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*Retraction*

# Retracted: Design of the Intelligent Recognition Model for English Translation Based on the BP Neural Algorithm

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This article has been retracted by Hindawi, as publisher, following an investigation undertaken by the publisher [1].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] Z. Wang, "Design of the Intelligent Recognition Model for English Translation Based on the BP Neural Algorithm," *Security and Communication Networks*, vol. 2022, Article ID 3799061, 12 pages, 2022.

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*Research Article*

# Design of the Intelligent Recognition Model for English Translation Based on the BP Neural Algorithm

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With the development of modern intelligent recognition, many intelligent recognition translation tools have emerged. These translation tools mainly include machine learning, neural network, KNN, and other artificial intelligence technologies. These technologies have been applied to many fields. Among them, machine translation is the most important and widely used one. A large number of English translation technologies have appeared in this development era. However, the translation accuracy of intelligent recognition technology cannot be guaranteed. Under the background of this English translation environment, we design an intelligent recognition algorithm of English translation based on the BP neural algorithm to improve the rationality of English translation and analyze the intelligent recognition model of English translation. The following conclusions are drawn from the experimental comparison Four Methods of Translation. (1) Compared with some similar algorithms, machine translation based on the BP neural algorithm has many characteristics, such as convenience, which are very suitable for English translation. (2) The intelligent recognition model of English translation using the BP neural network makes the sentence flow higher, which can solve some problems in translation and achieve coherent translation in context. (3) The intelligent recognition model with the BP neural network as the core realizes a variety of permutations and combinations of different characteristics of complex English sentences, solves many poor English sentences, and significantly improves the accuracy of English translation.

## 1. Introduction

In my country, many experts put forward some measures to optimize the network structure. Among them, it has very powerful self-learning and fault tolerance and has been applied in many fields. However, there is no unified and effective scheme for the design of network model structure [1]. English CAI has made great achievements in teaching, but traditional English CAI fails to pay full attention to students' differences in teaching and cannot provide a more perfect service system. To solve this problem, an ICAI Moore system is designed, which can automatically push students' characteristic learning plans according to their different learning effects. Based on students' foreign language knowledge and their own specialties, the system formulates one-to-one learning methods, which is conducive to improving English learning efficiency. The web-based teaching mode can effectively solve the existing problems in traditional teaching so that both teachers and learners can participate in teaching activities [2]. Syntactic analysis-based English machine translation cannot solve the problem of intelligent recognition in processing a large number of ambiguous parts of English language structure, resulting in low accuracy of machine translation. For the analysis of English translation by perfecting intelligent machine translation tools, an English machine translation model construction method combined with modern intelligent recognition technology is proposed [3]. It can learn to get a new sample and use it to train for another unknown model. Because of the development of neural network technology, in recent 10 years, more and more research studies have been made on neural networks, and some achievements have been made, most of which are focused on financial decision-making. A real estate-listed company is taken as an example for empirical analysis. The results show that the model can accurately reflect the financial distress of enterprises and has

good stability and generalization ability. It shows that the back propagation algorithm is an effective financial risk early warning system [4]. On this basis, a new control strategy, the BP Smith predictor control algorithm, is proposed. Its structure and working principle are also discussed. The relevant results are given. The BP neural network is trained by the classical BP algorithm and the error backpropagation algorithm. Firstly, on this basis, it focuses on how to select the appropriate learning rate to achieve the optimal weight and threshold selection. By comparing the relative deviation between the output of the BP network and the set value under different parameters, the optimal learning rate is determined. Secondly, momentum term and variable step size are introduced to improve the convergence progress of algorithm [5]. This method first converts English sentences into corresponding Chinese sentences and then aligns the Chinese sentences. After training the direct maximum entropy model and obtaining the relevant parameters, the optimal combination mode between different English language features is obtained, which resolved a lot of structural ambiguity in English language and improved the accuracy of English machine translation. After studying and improving the traditional rule-based machine learning algorithm, a new multifeature fusion neural network structure is proposed and applied to word matching in English dictionaries [6]. For the network, the key problem is how to overcome staying at the local minimum point and how to improve the training speed on this basis. An improved scheme is proposed for the selection of learning rate and momentum. When this scheme is applied to digital recognition, it achieves satisfactory results [7]. The constraint response of the BP algorithm is low, and the solution obtained is local optimal. A new power load forecasting model is established by combining the two methods. This model overcomes the characteristics of previous algorithms that are premature. As a global optimization algorithm, the genetic algorithm has strong global search ability, but it is easy to cause premature convergence in practice, and the efficiency of later evolutionary search is not high. A new hybrid genetic operator, simulated annealing, is proposed to solve multiobjective optimization problems. The results of numerical experiments show that this method can be used. The simulated annealing algorithm has the advantages of avoiding falling into local optimal solution and solving premature convergence [8]. The neural network has a wide range of applications in the fields of pattern recognition, image processing, system control, and so on. On this basis, several problems worthy of attention in the future research of artificial neural networks are pointed out. However, the traditional neural network algorithm also has its shortcomings. Network training, for example, is slow and precocious. The artificial neural network optimized by this algorithm is fast and accurate, which can overcome its inherent shortcomings. Therefore, it becomes a very important intelligent information processing technology. Among many artificial neural network models, this algorithm is one of the most important and widely used neural network learning algorithms at present. Because of its easy implementation, it has been recognized and adopted by computer workers. At present, the BP neural network method has been widely used in various fields. The BP neural network has been widely used, but there are some problems such as slow convergence, easy to fall into local minimum, and difficult to build. In this study, an improved algorithm based on gradient descent is proposed, which adds a new parameter (i.e., weight) to the traditional learning rate formula to accelerate the convergence speed of the network. At the same time, the initial weights are modified to make them close to the optimal solution. The hidden layer structure is determined by experience, but the complex network structure cannot be accurately judged. The artificial neural network can overcome this shortcoming because of its own characteristics. Aiming at the deficiency of the traditional BP neural network, an improved BP neural network algorithm for tobacco industry production data is put forward [9]. English translation plays an important role in our work and life. Our country's economic level is getting higher and higher, science and technology are getting more and more developed, and some algorithms have emerged. We have designed to add the BP neural algorithm to English translation to improve the use effect of English translation; therefore, it is necessary to apply the BP neural network to English teaching [10]. Based on the traditional BP algorithm, this study puts forward a dynamic full-parameter self-adjusting learning algorithm for the BP neural network and then compiles a computer program to make the selection of hidden layer nodes and the learning rate completely dynamic, reduce the influence of human factors on the learning rate, and improve the adaptability of the network. Based on the traditional BP algorithm, this study puts forward a dynamic full-parameter self-adjusting learning algorithm for the BP neural network and then compiles a computer program to make the selection of hidden layer nodes and the learning rate completely dynamic, reduce the influence of human factors on the learning rate, and improve the adaptability of the network. Compared with other commonly used time-series analysis methods, the method proposed in this study has higher calculation results, higher calculation accuracy, and better generalization ability. Finally, based on the above research results, application software is developed to study the short-term fluctuation law of China's stock market. The software consists of the following three parts: system design, data acquisition, and data processing module and output module. Experimental results show that the time-series analysis model based on the artificial neural network has high accuracy and is regressive to the general support vector machine (SVM). The results show that the dynamic full-parameter self-adjustment algorithm based on the BP neural network has better effects than the traditional method. The trained neural network model can not only accurately fit the training values but can also accurately predict the future development trend [11]. Machine translation mainly includes rule-based translation and template-based translation, but they are all based on complex language rules. We introduce the BP neural network to study the problem of sentence transformation in Chinese-English machine translation. In addition to the integrated BP network model, the network architecture, parameter processing, learning

