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Original Article

Virtual Reality and Augmented Reality-Based Digital Pattern Design in the Context of the Blockchain Technology Framework

***Youjian Wang*[1,2,a], *Muling Sheng*[1,b*], *Dahlan Abdul Ghani*[3,c*]**

[1]*School of Architecture and Design, Jiangxi University of Science And Technology, Ganzhou 341000, Jiangxi, China, 50150585@qq.com*[a]

[2]*City University Malaysia, 46100 Petaling Jaya, Selangor Darul Ehsan, Malaysia, 19136921050@163.com*[b]

[3]*University Kuala Lumpur Malaysian Institute of Information Technology, 1016 Jalan Sultan Ismail 50250, Kuala Lumpur, dahlan@unikl.edu.my*[c]

ABSTRACT

Through an in-depth analysis and evaluation of digital design in traditional graphic art, this paper focuses specifically on how blockchain can enhance the digital representation and management of these designs. The integration of AI and digital design art is taking a major leap forward, breathing new life into traditional cultural elements by harnessing AI's capabilities to create immersive interactive experiences. This paper uses fuzzy comprehensive evaluation method to evaluate the digital design of classic pattern art, highlighting the richness, interest, innovation and digitalization of pattern. Blockchain technology provides a secure and decentralized platform for the storage and verification of digital graphic art, preserving the cultural and artistic value of the design. By linking digital design to blockchain, we can create a transparent and verifiable record of the creation and ownership of each artwork, promoting ethical practices in the digital art market. The study shows that the combination of VR and AR with blockchain technology not only revolutionizes the way traditional Chinese pictorial paintings are perceived and appreciated, but also provides a powerful framework for managing and protecting related digital assets. . The final scores obtained through the fuzzy comprehensive evaluation - 86.17 for richness, 89.24 for liking, 90.61 for innovation, and 91.38 for digitalization - underscore the significant advantages that the application of these technologies brings to the digital design of traditional pattern art.In conclusion, the application of blockchain technology in the realm of digital design of traditional pattern art is not merely a technological advancement but a cultural and ethical imperative. It ensures the preservation of traditional art forms in their digital manifestations, while also opening up new avenues for innovation and global appreciation.

Keywords: *Traditional Pattern Art; Artificial Intelligence; Virtual Reality; Augmented Reality; Digital Design; Blockchain Technology*

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***CORRESPONDING AUTHOR**
Muling Sheng, School of Architecture and Design, Jiangxi University of Science And Technology, Ganzhou 341000, Jiangxi, China; 19136921050@163.com;
Dahlan Abdul Ghani, University Kuala Lumpur Malaysian Institute of Information Technology, 1016 Jalan Sultan Ismail 50250, Kuala Lumpur; dahlan@unikl.edu.my

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1. Introduction

Blockchain is a chain of blocks. Traditional pattern is an art form formed on the basis of tradition and aesthetic emotion. It is an art form with regional customs and aesthetic characteristics. As a characteristic art form, its inheritance and aesthetics have been accepted by people. The ancient Chinese working class's knowledge of the world is preserved in traditional pattern art,

which is an integral aspect of China's rich cultural heritage. As a result of modern science and technology, passing down traditional Chinese pattern art has become more challenging. The fast evolution of information technology has led to an upsurge in the use of digital traditional pattern design. Digital design is now trending due to the rising aesthetic and psychological demands of the target audience. The process of fostering creative minds in the field of digital design has therefore progressed to a new level. The need for modernization and improvement of time-honored pattern design practices is pressing. Blockchain technology is an amalgam of traditional computer systems. The consensus algorithm, smart contract technology, and encryption technology are its mainstays. An emerging approach to design is the application of augmented and virtual reality technologies to the production of digital artwork. The primary goals of this study are to provide an overview of artificial intelligence (AI), the processes and procedures involved in digitally designing traditional patterns, and to discuss the benefits of AI in this context.

With the continuous development of society, the research of traditional pattern art has gradually increased. Chen Daoling proposed the combination of Kansei engineering theory and statistical product and service solutions to obtain young consumers ' perception of traditional patterns, and which design elements of traditional patterns have an impact on consumers' perception[1]. Wang Jun aimed to extract elements of traditional Chinese patterns and apply them to the design of mobile game user interface. Through literature analysis of traditional Chinese patterns and case analysis of mobile user interface, he learned the design principles and methods of traditional Chinese pattern elements in mobile game user interface[2]. In western Hunan, Xiao Hong developed an optimization solution for conventional printing and dyeing operations utilizing big data pattern mining and scene interpretation algorithms. With an eye toward optimizing conventional models, he performed systematic study using the edge-driven scene model[3]. Using modern animation tools, Feng Zhipeng created a 10-minute film that showcased the necessary design abilities and performance aspects in a traditional animation style. Contemporary animation may accomplish classical art aesthetics, according to the comparative study of various interviewers[4]. Baek Seona's goal was to incorporate traditional Korean designs onto art masks in order to increase their expressive potential[5]. While these studies have helped advance conventional pattern art research, they have not yet been integrated with real-world scenarios.

