Research Article

The Design of Emoticon-Generating Device Based on Artificial Neural Network

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Along with the rapid development of the new internet media, people's lives are becoming increasingly digital, information is diversified, and communication methods have undergone significant changes. "Emoticon pack," as a kind of visual symbol that was generated and developed in the context of the internet, can use nonverbal symbols such as words, images, symbols, and other nonverbal symbols to simulate expressions, posture, and movements and a new expression and cultural phenomenon. In this study, the principle of neural network optimization is analyzed by applying the particle swarm algorithm, incorporating the harmonic search algorithm to neural network optimization, and the principle of neural network optimization is analyzed. This study is aimed at college students, investigating the consumption status of emoticon packs and the consumption amount of emoticon packs for men and women; among them, people who only use free emoji packs and those who only use emoji packs under 10 yuan account for the highest proportion, accounting for 73.07% and 22.41% of the surveyed people. Among the people who buy emoticons, boys are more likely to have large consumption behaviors than girls. In the consumption segment below ten yuan and above 150 yuan, the ratio of men to women is the same; in the consumption range of 11–50 yuan, the number of girls exceeds that of boys, accounting for 70% of the number; however, in the consumption range of 51 yuan to 150 yuan, the proportion of boys surpassed that of girls and the number of consumers accounted for more than 60%.

1. Introduction

The birth, development, and global popularity of the internet have a particularly obvious impact on the way people communicate. Internet language is gradually being accepted by more people, and emojis have also taken place in the spread. Combined with the research of related scholars, it can be seen that popular emoticons have shown an amazing mobilization effect in the online world, and the influence of this mobilization stems from the accumulation of speaking volume.

Emoticons have developed from character sets to emoticons. It has undergone great changes in form and connotations, but the general trend is that the autonomy of the public has been brought into play to a greater extent. At the moment when emojis are so popular, analyzing the pop culture phenomenon of emojis has essential motivation and significance.

Regarding artificial neural networks, relevant scientists have performed the following research. The multibody problem in fluid mechanics arises from the ductility that shows how important the exponential complexity encoded in multibody wave functions is. Carlo, a type of computer for machine learning, is the systematization of wave functions to reduce their complexity to a physically manageable level. Carlo provides a confidential view of tumor status for artificial neural networks. A powerful learning solution that can detect ground conditions is demonstrated, and the minimal positive time evolution of interconnected quantum networks is explained. The Carlo approach provides a high degree of accuracy in determining the rotation pattern of the prototype that interacts with these two dimensions [1]. Alanis presented the results using an artificial neural network learning algorithm based on the Kalman wave filter extension and its application for predicting electricity rates

in two cases: the complete step and the N step. In addition, it includes a demonstration of stability and a complex algorithm based on the Kalman filter, using the famous Lyapunov approach. Finally, the feasibility of the proposed estimation scheme is demonstrated using one-stage and n-stage forecasts with data from European electrical systems [2]. Keles proposed an artificial neuron network (ANN)-based approach to predict tariffs. Since the accuracy of the performance of the ANN prediction depends on the appropriate set of parameters for the inputs, the concentration is placed on the choice and readiness of the underlying data that have a significant effect on the electricity price. This is achieved by using various clustering algorithms and comparing the configuration results of the selected model with different input argument parameters. Once they identify the optimal INS inputs and configurations, they perform well to influence future electricity prices. As a result, the KNN model, which is used for in-sample and out-of-sample analysis, has been developed. The results show that the integrated approach results in very favorable electricity price estimates, with lower or lower estimation error than other electricity price estimation tools recognized in the document [3]. Santosh presented a study of various algorithms for artificial neural networks (ANN) to select the most appropriate algorithm to diagnose transients in a representative nuclear power plant (NPP). The objective of this study is to formulate a framework based on neural networks that will help operators to quickly identify such starting events and take corrective actions. Optimization studies have been performed on several neural network algorithms. These are algorithms that have been trained and tested for several initiating events in a typical nuclear power plant. The study has shown that the resilient backpropagation algorithm is the most suitable for this purpose. The algorithms have been used in the operator support system development [4]. In machine learning, the model division provides high-quality vectors (configuration) for classes based on common models. The neural network created to date has achieved the best results in this area. Rauber proposes to use the dimensional reduction of two functions: to study the relationship between the studied visual representations and to see the relationship between the artificial neural networks. By experimenting with three standard sets of imaging data, we have shown how visualization can provide the most important information for network designers. Results from one of the datasets (SVHN) include, for example, the existence of interpretive learner representation sets and the fragmentation of neural networks that were generated by groups with clearly related discriminatory effects [5]. Li investigated how a neural network could be used to control an on-grid rectifier/inverter to minimize this limitation. Neural networks perform dynamic programming algorithms and are trained to propagate time. Additional strategies are adopted to improve productivity and sustainability when interventions are available. This includes the use of built-in signals to damage the network inputs and the introduction of interference voltages from the output network into a properly configured network. The performance of the neural network controller was examined under

