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Research Article

Artificial Intelligence Interactive Design System Based on Digital Multimedia Technology

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The current extraction speed of artificial intelligence interactive elements is low, with the low effect, resulting in the poor effect of artificial intelligence interaction. Therefore, a new artificial intelligence interaction method has been developed for digital multimedia technology, performing analysis based on the current background of artificial intelligence, providing a good environment foundation for the interactive place, so that it can integrate artificial intelligence technology after interaction. Aiming at the current problems of digital multimedia technology in the use of artificial intelligence interaction design, innovative exploration of artificial intelligence technology will be carried out based on multimedia technology and innovative thinking. Based on the in-depth analysis of digital multimedia technology, the relationship between artificial intelligence technology and digital multimedia technology is analyzed, and an artificial intelligence interactive design system based on digital multimedia technology is proposed. Finally, the digital multimedia technology is verified on the artificial intelligence interactive design through case analysis.

1. Introduction

With the continuous technological progress and graphics processing technology, the effective combination of digital multimedia technology and artificial intelligence interactive design has been widely used in various fields. Nowadays, the electronics industry, film and television industry, art industry, advertising design industry, and art design industry within China all involve digital multimedia technology graphics and visual design [1, 2]. It has turned to intelligence, providing to the current artificial intelligence interactive design technology gradually from the past two-dimensional graphic design and then to show people different ways and types of graphic design. Therefore, on the premise of modern media technology and media popularization, not only are people's needs for the visual aesthetics of media forms satisfied with the simple performance of traditional forms, but also more attention is paid to the overall effect perception of the view. By optimizing the graphic design and auditing the design principles between the virtuality and the reality, the aesthetic effect and the visual impact of the digital multimedia technology graphic design can be ensured. While carrying out the digital multimedia technology graphic visual design, imagery increases emotional expression, usually effectively combining the text form and graphic visual, as well as segmenting and organizing the basic elements of the graphic target according to the basic form of the image, which is effectively combined with visual sense [3, 4]. Digital multimedia technology graphics processing has also been popularized in various fields, and competition in the industry has become increasingly fierce.

Digital multimedia technology is an artificial multimedia technology of error backpropagation. It has been one of the most widely used models since the birth of multimedia technology. About 70% to 80% of multimedia technology is digital multimedia technology or its variants. Digital multimedia technology has its own shortcomings that cannot be overcome; input parameters cannot be selected for input datasets with many features; the unstable interaction design will be caused; meanwhile, digital multimedia technology is very sensitive to the initial weight. If the initial weight is selected improperly, the multimedia technology will be extremely poor, and the world's optimal solution cannot be obtained. Digital multimedia technology can be used to design an artificial intelligence interaction design system based on the interactive behavior patterns between users, through mental models and cognitive logic inferences, combined with users' actual experience.

2. Digital Multimedia Technology

In digital multimedia technology, the choice of design plan is mainly performed based on the level of personal fitness to determine the probability of the next generation of artificial intelligence. Individuals with low fitness values are least probable to be selected, and the entire technology is likely to stagnate after the emergence of super individuals. In order to converge the technology faster, the technology guarantees conversion to the global optimal solution with a probability of 1 and improves the criterion of the selection method [5].

When choosing the next generation of artificial intelligence, the individuals with the most adaptive values in the current artificial intelligence can be unconditionally entered into the next generation. In other words, the current best solution can be maintained to prevent the inverse change of the technology. Individuals i and j are randomly selected in the parents and offspring, and the probabilities of being selected as the next generation are different.

$$p(i) = \begin{cases} 1, f(i) \geq f(j), \\ \exp\left(\dfrac{f(i) - f(j)}{T}\right), \text{otherwise}, \end{cases} \quad p(j) = \begin{cases} 0, f(i) \geq f(j), \\ 1 - \exp\left(\dfrac{f(i) - f(j)}{T}\right), \text{otherwise}. \end{cases} \tag{1}$$

Here, the fitness value of each of i and j is given. T is the control parameter. After the selection of each generation is over, the value of T decreases proportionally. As the number of iterations increases, the value of T continues to decrease, and then $f(i)$, $f(j)$, α, $T \longrightarrow 0$.

$$\exp\left(\frac{f(i) - f(j)}{T}\right) \longrightarrow 0. \tag{2}$$

At this time, the probabilities of individuals i and j being selected become

$$p(i) = \begin{cases} 1, f(i) \geq f(j), \\ 0, \text{otherwise}, \end{cases} p(j) = \begin{cases} 0, f(i) \geq f(j), \\ 1, \text{otherwise}. \end{cases} \tag{3}$$

The improved selection method is as follows:

(1) Individuals with the highest fitness value are directly selected for the next generation
(2) Randomly select i and j in the parent and offspring artificial intelligence
(3) if $f(i) > = f(j)$
(4) Individual i is selected for the next generation
(5) $T = T \times \alpha$
(6) else
(7) if $\text{rand}(0,1) < = \min(1, \ \exp(f(i) - f(j))/T)$
(8) Individual i is selected for the next generation
(9) else
(10) Individual j is selected into the next generation
(11) $T = T \times \alpha$
(12) end
(13) end

In the standard digital multimedia technology, interactive design needs to introduce interactive design operators, and the following definitions are given first.

Definition 1. Suppose that x is the bit string of artificial intelligence $P(K)$, $f(x)$ is the fitness function of bit string x, $\overline{f}$ is the average of the fitness value of artificial intelligence, and if $f(x) > \overline{f}$, then x is said to be a good bit string.

Definition 2. Set the m bits of the bit string x_{im}, x_i. If $x_{im} = x_{jm} \forall i$, $j \in \{1, 2, \ldots, k\}$ and $i \neq j$, the m bit is the good position of K good bit strings: $x_1, x_2, \ldots, x_k$.

Definition 3. Let $\widehat{H}$ be any mode in artificial intelligence, $\overline{f}(H)$ is the average fitness value of mode H, and if $\overline{f}(H) > \overline{f}(\widehat{H})$, then H is said to be an excellent mode of artificial intelligence: $x_1, x_2, \ldots, x_k$.

