues, teacher-computer dialogues and student-based dialogues. The effectiveness of teacher-based dialog lies in the teachers' multiple interpretations of the teaching materials and their foresight in setting up classroom activities, so that the teaching design is appropriate and feasible, and the teaching methods are flexible and adjustable. Teacher-computer dialog is a new requirement for college teachers in the age of information technology. The effectiveness of student-based dialogues lies in the fact that students should exercise their critical thinking skills and engage in critical thinking while penetrating the text. The three forms are the prelude to classroom interaction, provide a strong guarantee for effective interaction in the classroom, and are the basis for effective classroom interaction.

2) Dialogue in class is an important way of classroom interaction, the core of which is teacher-student dialog. The characteristics of language courses determine the quality of teaching and learning. The test index of the effect is the learners' appropriateness and proficiency in language use, and the way to test it is classroom interaction and dialogues in the classroom.

3) After-class dialogues. After-class dialogues include student-student dialogues, student-machine dialogues and teacher-student dialogues. The effectiveness of student-student dialogues lies in students' ability to interact creatively and openly. The effectiveness of the student-machine dialogue lies in the fact that students can truly realize the autonomy of learning. The two are the perfect and necessary complement to the classroom interaction, coupled with the teacher's reflection on teaching after the class, students reflect on learning after the formation of the teacher-student dialogue, the combination of several ways to ultimately contribute to the achievement of the teaching goals.

4) Between or Relationships. The above three stages of dialog are not absolutely independent. If the ringing of the classroom is the point, the boundaries between them are obvious, and if the interactive relationship is the point, the boundaries are blurred. The relationship between teacher, student and machine in the three stages continues and promotes each other until the teaching goal is realized.

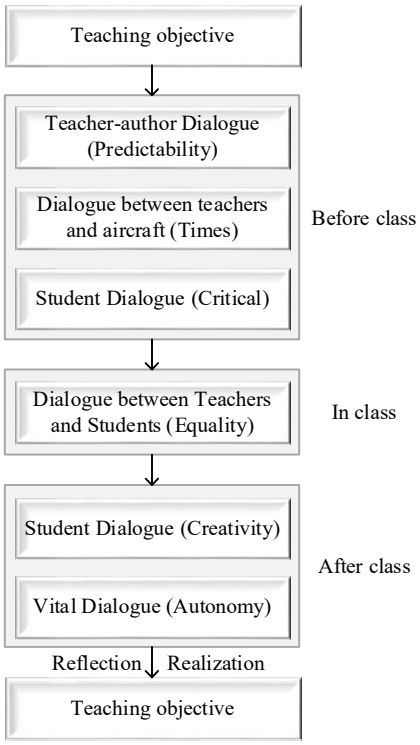


**Fig. 3.** Dialogue teaching effectively interactive generation

## 3. Intelligent speech corpus-assisted dialog teaching

### *3.1. Intelligent annotation construction for speech corpus*

3.1.1. Experimental data. All the data used in the experiments come from the Pennsylvania Chinese Book Collection and the English translations of its first 300 documents (LDC corpus), and the English-Chinese parallel corpus in the United Nations Parallel Corpus, Second Edition (UN corpus). In order to obtain a more accurate training corpus, it is necessary to apply manual annotation to tense labeling of Chinese and English in the LDC corpus before conducting experiments, and the corresponding tenses are labeled on the nodes corresponding to CP, IP, and the verb nodes in the Chinese treebank, so as to obtain a Pennsylvania Chinese treebank with 144 messages labeled with tenses. The first 134 in the treebank are used as the validation data for the training of this paper, and the last 10 are the test data for the training of this paper.

Due to the inefficiency of the manual labeling method, a large amount of training data cannot be obtained in a short period of time. Therefore, the automatic annotation method proposed above is applied to obtain the training data, and 50,000 Chinese and English parallel sentences are randomly obtained from the UN corpus and used as the input data. For long sentences, parsing with the automatic annotation algorithm is very prone to errors. Therefore, the Chinese and English sentences are preprocessed so as to reduce the errors. The allocation of test and validation sets in the corpus for training and the allocation of test and validation sets in the data are shown in Table 1.

**Table 1.** Data distribution

| Corpus | LDC corpus | UN corpus |
|---|---|---|
| Training validation set | 1325 | 50000 |
| Test set | 86 | 5000 |
| Corpus | LDC corpus | UN corpus |
| Training validation set | 12410 | 253641 |
| Test set | 1100 | 25000 |

3.1.2. Experimental procedure. In this experiment 2 sets of experimental data were created, the first from the UN corpus and the second from the LDC corpus.