standard vector control conditions and was compared to conventional vector control methods. This shows that the strategy proposed by Li for neural network vector management is effective. Even in a dynamic switching and power converter environment, neural vector controllers demonstrate a strong ability to follow rapidly changing reference commands [6]. Artificial neural networks (ANNs) have been successfully applied to predict the chemical stability of volcanic alkali-activated materials. Nine input data for each chemical's physical parameter were used to train each artificial neural network. Finocchiaro presented evidence for the strong effect of the chemical stability of the alkaline activator $\text{SiO}_2/\text{Na}_2\text{O}$ molar ratio and the Si/Al ratio of the precursor mixture on the reticularity of ghiaira-based formulations of pozzolan-based materials. It must be noted that this effect is much less sensitive to the compressive strength values and appears to be less sensitive to the molar ratio of the alkaline activators. A comparison of the ANN results with the more traditional multiple linear regression (MLR) demonstrates that the first method has higher predictive performance. The MLR results are less important and can be used to confirm the strong ability of the ANN to determine a more suitable formulation using a set of experimental AAMs [7]. These methods have provided some references for our research, but due to the short time and small sample size of the relevant research, the research has not been recognized by the public.

The innovation of this study is the introduction of artificial neural networks. According to the application of the BP neural network, a cyclic learning circuit is designed, and the whole BP neural network hardware circuit is combined to test the effectiveness of the cyclic learning circuit designed in this study. By applying this learning circuit to the artificial neural network circuit, the BP neural network hardware simulation circuit is built, the function fitting function is realized, and the emoticon package that the user may need can be intelligently generated [8].

2. Method of the Emoticon Generation Device

2.1. Artificial Neural Network. Artificial neural network theory is a theory in which intelligent computers use the mental functions and technology of the human brain to track information about human neurons. It is currently one of the most active research fields in the world. The constructed neural network is a theoretical mathematical model of the human brain and its functions. It is composed of several interconnected process units. It is a nonlinear adaptor system, and the resulting neural network is not only similar to the biological nervous system but also performs basic brain functions. From the perspective of the system's morphology and the way in which neurons interact, its function is similar to that of the biological nervous system. In terms of performance, it focuses on modeling the basic functions of the biological nervous system. For example, a proper learning algorithm can remove data links hidden in larger datasets, as people continue to learn rules, generalize experiences, and create new rules from examples taken when necessary. To some extent, they play a "separation" role [8].

Artificial neural networks (ANNs) have attracted great attention due to their powerful image processing, speech recognition, and natural language processing capabilities. The performance of the ANN model is highly dependent on the quantity and quality of data, computing power, and algorithm efficiency. A traditional neural network trains the model by iteratively adjusting all weights and biases to minimize the loss function, which is defined as the error between the model prediction and the actual result. In the learning process, the derivative of the loss function passes through each level to control the insertion. However, this method has several main disadvantages, such as slow convergence, local minimum problems, and model selection uncertainty.

In terms of learning models, research on classification and regression based on artificial neural networks has received great attention in the fields of artificial intelligence and machine learning. The artificial neural network has good generalization ability. After training the network model according to the known sample information, it can classify or predict any linear or nonlinear data structure. However, traditional neural network learning algorithms are based on gradient optimization algorithms [9].

For a single hidden layer forward neural network, let d , L , and m be the number of nodes in the input, layer hidden, layer and output, and layer, respectively, and the output function of the network can be expressed as follows:

$$f(x) = \sum_{i=1}^M \alpha_i Q(\mu_i, \eta_i, x), \quad (1)$$

$$AGA = A, GAG = G, (AG)^T = AG, (GA)^T = GA, \quad (2)$$

$$\|A\hat{x} - y\| = \min_x \|Ax - y\|, \quad (3)$$

$$\|x_0\| \leq \|x\|, \quad \forall x \in \{x : \|Ax - y\| \leq \|Az - y\|, \forall z \in R^n\}. \quad (4)$$

$x \in R^d$ is the output vector.

