

## *Retraction*

# **Retracted: Intelligent Environmental Art Design Combining Big Data and Artificial Intelligence**

### **Complexity**

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Manipulated or compromised peer review

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets 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 own 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] Y. Li, "Intelligent Environmental Art Design Combining Big Data and Artificial Intelligence," *Complexity*, vol. 2021, Article ID 1606262, 11 pages, 2021.

## Research Article

# Intelligent Environmental Art Design Combining Big Data and Artificial Intelligence

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The widespread use of artificial intelligence in the field of design teaching has become a development trend, and for the art design profession, we should conform to and actively adapt to this development trend, change the original teaching mode, innovate their own teaching methods, constantly enrich the teaching methods, so as to improve the quality of teaching, and constantly cultivate high-quality art design talents in the new era. For the subject students, they grow up under the Internet. They are more affectionate to many new technologies, and the traditional teaching methods have some problems to meet their learning needs, so it is very necessary to introduce artificial intelligence in teaching. In this paper, we will discuss the optimization of the curriculum system of art design in higher education institutions in the context of artificial intelligence. The purpose of guiding the innovation of environmental art design thinking is to stimulate students' learning ability and innovation ability and learn to use design ideas in practice. Integrating design thinking with artificial intelligence gets four innovative ways of culture, form, function, and emotion in terms of innovation at the design thinking level; in terms of thinking innovation guidance, it gets the guidance of role transformation and model practice, integrating artificial intelligence with environmental art design thinking, designing interactive spaces more in line with the times, and promoting the harmonious development of human and nature.

## 1. Introduction

With the intensification of market competition and internationalization, the artistic elements inherent in urban planning, architecture, and environmental landscape design are gradually discovered, and most designers recognize the importance of mastering the design vocabulary, which is the many alternative ways and means to express design requirements [1]. As a result, the concept of "expression" has become a new means of competition, and more people are considering the form of "expression." Throughout the history of environmental art design, expression techniques have been an important driving force for the design, and the direction of design work has been explored along with the emergence of new methods of image expression [2]. Since the techniques used in urban planning, architecture, and environmental landscape design are similar, they are collectively referred to in this paper as environmental art design [3]. The increasing level of people and society's understanding of visual expression has driven the development

of environmental art design expression techniques, and the proliferation and diffusion of means of expression have prompted designers to update their original concepts of design communication and to reexamine their choices of environmental art design expressions and means [4]. On the other hand, with the rapid development of multimedia technology and techniques, the volume of digital images worldwide is growing at an alarming rate, generating gigabytes of images every day, and these digital images contain a vast amount of design works [5].

As an excellent designer, one must decide which expression method to use and make the best choice for different design requirements, different atmospheres, and different nature of spatial environments under the premise of mastering a variety of expression techniques [6]. In order to solve the problem of designers learning to refer to mature design works, this paper introduces image classification into the design industry in this context and proposes an automatic classification method for effect drawings based on

performance techniques, providing designers in environmental art design and other industries with a conceptualized reference browsing method, making design digital and manageable, and providing diverse services so that users can conveniently, accurately, and efficiently. This allows users to easily, accurately, and efficiently draw on design works that meet certain requirements to create better works [7]. The use of artificial intelligence technology in urban environment design can, first of all, make efficient use of the huge amount and complex forms of data that cities have had difficulty using in the past and optimize the relationship between people and cities in a more rational and effective way. In many aspects including residents, community, and environment, AI technology will create a more accurate analysis basis for the improvement of urban public space, regulation of urban microclimate environment, and intelligence of urban traffic environment from the design level [8]. It will assist in the design of the urban environment to maximize the quality of urban public space and ensure scientific and rational design solutions [9]. Second, the use of artificial intelligence technology can make the efficiency and value of urban environment design significantly improved. In the past, the design of the urban environment was based on a manual, subjective, and single mode, and the efficiency of data processing and design quality could not be guaranteed, which made it difficult to effectively solve the practical problems related to the public space environment in urban development [10].

The intervention of artificial intelligence can quickly and effectively process a large amount of information, simplify the design workflow, improve accuracy and effectiveness while significantly improving the efficiency and reducing the investment of human, material, and financial resources in design. Therefore, the application of artificial intelligence technology in urban environment design is a requirement of the times. The city is the scene where most of the human behaviors occur in the current era and generates a large amount of data, so it is one of the biggest scenes where AI technology can exert its energy. Optimizing the urban environment based on AI technology brings new concepts and perspectives to the development of cities, and at the same time, can prompt the evolution of urban management models and spatial structures, etc., corresponding to them. Although AI has not yet been applied on a large scale in urban environments, the feasibility study of this technology has made great progress. These changes will help the development of cities in the future, leading to innovation and a new level of urban construction.

*1.1. Related Work.* Image classification technology is an artificial intelligence technology that involves many fields, such as image analysis technology and pattern recognition technology [11]. From the literature, we found that the research of image classification technology mainly includes the following three aspects, which are region classification based on an image, classification based on image repository, and automatic annotation technology based on image classification [12]. Region-based image classification is to

distinguish the different information contained in an image, similar to image segmentation; for example, classifying land cover, water bodies, and crops from remote sensing images, and automatically finding cancer cells on medical images. Image repository-based classification includes both web repositories and specified repositories, and regardless of which repository, the images in the repository are divided into several different categories according to different rules. Image classification-based annotation techniques are a way to achieve image understanding and labeling; i.e., after analyzing the content of an image, a semantic interpretation is given directly, which allows the user to conceptualize the query [13]. Regardless of the type of image classification, the traditional approach is to classify images by manual visual inspection of the content and then by manual annotation of keywords, which is time-consuming and laborious and does not guarantee accuracy due to the subjectivity and incompleteness of people's understanding of images and the lack of uniform semantic annotation [14].