Set x to be a bit string with a relatively low adaptability value in artificial intelligence. p_1 is the interaction design rate; the interaction design operator S is expressed as S: $(x, H) \longrightarrow y$.

$$y_i = \begin{cases} x_i, \text{rand}(0,1) > p_1, \\ H_i, \text{rand}(0,1) \leq p_1. \end{cases} \tag{4}$$

Formula (4) represents the random number between (0,1), the interactive design H of the bit string x is y, and the bit string y randomly enters the good mode H, which improves the overall performance of the technology rand$(0,1)$, p_1. The specific steps of the technology are as follows.

The improved interaction design technique is as follows:

(1) Initialization parameters, P_c, P_m, P_1, N;
(2) Population initialization, $P(K)$, $K = 0$.

(3) Calculate the fitness value of the bit string in $P(K)$.
(4) Let solution = the maximum fitness value in $P(K)$.
(5) while (the termination conditions are not met)
(6) Search Good Mode H in $P(K)$.
(7) f (H exists)
(8) Use the interactive design operator to modify the bit string with low fitness value in $P(K)$.
(9) Perform selection, crossover, and mutation operations on $P(K)$.
(10) $K = K + 1$
(11) Calculate the fitness of the bit string in $P(K)$.
(12) if (solution < the maximum fitness value)
(13) solution = the maximum fitness value of $P(K)$.
(14) return solution.

The change of the mutual design rate can be judged by the increase or decrease of error e. When facing the target in the form of a minor error, the correction direction is correct. This is an increase in the rate of interaction design; if the increase in error exceeds the predetermined range, it means that the modification of the previous step has not been performed correctly. Reduce the step size and cancel the modification of the previous step. The increase and decrease formula of the interaction design rate is as follows:

$$\eta(n+1) = \begin{cases} k_{inc}\eta(n), e(n+1) < e(n), \\ k_{de\ c}\eta(n), e(n+1) > e(n). \end{cases} \tag{5}$$

The momentum term is introduced based on back-propagation of error to control the change of control power and can have better performance than traditional technology, and several definitions are defined before describing the technology [6].

Suppose that the training sample dataset is $D = \{(\mathbf{x}^{(p)}, \mathbf{t}^{(p)})\}_{p=1}^{N}$, of which $\mathbf{x}^{(p)}$ represents the input vector, $\mathbf{t}^{(p)}$ indicates output vector, N is the number of training samples, and the sum of squared errors is taken as the error function of the network:

$$E = \frac{1}{2}\sum_{p=1}^{N}\sum_{k=1}^{m}\left[\mathbf{t}_k^{(p)} - \mathbf{y}_k^{(p)}\right]^2, \tag{6}$$

where $\mathbf{y}_k^{(p)} = \mathbf{y}_k(\mathbf{x}^{(p)})$.

From the chain derivation rule,

$$\begin{aligned}
\frac{\partial E}{\partial v_{kj}} &= \sum_{p=1}^{N}\left[\mathbf{y}_k^{(p)} - \mathbf{t}_k^{(p)}\right]\varphi\left(\sum_{i=1}^{d}\omega_{ji}x_i + \omega_{j0}\right), \\
\frac{\partial E}{\partial v_{k0}} &= \sum_{p=1}^{N}\left[\mathbf{y}_k^{(p)} - \mathbf{t}_k^{(p)}\right], \\
\frac{\partial E}{\partial \omega_{ji}} &= \sum_{p=1}^{N}\sum_{k=1}^{m}\left[\mathbf{y}_k^{(p)} - \mathbf{t}_k^{(p)}\right]\varphi\left(\sum_{i=1}^{d}\omega_{ji}x_i + \omega_{j0}\right), \\
&\quad \cdot\left[1 - \varphi\left(\sum_{i=1}^{d}\omega_{ji}x_i + \omega_{j0}\right)\right]x_i, \\
\frac{\partial E}{\partial \omega_{ji}} &= \sum_{p=1}^{N}\sum_{k=1}^{m}\left[\mathbf{y}_k^{(p)} - \mathbf{t}_k^{(p)}\right]\varphi\left(\sum_{i=1}^{d}\omega_{ji}x_i + \omega_{j0}\right) \\
&\quad \cdot\left[1 - \varphi\left(\sum_{i=1}^{d}\omega_{ji}x_i + \omega_{j0}\right)\right].
\end{aligned}$$

Let η be the interaction design rate and α is the momentum constant; then the change of the weight vector is

$$\begin{aligned}
\Delta\mathbf{v}_{kj} &= -\eta\frac{\partial E}{\partial v_{kj}} + \alpha\Delta\mathbf{v}_{kj}^{\text{old}}, \\
\Delta\mathbf{v}_{k0} &= -\eta\frac{\partial E}{\partial v_{k0}} + \alpha\Delta\mathbf{v}_{k0}^{\text{old}}, \\
\Delta\boldsymbol{\omega}_{ji} &= -\eta\frac{\partial E}{\partial \omega_{ji}} + \alpha\Delta\boldsymbol{\omega}_{ji}^{\text{old}}, \\
\Delta\boldsymbol{\omega}_{j0} &= -\eta\frac{\partial E}{\partial \omega_{j0}} + \alpha\Delta\boldsymbol{\omega}_{j0}^{\text{old}},
\end{aligned} \tag{8}$$

and the technical steps for improving momentum and interaction design rate are as follows.

Step 1. Initialize the weights and deviations, v_{kj}, ω_{ji}, v_{k0}, and ω_{j0} , where $k = 1, 2, \ldots, m$, $j = 1, 2, \ldots, n$ and, $i = 1, 2, \ldots, d$; set the interaction design rate as η and momentum as α.

Step 2. For the input vector $\mathbf{x}^{(p)}$, calculate the multimedia technology output $\mathbf{y}_k^{(p)}$, and calculate the error according to the expected target output. If the error is greater than the set threshold, go to Step 3; otherwise, go to Step 4.

Step 3. If the number of iterations exceeds the upper limit, go to Step 4; otherwise, update the weights and deviations $\mathbf{v}_{kj}^{\text{new}} = \mathbf{v}_{kj}^{\text{old}} + \Delta\mathbf{v}_{kj}$, $\omega_{ji}^{\text{new}} = \omega_{ji}^{\text{old}} + \Delta\omega_{ji}$, $\omega_{j0}^{\text{new}} = \omega_{j0}^{\text{old}} + \Delta\omega_{j0}$, and $\omega_{j0}^{\text{new}} = \omega_{j0}^{\text{old}} + \Delta\omega_{j0}$, and return to Step 2.