$\mu_i \in R^d$ is the weight vector connecting the i node of the hidden layer and the nodes of the input layer.

η_i is the bias of the i -th hidden layer node.

$\alpha_i \in R^m$ is the connection of the weight vector between the i -th hidden layer node and the output layer node.

$Q(\mu_i, \eta_i, x)$ is the activation function of the i -th hidden layer node.

The network structure is shown in Figure 1.

Suppose the actual calculation result of the network is O_j , and the expected result of the sample is T_j , then, as long as the error between O_j and T_j is minimized and the network output is close to the expected output, the network can obtain better predictive ability and generalization ability [10]. The input and output are expressed in matrix form, and the formula can be written as follows:

$$\text{In} \quad \omega \lambda = Z. \quad (5)$$

FIGURE 1: ELM network structure.

$$\omega = \begin{bmatrix} Q(\mu_1, \eta_1, x_1) \cdots Q(\mu_L, \eta_L, x_1) \\ \vdots \\ Q(\mu_1, \eta_1, x_N) \cdots Q(\mu_L, \eta_L, x_N) \end{bmatrix}, \quad (6)$$

$$\lambda = \begin{bmatrix} \lambda_1^Z \\ \vdots \\ \lambda_L^Z \end{bmatrix}_{L \times m}, \quad (7)$$

$$Z = \begin{bmatrix} t_1^Z \\ \vdots \\ t_N^Z \end{bmatrix}. \quad (8)$$

ω is the hidden layer output matrix of the network.

The above ELM algorithm is expressed from the “regression” aspect. In the multiclassification problem, ELM is realized by the multioutput regression algorithm. The specific method is as follows.

It is assumed that the sample set has s categories.

$$\delta\{x_i, y_i\}_{i=1}^N, x_i \in R^n, y_i \in \{1, 2, \dots, s\}, \quad (9)$$

$$\lim_{L \rightarrow \infty} \left\| \sum_{i=1}^L \alpha_i h_i(x) - f(x) \right\| = 0, \quad (10)$$

$$h(x) = [Q(a_1, b_1, x), \dots, Q(a_L, b_L, x)]^T, \quad (11)$$

$$Q(m, n, x) = \exp(-n\|x - m\|^2). \quad (12)$$

A new multidimensional target vector is defined.

$$c_i \hat{=} [c_{i1}, c_{i2}, \dots, c_{is}], \quad (13)$$

$$Q(m, n, x) = \frac{1}{1 + \exp(-m \cdot x + n))}, \quad (14)$$

$$Q(m, n, x) = (\|x - m\|^2 + n^2)^{1/2}, \quad (15)$$

$$Q(m, n, x) = \begin{cases} 1, & \text{if } m \cdot x - n \geq 0, \\ 0, & \text{otherwise.} \end{cases} \quad (16)$$

For the generated new sample set $\{(x_i, c_i)\}_{i=1}^N$, the ELM model is trained, and then, the final prediction result of the classification problem is given by the following formula [4]:

$$\hat{y}_i = \text{MAXI}(\hat{c}_i). \quad (17)$$

$\hat{c}_i$ - c_i is the prediction vector.

MAXI is the subscript of the largest element.

The random projection has been widely used in various fields, such as signal processing, least square regression, classification, and clustering. A recent study showed that the reason humans can identify complex objects and process large amounts of data is because the human brain uses random mapping algorithms. The design of artificial neural networks is inspired by the way the human brain system processes information in biology. Therefore, the theory of learning algorithms based on random mapping will become a common technique in the field of machine learning to process different types of complex data [11].

For a given sample set $x_i \in R^d$, $i = 1, \dots, n$, $W \in R^{k \times d}$ random matrix is compressed and transformed to k dimension, there is $k < d$, and then, the following is the conversion formula:

$$\tilde{x}_i = Px_i, \quad i = 1, \dots, n. \quad (18)$$

$\tilde{x}_i$ is the high-dimensional vector x_i in the low-dimensional space after random projection transformation.