At the same time, with the development of computer technology, global informatization and networking process accelerates, network and multimedia information technology make a large amount of image information generated every day, manual classification index is no longer suitable for large-scale information processing; how to effectively classify and manage these images has become a common concern; therefore, how to combine digital image processing, computer vision, and automatic classification technology. Therefore, there is an urgent need to combine digital image processing, computer vision, and automatic classification techniques to establish automatic or semiautomatic image classification methods based on digital images [15]. Image area classification is widely used in professional fields such as remote sensing images and biological images. Remote sensing image classification has been widely used in the fields of crop estimation, resource surveying, weather forecasting, disaster assessment, and military reconnaissance. Biological image area classification can highlight cancer cells and lesion sites for diagnosis [16]. In the early days, such images were mainly interpreted manually. Manual interpretation can make use of the knowledge of image features such as tones or colors, shapes, sizes, shadows, textures, patterns, positions, and layouts of features and lesions, as well as relevant expert knowledge, and combine with other data for comprehensive analysis and logical reasoning, thus achieving high classification accuracy [17]. However, manual classification is labor-intensive and time-consuming. The effectiveness of information is particularly important in today's society, where remote sensing of resources for disaster monitoring and assessment, crop yield estimation, and disease prevention and diagnosis need to be completed within a few hours. For such requirements, it is necessary to study the rapid automatic classification of images to achieve the intelligence and automation of feature identification and disease site judgment, and finally to realize the network integration of remote sensing information and disease prevention information to serve the application departments quickly [18].

There are thousands of image resources on the Internet, and the current graphic image classification browsing mainly includes two categories from the source of

information. One is the graphic image search provided by portals, which often takes the same technology like websites and web search engines to obtain information sources, that is, by automatically looking for the collection and then classifying the images into several categories for users to browse by keyword annotation. Large domestic search sites such as Baidu and Sogou provide catalogs for image classification and browsings, such as classifying image resources on the Internet as cartoons, scenic spots, and portraits of people [19–22]. The image resources on the Internet are different from the image libraries stored on the hard disk, which have many connections with web pages. Graphics on the Internet are usually embedded in documents and saved to the web server along with the publication of web pages, maintaining a contextual environment with the documents. Therefore, the contextual environment between images and text on the Internet can provide a basis for image classification and citation to a certain extent. Usually, the subject of the page where the image is located, the name of the image, the label, and the link address of the image all have a connection with the image, and these texts can be used as the basis for image analysis (Chen, T. H., and Chen, W.). By analyzing these texts, the relevant contents of the images can be inferred. However, it is possible to achieve image classification to a certain extent by making full use of the rich textual context of documents and hypertext structure information. However, the contextual relationship-based web image classification technology is based on keyword classification, and there is a subjective understanding of the image, so the simple text-based image retrieval technology can no longer meet the needs of people, content-based image classification technology will become the main development direction of Internet image classification.

*1.2. Spatial Secondary Design Based on Big Data.* The secondary design of space is the design of the three vectors of space according to the specific use function and visual aesthetic requirements of the completed primary space of the architectural design, including the proportional scale of space, space and space interface and transition, contrast and unity, in order to make the space form and space layout more reasonable, as shown in Figure 1. For designers and artists, if they can make good use of technological intelligence, extract new strategies from it, and then reconstruct their consciousness to guide the creative direction and form of the art design, it will bring them an important transformation to create better works. This is the initial issue that needs to be considered for interior design. According to the site environment, site type, and functional requirements provided by Party A, space is divided, which in turn requires consideration of the main and secondary space, functional areas, rationalization of the movement lines, dynamic and static partitioning, and comfort. After redividing the enclosed space, it is necessary to further design the spatial interface. The most common space is composed of six interfaces, including the top surface, the ground, and four walls. Depending on different functions, the interface of different spaces may vary. In the market, this type of design

is generally referred to as hardscaping. In the interface design, it is necessary to decide whether to use additional decorative materials for surface beautification or to use the original interface structure and texture material beauty for design.

In addition, it is also necessary to consider the level of interface changes in depth so as to play the role of invisible division of the area, guide the direction, etc., rather than simply surface beautification. If the space interface is the bone, furniture and furnishings are the blood and flesh. Furniture and furnishing configuration design is called soft furnishing in the market. Furniture furnishings meet people's needs while also changing the atmosphere and increasing the beauty of the space because of its different shapes, colors, and textures. When selecting and placing furniture furnishings, it is necessary to consider its volume, style, ergonomics, etc., according to the requirements of the space. If space and furniture furnishings are well matched with each other, the feeling of the whole space can be enhanced to meet the spiritual needs of people. With the continuous development of technology, people's living and working spaces are also more comfortable and intelligent. It is not enough for designers to focus only on the basic use and aesthetics of a space; part of a high-quality interior environment also depends on the factors of the indoor physical environment. Basic indoor physical environment factors include indoor temperature, humidity, ventilation, lighting, sound, etc., which directly affect people's living experience. Coupled with today's hot smart living, design continues to evolve with the times.

*1.3. Creation of Interior Design.* Creating a Zen space requires following the basic interior design process and then combining natural elements and human elements to elevate the dialogue between people and architecture to a spiritual level. The enclosed space influences people's inner feelings through the atmosphere, and the Zen space is the perfect expression of the Zen atmosphere. The creation of Zen space is to guide people to love life and adapt to the social environment with a healthy body and mind so as to achieve inner peace and tranquility and spiritual freedom through the spiritual concept of Zen Buddhism. Designers need to design from all senses such as sight, smell, hearing, and touch, rather than simply considering only visual factors, as shown in Figure 2. These senses are all dependent on the feedback of objects, which are mainly reflected in interior furnishings and facilities, etc. The following are two aspects of natural and human elements.