Step 4. Training stops.

2.1. Application of Digital Multimedia Technology in Intelligent System Design. The interactive design of modern artificial intelligence incorporates knowledge from multiple fields. The expression of aesthetics also includes the philosophical concepts; logical thinking includes the process of artificial intelligence experts in artificial intelligence creation, as well as the whole process of their logical thinking. Therefore, on the basis of modern technological interaction, the interaction between artificial intelligence and digital multimedia technology can be combined to generate works that combine artificial intelligence with modern artificial intelligence. Among them, the comparison between traditional artificial intelligence design and digital multimedia technology is shown in Figure 1.

Digital multimedia technology has gradually matured in the calculation of spatial structure in computers, and the theory of digital multimedia technology has also played an important role in mutual computing. The principle of continuous Turing machine in digital multimedia technology is used to design the performance of modern artificial intelligence in this paper. The continuous Turing machine is built on the basis of the Turing machine, so it has a stronger performance ability than the Turing machine. The continuous Turing machine has an output belt, an input belt, and a working belt. Let the set of elements be I and O; then, define the two sets as

$$\begin{aligned} X &= \{s \mid s = i_1 i_2 \ldots i_n \text{ is an infinite sequence on } I\}, \\ Y &= \{s \mid s = O_1 O_2 \ldots O_n \text{ is an infinite sequence on } O\}. \end{aligned} \tag{9}$$

Due to the constraints of the parameters in the function, the input value of its variables is calculated according to the corresponding mapping principle of the function [7]. The conversion is performed by setting the value of mapping f_x as shown in Figure 2; the conversion diagram of the operation parameters of f_x is shown in the figure. When the first mapping condition in the operation space is blank, the output values of the function will all become 0, and when the content is not blank, the output value will all be 1. The sequence corresponding to f_x can be quickly obtained.

The artificial intelligence algorithm is represented by a three-element array (r_1, r_2, r_3) $r_1 < r_2 < r_3$ of cleared numbers, and its subordinate function is

$$\mu(x) = \begin{cases} \dfrac{x - r_1}{r_2 - r_1}, & r_1 \le x \le r_2, \\[2ex] \dfrac{x - r_3}{r_2 - r_3}, & r_2 \le x \le r_3, \\[2ex] 0, \mathit{other}. \end{cases} \tag{10}$$

Assuming digital multimedia technology $\alpha = (a_1, a_2, a_3)$, $\beta = (b_1, b_2, b_3)$ has expansion principles of addition and multiplication based on artificial intelligence calculations.

$$\mu_{\alpha+\beta}(z) = \sup\left\{\min\left\{\mu_{\overline{\alpha}}(x), \mu_{\overline{\beta}}(y)\right\} | z = x + y\right\} = \cdot \begin{cases} \dfrac{z - (a_1 + b_1)}{(a_2 + b_2) - (a_1 + b_1)}, & a_1 + b_1 \le z \le a_2 + b_2, \\[2ex] \dfrac{z - (a_3 + b_3)}{(a_2 + b_2) - (a_3 + b_3)}, & a_2 + b_2 \le z \le a_3 + b_3, \\[2ex] 0, \text{other}. \end{cases} \tag{11}$$

Then,

$$\overline{\alpha} + \overline{\beta} = (a_1 + b_1, a_2 + b_2, a_3 + b_3). \tag{12}$$

We have $\mu_{\lambda\overline{\alpha}}(z) = \sup\{\mu_{\overline{\alpha}}(x) | z = \lambda x\}$.

Then,

$$\lambda\overline{\alpha} = \begin{cases} (\lambda a_1, \lambda a_2, \lambda a_3), & \lambda \ge 0, \\ (\lambda a_4, \lambda a_3, \lambda a_2), & \lambda < 0. \end{cases} \tag{13}$$

Suppose that $\overline{\alpha}_i = (a_{i1}, a_{i2}, a_{i3})$, $i = 1, 2, \ldots, m$, are digital multimedia technology, the resulting nonnegative linear combination, and digital multimedia technology plan of $\overline{\alpha}_i$:

$$\sum_{i=1}^{m} \lambda_i \overline{\alpha}_i, \quad \lambda_i \ge 0. \tag{14}$$

And,

$$\sum_{i=1}^{m} \lambda_i \overline{\alpha}_i = \left(\sum_{i=1}^{m} \lambda_i a_{i1}, \sum_{i=1}^{m} \lambda_i a_{i3} \right). \tag{15}$$

Digital multimedia technology is a random plan. Constraints include random parameters, and chance represents the probability of the constraint being true. Under the digital multimedia technology, understand the possibility of taking opportunity as a constraint condition. The random digital multimedia technology control plan provides a powerful tool to solve planning problems with random parameters and digital multimedia technology parameters.

Modern artificial intelligence experts in China and other countries no longer use familiar patterns, expression subjects, and styles to attract people to love them [8]. However, many innovations are quite the contrary. Therefore, in the process of modern artificial intelligence interactive creation, not only does the creative style of the artificial intelligence artist need to be known, but also the similarity needs to be adjusted independently, as shown in Figure 3.