Meanwhile, AI has been progressively gaining a lot of traction in the academic world. Chen Guo, drawing on his experience in artificial intelligence, suggested a virtual reality (VR) interactive teaching methodology for apparel design instruction using traditional Tibetan garments as an example.Virtual reality (VR) interactive instruction may better showcase traditional Chinese garment features and facilitate the acquisition of information about these garments that would otherwise be difficult to access outside of a museum's collection[6]. Traditional Chinese patterns, according to Liu Qijie, may be used by creative individuals to showcase a variety of colors, textures, and ornamental effects since they are an aesthetic substance that can extract components.To accomplish inheritance, integration, and invention, he made active use of traditional patterns on public murals; this gave rise to concepts for incorporating artificial intelligence into traditional patterns[7]. Despite the novel nature of these research methodologies, substantial experimental evidence is required to demonstrate their validity.

After introducing the methodologies for evaluating digital designs of traditional pattern art, this study examines digital designs of traditional patterns and discusses the relevant content of AI-digital art combinations. This article laid forth the specifics of how artificial intelligence (AI) and digital art were integrated throughout the creative process.Second, using a six-step process, this article built an assessment model for digital pattern art that is based on the fuzzy comprehensive evaluation model. Thirdly, using the preliminary questionnaire data, this research sets the ground for the subsequent investigation of the two patterns.Lastly, a fuzzy comprehensive assessment model was used to assess the digital design of traditional pattern art that was built on top of VR and AR technologies.

2. Evaluation Method of Digital Design of Traditional Pattern Art

2.1 Digital design of traditional patterns

Traditional patterns are a source of innovation in contemporary design and an indispensable part of human aesthetic experience. Multimedia technology and digital design, as a new technology, have been rapidly developed and popularized. This has had a certain impact on art learning[8]. Digital pattern design is to extract the essence of art from traditional patterns, combine digital technology, and then create a new national pattern through computer technology. Applying digital technology to traditional graphic design would make traditional manual drawing develop into computer graphics. At present, some commonly used design software are commonly used design tools with clear image quality and aesthetic design. It can not only ensure high-quality and efficient picture effect, but also free the cumbersome processes of traditional handicrafts and improve the efficiency of the whole production and printing. This is an inevitable trend in the development of design today.

At present, computer digital technology has penetrated into people's daily life. The traditional pattern design industry is also impacted by the development and innovation of computer digital technology. At present, digital technology has been widely used, not only through the graphics and image processing functions provided by computer software, but also for the creative design of traditional handmade fabrics to inject new ideas and expressions.

Blockchain features: anonymity, decentralization, trust, collective maintenance, and reliable database. The digital representation function of computer can not only quickly collect the creative ideas and elements of design, but also intuitively display the expression of design creativity and production. At the same time, digitalization would also have a certain impact on education[9]. Traditional pattern design relies on paper, pen, color and other tools and materials, which are expressed and realized through manual drawing. The realization of digital design does not need paper, pen, paint, etc., and does not need the constraints of time, place, space and other factors.

The steps of designers in the digital design of traditional patterns are shown in **Figure 1**.

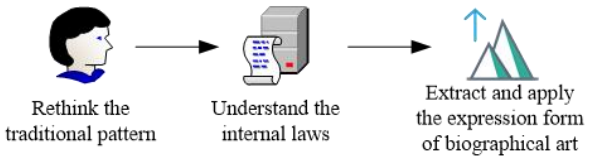


Figure 1. Digital design process of traditional patterns.

Based on **Figure 1**, it is clear that designers must reevaluate historic patterns, learn their underlying rules, and then use the creative manifestation of these patterns in their work. Through the above steps, designers can transform abstract graphics into beautiful and creative graphics, and then conduct secondary processing of images and colors to achieve the best design effect.

As we all know, in the field of digital art design, point, line and surface are the most basic visual elements, which is to integrate these elements into the design. In digital art design, the culture of traditional patterns contains deep feelings and plays a key role in digital art design.