Plants are one of the important components of nature, and space can only look vibrant with flowers and greenery. The greening of a Zen space mainly includes the introduction of plant exteriors into the interior and the greening and embellishment of the interior space with a moderate volume of greenery. According to the Zen theme, we need to choose the type of greenery: outdoor greenery such as linden, banyan, ginkgo, plum, pine, maple, maple, and cherry and plants that can be grown both indoors and outdoors such as water lilies, lotus, and bamboo. Some

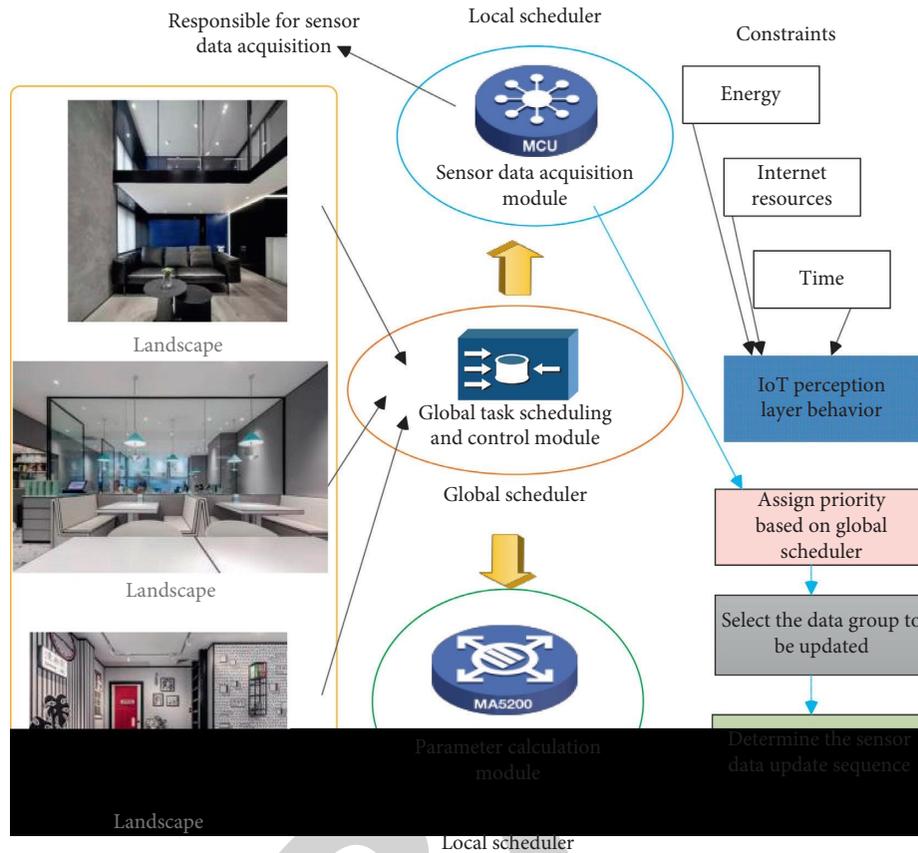


FIGURE 1: Secondary design of space.

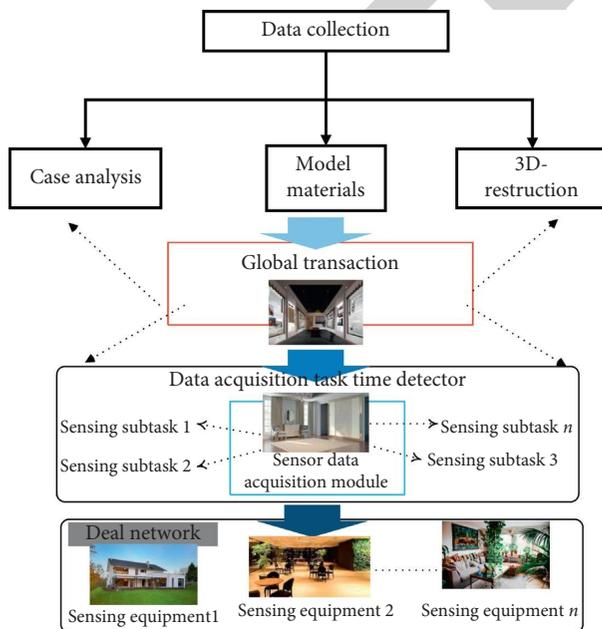


FIGURE 2: Creation of interior design.

who live in a claustrophobic space for a long time will slowly tend to sulk. Light is a very important part of interior design, how to introduce natural light into space, how to use the effect of light and shadow to create a Zen atmosphere, which requires us to have an in-depth understanding of the language of light expression in human architecture from ancient times to the present, from the Western churches to the Eastern temples, and then to the modern excellent architectural design and interior design, are worthy of our serious reference study. Water is the most transparent and pure substance in nature, a symbol of purity, wisdom, sacredness, eternity, and other spirituality. There is an old saying in Eastern philosophy that “the benevolent man enjoys the mountains and the wise man enjoys the water.” Water is dynamic and static; dynamic water can bring movement and vitality to the environment, while static water can create the tranquility of space. In Suzhou gardens, water occupies more than half of the space in the garden; whether it is flowing water or sparkling water and the reflection of the buildings in the water, it is an important part of the Zen space. Water is also the living carrier of some Zen cultural plants. Lotus flowers and lotus blossoms are reflected in the water, how wonderful it is for people to live in this kind of space.

plants and flowers also emit pleasant aromas that heal tired people from all senses of sight, sound, and smell. Without light, all living things will be destroyed. Light is a condition for human survival and gives a positive, warm feeling. People