If these vulnerabilities are used illegally, artificial intelligence interaction will suffer a huge threat. Therefore, the research on artificial intelligence interaction has aroused the emphasis of research in China and other countries [9]. Under normal circumstances, it is difficult to obtain satisfactory results using the previous data methods to solve the problem of data encryption and artificial intelligence interaction. With the use of bionic intelligent algorithms on classic problems, it has a relatively global performance in the application. By means of the integrated design style, you can create a page layout that humans love according to the corresponding visual space configuration, color, design principles, and cognitive methods of the image. The form of information transmission is more diversified with stronger real-time interaction. While improving the user experience, the interactive design of modern artificial intelligence is also more intelligent. Artificial intelligence creative inspiration and data information integration are the basic conditions of digital multimedia technology in artificial intelligence interactive design. It can effectively combine the two key elements of color and style to illustrate the superiority of the

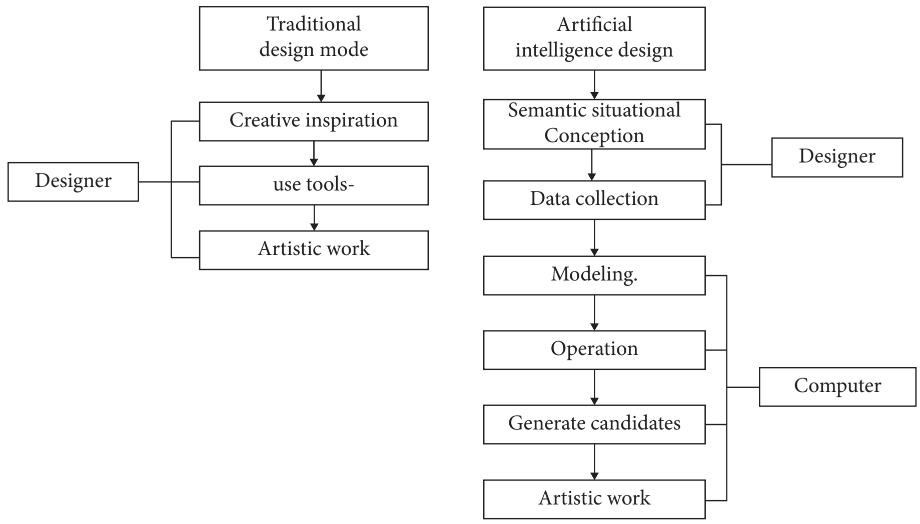

Figure 1: The division of labor between traditional design methods and artificial intelligence design.

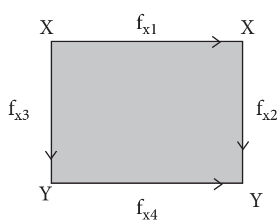

Figure 2: Equivalent exchange diagram of f_x and calculated parameters.

combination of artificial intelligence and artificial intelligence interactive design.

The use of digital multimedia technology reflects the diversity, repeatability, and spatiality in the interaction of multimedia elements. The methods used are based on the criteria of customer confidence, first finding the target customer, and being able to take different interactive services according to different customers. Providing willful services to users is the purpose of interactive artificial intelligence, which can analyze and collect user information and establish a good interactive platform. Digital multimedia technology shows the performance of hearing, touch, vision, and other functions in the interaction of multimedia elements, and these elements promote each other. Users are allowed to fully integrate into the multimedia interactive artificial intelligence to give customers a strong visual impact. The common visual effects of visual pictures, the adjustment of screen colors, and the structure of characters are used to make users feel the three-dimensional and multidimensional vision in digital multimedia technology. Combine cloud big data and personal self-quantified minor data to discover explosion points, and then form internal and external interaction behaviors in which internal components are transformed into external influencing factors. The interactive system expands the field of interaction design from physical information space to digital cyberspace, and then continue the intelligent thinking space. Design research under digital multimedia technology is shown in Figure 4.

In other words, from a historical point of view, the birth and development of digital multimedia technology are inseparable from the continuous improvement of machine intelligence. Digital multimedia technology has a long history and is widely used in the design and evaluation of complex intelligent systems. The research practice of Chinese scholars mainly focuses on the CWA method and the design theory of ecological interface derived from this method.

2.2. Artificial Intelligence Interaction Process of Digital Multimedia Technology

2.2.1. Description of Artificial Intelligence Interactive Design Based on Digital Multimedia Technology. Not only can artificial intelligence interaction design use text to meet the emotional needs of users but also it must use imaging media to complete the communication between users and artificial intelligence interaction design. Graphical text can use graphics to describe text to improve the performance of text [5]. During the artificial intelligence interaction design, appropriate graphic symbols are used to describe the difference information, and the user's cognition can be transmitted directly and with high precision. Convert a large number of texts into logical graphical depictions to stimulate users' interest and ensure the value of information obtained by users.

2.2.2. Information Transmission Design of Artificial Intelligence Interaction Design.

(1) The information transmission mode in artificial intelligence interactive transmission design is that the designer converts information into artificial intelligence interactive language to achieve coding and changes it into a graphical artificial intelligence interactive design interface. The user decodes the information and obtains all the high price information

Figure 3: CAN generated works.

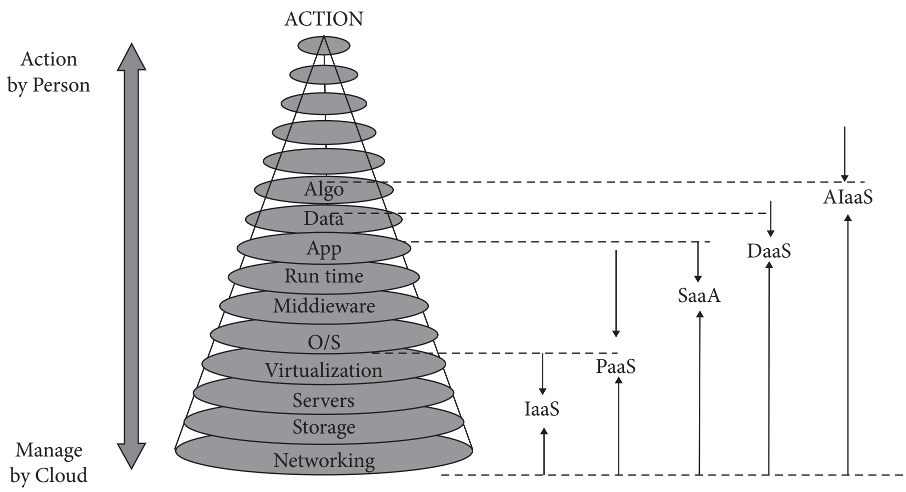

Figure 4: Design research under digital multimedia technology.

needed through conversion. The specific process is shown in Figure 5.

Using graphics, it is possible to describe the steps that enable designers, users, and artificial intelligence interactive design interfaces to interact with high precision and to achieve transmission and acquisition of information. The process for completing the interaction between the designer and the artificial intelligence interactive design interface can be considered as the step of converting raw data into artificial intelligence interactive information [9]. The interaction between the user and the artificial intelligence interaction design interface can be regarded as the step of transforming the artificial intelligence interaction information into knowledge. Based on the structure and coding principle, these two steps can intuitively represent the process of artificial intelligence interaction design.