For any $0 < \omega < 1$ and integer n , the other satisfies k .

$$k \geq 4 \ln \frac{n}{(\omega^2/2 - \omega^3/3)}, \quad k > 0. \quad (19)$$

Hence, for any u and $v \in V$, the following formula holds:

$$(1 - \mu)\|u - v\|^2 \leq \|f(u) - f(v)\|^2 \leq (1 + \mu)\|u - v\|^2. \quad (20)$$

Given $\mu, \eta > 0$, for any sample $\mu, \eta > 0$ set and P composed of n points in a d -dimensional space, expressed as matrix $A_{n \times d}$. Making

$$k_0 = \left\lceil \frac{4 + 2\alpha}{\omega^2/2 - \omega^3/2} \right\rceil \ln n. \quad (21)$$

Let $f: R^n \rightarrow R^d$; map the i -th row of A to the i -th row of E .

$$E = \frac{1}{\sqrt{k}}AW. \quad (22)$$

It is assumed that the two k -dimensional column vector data from the same dataset are x_i and x_j , respectively. The low-dimensional vectors generated by the random projection transformation matrix W are $\tilde{x}_i$ and $\tilde{x}_j$, respectively, and the following equations are given as follows:

$$\tilde{x}_i = Wx_i, \quad (23)$$

$$\|\tilde{x}_i - \tilde{x}_j\|^2 = \|\tilde{x}_i\|^2 + \|\tilde{x}_j\|^2 - 2\tilde{x}_i^T \tilde{x}_j = 2(1 - \tilde{x}_i^T \tilde{x}_j), \quad (24)$$

$$\lambda = 1 - \tilde{x}_i^T \tilde{x}_j = 1 - x_i^T W^T W x_j, \quad 0 < \lambda < 1. \quad (25)$$

The topology structure of the artificial neural network is an important feature of neural networks. From the point of view of the connection method, the structure of the neural network is mainly divided into two types: (1) feedforward neural network, each neuron in the feedforward network receives the input signal of the previous layer is output, and the output value is output to the next layer. The whole process is one-way transmission without feedback. The nodes of a feedforward network are divided into two categories: input units and computational units. The input node is directly connected to the computing node, and each computing unit can have many inputs but only one output. (2) In the feedback neural network, each node can be used as a computing unit. Although it is also multi-input and single output, the output can not only be connected to the next layer as the input of the next layer of nodes but also can be connected to the same layer or the previous layer, that is, one layer as input to other nodes.

2.2. Emoji Generation. The development of the internet has brought about tremendous changes in people's daily communication, from the initial face-to-face communication to the use of the internet to communicate in the virtual environment of the network. After the active social software, the way people use pictures to convey their feelings in online communication has become increasingly popular. It often uses screenshots of popular stars, quotations, animations, and movies with matching text to convey specific emotions. The "emoji package" was formed in this context [12].

As a medium of cultural content, emoticons are the core of communication and acceptance between people. Some of the most popular emoticons attract more people. When people spread emojis, their facial expressions have similar characteristics. This group of jokes with similar facial expressions is a group of popular internet jokes. The process of applying emoticons is a process of constant imitation and copying, and the popular smile culture today is also the result of the proliferation of imitations.

Imitation of facial expressions is not a very complicated topic for the audience. For the emoticons, you like just download the corresponding emoticons, save them to your own emoticon library, and then send them to your favorite activities. Emojis with special feelings will enter the next activity at this time. Emoticons can maintain the original descriptions or modify them to provide users with a more personalized style. The simulation process can be summarized as "identity-generation-expression-transfer" with four steps. Although this process may seem a bit complicated, in real life, these four steps usually randomly happen, which is constantly exciting. From this perspective, emoji itself is a reproducible network emoticon package, which is extremely simple to use [13].

When people communicate on the internet, pure text communication cannot make both parties feel each other's emotions. Most of the "emoji packs" have both pictures and texts, which can express emotions and intuitively spread

information, making people increasingly prefer to send emoticons instead of some text content. The content expression of “emoji package” is generally relaxed and humorous. When people use “emoji package” to chat, they can activate the chat atmosphere and make the chat atmosphere more relaxed; when people encounter a topic, they do not want to answer in their communication, an interesting “emoticon” can “politely” interrupt the topic and also relieve some embarrassment. Second, the meanings of many “emoji packages” are ambiguous, and the specific meanings of the words are not directly expressed, which can trigger people’s associations, for example, “The wind is so big, I’m so cold” and “Is there anyone in charge of this?” (as shown in Figure 2), giving people unlimited space for reverie. Different people have different understandings of this, and even if the same person sends this expression in different situations, the inner emotions they want to express are also different. On the other hand, the fast-paced modern life and work pressure have brought increasing oppression to people. Sending various “emoticons” through online chat entertainment makes people have fun and has become a way for people to release pressure. Therefore, “fighting pictures” are becoming increasingly popular in online chats [14].