As a kind of cultural production, so-called digital art design draws inspiration from traditional practices and practices of the people to create works that communicate ideas via interactive visuals. Unlike the direct transmission of words, the essence of image language is to create a perfect artwork through the combination of internal and external forms. In digital art design, three basic visual elements, point, line and plane, are directly or indirectly used. Their addition makes the image language more dynamic. Dunhuang frescoes are the representative of Chinese traditional culture, with distinctive artistic features and rich connotations, which convey the people's desire for a better life and love for life. It is in this case that China has the digital art design of Dunhuang Mural, which integrates Chinese traditional elements into the digital art design, so that Chinese traditional culture can be inherited and not buried by time. The application of dots, lines and planes is to show the Chinese traditional culture incisively and vividly.

2.2 Combination of AI and digital Art

Blockchain is first of all a social trend of thought, that is, the evolution laws of nature, society and

technology based on biological logic, including distributed decentralization, bottom-up control, edge maximization and modular growth, etc. Blockchain is just the interpretation of this law, which will inevitably have a profound impact on society. Additionally, block-chain is a novel way of combining various computing technologies, such as databases, encryption algorithms, distributed ledgers, consensus mechanisms, point-to-point transmission, smart contracts, etc., and is therefore an example of modular growth. Finally, it falls to the physical layer. Blockchain is a chain data block structure that is generated by using cryptographic methods and connected in chronological order. In essence, it is a decentralized distributed general ledger database.

AI is the crystallization of human intelligence. It is to make computers become intelligent technology, or an important change of human labor tools[10,11]. AI would become a new and high-quality tool in the future development, and it would bring great value to mankind[12].

AI technology can be used to combine the extracted features for image retrieval to achieve the purpose of designing the traditional pattern information in the image. **Figure 2** shows the specific process and way of combining AI with digital art.

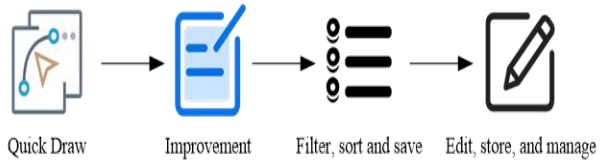


Figure 2. Specific steps of combining AI with digital art.

It can be seen from **Figure 2** that, first of all, computer technology can be used to realize the rapid rendering of traditional patterns. Secondly, the design should be improved during production to better reflect the cultural connotation contained in the design. Then, it needs to filter, classify and save the design results. Lastly, the design results may be edited, stored, and managed via the AI system. When compared to more conventional methods, this one clearly helps designers save time and effort when creating traditional designs.

VR technology has brought new forms of expression and cognitive methods, and displayed a new perspective[13-15]. Through the computer virtual environment and a variety of display sensors as the interface, the VR interaction is constructed through human perception, and a dynamic digital work is created by combining multiple dimensions of senses. VR interaction is an interaction for the purpose of experience. The interaction in VR experience includes the original interaction, the interaction of tools and symbols, and the interaction of gestures, sounds, and bodies. These are all happening in the virtual world, which is a very common, natural, artificial, new multi-sensory interaction combined with its own media characteristics[16].

AR is based on reality, and its most prominent feature is the combination of virtual and real. The "reality" here does not only refer to the real vision, but also the sense of hearing, smell, touch and other senses, but now the most used is the visual reality enhancement. The camera device can be used to obtain the real position information, and then transmit it to the device, calculate the position and angle of the image, and then use the data to determine the virtual object. So the biggest feature of AR technology is the integration of VR technology. Real-time interaction is the common feature of AR and VR, and its core is interactive real-time[17]. Because AR can strengthen the real world, it would react quickly when the real world changes.

By means of AR technology, the content that different artists want to express can be added around the artwork, including text, image, video, voice and other forms of expression. This article integrates the introductory information into the works of art, becoming an extension of art, so that the works can be extended to the surrounding walls instead of being limited to the framework. At the same time, dynamic and interactive effects are added to let viewers have a deeper understanding of art, so as to better convey their ideas and make the display more efficient and innovative.

In the design process, designers can combine traditional patterns with AI technology, VR technology and AR technology to create[18]. The benefits of using virtual reality and augmented reality into conventional pattern creation are shown in **Figure 3**.