During information transmission, the initial data of the artificial intelligence interactive design screen must first be analyzed. Convert such data into information to complete the analysis of difference data. The initial data after organization and processing is converted into valuable information, which can provide users with a bridge of communication. Appropriate methods are used to explain the data information analyzed and summarized by the artificial intelligence interaction designer to complete the rapid and high-precision transmission of artificial intelligence interaction information. After the dataset by the designer is processed graphically with digital multimedia technology, it is conveyed to the user as artificial intelligence interactive information.

(2) Design of information receiving mode: the information receiving mode is as follows: when the artificial intelligence interactive information of the artificial intelligence interactive design interface obtains the user's preference, the coding process is based on the user's needs to understand the artificial intelligence interactive information and analyze such information in an appropriate form [10]. As shown in Figure 6, the human information operating system is composed of sensory, central nervous, and motor organs.

When the artificial intelligence interactive design interface realizes the artificial intelligence interactive transmission, people attach importance to the artificial

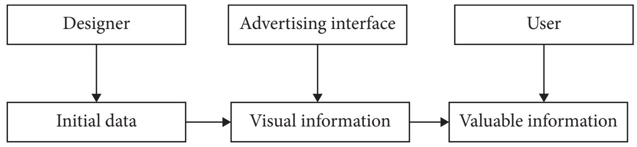

Figure 5: Information transmission mode of artificial intelligence interaction design.

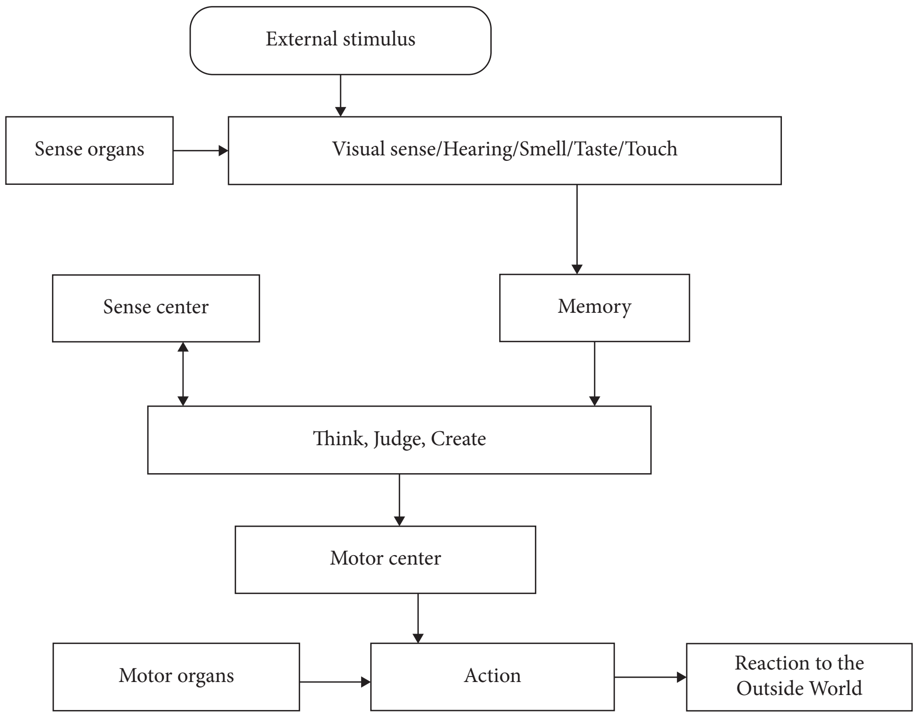

Figure 6: Information processing system.

intelligence interactive information of the artificial intelligence interactive design interface and construct related information activities and finally get the interface information of artificial intelligence interaction design. Considering the psychological and physical factors of different users, in the artificial intelligence interactive delivery design of a better-quality artificial intelligence interactive design interface, the high definition and intuitiveness of artificial intelligence interaction must be ensured. Graphical technology can be used to achieve this goal, ensure the aesthetics of the artificial intelligence interactive delivery design of the artificial intelligence interactive design interface, and increase the interest of users. Meanwhile, the graphic beautification method can improve the ability of users to use artificial intelligence interactive design interface information, as well as the decoding speed and cognitive ability of artificial intelligence interactive design information.

The experience of artificial intelligence interaction shows that, compared with the artificial intelligence interaction design of digital multimedia technology, human eyes are different in the degree of interest in various fields [11]. With regard to the area of interest after digital multimedia technology graphics processing, as the area decreases, human eyes are more and more sensitive to distortion, and human eyes will find that the level of interest is inversely proportional to the area. Every time you are interested, if they expand to the entire multimedia graphics, the human eyes will become very small. If the above-mentioned experience of artificial intelligence interaction interference is quantified, the artificial intelligence interaction degree of artificial intelligence interaction design can be quantitatively detected. The main task based on the measurement of artificial intelligence interaction is how to set the weighted traditional artificial intelligence interaction experience. If only interested in the artificial intelligence interaction design, we suggest that the simple quality evaluation model setting w must meet the two following approximate conditions in this paper:

(1) When the user increases area $A1$ interested in the artificial intelligence interaction design after digital multimedia technology graphics processing from 0 to the overall area A, the quality evaluation result is reduced from $+\infty$ to 1.