algorithm, and learning samples are discussed in depth [12]. Reasonable English translation teaching activities can promote students' English translation ability and the English cross-cultural communication level. We should actively carry out teaching reform and properly introduce advanced computer technology to promote the quality of college English translation teaching, promote the development of students' comprehensive English ability, and lay a solid foundation for their future study and growth. With the development of science and technology and the progress of social economy, artificial intelligence technology has been widely used. Among them, artificial intelligence translation is a new high-tech means, which has high practicability and convenience, and can effectively improve the shortcomings of the traditional teaching mode. At present, all colleges and universities in China have begun to attach importance to the development of this work and have achieved initial results. Combining with college teaching is also an important direction of teaching reform at present. In view of this situation, this study makes a detailed analysis of college English teaching in the context of artificial intelligence translation, hoping to provide some help for relevant personnel [13]. Translation can be divided into the following categories: rule-based machine translation and temple-based machine translation. The former theory is mature and widely used; the latter lacks deep research on Chinese characteristics and no general technology to implement it. So, there are pros and cons to both. However, both language rules are based on complex language rules and are difficult to generalize in nature. A new type of Chinese-English machine translation is based on process language after combining other methods. The integrated BP network model is given and the network structure, parameter processing, learning algorithm, and learning samples are discussed. This work will help improve the intelligence of machine translation [14]. There are many methods for English character recognition methods. As a classical machine learning algorithm, the BP neural network algorithm has achieved great success. The main reason is its strong nonlinear mapping ability, self-organization, and fault tolerance. It has high practical value. However, the traditional BP neural network algorithm also has some problems in practice. Especially, for some small samples, this phenomenon is more serious. Because the BP neural network has the problems of slow learning rate, easy to produce local minimum points, and easy to diverge, its practical application is limited. This will affect the recognition rate of the whole system [15].

## 2. Research on the BP Neural Network Algorithm

It has a complete theoretical system and a perfect learning mechanism. It is widely used in fault diagnosis and detection in practical engineering field. Aiming at the topology optimization problem of the adaptive neural network, a new adaptive neural network optimization method is proposed. It uses the learning mechanism of signal forward propagation and error reverse regulation to simulate the response of human neurons to external excitation signals by multiple iterative learning and constructs a multilayer perceptron, which successfully establishes an intelligent network model to process nonlinear information.

*2.1. The BP Neural Network Model.* The backpropagation (BP) neural network is a multilayer network for training the weights of nonlinear differentiable functions, which belongs to the field of the forward neural network, which is mainly used for the following:

(1) Function approximation and prediction analysis: using input vector and corresponding output vector to train network approximations or predictive unknowns

(2) Pattern recognition: identification of output vector input of input networks and classification of input vector

(3) Division: clear and appropriate division of input vector

(4) Data compression reduces the dimension of the output vector and facilitates transmission and storage

In the specific application of the artificial neural network, the BP network or its changed form is used to build the forward neural network model. This forward network is also the heart of the forward network (BP-ANN), which reflects the most essential aspect of the artificial neural network (ANN). The model structure of the BP neural network is shown in Figure 1.

The activation function in the BP network is inevitably differentiable everywhere, so it is impossible to use binary threshold function ({0, 1}) and symbolic function ({1, 1}). These activation functions have their own characteristics, so it is necessary to select appropriate activation functions for training according to specific problems in practical application. However, there is no general and effective method to determine the optimal activation function. This study discusses how to use three common activation functions of neural networks, namely, negative tangent activation function, sigmoid activation function, and linear activator, and to solve nonlinear problems. Sigmoid activation function plays a role in the nonlinear amplification system. It can change the input from negative infinity to positive infinity and convert it into 0–1 or −1–1 output. For larger input signals, the amplification coefficient is small, while for smaller signals, the amplification coefficient is large. Therefore, using sigmoid activation function, we can process and approximately describe the nonlinear input-output relationship. However, since the sigmoid activation function is a linear activation function, it cannot be directly applied to practical problems. Therefore, only when the network output is constrained, for example, when the constraint is 0 to 1, the output layer should contain sigmoid type activation function.

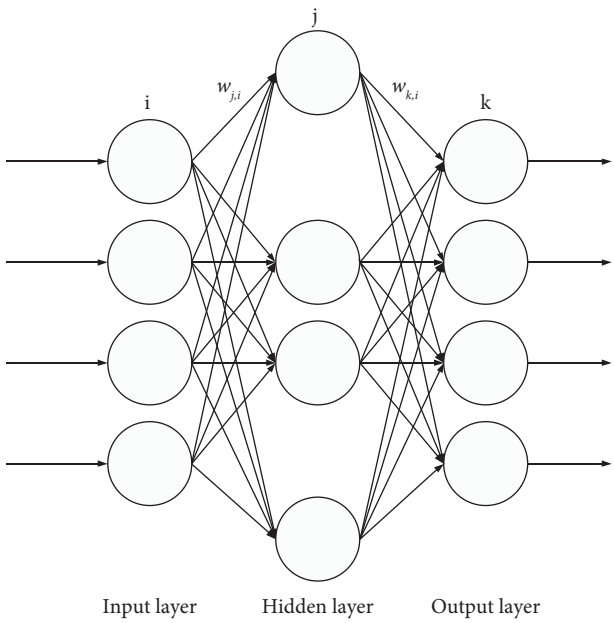


Figure 1: TheBP neural network model with the hidden layer and the output layer.