1.4. *Automatic Sorting Technology.* Automatic classification technology is an application of pattern recognition, and the purpose of pattern recognition is to use computers to achieve

human class recognition ability, as shown in Figure 3. As an intelligent activity, automatic classification technology consists of two processes: analysis and judgment. The process of analysis is to determine the features and expressions used to classify a pattern class. The process of judgment is to determine the characteristics of the object to be recognized and to assign it to a pattern class. The classification task requires the system to analyze the description of the input unknown pattern based on the known classification knowledge in order to determine the class of the input pattern. The corresponding learning goal is to learn the criteria used for classification, such as classification rules. Automatic classification techniques are developed on the basis of manual classification techniques. The traditional manual information classification technology has been quite mature, but it wastes a lot of human and material resources at the same time. The classification results in the timeliness of the information can not keep up with the speed of updates. In the late century, the company conducted the first research in the field of automatic classification. Subsequently, many famous scholars have conducted in-depth and effective research and experiments in this field. The object  $x$  is denoted as  $[x_1, x_2, \dots, x_{im}]$ , where  $m$  is the characteristic number. Let  $x_i$  and  $x_{im}$  be the two objects represented by  $[x_{i1}, x_{i2}, x_{im}]$  and  $[x_{i1}, x_{i2}, x_{im}]$ , respectively.  $x_i$  and  $x_{im}$  are defined by the following equation for calculating the distance between  $x_i$  and  $x_{im}$ :

$$Q(x_i, x_{im}) = \sum_{i=0}^n \Phi(x_i, x_{im}), \quad (1)$$

where  $\Phi(x)$  is the indicator function.

$$\Phi(x_i, x_{im}) = \begin{cases} 1, & x_i < x_{im}, \\ 0, & x_{im} < x_i. \end{cases} \quad (2)$$

The optimization model of the algorithm when the formula is used as a distance metric for the object is defined as follows:

$$Q(X, Y) = \sum_{i=0}^k \sum_{j=0}^n x_{ij} (\Phi_i + \dots + \Phi_{im}), \quad (3)$$

Subject to

$$\begin{aligned} \sum_{i=0}^k u_{ij} \sum_{i=0}^n (\Phi_i + \Phi_j) &= 1, \quad i, j \in [0, 1], \\ \sum_{i=0}^k u_{ij} \sum_{i=0}^n (\Phi_i - \Phi_j) &= 0, \quad i, j \in [0, 1], \end{aligned} \quad (4)$$

where the affiliation matrix  $U$  is an  $n * k$  binary matrix. At each iteration, if object  $i$  belongs to cluster  $p$ , then let  $i_{pu} = 1$ , otherwise  $i_{pu} = 0$ .  $Z = \{z_1, z_2, z_k\}$  denotes the set of  $k$  centers.  $w = \{w_1, w_2, w_m\}$  is the weight vector of all features in the dataset.

The research of automatic classification technology is mainly focused on the field of processing. By introducing automatic classification technology for archives, documents or books in some universities, libraries, and documentation units, some computer-aided classification systems and automatic classification systems have been developed one after another.

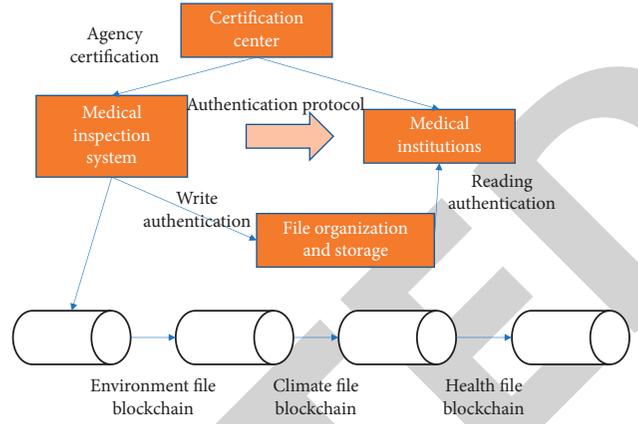


FIGURE 3: Automatic classification techniques.

For example, a classification model can be constructed to assess the risk of bank loans through customer classification. In marketing, customer types can be subdivided through preliminary market research data to adopt corresponding service strategies. Automatic classification technology will be all kinds of information in accordance with a certain classification system for immediate classification, thus greatly improving the efficiency of the user to collect information. Automatic classification technology has become the trend to replace manual classification.

Data clustering is based on the theory of clustering, which is a “blind” classification by the natural clustering of data. The goal of clustering is to find similarities in patterns, i.e., to automatically classify the group of objects into categories. Objects in the same category are similar, while objects in different categories are different. The attributes of the categories are determined by visual interpretation or field survey at the end of the classification. Statistical classification recognition theory is more complete and has formed a complete system, which directly uses the probability statistical model of each category to get the feature vector distribution, and based on this for classification recognition, as shown in Table 1. Statistical classification methods have many specific methods, and they depend on whether to use a known, parametric distribution model. Common statistical classification methods include decision trees and decision tables. Artificial neural networks, based on the results of modern neuroscience research, are complex network systems that perform information processing and nonlinear transformation in a way that mimics the processing behavior characteristics of animal neural networks and performs distributed parallel information memory.

The neural network mainly uses the learning, memory, and generalization functions of the artificial neural network, firstly, according to the training samples, training classifier, and then use the classifier to classify the object to be recognized for decision making.

## 2. Application Module Design and Analysis

*2.1. Application of Artificial Intelligence in Interactive Art Design.* In recent years, artificial intelligence and art design have converged and gradually integrated and have begun to

TABLE 1: Statistical characteristics of the participants' feedback.