Experiment 1 set up the experimental network parameters, and the detailed parameter settings of the experiment are shown in Table 2. Based on the network parameters in the table, the data experiments were conducted. The encoding of the tree nodes can be customized based on the encoding of the temporal tree, and the more the number of tree nodes, the more information is obtained. However, with the increase in the number of tree nodes, the coding dimension increases, leading to the phenomenon of sparse loud data. Therefore, it was determined that the dimensionality of the inputs to Experiment I and Experiment III was 800 dimensions, the dimensionality of the experimental inputs was 560 dimensions, and the data from the three sets of experiments outputs 16 temporal probabilities, i.e., 16 dimensions.

**Table 2.** Experiment detailed parameter setting

| Parameter name | Value |
|---|---|
| Batch size | 200 |
| Network number | 10 |
| Input dimension | 560 |
| Output dimension | 16 |
| Learning rate | 0.03 |
| Momentum factor | 0.99 |
| Subvector dimension | 100 |
| Iteration number | 800 |

In order to analyze the performance of the experimental results on the three tenses of past, present and future, in this section, the experimental results of the sixteen tenses are transformed into three tenses to get the experimental results of different experimental data. The comparison of the experimental results of different experimental data is shown in Table 3.

As can be seen from the table, the total accuracy rate and verb accuracy rate of the three tenses judgment is higher than the total accuracy rate and verb accuracy rate of the sixteen tenses judgment, the reason is that the sixteen tenses not only need to judge the tense system, but also need to judge the tense body at the same time, which increases the complexity of the judgment method. On the other hand, the three tenses only need to find the corresponding tense system and do not need to consider the problem of time body, so their accuracy is higher. The experiment proves that the tree-shaped Chinese-English tense labeling algorithm based on deep training improves the effect of tense labeling and has practical feasibility and effectiveness.

**Table 3.** Comparison of experimental results of different experimental data

| Experimental name | Sixteen tense | | Three time system | |
|---|---|---|---|---|
| | Total accuracy | Verb accuracy | Total accuracy | Verb accuracy |
| Experiment one | 68.21% | 68.27% | 73.85% | 72.46% |
| Experiment two | 64.73% | 66.84% | 69.79% | 71.33% |
| Experiment three | 69.65% | 69.95% | 74.57% | 77.54% |

Experiment 2 is to verify the effect of the automatic annotation algorithm in information annotation, the data used in this experiment is from the UN dataset, and the situation of its evaluation results on each tense is shown in Table 4.

As can be seen from the table, the past perfect tense and past general tense are poorly labeled, and the present general tense is well labeled, which is mainly due to the fact that the UN corpus is mostly news data, which describes mostly current happenings. Therefore, the automatic labeling algorithm has better labeling effect on present tense. The experimental results show that the automatic labeling algorithm has been basically usable.

**Table 4.** Experimental 2 evaluation results

| Tenses | Experiment two | | |
|---|---|---|---|
| | Accuracy rate | Recall rate | F value |
| Past simple tense | 32.35 | 42.16 | 53.91 |
| Past continuous tense | 61.15 | 62.37 | 74.13 |
| The past perfect tense | 38.97 | 32.27 | 42.34 |
| Present simple tense | 79.67 | 85.64 | 86.73 |
| Present continuous | 74.51 | 80.97 | 75.46 |
| Present perfect | 73.76 | 83.66 | 77.94 |
| The simple future tense | 70.41 | 83.47 | 79.12 |
| Other tense | - | - | - |

### *3.2. Observational Analysis of Dialogue Teaching in English Classroom*

In English classroom dialog teaching, both teachers and students can be the subject of dialog initiation, and questioning is an important way and means to initiate dialog. Through classroom observation of a dialogic interactive teaching classroom of English majors in a school, this study found that in the process of teacher-student dialogues in college English classrooms, the teacher is still the main body of questioning, and there are fewer cases in which the students trigger questions and act as the main body of questioning.

The statistics of the questioning subject of teacher-student dialogues in the triggering classroom are shown in Table 5. As shown in the table, in 10 English classes, the total number of teacher-student triggers is 351, of which the number of student-triggered dialogues is 103, and the remaining 248 are triggered by the teacher, which is much larger than the number of student-triggered triggers. Students' initiation accounts for only 29.34% of the total number of initiations, while 70.66% of the conversations are initiated by teachers. This shows that students are still on the passive side and teachers still have the initiative and control.