(2) When the user increases area $A1$ interested in the artificial intelligence interaction design after digital multimedia technology graphics processing from 0 to A/D, the quality evaluation result decreases the

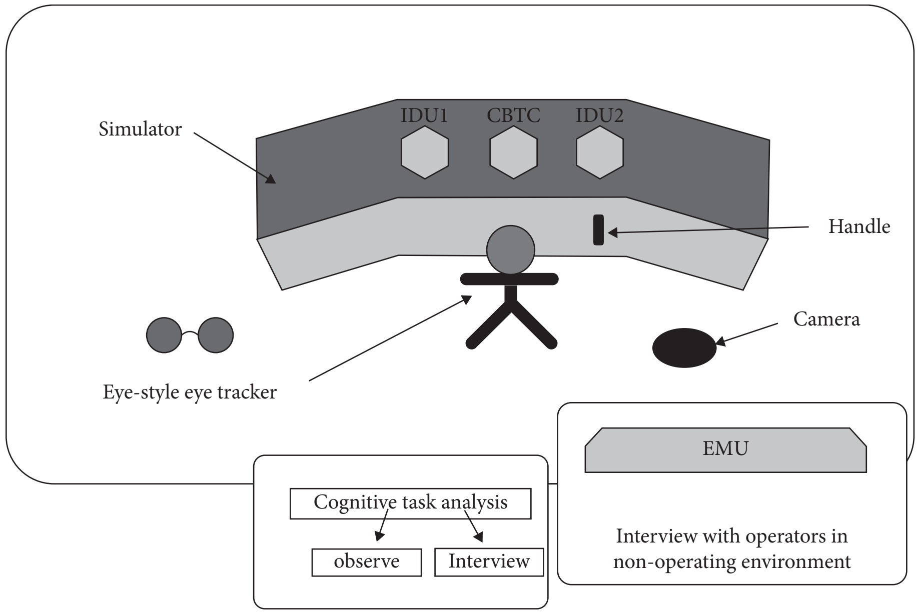

Figure 7: Artificial intelligence interactive design.

constant from 1 to above 0. However, when users increase area $A1$ interested in artificial intelligence interaction design after digital multimedia technology graphics processing from A/D to A, the quality evaluation result increases the constant from greater than 0 to 1.

(1) If the user increases area $A1$ interested in the artificial intelligence interaction design drawing from 0 to the overall area A after processing the digital multimedia technology, the quality evaluation result is reduced from $+\infty$ to 1.

(2) If the user increases area $A1$ interested in the artificial intelligence interaction design drawing from 0 to A/D after processing the digital multimedia technology, the quality evaluation result is reduced from 1 to a constant greater than 0. However, if the user increases area $A1$ of interest in the artificial intelligence interaction design drawing from A/D to A after processing the digital multimedia technology, the quality evaluation result is increased from a constant greater than 0 to 1.

(1) w_2 is set to

$$w_2 = 1 - \frac{2t}{A}\sqrt{A_1(A - A_1)}. \tag{16}$$

Here, t represents the adjustment factor, indicating the importance of areas that are not interested in and areas of interest to the artificial intelligence interaction design processed by digital multimedia technology.

w_1 is set to

$$w_1 = 1 - \frac{A}{A_1}(1 - w_2) + w_2. \tag{17}$$

(2) According to what is known $\sqrt{A_1(A - A_1)} \leq A/2$ and $w_2 \geq 1 - t$; if $A_1 = A/2$, $w_2 = 1 - t$; if $A1 = \mathrm{A}$ or $A1 = 0$, because $w_2 = 1$, formula (16) meets the boundary condition of w_2.

By quantifying equation (16), the approximate value of w_2 is as follows:

$$w_2' = -\frac{t(A - 2A_1)}{A\sqrt{A_1(A - A_1)}}. \tag{18}$$

It can be known by formula (18). In the case of A1 > A21, A > A1 > . For A21, w_2 is a strictly monotonic increment function of A1. In the case of A1 < A21, $w_2' > 0$ $w_2 < 0$, 0 < A1 < . In the case of A21, w_2 is a strictly monotonic decreasing function of A1. Therefore, the structure function of w_2 meets the approximation condition 2 then,

$$\lim_{A \longrightarrow 0} w = \lim_{A \longrightarrow 0}\left[1 + 2t\sqrt{\left(\frac{A}{A_1} - 1\right)} - \frac{2t}{A}\sqrt{A_1(A - A_1)}\right]. \tag{19}$$

By quantifying the expression in (24), the approximate value of w_1 is as follows:

$$w_1' = \frac{A}{A_1^2}(1 - w_2) + \left(1 - \frac{A}{A_1}\right)w_2'. \tag{20}$$

Formula (16) and formula (18) are summarized to get

$$w_1' = \frac{2t}{A_1^2}\sqrt{A_1(A - A_1)} - \left(1 - \frac{A}{A_1}\right)\frac{t(A - 2A_1)}{A\sqrt{A_1(A - A_1)}}. \tag{21}$$

Here, $w_1' < 0$, w_1' belongs to the strictly monotonically decreasing function of $A1$, and the constructor of w_1 meets approximate condition 1, and the evaluation is completed.

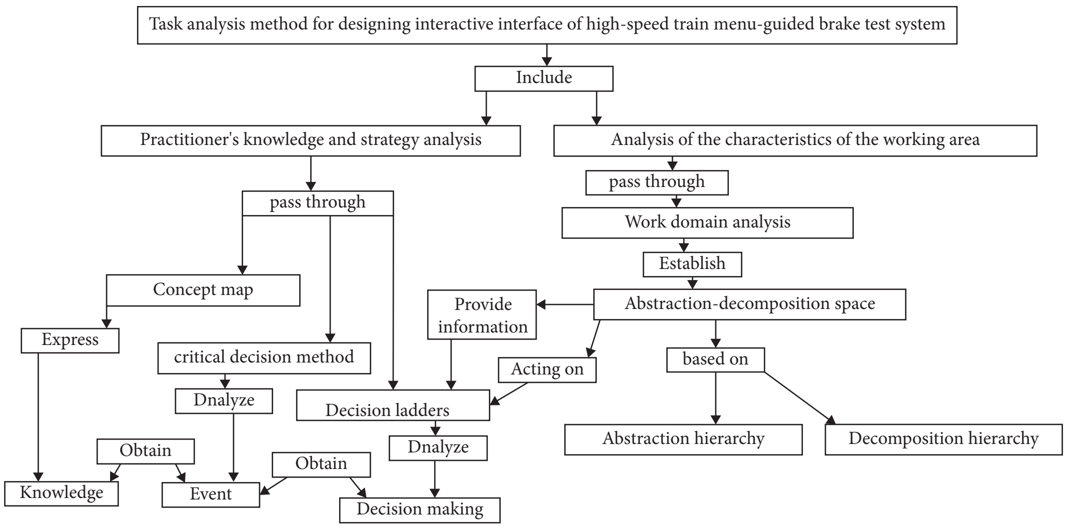

Figure 8: The task analysis method of the interactive interface design of the artificial intelligence interactive design system.