*2.2. BP Neural Algorithm Rules.* The BP network refers to a network with three or more layers, where the upper and lower layers are completely connected and the neurons of each layer are not connected. This network structure is called the connectionless neural network topology network model. Because of its simple structure, fast training speed, and strong generalization ability, it has been widely used in many aspects. This study mainly introduces some specific applications of artificial neural network (ANN) technology in fault diagnosis. The neural network technology is summarized and analyzed, and the existing problems and future development direction are pointed out. Finally, I put forward my own views. The BP network is used in pattern recognition, signal processing and other fields, which has become one of the focuses of attention. This study presents an improved BP model. The model consists of three steps.

This algorithm is a supervised learning algorithm. It is proposed according to the "black box" phenomenon in the process of human brain processing information and has been widely used in pattern recognition and other fields. Its main points are as follows: for learning samples with N inputs: $X^1, X^2, \ldots, X^n$. It is known that the corresponding output samples are $T^1, T^2, \ldots, T^m$. The purpose of learning is to use the actual output of the network $Y^1, Y^2, \ldots, Y^m$ and target vector $T^1, T^2, \ldots, T^m$ to correct the weight of the target vector so that the actual output is as close as possible to the target vector. That is, the sum of squares of errors in the network output layer is minimized. The algorithm adopts an improved iterative learning control method, which is called the adaptive iterative learning control algorithm.

In the front, the training neural network is used to predict the predicted value, and then, the gradient descent method is used to solve the nonlinear mapping relationship between the number of hidden layer nodes and the learning rate. The model is applied to transient stability assessment of power system. If the output layer does not obtain the expected output, the error change value for the output layer is calculated, and the error signal is propagated backwards. Error signals are transmitted through the network along the original connection path to each layer of neurons, and the weight of each layer is calibrated until the desired output is achieved.

## 3. The Intelligent Recognition Model of Translation and the BP Neural Network Algorithm

*3.1. Application of Intelligent Translation Tools in English Translation.* Intelligent machine translation tools came into being. We solve this problem by using modern intelligent recognition technology to assist English translation.

*3.2. An Intelligent Translation Tool-Aided English Translation Model.* If a sentence contains two or more words, its translation should be consistent with the original; otherwise, this condition is not met. This means that each word must be preprocessed. This is especially true for English sentences. If the strings are $m$ and 1, respectively, it is $f = f_1^m = f_1 f_2 \cdots f_m$ and $a = a_1^m = a_1 a_2 \cdots a_m$; there is a point as follows:

$$P(f, A|e) = p(m|e) \prod_{j=1}^{m} p\left(\alpha_j | \alpha_1^{j-1}, f_1^{j-1}, m, e\right) \bullet p\left(f_j | \alpha_1^j, f_1^{j-1}, m, e\right). \tag{1}$$

In formula (1), Chinese sentences are generated and aligned according to English sentences. According to English sentences, the sentence length after translation and the position of string of Chinese words can be calculated. Then, according to English sentences, the length of Chinese sentences is obtained. According to the first-place string of the Chinese associated with the English sentence, the first string of the Chinese sentence is obtained. This process can be repeated to get the whole Chinese sentence.

The IBM machine translation model not only simplifies (1) but also sets preconditions:

(1) If $P(m \mid e)$, there is no correlation use for the length of the target language $E$ and the length of the source language $M$.

(2) If $p(\alpha_j \mid \alpha_1^{j-1}, f_1^{j-1}, m, e)$ is related to the length $L$ of the target language $E$, then

$$p\left(\alpha_j \mid \alpha_1^{j-1}, f_1^{j-1}, m, e\right) = \frac{1}{l+1}. \tag{2}$$

(3) If $p(\alpha_j \mid \alpha_1^{j-1}, f_1^{j-1}, m, e)$ with $f_j$ and $f_{al}$ is relevant, the following exists:

$$\begin{aligned} \varepsilon &= P(m \mid e), \\ t\left(f_j \mid e_{al}\right) &= p\left(f_j \mid a_1^j, f_1^{j=1}, m, e\right). \end{aligned} \tag{3}$$

Equation 4 is the probability $f_j$ that occurs given $e_{al}$. The English machine translation model is defined as follows:

$$h(p,\lambda) = \frac{s}{(l+1)^m}\sum_{al=0}^{l} L \sum_{a_m=0}^{l}\prod_{j=1}^{m} t\left(f_j|\alpha_\theta\right) - \sum_{\theta}\lambda_\theta\left(\sum_{l} t(f|e) - 1\right). \tag{4}$$

The experimental results show that, under the same conditions, the statistical machine based on reverse motion has higher accuracy and recall than the traditional statistical machine. At the same time, the accuracy of Chinese recognition has been greatly improved. The conversion within the statistical machine source channel model is as follows:

$$\widehat{\theta} = \arg\max_{\theta}\prod_{s=1}^{s} p_\theta(f_s|e_s). \tag{5}$$

Formula (5) in this study is a process of converting the acquisition process of maximum probability of English translation into Lagrange coefficient and finding the maximum value of the auxiliary function factor of random state $\lambda_1$:

$$\widehat{\gamma} = \arg\max_{\gamma}\prod_{s=1}^{s} p_\gamma(e_s). \tag{6}$$

The formula obtained is as follows:

$$\widehat{e}_1^l = \arg\max_{e_1^l}\left\{p_{\widehat{\gamma}}\left(e_1^l\right)\bullet P_{\widehat{\theta}}\left(f_1^j|e_1^l\right)\right\}. \tag{7}$$

After that, $P_{\widehat{\theta}}(ej/1|fl/1)$ replaces $P_{\widehat{\theta}}(f_1^l|e_1^j)$. The resulting framework is as follows:

$$\widehat{e}_1^l = \arg\max_{e_1^l}\left\{P_{\widehat{\gamma}}\left(e_1^l\right)\cdot P_{\widehat{\theta}}\left(e_1^l|f_1^l\right)\right\}. \tag{8}$$

*3.3. The Intelligent Recognition Model for English Translation.* On this basis, the relationship between the spectrum peak and the corresponding fundamental frequency under different parameters is compared to determine whether there is no accent. When there is no stress, it is considered that the speaker has begun to speak so as to improve the quality of processing. A high-frequency signals' enhancement filter with 6 dB SNR is used for technical processing of in-band speech signals above 800 Hz. Weighting factor $\alpha$ is at 0.9 ~ 1.0; calculation formulas after weight processing signal calculation formula of $y(n)$are as follows:

$$y(n) = T[x(n)] = ax(n) + b(a, b \neq 0). \tag{9}$$

(1) In the study, $y(n)$ in formula (10) represents the emphasis processing signal.