**Table 5.** The data of the students' dialogue questions

| Teacher | Trigger total | The number of questions raised by teachers | Students raise the number of questions |
|---|---|---|---|
| T1 | 35 | 30 | 5 |
| T2 | 41 | 30 | 11 |
| T3 | 26 | 15 | 11 |
| T4 | 36 | 29 | 7 |
| T5 | 35 | 28 | 7 |
| T6 | 32 | 21 | 11 |
| T7 | 30 | 20 | 10 |
| T8 | 25 | 15 | 10 |
| T9 | 45 | 30 | 15 |
| T10 | 46 | 30 | 16 |
| Total | 351 | 248 | 103 |

3.2.1. Ways of triggering teacher-student dialogues in the classroom. How conversations are triggered and the way they are triggered is the key to stimulate students' interest and participation, as well as a prerequisite for whether teacher-student conversations can be carried out in depth. The ways of triggering classroom teacher-student dialogues include direct questioning and guided questioning, and in this study, all the effective teachers' questioning in 10 English lessons were counted. The statistics of the ways of provoking classroom teacher-student dialogues are shown in Table 6.

In the English classroom teacher-student dialogues, teachers use direct questioning in 23.96% of the cases and use provoking questioning in 76.04% of the cases, which shows that guided questioning is used more frequently than direct questioning. The more direct and simple direct questioning, in which students can directly extract known information from the memory bank without thinking processing, is usually used to help students master knowledge or check their understanding of the text, and it is easy to form a single ternary structure in this triggering method. In guided questioning, the questions posed by the teacher are usually more complex, and students need to think carefully and make an effort to link more information in order to answer them, playing the role of “scaffolding” support.

**Table 6.** The cause of the conversation between teachers and students is statistics

| Teacher | The total number of conversations | Guided questions | | Direct question | |
|---|---|---|---|---|---|
| | | Quantity | Proportion | Quantity | Proportion |
| T1 | 33 | 22 | 0.6667 | 11 | 0.3333 |
| T2 | 37 | 25 | 0.6757 | 12 | 0.3243 |
| T3 | 24 | 20 | 0.8333 | 4 | 0.1667 |
| T4 | 32 | 28 | 0.8750 | 4 | 0.1250 |
| T5 | 30 | 20 | 0.6667 | 10 | 0.3333 |
| T6 | 32 | 21 | 0.6563 | 11 | 0.3438 |
| T7 | 28 | 25 | 0.8929 | 3 | 0.1071 |
| T8 | 21 | 17 | 0.8095 | 4 | 0.1905 |
| T9 | 37 | 30 | 0.8108 | 7 | 0.1892 |
| T10 | 39 | 30 | 0.7692 | 9 | 0.2308 |
| Total | 313 | 238 | 0.7604 | 75 | 0.2396 |

3.2.2. Statistics on student responses to classroom dialogues. In classroom dialog teaching, the effect of dialog teaching does not lie in how much the teacher has taught in the classroom, but is the result of a joint synthesis of the students' learning process and outcomes within a certain period of time.

How to involve as many students as possible in learning and dialogic practice within a certain time is a sure way to promote effective dialogic teaching. From the perspective of classroom assessment, effective dialogic teaching in a foreign language classroom is centrally reflected in the specific progress or development that students have achieved, especially their state of mind and speech performance or discourse generation. In the classroom observation, the students' responses in the classroom dialogues were recorded. The statistics of students' responses to the classroom dialogues are shown in Table 7.

In the 10 English classes observed, after the teacher triggered the question, the order of classroom dialogic teaching students' responses was 41.21% for single response, 20.77% for class unanimous response, 19.49% for multiple responses, and 18.53% for students' silence and no response, in that order. Single responses accounted for the most in English classroom dialog teaching.