3. Experiment of the Device for Emoji Generation

In biology, there are many dendrites and branches around the cell body of a neuron. The dendrites and cell bodies are in contact with the axons of other neurons, and the stem is connected with the dendrites or cell bodies of other neurons. The neuron sends information about the impulse. When an electric shock is applied to the axial end of the neuron, it releases chemicals into the synaptic hole to generate an electric potential. If the potential difference around another neuron body is within a certain range, that is, the tube potential is accumulated, a new wave will be generated and sent to the axon. The constructed neuron is the processing unit of the neural network, and its model is similar to the biological neuron [15]. It consists of three basic elements: connection weight, summation unit, and activation function, as shown in Figure 3. (1) Connection weight: it is the weight corresponding to each group of input signals after being input to the neuron model. When the weight is positive, it means that the neuron is activated; otherwise, when the weight is negative, it means that the neuron is inhibited. (2) Summation unit: after the input signal is multiplied by the connection weight, the summation is performed, that is, a linear combination. (3) Nonlinear activation function: when the weighted sum of the input signal exceeds the threshold, the nonlinear function is activated and controls the output of the neuron within a certain range.

Eight UCI datasets are selected to test the classification ability of artificial neural networks on real datasets [16]. The basic information of the dataset is shown in Table 1.

Artificial neural network learning methods can be divided into two categories: (1) Supervised learning. Supervised research is also called supervised learning. It describes the external world and provides some expected input and

FIGURE 2: Emoticon screenshot (image source: network screenshot).

FIGURE 3: Basic neuron model.

TABLE 1: Basic information of the classification dataset.

Dataset	Dimension	Number of samples	Category information
Glass	9	214	2 [51, 160]
Ionosphere	34	350	2 [125, 225]
Iris	4	150	3 [51, 50, 60]
Lenses	4	25	3 [4, 5, 15]
New thyroid	6	215	3 [150, 50, 30]
Soybean small	34	50	4 [10, 10, 20, 20]
Dermatology	35	350	6 [110, 60, 70, 50, 20]
E coli	7	350	6 [143, 70, 50, 30, 20]

output groups for the neural network. The neural network calculates the actual output according to the recorded data, then compares the difference with the expected output, adjusts the correct system parameters according to the difference, and finally confirms that the actual output meets the correct conditions. (2) Unsupervised learning. Uncontrolled learning is also called unsupervised learning. Only imported from outside, there is no significant effect. Therefore, the system parameters cannot be adjusted by calculating the difference, but according to some statistical data input from the outside world, it will adjust itself [17]. System settings are configured, and special functions not

included in the remote registry are specified. Figure 4 shows the flow chart of supervised learning and unsupervised learning.

Because artificial neural networks have disadvantages such as slow training speed, weak global searchability, and easy to fall into local extreme points during learning, the optimization of neural networks has become a hot spot in the study of artificial neural networks. With the rise of optimization algorithms such as swarm intelligence algorithms, increasingly, people have begun to focus on the study of combining swarm intelligence algorithms with neural networks [18]. Because the swarm intelligence algorithm has the advantages of strong global convergence and does not need to use some characteristic information (such as gradient information) of the problem to be solved, the swarm intelligence algorithm is used to optimize the neural network. Not only can the training speed of the neural network be effectively improved but also the generalization ability of the neural network can be effectively enhanced.

BP network is currently the most common and widely used neural network. When determining the connection weights of BP network, the traditional BP algorithm mainly relies on the gradient optimization method, which is not only inefficient but also easy to fall into the local optimal solution. The particle swarm algorithm has the advantages of simple, easy to implement, and fast calculation. It can also be used to optimize neural networks like genetic algorithms and other evolutionary algorithms. Although the research in this area is still in the preliminary stage, the particle swarm algorithm still has great potential for the optimization of neural networks [19].

The particle swarm algorithm and the particle swarm algorithm integrated into the harmony search algorithm are, respectively, applied to neural network optimization. Through modeling parameter design programming and simulation, 100 sets of experiments were performed on the unoptimized BP network, the BP network optimized using the basic PSO algorithm, and the neural network optimized using the PSO-HS algorithm. The experimental results are shown in Figures 5 and 6.