(2) In formula (11), $x(n)$ represents enter the voice signal. After signal processing, the second step of speech signal processing, the half frame overlap method is selected to realize the intraframe method.

There $x(n)$ is import voice signal. After the signal processing in step 2, the frame division operation is carried out in the way of half frame overlap. Based on the above research results and algorithms, an intelligent speech recognition terminal based on stm32f103zet6 is designed and tested in the laboratory environment. This study presents an intelligent speech acquisition and recognition system based on DSP and FPGA. To understand the speech signal, the speech signal into $t$ frames is divided and its formula is given as follows:

$$z(n) = \frac{1}{t}y(n), \tag{10}$$

where $x(n)$ is the input voice signal. After the signal processing in step 2, the frame division operation is carried out in the way of half frame overlap. The formula is as follows:

$$w(n) = w(n) \times z(n). \tag{11}$$

On this basis, an adaptive detection method based on short-time energy, instantaneous zero crossing rate, and Hilbert envelope spectrum peak position is proposed to judge whether there are discontinuities in speech. Fast Fourier transform (FFT) makes use of the odd, even, imaginary, and real properties of discrete Fourier transform (DFT), improves the DFT algorithm, and improves a DFT speech signal with limited length. The following formula is obtained as follows:

$$X[K] = \sum_{N-1}^{n=0} x[n]e^{-j\frac{2\pi}{N}nk}, k = 0, 1, 2, \cdots, N. \tag{12}$$

Of these, an audio denoising method based on short-time Fourier transform and wavelet packet decomposition is proposed. Firstly, the wavelet denoising method is used to remove noise. Then, the short-time Fourier algorithm is used to further analyze the original signal. Transform discrete speech sequences to MFCC scale as follows:

$$\mathrm{Mel}(\mathrm{f}) = 2579\lg\left(1 + \frac{\mathrm{f}}{700}\right). \tag{13}$$

DTC is applied to filter output to obtain the speech signal $w(n)$ feature parameter extraction effect:

$$P = \overline{Z}_{n=1}^{N} F(l)w(n)\cos(\pi n(M + 0.5)). \tag{14}$$

A segment of speech signal needs to be weighted, windowed, and framed after generating the spectrum. Fast FFT is performed on each short-time analysis window to obtain spectrum information, and then, Mel filtering is performed to obtain two-dimensional MFCC map.

(1) Video images are simpler in the transformation domain than in the spatial domain.

(2) The correlation of video images has obviously decreased, and the signal energy is mainly focused on several transformation coefficients. Quantification and entropy coding can compress data effectively.

(3) It has strong anti-interference ability, and the impact of the error code on image quality during transmission is far less than that of predictive coding. In general, for high quality images, DMCP requires channel bit error rate, while transform coding requires channel bit error rate too.

*3.4. BP Neural Network Calculation.* The detailed steps of the algorithm are as follows:

(1) Sampling (randomness): take $J$ input samples randomly from sufficient training sample database, and the corresponding value is expected to be output.

(2) Calculate the input and output values of population individuals (including hidden layers) $h_{ih}(j), h_{oh}(j), y_{ih}(j), y_{oh}(j)$, as shown in formulas (15)–(18):

$$h_{ih}(j) = \sum_{i=1}^{n} W_{ih} x_i(j) b_h, h = 1, 2, \cdots, p, \tag{15}$$

$$h_{oh}(j) = f\left(h_{ih}(j)\right), h = 1, 2, \cdots, p, \tag{16}$$

$$y_{io}(j) = \sum_{h=1}^{p} W_{oh} h_{oh}(j), o = 1, 2, \cdots, p, \tag{17}$$

$$y_{io}(j) = f\left(y_{io}(j)\right), o = 1, 2, \cdots, p. \tag{18}$$

(3) Partial derivatives of output layer neurons and hidden layer neurons to error function are shown in equations (19) and (20):

$$\delta_0(k) = \left(d_0(k) - y_0(k)\left(1 - y_0\right)(k)\right), \tag{19}$$

$$\delta_h(k) = \left[\sum_{o=1}^{q} \delta_o(k) W_{ho}\right] v_h(k)\left(1 - v_h(k)\right). \tag{20}$$

(4) Adopt $\delta_o(k)$ and $v_{ih}(k)$ pair connection weight values $W_{ho}$ and threshold $\gamma$ of amendment, as shown in equations (21) and (22):

$$W_{ho}^{N+1}(k) = W_{ho}^{N}(k) + \eta \delta_0(k) v_h k, \tag{21}$$

$$\gamma^{N+1}(k) = \gamma^{N}(k) + \eta \delta_0(k), \tag{22}$$

where $\eta$ is between 0 and 1.

(5) Adopt $\delta_h(k)$ and $x_i(k)$ pair connection weight values $W_{ih}$ and threshold $\theta$ of amendment, as shown in equations (23) and (24):

$$W_{ih}^{N+1}(k) = W_{ih}^{N}(k) + \eta \delta_h(k) x_i(k), \tag{23}$$

$$\theta^{N+1}(k) = \theta^{N}(k) + \eta \delta_h(k). \tag{24}$$

(6) Calculate the global error $E$, as shown in equation (25):

$$E = \frac{1}{2m} \sum_{k=1}^{m} \sum_{o=1}^{q} \left(d_0(k) - y_0(k)\right)^2. \tag{25}$$

(7) According to the calculation result of $E$, the end algorithm can be determined. If $E < \varepsilon$, or if the detector executes this content more than the set maximum number of times, the algorithm will automatically end; otherwise, you need to re-enter the program (1) and take samples again to start learning.

## 4. Experimental Analysis of the Translation Model

*4.1. Validation.* In order to verify the accuracy of the English translation intelligent recognition model, an English translation proofreading test is carried out and the experimental data are recorded and analyzes the system performance. The results show that the system automatically classifies words and sentences and calculates the correct rate. The algorithm is used to automatically identify part of speech, collocation, and other information, which can accurately determine the position of words or phrases in the sentence. Additionally, the accuracy is high. The experimental results show that, in terms of speed, the proposed method can achieve a vocabulary recognition speed of about 25 kb/s between 400 and 500 articles. The accuracy of English translation results after proofreading and before proofreading is compared, as shown in Table 1.