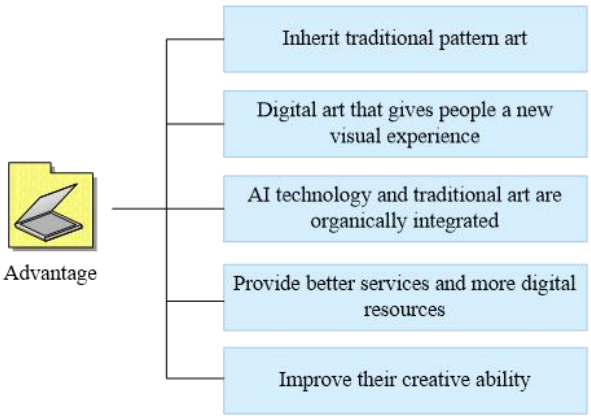


Figure 3. Advantages of VR and AR technology in the process of traditional pattern art creation.

It can be seen from **Figure 3** that the digital design of traditional patterns is a digital art that can not only inherit traditional pattern art, but also give people a new visual experience. AI technology and traditional art can be organically integrated, and designers can use computer technology to provide users with better services and more digital resources, thus improving their creative ability.

In the context of blockchain, the combination of VR technology and AR technology has greatly expanded the digital presentation of traditional Chinese pattern art[19]. Augmented reality (AR) allows people to see 3D content straight from their virtual environment by merging 2D visuals with 3D space. A more natural and intuitive visual experience has been made possible by the advent of virtual reality technology, which has brought about a breakthrough in computer vision technology within the realm of visual art. The traditional Chinese way of life is full with priceless artifacts that preserve the accumulated knowledge of the ancient Chinese people about the natural world and their place in it.

Art designers' attention has shifted to computer software design due to the proliferation of new technologies. VR technology and AR technology can provide a new visual experience. These advanced means can be used to combine excellent traditional Chinese patterns with virtual reality, so that more people can experience this new and interesting way of expression. At the same time, VR technology and AR technology show the cultural and ideological connotation of the "Four Gentlemen", "Mandarin Duck and Golden Rooster" and other patterns in China's excellent traditional culture. Therefore, it would be a very important and meaningful research topic to combine VR and AR to realize the digital presentation of traditional Chinese pattern art[20].

2.3 Fuzzy comprehensive evaluation model

The goal of fuzzy comprehensive evaluation in this paper is the digital design of traditional graphic art. In the process of fuzzy comprehensive evaluation, the principle of fuzzy transformation and the principle of maximum subordination should be applied to comprehensively analyze various impact factors[21,22]. This method has been widely used in various fields. It is a comprehensive and practical method. **Figure 4** shows the algorithm steps in this paper.

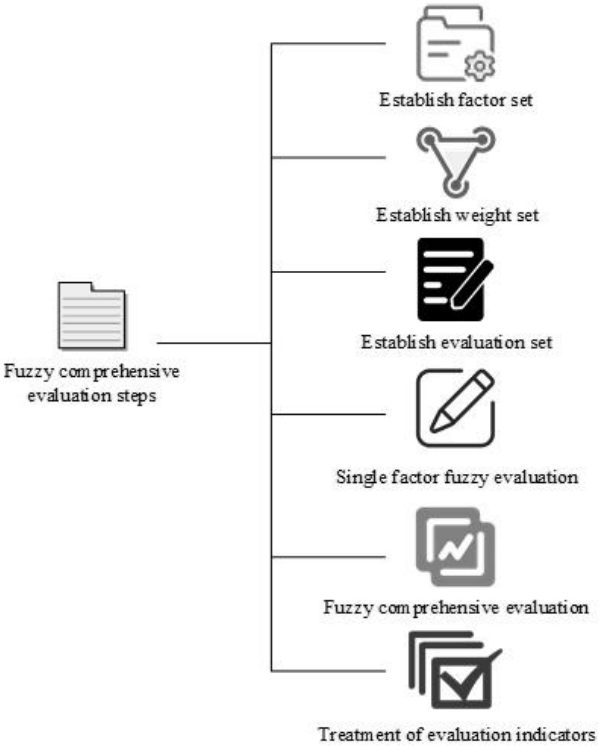


Figure 4. Steps of fuzzy comprehensive evaluation.

(1) Establish factor set

On the basis of VR technology and AR technology, each element of the evaluation of traditional pattern art digital design is composed of P, which is expressed as follows:

$$P = \{p_o\} = \{p_1, p_2, .., p_m\} \quad (1)$$

Among them, element p_o is a number of influencing factors.

(2) Establish weight set

In the digital design of traditional pattern art, each element in factor set P has different influence on digital graphic design. Therefore, the weight s_m of each element p_o should be determined according to its influence on the digital design of traditional pattern art. The weight set S of a factor is a fuzzy subset of P, which is a vector composed of the weight s_m of each factor.