Currently, most of the emojis in WeChat and QQ emoji packs are free and users can download them for free and continuously use them if needed. The cost of paid emoji at the WeChat emoji store is mainly 6 yuan per group, which contains 8–16 separate emojis, the topic of the most famous singers or actors. Most of the emojis in the QQ emoji store are for super QQ members. Participants can download and use the emotions of blocked participants. [20] Lack of copyright information, the creator, and users of the emoticon does not care about copyright protection. This made most of the emojis on the market free. Figure 7 shows the students' use of expression packs and the number of expression packs used by both men and women.

The principle of the artificial neural network is analyzed, the mathematical model of the entire artificial neural network is established, and the main circuit diagrams needed to build the entire BP neural network hardware circuit are planned. Then, simulation tests are performed on each module circuit to verify the feasibility of the circuit and focus

on designing a cyclic learning circuit, which can make the entire artificial neural network hardware circuit to be cyclically learned. The circuit builds a link block diagram of the entire artificial neural network. The circuit includes 2 input neurons, 2 hidden layer neurons, and 1 output neuron. The abbreviated letters in the box in the figure represent the abbreviations of each module circuit, where "PC" means pulse circuit, "WS" stands for weighted summation circuit, "IV" stands for I/V conversion circuit, "tanh" represents the sigmoid activation function circuit, "DC" represents the difference circuit, "LC" represents the cyclic learning circuit, and the direction of the arrow represents the input and output of the circuit. Figure 8 is a schematic diagram of the BP neural network circuit connection.

Four standard test functions are used to test the particle swarm algorithm and the particle swarm algorithm of fusion harmony search for 20 times. When the two parameter settings are the same and the initial velocity and position of the particles are the same, after the evolution is over, the global optimal solutions finally searched out by the two optimization algorithms are not the same, and the optimal solution found by the latter is clearly better to the former. The experimental results are shown in Table 2.

According to the entire circuit connection design diagram in Figure 8, the entire artificial neural network circuit is built through simulation. Because only a single sample is required for testing, there is no need for a sample collection circuit. Instead of X_{n1} and X_{n2} , single samples X_1 and X_2 are input from the input neuron. The experimental results are shown in Table 3.

A fitting function is chosen because it is a more complex nonlinear function, which reflects the advantages of the artificial neural network fitting nonlinear functions. It has a certain degree of representativeness, and the function value of the function has been transformed to the range of 1~5. According to the uniform design table and its usage table, the first and third columns are selected as samples. The input of the BP neural network hardware circuit designed in this study is expressed by voltage, and the input range is 1–5 v, which is equally distributed according to 8 levels. The sample data table is shown in Table 4.

The artificial neural network is used to continuously learn in a loop. According to the different preferences and habits of each person, in the process of using social software, the user will intelligently generate emoticons that may be used through the words and sentences to be typed.

"Phone Baby" is an anthropomorphic emoticon package designed based on cartoon characters. It is cute, warm, and a bit naughty. According to the number of downloads of "Phone Baby" provided by WeChat, it is excellent, taking "Phone Baby" as an example to investigate whether the emoticon generated by the artificial neural networks can be accepted by everyone.

From the analysis of the age of users, the audience of "Phone Baby" is mainly young people, mainly young people in the 19–38 age-groups. Among them, most are 24–28 years old, as shown in Figure 9. Therefore, the development and design of its derivatives should focus on young consumer groups pursuing trends, fashion, and individuality and

FIGURE 4: Learning block diagram.

FIGURE 5: Unoptimized BP network prediction results.

FIGURE 6: BP network prediction results optimized with PSO-HS algorithm.

FIGURE 7: Consumption status of emoji packs of college students.

FIGURE 8: BP neural network circuit connection diagram.

TABLE 2: Comparison of test results of two algorithms.

Function	Algorithm	Max	Min	Average value	Variance	Standard deviation
Rastrigin function	PSO	0.35	0.002	0.096	0.009	0.098
	PSO-HS	0.35	8.7E	0.0033	4.98E	0.007
Girewank function	PSO	0.01	8.19E	0.003	8.59E	0.003
	PSO-HS	1.22E	1.61E	1.66E	7.2E	2.68E
Ackley function	PSO	1.27	0.03	0.035	0.085	0.3
	PSO-HS	0.15	0.007	0.062	0.002	0.043
Rosenbrock function	PSO	0.89	0.0034	0.11	0.039	0.19
	PSO-HS	0.10	3.2E	0.014	0.00065	0.025

TABLE 3: Simulation results of single learning and recurrent learning.