Measuring tools	The input speed	Feedback time
Distribution model	0.1	0.1
Neuroscience	0.01	0.1
Neural networks	0.02	0.2
Recognition model	0.03	0.1

be applied in the field of the interactive art design, with interaction being highlighted as a focus. By analyzing and studying a large amount of domestic and foreign literature and cases, the author summarizes the following stages, which are intelligent platform-oriented interaction art design, intelligent machine-oriented human-machine collaborative cocreation interaction art design, and human-machine collaborative cocreation and interactivity-oriented interaction art design. The first stage is intelligent platform-oriented interactive art design, which is applying artificial intelligence technology on some software platforms or integrating artificial intelligence technology in some mature design software products to form art design that can create human-machine interaction in intelligent platforms.

Artificial intelligence through deep learning, in natural language, machine vision, and other aspects have been significantly improved, through intelligent interaction platform for design creation, as Alibaba's deer class, just by simulating the work of human intelligent design, analysis of massive data, modeling, finishing to obtain the internal database of the machine, and then when the human needs from the database to analyze, organize, deconstruct the work through a key Generating relevant poster works, Lupin is able to design 8000 posters in one second. This is a high degree of integration between artists and engineers, creating a new interactive platform, as shown in Figure 4. With the continuous development of technology, artificial intelligence technology is applied on top of different design platforms, which is what we now call intelligent design platforms. In addition to Deerban, there are a series of design-related intelligent platforms such as Naughty Rabbit Key, Intelligent Copywriter, Micro Poster, etc. This kind of intelligent platform design has several matching methods, namely text matching text, text matching image, image matching text, and image matching image. And there are more matching schemes in AI design about design elements, such as automatic color matching, automatic coloring of line drawings, automatic correction of hand-drawn graphics, etc. Through these different matching, there have been many AI designers of different professions, including specialized poster designers, web designers, logo designers, etc. There are also some intelligent interactive platforms called "artists."

Among them, text matching text interaction art design is mainly realized by intelligent color matching. Intelligent color matching firstly obtains a large database of color matching, and according to the pixel points on the image, uses certain algorithms to extract the main color distribution areas to form a data set, and expresses the color into the form of text, and by transforming a certain collection of algorithms, collects a large amount of data of color matching schemes of pictures, and obtains a certain color matching

model through deep learning to complete the work, as shown in Figure 5. ColorMind is an artificial intelligence-based online color matcher, which is capable of generating color palettes through deep learning of the theory of color already familiar with, or the part of color that the user chooses to fill independently for intelligent filling.

The interactive art design of text matching images is to automatically generate design solution works by providing relevant design suggestions. One suggestion for AI design is made by the designer, and the other is made by the design demander. According to different demands and suggestions, AI design collates a large amount of data, including the most popular design trends, styles, colors, etc., and analyzes and compares the data of the best designers, and then judges what is a good design, as shown in Figure 6. At present, this system is not mature enough. One of the good design sites is Dribbble, which is about work page design. The page can be tagged, comments and colors can be added, data can be shared, and the design of other design works can be analyzed, which is a design closer to artificial intelligence. Artificial intelligence designer is following a certain algorithm language, can automatically generate numerous sets of design solutions to meet the needs of users, such as deer class, deep drawing, ARKie, and other artificial intelligence designers, can provide a large number of design solutions of which ARKie is a font input that can quickly layout and generate posters of intelligent design assistant; ARKie interaction design logic mainly inputs text first. I entered the "artificial intelligence designer," through the system's big data template to generate a variety of programs. You can choose one of them more satisfied with the further editing and production to complete the designer or other users and artificial intelligence designer of an interaction.

When smart technology intervenes in interactive art design, it brings a shift to creators and users. Creators will not only set the rules of intelligent interaction but, of course, will also engage in design and production. Most of the current interactive works are chosen by the participants themselves, and the interactive works are a transformation of the content form or otherwise, but with the continuous development and progress of intelligent technology, it is possible to respond to the behavior, posture, sound, expression, temperature, remote control of the receiver (including the intelligent tool itself) through intelligent robots, computers, sensors, intelligent programs, intelligent materials, and other intelligent tools and changes in climate and environment, as shown in Figure 7. Intelligent interactive artworks will themselves be dominant, arbitrary, and selective. The importance of interactivity and entertainment in a work is often raised, but its technological intelligence is overlooked. The progressive enhancement of technology is the key to the interactivity of the work. Alternatively, it can be understood that contemporary interactive artworks mainly require conceptual and technological progress together, intertwined and intermingled, one without the other. Artists and designers can create with the form of intelligent technology, and new thinking and new ideas in creation can in turn explore technology. Before the application of artificial intelligence technology, the creators of interactive art

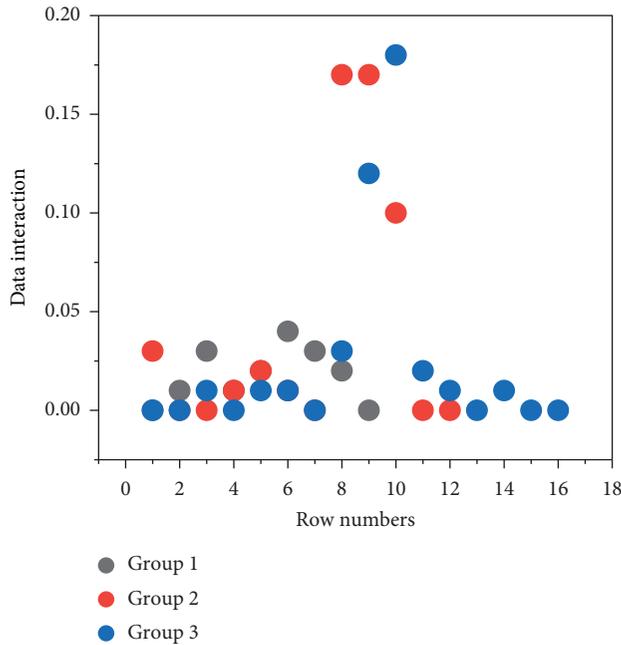


FIGURE 4: Big data filtering and data interaction.