**Table 7.** Classroom dialogue teaching student response statistics

| Teacher | Total | Silence/no response | | Single answer | | Tidy answer | | Answer from many | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | % | N | % | N | % | N | % |
| T1 | 33 | 5 | 15.15 | 12 | 36.36 | 10 | 30.30 | 6 | 18.18 |
| T2 | 37 | 6 | 16.22 | 12 | 32.43 | 8 | 21.62 | 11 | 29.73 |
| T3 | 24 | 7 | 29.17 | 10 | 41.67 | 3 | 12.50 | 4 | 16.67 |
| T4 | 32 | 5 | 15.63 | 15 | 46.88 | 6 | 18.75 | 6 | 18.75 |
| T5 | 30 | 3 | 10.00 | 14 | 46.67 | 7 | 23.33 | 6 | 20.00 |
| T6 | 32 | 5 | 15.63 | 13 | 40.63 | 4 | 12.50 | 10 | 31.25 |
| T7 | 28 | 2 | 7.14 | 18 | 64.29 | 6 | 21.43 | 2 | 7.14 |
| T8 | 21 | 4 | 19.05 | 8 | 38.10 | 6 | 28.57 | 3 | 14.29 |
| T9 | 37 | 10 | 27.03 | 15 | 40.54 | 5 | 13.51 | 7 | 18.92 |
| T10 | 39 | 11 | 28.21 | 12 | 30.77 | 10 | 25.64 | 6 | 15.38 |
| Total | 313 | 58 | 18.53 | 129 | 41.21 | 65 | 20.77 | 61 | 19.49 |

3.2.3. Classroom dialog teacher language feedback statistics. Teacher verbal feedback is a follow-up step in the teacher's discourse in response to a student's response or continuation after a classroom question or classroom activity. Teachers often produce different kinds of feedback when students respond to questions in the classroom. As discussed earlier, based on the differences in the effects of feedback, it can be classified as, judging correctness and error, sorting and summarizing, and extending and following up, plus sometimes zero feedback.

In this study, the teacher's linguistic feedback in 10 English classes was quantified and the organized data are shown in Table 8. In the classroom teacher-student dialogues, sorting and summarizing students' answers is the most used feedback method, accounting for 33.87%. It was followed by judging the correctness and error, extension and follow-up. Finally, the least used is “zero feedback”, accounting for 1.60%.

**Table 8.** The feedback method of classroom teachers

| Teacher | Total | Judgment right and wrong | | Comb and induction | | Extension and follow-up | | Zero feedback | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | % | N | % | N | % | N | % |
| T1 | 33 | 10 | 30.30 | 12 | 36.36 | 11 | 33.33 | 0 | 0.00 |
| T2 | 37 | 10 | 27.03 | 13 | 35.14 | 13 | 35.14 | 1 | 2.70 |
| T3 | 24 | 12 | 50.00 | 9 | 37.50 | 3 | 12.50 | 0 | 0.00 |
| T4 | 32 | 9 | 28.13 | 10 | 31.25 | 13 | 40.63 | 0 | 0.00 |
| T5 | 30 | 11 | 36.67 | 12 | 40.00 | 6 | 20.00 | 1 | 3.33 |
| T6 | 32 | 12 | 37.50 | 10 | 31.25 | 10 | 31.25 | 0 | 0.00 |
| T7 | 28 | 12 | 42.86 | 8 | 28.57 | 7 | 25.00 | 1 | 3.57 |
| T8 | 21 | 6 | 28.57 | 9 | 42.86 | 6 | 28.57 | 0 | 0.00 |
| T9 | 37 | 12 | 32.43 | 11 | 29.73 | 14 | 37.84 | 0 | 0.00 |
| T10 | 39 | 11 | 28.21 | 12 | 30.77 | 14 | 35.90 | 2 | 5.13 |
| Total | 313 | 105 | 33.55 | 106 | 33.87 | 97 | 30.99 | 5 | 1.60 |

### *3.3. The Effectiveness of Corpus-Assisted Interactive Teaching of English Conversation*

In order to test whether the effective interactive strategy of dialogic teaching has a positive effect on students' learning, both students' academic performance and the survey questionnaire were analyzed.

3.3.1. Learning achievement. According to the English reality of college English major classes, we have designed and practiced college English classroom conversation teaching, and developed appropriate English teaching lesson plans. Utilizing the students' characteristics, the students are fully involved in the classroom conversation scenarios and become the main body of the classroom. Truly student-centered and interactive in the English classroom, it greatly mobilizes the students' subjective initiative in learning English, and also cultivates their enthusiasm and creativity to be able to participate in English learning independently. After one academic year of practice, combined with the previous analysis of English classroom dialogue teaching, students' performance in English “listening, speaking, reading, writing and translation” has been improved to a certain extent.

Comparison of students' achievement before and after English conversation interactive teaching is shown in Table 9. From the analysis of the results, English conversation interactive teaching can improve students' English performance to different degrees in the 5 aspects of listening, speaking, reading, writing and translating. Especially in the 4 aspects of speaking, listening, writing and translating, the students' achievement increased by more than 20% respectively after practicing the English conversation interactive teaching mode.