(3) Establish evaluation set

According to the research goal of digital design of traditional pattern art, the set of evaluation results is evaluation set B, which is generally expressed as follows:

$$B = \{b_1, b_2, .., b_n\} \tag{2}$$

Among them, b_n is the possible evaluation result of the digital design of traditional pattern art. Fuzzy comprehensive evaluation has the benefit of being able to thoroughly and thoroughly examine many complicated influencing aspects; the outcome of this analysis is the best assessment result from evaluation set B.

(4) Single factor fuzzy evaluation

The degree to which each remark corresponds to a specific factor in a single-factor fuzzy assessment is determined by include just that factor in the evaluation set, which implies that other factors do not influence this evaluation.

The o factor p_o in each factor set is evaluated, and the subordinate degree of the n element b_n in the evaluation set is recorded as r_{on}. Then the single factor fuzzy evaluation result is:

$$R = \{r_{o1}, r_{o2}, .., r_{on}\} \tag{3}$$

Among them, R is a single factor evaluation set.

Hence, the set of additional factors that may be evaluated using a single-factor approach is represented as:

$$\begin{aligned} R_1 &= \{r_{11}, r_{12}, .., r_{1n}\} \\ R_2 &= \{r_{21}, r_{22}, .., r_{2n}\} \\ &\cdots \\ R_m &= \{r_{m1}, r_{m2}, .., r_{mn}\} \end{aligned} \tag{4}$$

(5) Fuzzy comprehensive evaluation

Therefore, the evaluation matrix R obtained is as follows:

$$R = \begin{bmatrix} R_1 \\ R_2 \\ \vdots \\ R_m \end{bmatrix} = \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1n} \\ r_{21} & r_{22} & \cdots & r_{2n} \\ \vdots & & & \vdots \\ r_{m1} & r_{m2} & \cdots & r_{mn} \end{bmatrix} \tag{5}$$

Assuming that the weight of each factor is S, a fuzzy comprehensive evaluation set Q can be obtained by selecting an appropriate fuzzy combination relationship:

$$Q = S \circ R = (s_1, s_2, ..., s_m) = \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1n} \\ r_{21} & r_{22} & \cdots & r_{2n} \\ \vdots & & & \vdots \\ r_{m1} & r_{m2} & \cdots & r_{mn} \end{bmatrix} = (q_1, q_2, ..., q_n) \tag{6}$$

In formula (6), ^{o} is a fuzzy operator and q_n is the final indicator of fuzzy comprehensive evaluation.

(6) Treatment of evaluation indicators

After obtaining the fuzzy comprehensive evaluation set Q, according to the principle of maximum subordination, take the comments corresponding to the maximum evaluation value max(q_n) as the final evaluation result.

3. Digital Design Experiment of Traditional Pattern Art Based on VR and AR Technology

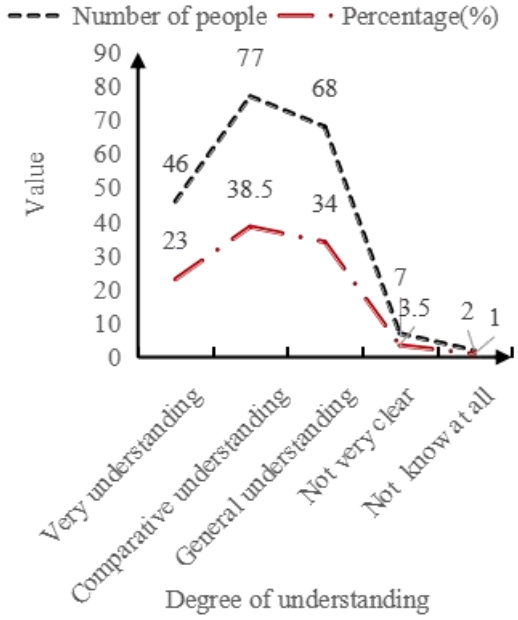
3.1 Preliminary basic survey

Many issues have surfaced in the transmission of traditional Chinese pattern art as a result of modern scientific and technological advancements. To start, traditional pattern art has evolved as a result of several aspects such as history, culture, society, economics,