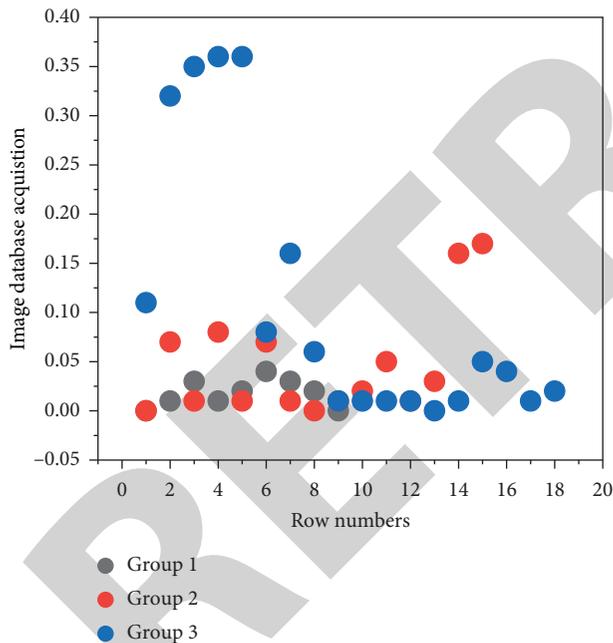


FIGURE 5: Image dataset acquisition.

design have gone through three important stages: the era of electronic image design, the era of network Internet design, and the era of new media intelligent interactive design.

In the design creation, the creative expression from a single hand-drawn way to a variety of forms of computer-aided design change. Nowadays, design creation pays more attention to digitalization, precision, intelligence, virtualization, and other comprehensive forms. The choice and application of technology and materials not only have an impact on the style of design but also influence the success or

failure of works at some level. In the present day, the focus of interactive art and design research is gradually shifting to new media interaction, intelligent interaction, and virtual reality, which are mainly human-centered interaction studies. The higher content of intelligent interaction in today's technology is interfaceless interaction (human body and voice to drive the machine), immersive interaction, brainwave interaction, and multimedia performance interaction. Although these forms of intelligent interaction offer greater freedom to artists, designers, and participants, it still has rules that limit the creators of interactive art, such as the transformation, feedback, and autonomy of the work, the limits of materials and space, and the degree of audience participation in manipulation and interaction. The emergence of nonbiological intelligence means that the trend of human design will shift to technological intelligence, which will also change the future innovation of art design structure, content, form, and development trend. For designers and artists, if they can make good use of technological intelligence, extract new strategies from it and then reconstruct their consciousness to guide the creative direction and form of the art design, it will bring them an important transformation to create better works. With the constant impact of smart technology, art and design are changing, and such changes will also reconfigure the perspective of the creator.

*2.2. Analysis of Experimental Results.* Although technology is constantly advancing, its ultimate service object is still people, so more humanized design will also be mainstream in interactive art design. The intervention of intelligent technology is to create a better way of life for people, which also brings a change in the user's perspective. How to make the design works or products more humanized needs to be analyzed from the user's perspective.

With the intervention of artificial intelligence technology, interactive art design has been treated as a new art style, emphasizing both the artistic form of the work and the aesthetic psychology of the audience, organically integrating the experience layer and the psychological demand layer.

By analyzing the user's feelings when using the product and facing the artwork, the interaction itself can be improved. With the continuous intervention of artificial intelligence technology, all industries have been developed rapidly, and the field of interactive art design is no exception. Artists and designers bring new feelings and experiences to users by creating works. The user's experience has played an important role from the previous design to the present, so the intervention of technological intelligence has brought a change of perspective to the user. In the previous design works for the user senses, most of them were one or two of the five senses, but with the continuous intervention of technology, the art works can interact with the user for a highly immersive and fluent experience, as shown in Figure 8. This form can bring users an all-around multidimensional experience effect, giving them the best experience effect. The advancement of technology brings a great experience to users and enables the public to directly participate in the creation of, especially interactive works, and the

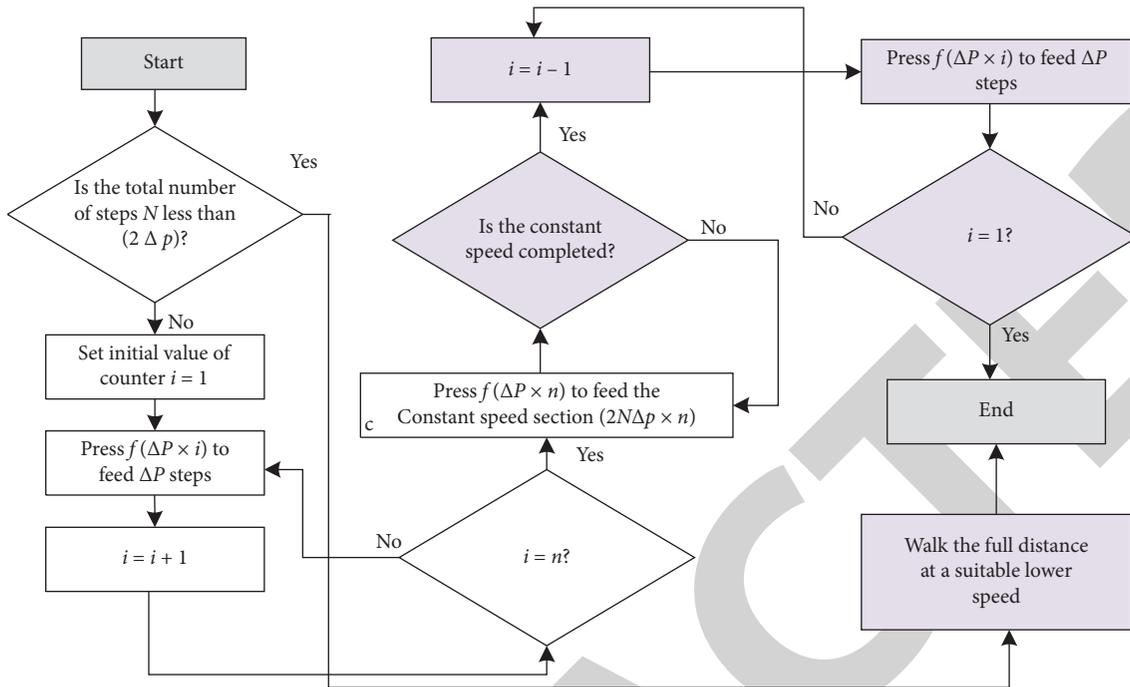


FIGURE 6: Data analysis of artificial intelligence and design.