3. Impact of Artificial Intelligence on Interaction Design

3.1. Artificial Intelligence's Auxiliary Strategy for the Logical and Perceptual Intelligence Model of Interactive Behavior. Artificial intelligence technology can be used for the design problems to be solved to analyze and judge according to the constructed artificial intelligence model and design method and formulate corresponding design rules. As a solution step of system engineering, the artificial intelligence interactive system integrates engineering analysis, comprehensive evaluation, and decision-making. At different stages of design, it penetrates into the problems of artificial intelligence design interactive system layer by layer and finds the best solution through multiple solutions. This technology can find more effective solutions in the interaction of digital multimedia technology. In the process of interactive system design, this technology focuses on the importance of innovative technology in the product design process and can quickly decide the best solution and use intellectual property protection innovative strategies of innovative style for conducting in-depth analysis of existing problems and analyze the effective use of different innovative technologies through research. The development stage of digital multimedia requires large-scale, real-time online, multisource heterogeneity, as well as parallel processing and other features. The artificial intelligence interactive system can quickly handle different factors such as big data flow, data information flow, capital flow, and material flow. Through integrated use, the system, information data, interactive information, and so forth form an artificial intelligence interactive information database.

3.2. Multidimensional Design of the Artificial Intelligence Interactive System. The artificial intelligence interactive system can analyze the human thinking mode in detail and conduct in-depth exploration by combining the user's innovative design thinking mode and design strategy. It is a kind of powerful method to a design method with the digital multimedia technology as the orientation and the artificial intelligence interactive system as the task [12]. In addition, digital multimedia technology can introduce human emotions, personality characteristics, social background and cultural level, and other related sciences and technologies into user-level cognitive behaviors. Based on in-depth analysis, research on human interaction experience patterns and willingness, life characteristics, user consumer psychology, and feedback on psychological satisfaction is conducted. According to the accurate interactive support system design, expansion model, and basic design requirements, the corresponding artificial intelligence interaction problem is solved by using digital multimedia technology, or, according to the current consumption level of consumers, people's imagination is continuously stimulated, to break through the limitations of human cognition and proceed to the innovative design stage of artificial intelligence interactive systems through digital information transmission.

3.3. Implementation of the Artificial Intelligence Interaction Design System. Due to the limitation of on-site investigation, a simulated control bridge was used to simulate on-site tasks. The digital multimedia simulated control bridge can more realistically and completely simulate the interaction process and interface of digital multimedia operation. It is equipped with a high-resolution real-time display screen. For example, the control bridge around the screen and the virtual reality system can give the simulator an experience close to the actual scene. By installing data logging software on the simulator, the operation steps can be recorded in detail. By integrating the eye contact recorder, it is possible to study the characteristics of visual attention at work. The analysis and research environment for planning the task of designing the interactive interface of the integrated artificial intelligence interactive design system is shown in Figure 7. The environment is based on digital multimedia simulator,

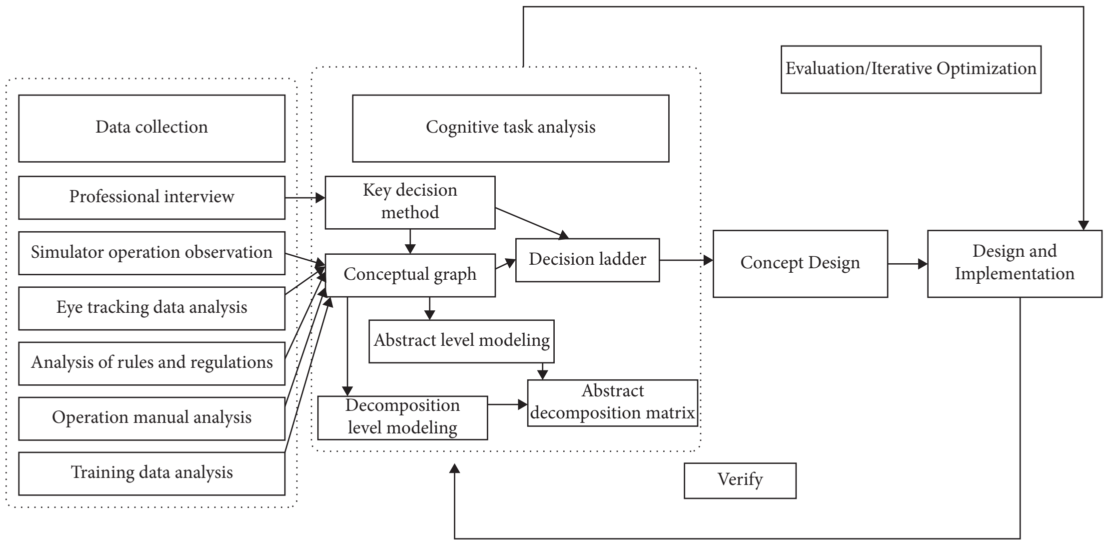

Figure 9: Design path of human-computer interaction interface based on digital multimedia technology.