From Table 1, it can be seen that the highest accuracy of the change calibration is 75%, and the accuracy of the intelligent recognition by using the module in the text is 99%. There is a significant difference between the two; this proves that the system's English translation intelligent recognition model is correct, as shown in Figure 2.

In order to test the effect of the improved BP neural network algorithm in translation, it is necessary to test and evaluate the BP neural network algorithm to show the performance of the BP neural network algorithm in translation. Key indicators of achievement assessed for English-Chinese translation tasks included translation accuracy, speed of translation, and ability to update. Finally, the experimental results are analyzed and the corresponding conclusions are given. Finally, the above evaluation methods are applied to practical engineering and good results are obtained.

Evaluation process: three English-Chinese machine translators translated 50 assigned phrases and 50 random network sentences. English-Chinese translation professionals translated the same designated phrases and 50 random sentences. After comparing machine translation with manual translation, the grader will score the three English-Chinese machine algorithms. The rules for scoring are shown in Table 2.

As shown in Table 3, the experimental corpus uses 586538 sentences from the Chinese-English Parallel Corpus of Zhongjun company. One thousand sentences are

Table 1: Accuracy of translation before and after change.

| Experiment no. | The accuracy | |
|---|---|---|
| | Before change (%) | After change (%) |
| A | 58.21 | 99.11 |
| B | 72.42 | 98.62 |
| C | 67.53 | 98.41 |
| D | 72.14 | 99.15 |
| E | 75.11 | 98.56 |
| Precision mean | 69.02 | 98.72 |

randomly collected from the experimental corpus as the test corpus, 2000 sentences as the development corpus, and the rest as the training corpus. In order to ensure that the test results have high reliability and accuracy, this study also designed the corresponding evaluation indicators and verified that the evaluation indicators have achieved the expected results through experiments. Finally, after the completion of the above work, a summary and an outlook are made. According to the different length of sentences, the test corpus is divided. It is divided into three following test sets: single sentence, common sentence, and difficult sentence.

As shown in Figure 3, the test corpus is divided into three following test sets according to sentence length: single sentence, common sentence, and difficult sentence. The translation accuracy of single sentence is relatively good, while the translation accuracy of common sentences and difficult sentences is more reasonable than that of traditional translation methods.

The Bleu value of the test set in Table 3 is calculated by using the calculation results that are shown in Table 4. Analysis of Table 4 shows that, in the process of machine translation, the larger the Bleu value is, the larger the Bleu is, which indicates that this method is more effective than other commonly used parsing machine reading method. The smaller the Bleu, the more effective this method is than other commonly used parsing methods. This shows that, on the basis of the BP neural algorithm, the optimal combination mode between various English language features in complex sentences can be obtained, some structural ambiguities can be eliminated, and the accuracy of English machine translation can be improved, as shown in Figure 4.

A machine translation system based on machine learning is designed and implemented. The system improves the traditional machine translation methods and uses statistical features and neural network models to assist machine translation. Lastly, the experiment proves that the system is feasible. Experimental results show that the improved algorithm can effectively improve the recall rate and time efficiency, while ensuring the accuracy.

The probability results obtained by different methods are mapped with the real machine translation results, so as to compare the retrieval range of different methods. Aiming at the disadvantages of complex and time-consuming construction of large-scale corpus, this method uses tree model to model and classify natural language sentences. The calculation of Chinese sentence similarity in tree structure is studied, and an improved algorithm combined with the FCM clustering algorithm is proposed. On this basis, a prototype of Chinese text semantic extraction and analysis, which is the core part of Chinese text information retrieval system, is implemented. Experiments show that this method is more efficient than the traditional syntactic mechanism translation method. In this algorithm, the left circle represents the accurate translation probability results of different methods, while the right circle represents the probability distribution of the actual machine translation results, as shown in Figure 5.

As can be seen from Figure 5, the final probability retrieved by the traditional parsing machine translation method is in the lower left corner, while the probability of the real machine translation result is in the upper right corner, and this method cannot be mapped to the real result, which verifies the poor translation accuracy of the traditional method. To solve this problem, an improved algorithm is proposed: the part of speech information and context features are weighted to improve the quality of translation. This weight is added to the traditional machine learning model to improve the system performance.

The points obtained from the internal syntax analysis of the tree-based machine translation method are not the most likely points in the real machine translation results, as shown in Figure 6. Therefore, the probability distribution needs to be expanded and optimized to achieve better results. Tree structure is proposed and the corresponding algorithm implementation process is given. Although the result probability obtained by the tree-based machine translation method cannot correspond to the actual machine translation results, it can be mapped on these results, but the mapping range is very small.

The points obtained from the internal syntax analysis of the forest-based machine translation method are not the most likely points in the real machine translation results, as shown in Figure 7. Therefore, the probability distribution needs to be expanded and optimized to achieve better results. Tree structure is proposed and the corresponding algorithm implementation process is given. Although the result probability obtained by the tree-based machine translation method cannot correspond to the actual machine translation results, it can be mapped on these results, but the mapping range is very small.

The comparison between the machine translation method in this paper and the retrieval range of the actual machine translation results is shown in Figure 8. The maximum entropy value retrieved by the direct maximum entropy method is the maximum entropy value of the actual machine translation, which can be basically mapped to the actual machine translation. Compared with other traditional syntactic parsing machine versions, the proposed algorithm has certain advantages and comparative significance. To solve this problem, after studying various improved machine translation algorithms, a new machine translation scheme based on tree structure is proposed. The tree-based machine translation method is used, and the decoding performance of the forest-based machine translation method and the