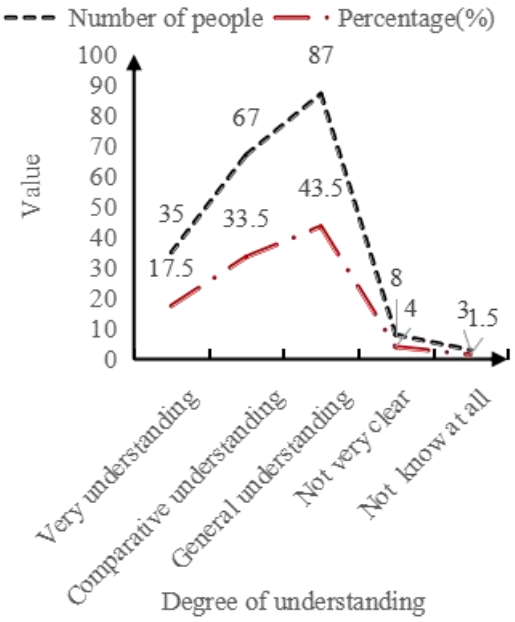
science, and technology[23-24]. And secondly, there is an abundance of "fake art" and "fake design" in today's culture, which satisfies people's practical and religious demands but falls short when it comes to satisfying their aesthetic preferences. Thirdly, computers can now perceive the aesthetic signals sent by a wide range of classical pattern types, thanks to the ever-expanding capabilities of contemporary information technology. As a result of the proliferation of digital tools made possible by ongoing scientific and technological advancements, conventional forms of graphic design are seeing dwindling usage in the modern business world. Finally, China's comprehensive national strength is constantly increasing, and the people's demand for their own cultural identity[25], national image, spiritual connotation and other aspects is also growing. In the modern era, traditional pattern art has been given new tasks.

Based on blockchain technology, in this experiment, 200 respondents were randomly selected for questionnaire survey and analysis. Among them, 200 questionnaires were distributed, returned and valid. The following is a detailed analysis of the contents of the questionnaire.

Figure 5 shows the respondents' understanding of VR, AR and other technologies and traditional patterns.



(a) Knowledge of VR, AR and other technologies.



(a) Knowledge of traditional patterns.

Figure 5. Understanding of VR, AR and other technologies and traditional patterns.

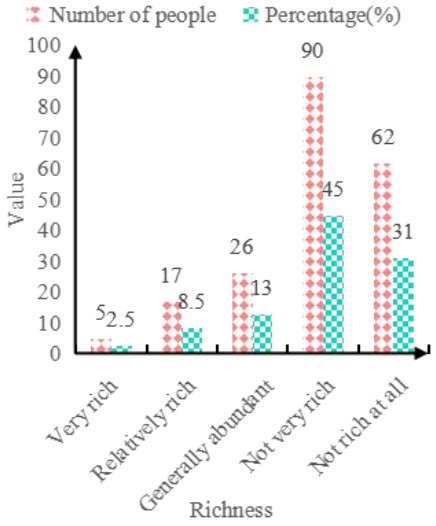
According to **Figure 5 (a)**, 46 respondents said they knew VR, AR and other related technologies very well, accounting for 23.00%. There were 77 respondents who said that they understood, accounting for 38.50%. 68 respondents said they generally understood, accounting for 34.00%. Seven respondents said they didn't know much, accounting for 3.50%. Two respondents said they did not understand, accounting for 1.00%. It can be seen from the data that the subjects investigated in this paper have a certain understanding of the relevant technologies in this paper.

According to **Figure 5 (b)**, 35 respondents said that they knew traditional patterns very well, accounting for 17.50%; There were 67 respondents who said that they understood, accounting for 33.50%; 87 respondents said they generally understood, accounting for 43.50%; Eight respondents said they didn't know much, accounting for 4.00%; Three respondents said they did not understand, accounting for 1.50%. It can be seen from the data that the objects investigated in this paper have a certain understanding of traditional patterns. Therefore, a detailed analysis is carried out below.

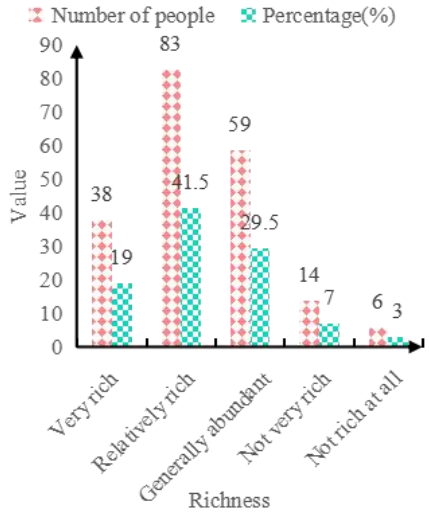
3.2 Different traditional patterns

In order to make the data more convincing, this paper sets the common traditional pattern as pattern 1. This paper sets the digital design of traditional pattern art based on VR and AR technology as pattern 2.