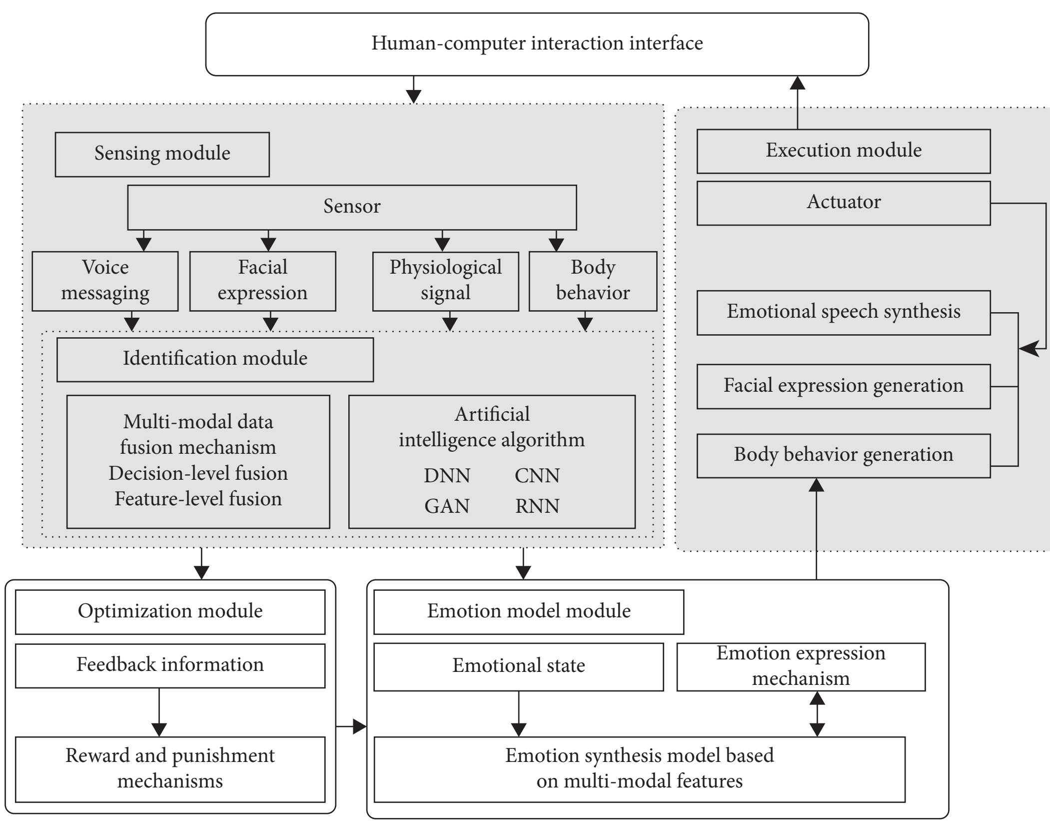

Figure 10: Design of artificial intelligence interaction design system based on artificial intelligence.

which is equipped with integrated display unit (IDU), CBTC column control display, operating lever, and other equipment related to MBT task. Participants wear glasses-type contact lenses to operate, and the set-up camera will record the entire process. In the nonoperational environment of the EMU Group's operating organization, relevant personnel were interviewed to sort out the experience of experts in the field. The analysis data is obtained by applying digital multimedia technology to the data obtained from the interview and the task process of the simulator.

Facing the investigation of high-speed digital multimedia operation scenarios, these actual conditions are in line with the characteristics of digital multimedia technology. Four digital multimedia technology methods are selected: (1) conceptual graph technology, (2) key decision method, (3) work domain analysis methods including abstract level modeling, decomposition level modeling, and abstract space decomposition methods, and (4) decision ladder. The relationship between these methods is drawn using CmapTools. See Figures 8 and 9.

Conceptual graph is a kind of graphical representation describing and expressing knowledge [5, 13]. I am good at organizing knowledge. The conceptual graph is used to obtain knowledge from rules and regulations, standards, technical documents, observations, and interviews, to help analysts understand this professional field and lay a foundation for the development of other analyses.

The ultimate goal of artificial intelligence interaction is to make reasonable adjustments on the premise that the computer understands the state of human artificial intelligence to adapt to the movement of the user's artificial intelligence. Based on the above discussion, in the context of artificial intelligence, the focus of the artificial intelligence interaction design system is to use various perception methods to identify, explain, and respond to human artificial intelligence. Therefore, we propose a modular design scheme based on artificial intelligence technology with better flexibility and scalability. As shown in Figure 10, it is mainly divided into five aspects: sensing module, execution module, recognition module, artificial intelligence computing module, and optimization module.

The sensor module is the basis of the artificial intelligence interactive design system. It uses a variety of sensor devices such as microphones, cameras, installable equipment, visual photometer, and clamping ring to collect biometric data and collects electrical signals in the brain, artificial intelligent voice, facial expressions and postures, and so on [14]. The sensor module is equivalent to the neurons of the human body and can feel the stimulation of external substances at any time.

The recognition module is the basis of the interaction of artificial intelligence. It needs to preprocess the collected data and extract and analyze the characteristics of the data sample. According to related research, the deep learning methods such as Recurrent Neural Network (RNN), Convolutional Neural Network (CNN), Generative Adversarial Network (GAN), and so forth are used to show higher estimation possibilities. These can model the user's long-term behavior through the storage device to automatically generate the best method for detecting the subjective experience of the user's feelings. In addition, artificial intelligence recognition based on multimode user information can choose different mode couplings, and the data fusion scheme between modes can also be selected according to the actual situation.

The artificial intelligence model module is an important part of artificial intelligence recognition and artificial intelligence performance. A more reasonable artificial intelligence understanding and feedback can be realized by making a mathematical model of the multimodal artificial intelligence state. The artificial intelligence model module needs to make a reasonable response to the user's emotions by judging the composition of artificial intelligence information based on research of the users' various psychological phenomena according to cognitive science. The performance of artificial intelligence is a branch of empirical and classical theoretical research. It is necessary to build a solid and effective human artificial intelligence model, summarize cognitive or psychological phenomena and theories from reality, and verify hypotheses and inferences through experiments. One of the most significant features in the big data era is quantitative thinking, which can be fully quantified. Quantitative thinking comes from people's desire for data analysis. There is still controversy about the quantification of artificial intelligence cultural resources. However, as a cross-discipline that integrates innovation and science, design uses a large amount and variety of data. Traditional design is obviously incapable of data processing, while the traditional design process also has a lot of repetition.

4. Conclusions

Digital multimedia technology combines practical summary with process development cognitive behaviors. Through extensive application in complex artificial intelligence interfaces and continuous accumulation of practical experience, this technology is widely used in intelligent transportation, intelligent driving, and other rapidly developing artificial intelligence interactive systems, providing an artificial intelligence interaction design system for the development of this field. The main design concept adopted by the system is to introduce multimedia technology into the interactive system design, while using digital multimedia technology to perform model recognition, as well as evaluation and iterative calculations for the key part. Finally, an example analysis shows that the algorithm can integrate digital multimedia technology according to the target.

Data Availability

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

Conflicts of Interest

The author declares no conflicts of interest.

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