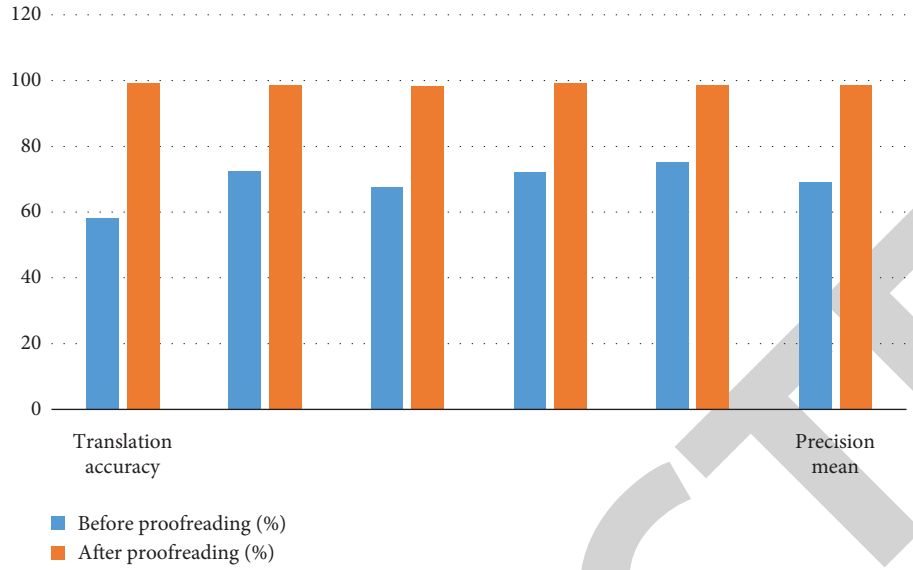


Figure 2: Accuracy of translation before and after change.

Table 2: Scoring rule table.

| Project | Scoring requirements |
|---|---|
| Accuracy of identification | Score the content according to its rigor and rationality, and the perfect score is 100 points |
| Calculate the recognition speed formula | The calculation formula is recognition time multiplied by percentage divided by times |
| Renewal capability | The calculation formula is update time multiplied by percentage divided by number of times |

Table 3: Test set classification results.

| Sentence type | M numbers | Targets' numbers |
|---|---|---|
| Single sentences | $M < 9$ | 432 |
| Common sentences | $9 \le M < 20$ | 325 |
| Difficult sentences | $M \ge 20$ | 168 |

method in the text is gradually enhanced, as shown in Figure 9.

Figures 5–8 in this study show the probability distribution of the traditional parsing machine translation method, the tree-based translation method, and the translation method based on forest and the BP neural algorithm between the accurate translation probability calculation result and the real machine translation calculation result. The calculation result is as follows:

(1) It is proved that the translation accuracy of traditional methods is poor.

(2) Although the result probability obtained by the tree-based machine translation method cannot correspond to the actual machine translation results, it can be mapped to them, but the mapping range is small.

(3) The mapping range of forest-based machine translation method is large, but its mapping accuracy is low.

(4) The best advantage of the translation method based on the BP neural algorithm for syntactic analysis and retrieval is the best advantage of the actual machine translation results, which can be completely mapped to the actual machine translation results.

It can be seen from Figure 9 that the retrieval range of these three methods is increasing. The method Bleu in this study has the largest number of rules, and the number of rules obtained is more than the traditional tree-based machine translation method and the forest-based machine translation method, and the decoding and retrieval performance is higher.

*4.2. Test Results.* Figure 10 shows that the speech recognition machine translation based on the BP neural network is one of the best in terms of recognition accuracy, recognition speed, and updating ability. As shown in Figure 10, the average score of the BP algorithm is 92.3, which is higher than the average score of the statistical algorithm and the dynamic memory algorithm, indicating that the BP algorithm has strong updating ability. Therefore, as an important method and tool for automatic text classification system, the neural network has a broad application prospect. At the same time, the BP algorithm provides a good example for future research. This can be seen in Figures 10 and 11 that the BP algorithm has obvious advantages over other algorithms in performance.

As can be seen from Figure 11, by comparing statistical algorithm, dynamic memory algorithm, BP neural network

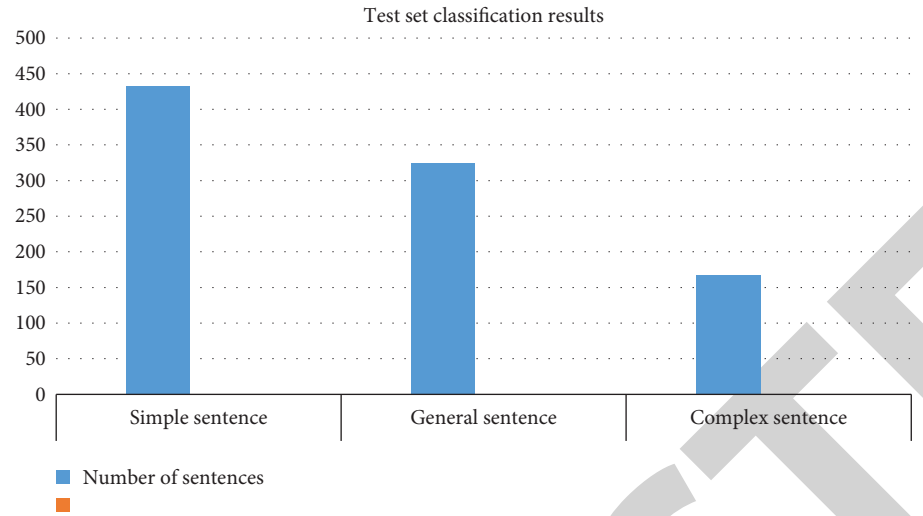


Figure 3: Test set classification results.

Table 4: Comparison of machine translation performance based on test set classification.

| Machine translation methods | Simple sentence | General sentence | Complex sentence |
|---|---|---|---|
| Traditional parsing machine translation methods | 33.58 | 32.85 | 27.24 |
| Modern intelligent recognition, analysis, and translation methods | 33.60 | 33.32 | 30.12 |
| The translation method based on the BP neural algorithm | 33.62 | 33.64 | 32.18 |

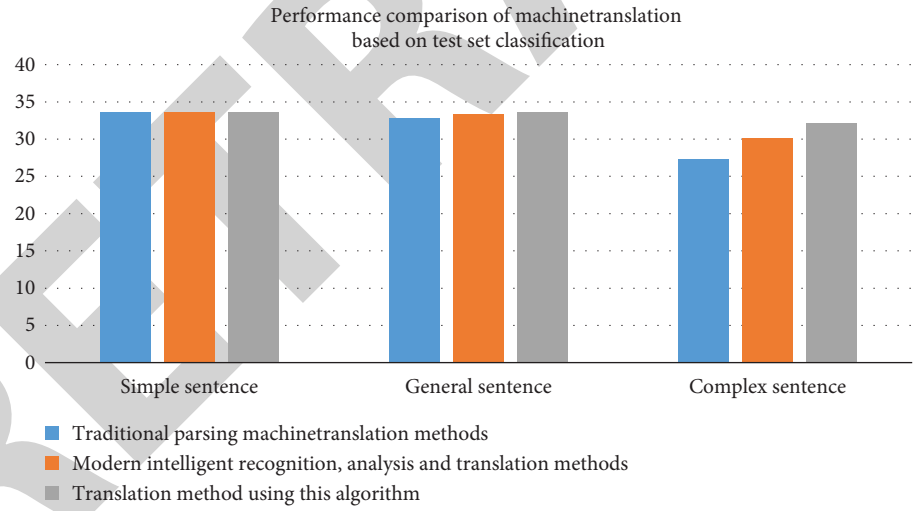


Figure 4: Comparison of machine translation performance based on test set classification.