Figure 6 is the respondents' evaluation of the richness of the two patterns.



(a) Pattern 1



(b) Pattern 2

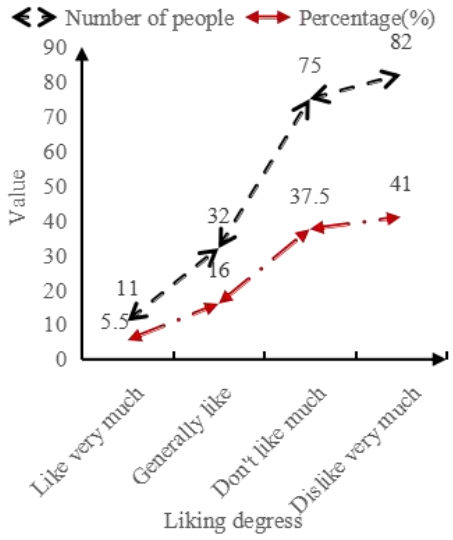
Figure 6. Abundance evaluation

According to **Figure 6 (a)**, five respondents said that pattern 1 was very rich, accounting for 2.50%; 17 respondents said they were rich, accounting for 8.50%; 26 respondents said they were generally rich, accounting for 13.00%; 90 respondents said they were not rich, accounting for 45.00%; 62 respondents said they were not rich at all, accounting for 31.00%.

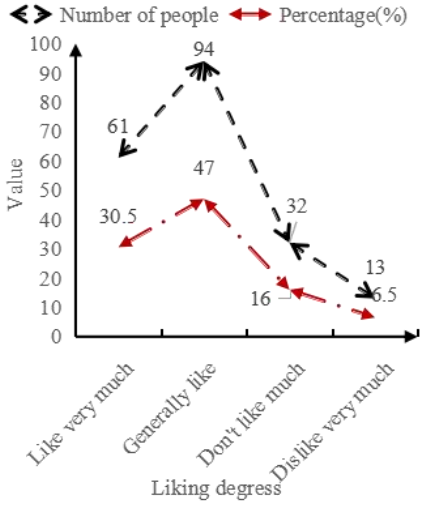
According to **Figure 6 (b)**, 38 respondents said that pattern 2 was very rich, accounting for 19.00%; 83 respondents said they were rich, accounting for 41.50%; 59 respondents said they were generally rich, accounting for 29.50%; 14 respondents said they were not rich, accounting for 7.00%; Six respondents said they were not rich at all, accounting for 3.00%.

It can be seen from the data in Figure 6 that the respondents in this paper believe that the richness of pattern 1 is low, while that of pattern 2 is high.

Figure 7 is the respondents' evaluation of their liking for the two traditional patterns.



(a) Pattern 1 evaluation



(b) Pattern 2 evaluation

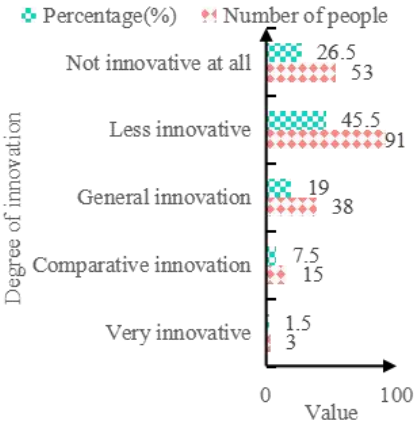
Figure 7. Likeness evaluation

According to **Figure 7 (a)**, 11 respondents said they liked Pattern 1 very much, accounting for 5.50%; 32 respondents said they liked it generally, accounting for 16.00%; 75 respondents said they didn't like it very much, accounting for 37.50%; 82 respondents said they didn't like it very much, accounting for 41.00%.

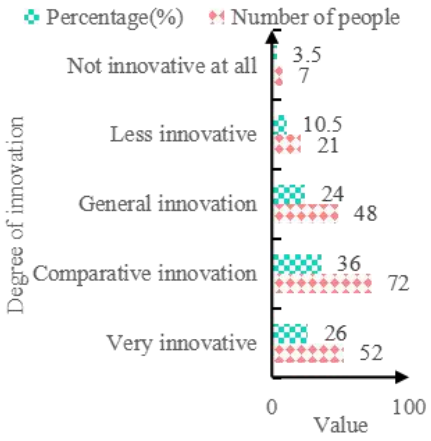
According to **Figure 7 (b)**, 61 respondents said they liked Pattern 2 very much, accounting for 30.50%; 94 respondents said they liked it generally, accounting for 47.00%; 32 respondents said they didn ' t like it very much, accounting for 16.00%; Thirteen respondents said they didn't like it very much, accounting for 6.50%.