public can become artists. For example, Google developed a VR painting software called “TiltBrush” for VR in 2016, which allows you to paint in space simply by putting on VR glasses. Through the VR device and tilt brush, you can paint and design according to your imagination in 3D space at will, and you can shift the creative space from 2D to 3D. You can also draw stars, light, or fire with special effects, giving people more creative design space to express their own personalities.

When everything on Earth can interact intelligently with each other, man and machine will gradually become the protagonists and carriers of art creation in the future, resulting in a new form of art, namely man-machine art, which refers to the expression of human needs by borrowing the behavior of machines, using machines to think and plan the environment of human social development and the state of existence; it will also use machines to infer the possibility of imagining the future, thus breaking the art of portraying and mapping the model of reality. As a branch of new media art, interactive art design uses artificial intelligence technology as a media communication carrier to express artistic thinking and expression using intelligent machine language, thus realizing the interchange of intelligent machine and human art, as shown in Figure 9. Interaction art design spans many fields such as physical, biological, and digital, and is a concentrated display of art, which will then no longer simply be a cold tool in life, ranging from small nanorobots to large Earth settings as interactive artworks. The development of human-machine art also goes beyond discussing only the properties of AI as practical machines in their own right; they also require independent insights and theoretical thinking through nonlimiting thinking that can be

expressed autonomously. As AI continues to develop, the author sees two major trends in the future, one in which AI may become our partner friend in the future; the other in which AI becomes our adversary. The author would like to see that in the future, we will gradually expand from the relationship between man and nature “the unity of man and nature” to “the unity of man and machine,” to achieve the state of subconscious integration of you in me and me in you, and then realize the parallelism or interaction of the two relationships. This concept can also be extended to future interactive art design.

In this period of development, when everything is connected and everything is intelligent, artificial intelligence has been gradually implanted into all aspects of our real life. Only by understanding the definition, generation, and technical basis of artificial intelligence in all aspects, observing things from multiple perspectives such as art and philosophy, understanding things, and getting rid of the existing technical basis we can adopt a new way to discuss and study the relationship between human beings and artificial intelligence, and the beneficial impact of artificial intelligence on the progress of human development and even the evolution of the universe to what extent, as shown in Figure 10. Respecting machine intelligence is respecting ourselves, and we can only use machines equally and freely to constantly explore and prophesy about the world, to constantly break through and improve human intelligence, and to use machine intelligence to assist and supervise human development behavior, so that machine intelligence can reach a level that truly helps human development and can help us deal with the crisis of human existence, reflecting the concept of human-machine coexistence. Artificial

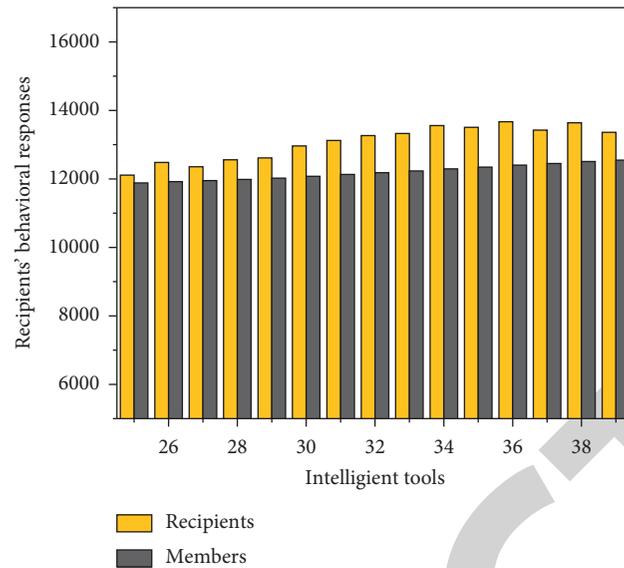


FIGURE 7: Association between recipients' behavioral responses and the development of intelligent tools.