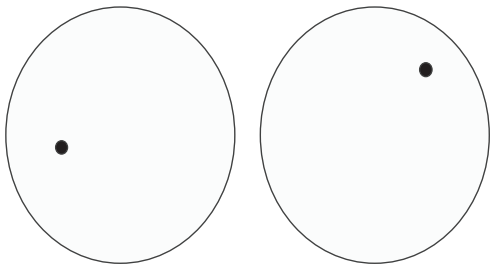

Figure 5: Comparison of retrieval range based on traditional parsing machine translation methods.

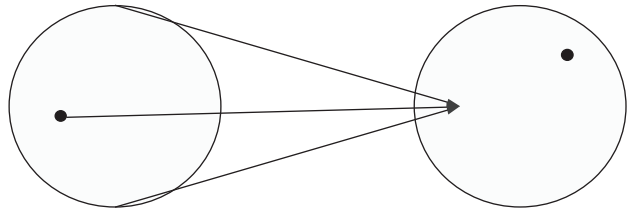

Figure 6: Comparison of retrieval range of tree-based machine translation methods.

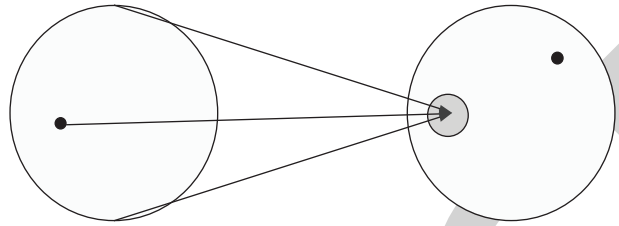

Figure 7: Difference in probability distribution based on the forest translation method.

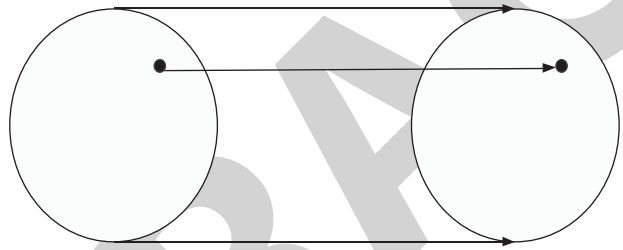

Figure 8: Comparison of search scope based on this method.

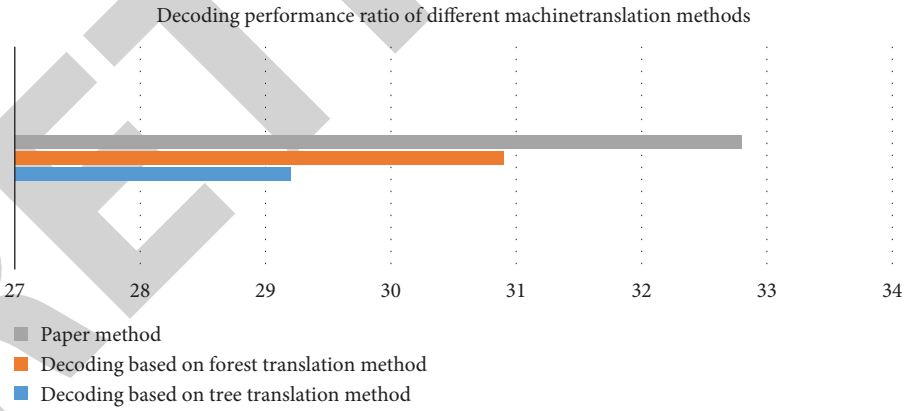


Figure 9: Decoding the performance ratio of different machine translation methods.



algorithm, machine translation, and manual translation, the score of the BP neural network algorithm is better than the other three algorithms. This shows that the ability of the BP neural network algorithm is the best among similar algorithms in recognition accuracy, recognition speed, and updating ability.

The comparison experiment also uses a real translation case and selects the sentence "the price limit of beef noodles by Xi'an Price Bureau" as the translation. Finally, the comparison results of machine translation list the statistical algorithm, dynamic memory algorithm, BP neural algorithm, and manual translation in Table 5.

It can be seen from Table 5, that the word "Price Bureau" is not translated by machine translation according to the statistical algorithm and the dynamic memory algorithm, but by machine translation according

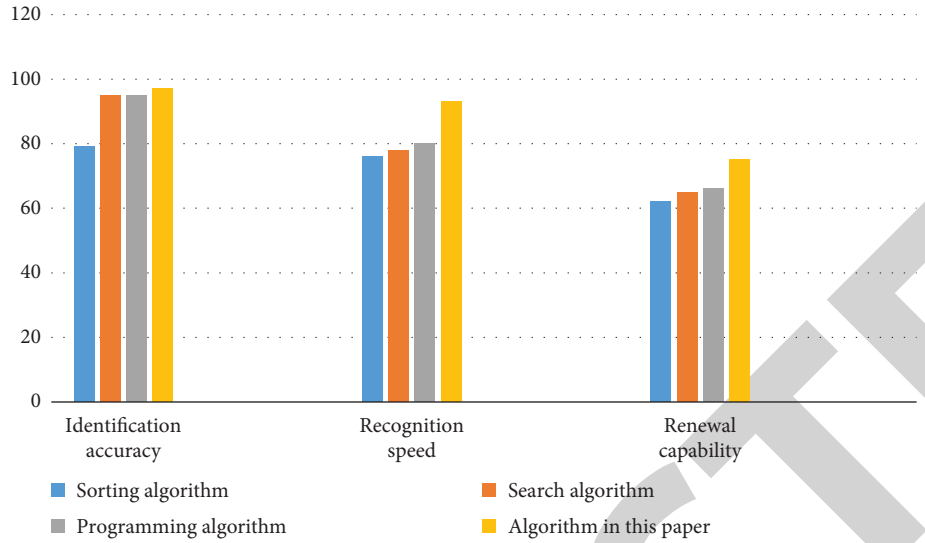


Figure 10: Test chart of four English-Chinese translation algorithms.