**Table 9.** The comparison of student achievements before and after the English dialogue

| Content performance | Roll score | Before practice (average score) | After practice (average score) | Increase proportion |
|---|---|---|---|---|
| Listen | 15 | 10.95 | 13.52 | 23.47% |
| Say | 10 | 7.01 | 8.95 | 27.67% |
| Read | 55 | 35.69 | 41.21 | 15.47% |
| Write | 10 | 6.12 | 7.54 | 23.20% |
| Translate | 10 | 6.5 | 7.89 | 21.38% |
| Comprehensive achievement | 100 | 66.27 | 79.11 | 19.38% |

3.3.2. Questionnaires. An experimental study of 2 lecture classes for one academic year shows that dialogic interactive teaching can positively promote students' learning. A total of 110 students in the two classes were surveyed, and this questionnaire included 8 aspects, namely, attitude towards

performance teaching, motivation, active atmosphere, improvement of grades, sense of cooperation, independent learning, creativity and teacher-student interaction. A total of 110 questionnaires were sent out and 110 questionnaires were recovered, of which 106 were valid and 4 were invalid. The statistics of students' questionnaires after the implementation of English dialogical interactive teaching strategies are shown in Table 10.

More than 85% of the students think that the English dialogue interactive teaching method can enliven the classroom atmosphere, enhance the sense of cooperation among them, mobilize the enthusiasm of learning English, and thus improve their English performance. This shows that dialogue interactive teaching in English dialogue classroom teaching is well liked and recognized by students. The stronger the students' independent learning ability is, the higher their motivation to learn, the better their learning results are, and thus the more they can inspire students' enthusiasm for learning. This also fully demonstrates that dialogic interactive teaching is an effective teaching method.

**Table 10.** The English dialogue interactive teaching strategy was carried out

| Content effect | Very effective | | More effective | | General | | No effect | | Effective number |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | |
| The attitude towards English conversation | 48 | 45.28 | 33 | 31.13 | 12 | 11.32 | 13 | 12.26 | 106 |
| Motivate | 65 | 61.32 | 20 | 18.87 | 15 | 14.15 | 6 | 5.66 | 106 |
| Active atmosphere | 71 | 66.98 | 21 | 19.81 | 10 | 9.43 | 4 | 3.77 | 106 |
| Improve your academic performance | 54 | 50.94 | 36 | 33.96 | 9 | 8.49 | 7 | 6.60 | 106 |
| Cooperative consciousness | 76 | 71.70 | 25 | 23.58 | 3 | 2.83 | 2 | 1.89 | 106 |
| Autonomous learning | 46 | 43.40 | 35 | 33.02 | 20 | 18.87 | 5 | 4.72 | 106 |
| Innovative ability | 45 | 42.45 | 51 | 48.11 | 8 | 7.55 | 2 | 1.89 | 106 |
| Student interaction | 36 | 33.96 | 45 | 42.45 | 18 | 16.98 | 7 | 6.60 | 106 |

## 4. Conclusion

In this paper, on top of analyzing the development of the use of artificial intelligence technology in the teaching of spoken English, we design an intelligent corpus annotation model combining artificial intelligence technology and corpus, which works in conjunction with the development of dialogue interactive teaching strategies in English dialogue classroom teaching.

1) The classical dataset is chosen as the experimental data, and experiments on the labeling accuracy of tense and tense system are carried out respectively. The automatic annotation algorithm of the speech corpus has good effect on the annotation of present tense, and the automatic annotation algorithm of the corpus has been generally applicable.

2) Analyzing the implementation of dialogic interactive teaching strategies over a period of one academic year, 70.66% of the dialogs in English dialogic classrooms are initiated by the teacher, and the percentage of dialogs initiated by students as the subjects is 29.34%. In the English conversation classroom, 41.21% of the conversations were answered by a single student, and the percentage of the class answering together and answering by more than one student did not exceed 25%. Organize the dialogue teaching language feedback to get, the effectiveness of English dialogue is generally good, no feedback of English dialogue is only 1.60%. This can show that the interactive teaching strategy of English conversation proposed by the interactive teaching model can optimize the quality of conversation and increase the feedback of conversation. Both the students' learning performance and

the results of the questionnaire show that corpus-assisted interactive teaching of English is feasible and utilizes the in-depth development of English conversation teaching.

## Funding

This study is supported by Financial Innovation and Multi-Asset Intelligent Trading Laboratory of the Key Laboratory of Philosophy and Social Sciences in Hainan Province of University of Sanya.

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