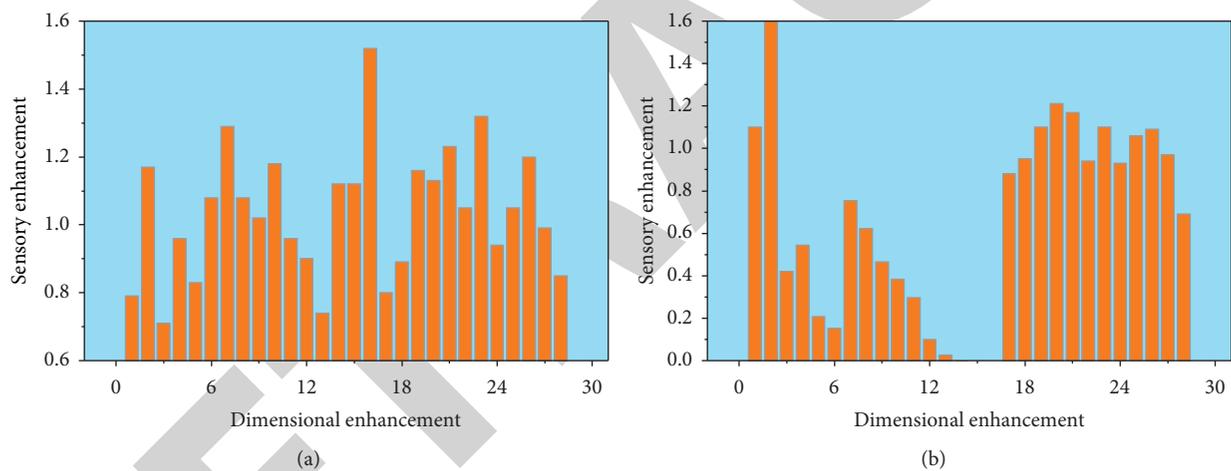


FIGURE 8: The link between dimensional enhancement and sensory enhancement. (a) 2D. (b) 3D.

intelligence is the medium through which human intentions are projected in the learning ability of machines. The research of interactive art design based on artificial intelligence in this paper draws on the philosophical aspect of the theory because the change of philosophical thought will change the perspective of people's thinking and observation of the world, and the field of art design as a large perspective; the influence of philosophy will certainly have an effect on the design.

The research of artificial intelligence in interactive art design has become an unavoidable trend today. Through the research of this paper, we can find that interactive art design has a new application paradigm due to the intervention of artificial intelligence, and the author summarizes the three current stages through the research, which are intelligent platform-oriented interactive art design, intelligent machine-oriented interactive

art design with human-machine collaboration, and interactive art design with human-machine collaboration and interactivity. The summary shows that artificial intelligence occupies an important position in interactive art design, and the integration of technological intelligence has opened up more creative forms for interactive art design. It not only reconstructs the creator's perspective but also brings changes to the user's perspective. With the intervention of artificial intelligence technology, interactive art design has been treated as a new art style, emphasizing both the artistic form of the work and the aesthetic psychology of the audience, organically integrating the experience layer and the psychological demand layer, forming various excellent art forms with its unique interactivity and virtuality, providing a better experience for people's entertainment and spiritual world. It can be said that the intervention of artificial

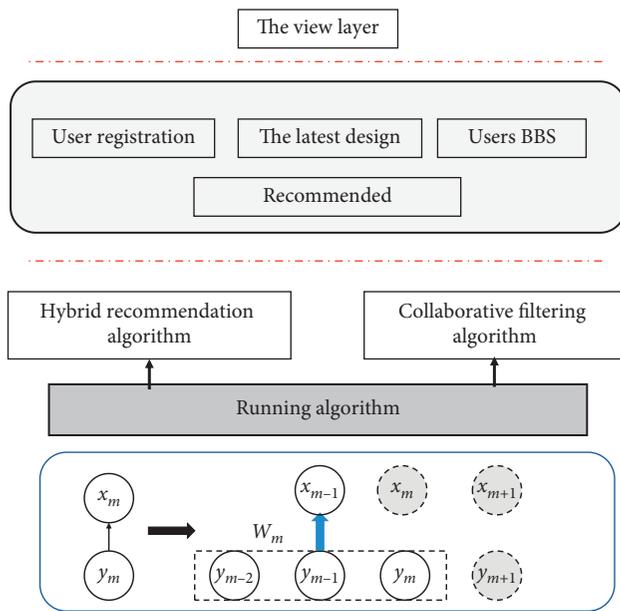


FIGURE 9: The interchange of intelligent machines and human art.

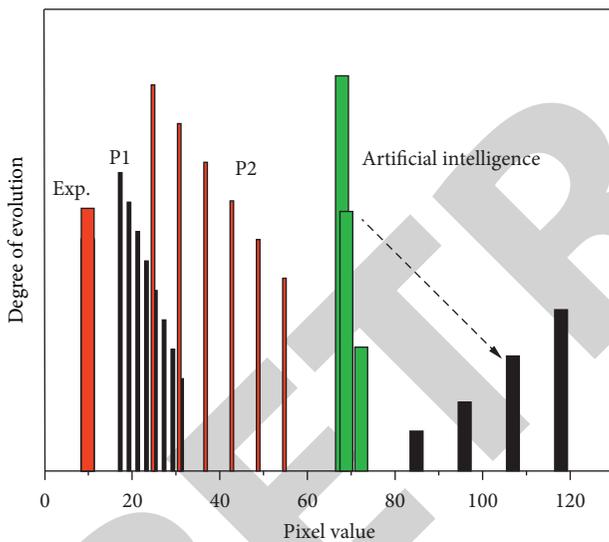


FIGURE 10: Degree of evolution of artificial intelligence.

intelligence provides a broader outreach for interactive art design because interactive art design works themselves are constantly changing with the times.

### 3. Conclusion

The intervention of artificial intelligence is not a relationship of substitution but a postintelligent art research design era of human-machine coevolution. This paper takes advantage of the research hotspot of artificial intelligence to cut into interactive art design, to study the developing intelligent interactive art research design, and to provide rigorous academic theoretical support for artificial intelligence in the field of interactive art design. This paper will discuss the optimization of the curriculum system of art design in

higher education institutions in the context of artificial intelligence. The purpose of guiding the innovation of environmental art design thinking is to stimulate students' learning ability and innovation ability and learn to use design ideas in practice. Integrating design thinking with artificial intelligence gets four innovative ways of culture, form, function, and emotion in terms of innovation at the design thinking level; in terms of thinking innovation guidance, it gets the guidance of role transformation and model practice, integrating artificial intelligence with environmental art design thinking, designing interactive spaces more in line with the times, and promoting the harmonious development of human and nature.

### Data Availability

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

### Consent

Informed consent was obtained from all individual participants included in the study references.

### Conflicts of Interest

The authors declare that there are no conflicts of interest.

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