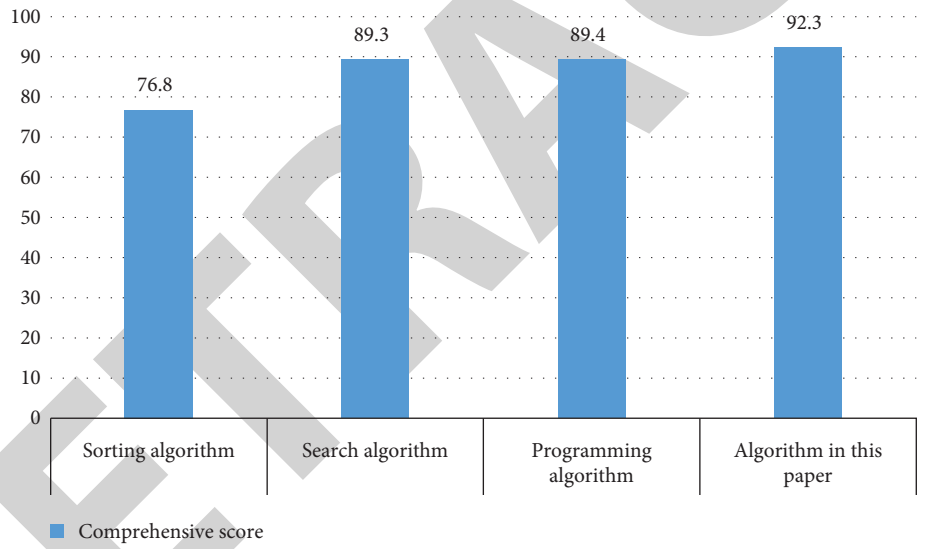


Figure 11: Comprehensive test chart of four algorithms.

Table 5: Comparison of translation example results.

| Translation methods | Translation content |
|---|---|
| Statistical method | There are so many people in this world, it's fate for everyone. Cherish the time you spend with those around you. |
| Dynamic memory algorithm | There are so many people in this world, everyone is fate, cherish the time with those around you. |
| GLR algorithm | There are so many people in this world, it's fate for everyone. Cherish the time you spend with those around you. |
| BP neural algorithm | There are so many people in this world, and it is fate for everyone to meet. Cherish the time with people around you. |
| Human translation | There are so many people in this world, it's fate for everyone. Cherish the time you spend with those around you. |

to the BP neural algorithm. The translation method combining the neural network with statistical calculation is applied to actual text, and its effectiveness and accuracy are known by testing. After testing, it can be seen that this method can effectively improve the efficiency of translation results.

## 5. Conclusion

This study designs an intelligent recognition model of English translation based on the BP neural network. The BP neural network is one of the most widely used representatives in the English intelligent recognition model. The BP neural network has strong nonlinear mapping ability and generalization performance. Therefore, the BP neural network algorithm has been widely used. Syntactic analysis is one of the most commonly used methods in machine translation. However, because intelligent recognition technology depends on English to some extent, it is easy to generate structural ambiguity and affect the quality of machine translation. This problem can be solved reasonably by designing an English translation model based on the BP neural network.

## Data Availability

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

## Conflicts of Interest

The author declare that there are no conflicts of interest regarding this work.

## References

[1] J. Li, J. H. Cheng, and J. Y. Shi, "Brief introduction of back propagation (BP) neural network algorithm and its improvement," *Springer Berlin Heidelberg*, vol. 24, no. (21), pp. 69–71, 2012.

[2] Y. Yang, "Design and implementation of English MOOC platform based on BP neural network algorithm," *Automation & Instrumentation*, vol. 29, no. (5), pp. 125–135, 2018.

[3] P. Lu, "Research on BP neural network algorithm based on quasi-Newton method," *Applied Mechanics and Materials*, vol. 52, no. (1), pp. 127–133, 2014.

[4] Q. Xu and W. Kong, "Research on forecast model based on BP neural network algorithm," *Journal of Physics: Conference Series*, vol. 1982, no. 1, Article ID 012065, 2021.

[5] Y. Zhao, "Research and application on BP neural network algorithm," in *Proceedings of the 2015 International Industrial Informatics and Computer Engineering Conference*, vol. 51, no. (15), pp. 134–137, 2015.

[6] F. Zhang, "English Machine Translation Model Based on Modern Intelligent Recognition technology," *Modern Electronics Technique*, vol. 20, no. (2), pp. 15–18, 2018.

[7] M. Z. Hua and J. Changzhou, "Improvement in the Training Algorithm of BP Neural Networks," *Journal of Jiangsu University of Science and Technology*, vol. 20, no. (11), pp. 277–282, 2000.

[8] S. Zhang and H. E. Jian-Nong, "Research on Optimized Algorithm for BP Neural Networks," *Computer and Modernization*, 2009.

[9] X. Li, B. Qi, and W. Lu, "A New Improved BP Neural Network Algorithm," in *Proceedings of the International Conference on Intelligent Computation Technology & Automation*, vol. 39, no. (2), pp. 225–231, IEEE, Changsha, Hunan, January2009.

[10] J. Zhang and D. Zhang, "Design and research of English-Chinese translation platform based on BP neural network," in *Proceedings of the The International Conference on Cyber Security Intelligence and Analytics*, vol. 19, no. 1, pp. 177–182, Cham, 2021.

[11] "Study on the construction of English ICAI course based on BP neural network algorithm[J]," *Journal of Physics: Conference Series*, vol. 1992, no. 2, (6pp), Article ID 022185, 2021.

[12] S. G. Ren, N. S. Wang, and B. R. Qin, "On sentence conversion methodology in artificial-neural-network-based process language translation," *Mechanical Science and Technology*, vol. 25, no. 1, pp. 123–126, 2004.

[13] Y. Chen, "Business English translation model based on BP neural network optimized by genetic algorithm," *Computational Intelligence and Neuroscience*, vol. 2021, pp. 1–10, 2021.

[14] N. Wang and M. Wang, "Research on machine translation sentence pattern transformation method based on BP neural network," *Revista de la Facultad de Ingenieria*, vol. 32, no. 3, pp. 693–700, 2017.

[15] H. Liu, Y. U. Yan-Mei, and D. S. Luo, "English Character Recognition Based on Momentum BP Neural network," *Journal of Sichuan University(Natural Science Edition)*, vol. 20, no. (11), pp. 277–282, 2011.