Enter (Vi/v)		Output (Vo/v)		Error (E/mv)	
X1	X2	Expected output	Single learning	Loop learning	Single learning
3	3	2	2.07	2	89.6
3	4	2	2.11	2	432
3	4	3	2.88	3	93.4
4	4	2	2.18	2	466
4	4	3	3.02	3	48.6
5	5	4	3.80	4	183

TABLE 4: Sample datasheet.

First row	Sample input			Expected output	
	Xn1	Third column	Xn2	dn1	
1	1.25	4	2.75	2.114	
2	1.75	8	4.25	3.224	
3	2.75	3	2.25	2.467	
4	2.75	7	4.25	3.607	
5	3.75	2	1.25	2.657	
6	3.25	6	3.75	3.862	
7	4.25	1	1.75	2.654	
8	4.75	5	3.25	4.068

FIGURE 9: User age data.

should pay more attention to the expression of its personalized design.

Analyzed from the level of education, the audience of “Phone Baby” has a relatively high level of education, and most of them have a bachelor’s degree, as shown in Figure 10. The consumption of this group of people tends to be more rational and pays more attention to product quality.

4. Discussion

Expression as a medium of cultural content is the essence of communication and acceptance between people. Some of the most popular emojis are affecting more people. If people continue to post emoticons, their emoticons will have similarities. This group of emoticons with similar emoticons is just a typical network emoticon package. The dissemination process of emoticons is essentially a process of constant imitating and copying, and today’s popular smiley culture is also the result of the spread of this emoticon. It is not difficult for the audience to imitate facial expressions. For their favorite emoji, people only need to download the appropriate emoji, save it to their personal emoji library, and then send it to their favorite occasion. They send an emoji that conveys a specific emotion once and then precisely move to the next one. In the process of expression, emoticons can remain original or deformed to provide users with a more personalized touch. The process of imitation can be limited to the four stages of “recognition-collection-expression-metaphor.” Although this process seems a bit complicated, in real life, these four steps often happen by accident. In this sense, the emoji itself is an online meme that can be simulated and is very easy to use.

FIGURE 10: User education data.

Artificial neural networks have four main characteristics: one is a high degree of parallelism, the other is a high degree of general nonlinearity, the third is the ability to resist and remember good errors, and the fourth is self-consistent and independent performance. Its advantages are mainly manifested in the following three aspects. One is that he has the ability to learn by himself. For example, if you use image recognition, all you have to do is to input several different image models and perform the same artificial neural network diagnosis. The network is slowly learning to recognize such images through the ability of automatic learning. The ability to learn on your own is essential for prediction. Computers with artificial neural networks are designed to provide people with economic forecasts, market forecasts, and future profits, and their implementation prospects are promising. Second, Lenovo has memory. The artificial neural network response network can be used to make this connection. Third, it has the ability to find suitable solutions at high speed. Finding the best solution to a complex problem often takes a lot of computational effort. With the help of artificial neural networks, it can quickly find the best solution for a specific task and the computer’s high-speed computing power.

5. Conclusions

The unique archive network is an algorithmic method that mimics the structure of animal muscle tissue used for disseminating and comparing information. This type of

network depends on the size of the system and achieves the purpose of data processing by creating a central network. Image-based emojis are becoming increasingly popular these days. This little symbol invaded the social media space of the community and organized wide participation and engagement and became a cultural phenomenon that could not be ignored. This study analyzes the working principle of the artificial neural network, creates a mathematical model of the entire artificial neural network, outlines the basic schematic diagram required to construct the entire BP neural network, and then optimizes the artificial neural network. This study starts a preliminary forecasting study. In view of the limited data sources and academic level, there are unavoidable omissions in the study. The analysis of the current situation analysis stage is not thorough enough, only showing the changes of related indicators, lacking internal judgment and analysis. In the theoretical research stage, the grasp of the theory is not deep enough. The potential of construction remains to be explored, and the limitations of development need to be paid more attention to. How to guide emojis from the flood of entertainment consumerism to a healthy state of development, and whether intelligently generated emojis can mobilize, will be the direction of future research.

Data Availability

The data that support the findings of this study are available from the author upon reasonable request.

Conflicts of Interest

The author declares no conflicts of interest.

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