It can be seen from the data in **Figure 7** that the respondents in this article like Pattern 1 less, but they like Pattern 2 more.

Figure 8 is the respondents' evaluation of the innovation degree of the two traditional patterns.



(a) Pattern 1 data



(b) Pattern 2 data

Figure 8. Evaluation of innovation degree

According to **Figure 8 (a)**, three respondents said that pattern 1 was very innovative, accounting for 1.50%; Fifteen respondents said they were relatively innovative, accounting for 7.50%; 38 respondents said that the level of innovation was average, accounting for 19.00%; 91 respondents said they were not innovative, accounting for 45.50%; 53 respondents said they were not innovative at all, accounting for 26.50%.

According to **Figure 8 (b)**, 52 respondents said that Pattern 2 was very innovative, accounting for 26.00%; 72 respondents said they were relatively innovative, accounting for 36.00%; 48 respondents said that the level of innovation was average, accounting for 24.00%; 21 respondents said they were not innovative, accounting for 10.50%; Seven respondents said they were not innovative at all, accounting for 3.50%.

Figure 8 displays the data showing that the respondents in this research think pattern 2 has a high degree of innovation, whereas pattern 1 says the opposite.

Table 1 is the respondents' evaluation of the digitalization degree of the two traditional patterns.

Table 1. Evaluation of digitalization degree

Degree of digitization	Pattern 1	Pattern 2
Very strong	2	105
In general	22	84
Not too strong	80	11
Don't feel	96	0

It can be seen from **Table 1** that 2 respondents said that pattern 1 was highly digitized, and 105 respondents said that pattern 2 was highly digitized; There were 22 and 84 respondents who said that the degree of digitalization of pattern 1 and pattern 2 was average; 80 and 11 respondents said that the digitalization of pattern 1 and pattern 2 was not very strong; 96 and 0 respondents respectively said that they did not feel the digitalization of pattern 1 and pattern 2.

It can be seen from the data in **Table 1** that the

respondents in this paper believe that the digitization degree of Pattern 1 is low, while that of Pattern 2 is high.

According to the above data, Pattern 1 (traditional pattern) is inferior to Pattern 2 (digital design of traditional pattern art based on VR and AR technology) in terms of richness, liking, innovation and digitalization.

3.3 Fuzzy Comprehensive Evaluation Results

Because of the objectivity of fuzzy factors, the final research conclusion is basically consistent with the reality, so the conclusion is more reasonable. Fuzzy factors can better reflect the intermediary transition of things. In the process of transformation, a specific state is analyzed, and the best result and scheme are obtained.

This research analyzes many traditional patterns, uses a fuzzy comprehensive assessment model, surveys people using a preliminary basic questionnaire, and then applies that model to the digital design of traditional pattern art that uses virtual reality and augmented reality.

Table 2 shows the results of fuzzy comprehensive evaluation.

Table 2. Fuzzy comprehensive evaluation results

Index	Score
Richness	86.17
Liking degree	89.24
Degree of innovation	90.61
Degree of digitization	91.38

It can be seen from **Table 2** that after the fuzzy comprehensive evaluation, the final score of richness in the digital design of traditional pattern art based on VR and AR technology is 86.17, and the final score of liking is 89.24. The final score of innovation degree is 90.61, and the final score of digital degree is 91.38. It can be seen that the digital design of traditional pattern art based on VR and AR technology has a relatively excellent evaluation.

4. Conclusions

A decentralized database is called a blockchain. Because it uses encryption technology, the database is generally secure. There is a lot of work that goes into digitising traditional pattern art. Traditional pattern designers are only one part of the puzzle; everyone's contributions are crucial. Before applying AR and VR technology to traditional pattern art design, it is necessary to integrate traditional pattern art with AI, which requires not only years of exploration and research, but also theoretical discussion by relevant scholars and artists. In digital design, AI technology can enrich traditional patterns. By applying intelligent algorithms to the digital design of traditional patterns, it can combine traditional patterns with real life, improve people's aesthetics and experience. At present, with the continuous development of AI technology, combining AI technology with traditional pattern art can not only improve the quality of life of modern people, but also promote people's art appreciation and appreciation. Therefore, it must comply with the development trend of the times and the needs of the market, and promote and innovate the digital design of traditional patterns.

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